UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 22 2002

OFFICE OF WATER

MEMORANDUM

SUBJECT: Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs

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TO: Water Division Directors
Regions 1 - 10

This memorandum clarifies existing EPA regulatory requirements for, and provides guidance on, establishing wasteload allocations (WLAs) for storm water discharges in total maximum daily loads (TMDLs) approved or established by EPA. It also addresses the establishment of water quality-based effluent limits (WQBELs) and conditions in National Pollutant Discharge Elimination System (NPDES) permits based on the WLAs for storm water discharges in TMDLs. The key points presented in this memorandum are as follows:

NPDES-regulated storm water discharges must be addressed by the wasteload allocation component of a TMDL. See 40 C.F.R. § 130.2(h).

NPDES-regulated storm water discharges may not be addressed by the load allocation (LA) component of a TMDL. See 40 C.F.R. § 130.2 (g) & (h).

Storm water discharges from sources that are not currently subject to NPDES regulation may be addressed by the load allocation component of a TMDL. See 40 C.F.R. § 130.2(g).

It may be reasonable to express allocations for NPDES-regulated storm water discharges from multiple point sources as a single categorical wasteload allocation when data and information are insufficient to assign each source or outfall individual WLAs. See 40 C.F.R. § 130.2(i). In cases where wasteload allocations

are developed for categories of discharges, these categories should be defined as narrowly as available information allows.

The WLAs and LAs are to be expressed in numeric form in the TMDL. See 40 C.F.R. § 130.2(h) & (i). EPA expects TMDL authorities to make separate allocations to NPDES- regulated storm water discharges (in the form of WLAs) and unregulated storm water (in the form of LAs). EPA recognizes that these allocations might be fairly rudimentary because of data limitations and variability in the system.

NPDES permit conditions must be consistent with the assumptions and requirements of available WLAs. See 40 C.F.R. § 122.44(d)(1)(vii)(B).

WQBELs for NPDES-regulated storm water discharges that implement WLAs in TMDLs may be expressed in the form of best management practices (BMPs) under specified circumstances. See 33 U.S.C. §1342(p)(3)(B)(iii); 40 C.F.R. §122.44(k)(2)&(3). If BMPs alone adequately implement the WLAs, then additional controls are not necessary.

EPA expects that most WQBELs for NPDES-regulated municipal and small construction storm water discharges will be in the form of BMPs, and that numeric limits will be used only in rare instances.

When a non-numeric water quality-based effluent limit is imposed, the permit's administrative record, including the fact sheet when one is required, needs to support that the BMPs are expected to be sufficient to implement the WLA in the TMDL. See 40 C.F.R. §§ 124.8, 124.9 & 124.18.

The NPDES permit must also specify the monitoring necessary to determine compliance with effluent limitations. See 40 C.F.R. § 122.44(i). Where effluent limits are specified as BMPs, the permit should also specify the monitoring necessary to assess if the expected load reductions attributed to BMP implementation are achieved (e.g., BMP performance data).

The permit should also provide a mechanism to make adjustments to the required BMPs as necessary to ensure their adequate performance.

This memorandum is organized as follows:

(I). Regulatory basis for including NPDES-regulated storm water discharges in WLAs in TMDLs;

(II). Options for addressing storm water in TMDLs; and

(III). Determining effluent limits in NPDES permits for storm water discharges consistent with the WLA

(I). Regulatory Basis for Including NPDES-regulated Storm Water Discharges in WLAs in TMDLs

As part of the 1987 amendments to the CWA, Congress added Section 402(p) to the Act to cover discharges composed entirely of storm water. Section 402(p)(2) of the Act requires permit coverage for discharges associated with industrial activity and discharges from large and medium municipal separate storm sewer systems (MS4), i.e., systems serving a population over 250,000 or systems serving a population between 100,000 and 250,000, respectively. These discharges are referred to as Phase I MS4 discharges.

In addition, the Administrator was directed to study and issue regulations that designate additional storm water discharges, other than those regulated under Phase I, to be regulated in order to protect water quality. EPA issued regulations on December 8, 1999 (64 FR 68722), expanding the NPDES storm water program to include discharges from smaller MS4s (including all systems within "urbanized areas" and other systems serving populations less than 100,000) and storm water discharges from construction sites that disturb one to five acres, with opportunities for area-specific exclusions. This program expansion is referred to as Phase II.

Section 402(p) also specifies the levels of control to be incorporated into NPDES storm water permits depending on the source (industrial versus municipal storm water). Permits for storm water discharges associated with industrial activity are to require compliance with all applicable provisions of Sections 301 and 402 of the CWA, i.e., all technology-based and water quality-based requirements. See 33 U.S.C. §1342(p)(3)(A). Permits for discharges from MS4s, however, "shall require controls to reduce the discharge of pollutants to the maximum extent practicable ... and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants." See 33 U.S.C. §1342(p)(3)(B)(iii).

Storm water discharges that are regulated under Phase I or Phase II of the NPDES storm water program are point sources that must be included in the WLA portion of a TMDL. See 40 C.F.R. § 130.2(h). Storm water discharges that are not currently subject to Phase I or Phase II of the NPDES storm water program are not required to obtain NPDES permits. 33 U.S.C. §1342(p)(1) & (p)(6). Therefore, for regulatory purposes, they are analogous to nonpoint sources and may be included in the LA portion of a TMDL. See 40 C.F.R. § 130.2(g).

(II). Options for Addressing Storm Water in TMDLs

Decisions about allocations of pollutant loads within a TMDL are driven by the quantity and quality of existing and readily available water quality data. The amount of storm water data available for a TMDL varies from location to location. Nevertheless, EPA expects TMDL authorities will make separate aggregate allocations to NPDES-regulated storm water discharges

(in the form of WLAs) and unregulated storm water (in the form of LAs). It may be reasonable to quantify the allocations through estimates or extrapolations, based either on knowledge of land use patterns and associated literature values for pollutant loadings or on actual, albeit limited, loading information. EPA recognizes that these allocations might be fairly rudimentary because of data limitations.

EPA also recognizes that the available data and information usually are not detailed enough to determine waste load allocations for NPDES-regulated storm water discharges on an outfall-specific basis. In this situation, EPA recommends expressing the wasteload allocation in the TMDL as either a single number for all NPDES-regulated storm water discharges, or when information allows, as different WLAs for different identifiable categories, e.g., municipal storm water as distinguished from storm water discharges from construction sites or municipal storm water discharges from City A as distinguished from City B. These categories should be defined as narrowly as available information allows (e.g., for municipalities, separate WLAs for each municipality and for industrial sources, separate WLAs for different types of industrial storm water sources or dischargers).

(III). Determining Effluent Limits in NPDES Permits for Storm Water Discharges Consistent with the WLA

Where a TMDL has been approved, NPDES permits must contain effluent limits and conditions consistent with the requirements and assumptions of the wasteload allocations in the TMDL. See 40 CFR § 122.44(d)(1)(vii)(B). Effluent limitations to control the discharge of pollutants generally are expressed in numerical form. However, in light of 33 U.S.C. §1342(p)(3)(B)(iii), EPA recommends that for NPDES-regulated municipal and small construction storm water discharges effluent limits should be expressed as best management practices (BMPs) or other similar requirements, rather than as numeric effluent limits. See *Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits*, 61 FR 43761 (Aug. 26, 1996). The Interim Permitting Approach Policy recognizes the need for an iterative approach to control pollutants in storm water discharges. Specifically, the policy anticipates that a suite of BMPs will be used in the initial rounds of permits and that these BMPs will be tailored in subsequent rounds.

EPA's policy recognizes that because storm water discharges are due to storm events that are highly variable in frequency and duration and are not easily characterized, only in rare cases will it be feasible or appropriate to establish numeric limits for municipal and small construction storm water discharges. The variability in the system and minimal data generally available make it difficult to determine with precision or certainty actual and projected loadings for individual dischargers or groups of dischargers. Therefore, EPA believes that in these situations, permit limits typically can be expressed as BMPs, and that numeric limits will be used only in rare instances.

Under certain circumstances, BMPs are an appropriate form of effluent limits to control pollutants in storm water. See 40 CFR § 122.44(k)(2) & (3). If it is determined that a BMP approach (including an iterative BMP approach) is appropriate to meet the storm water component of the TMDL, EPA recommends that the TMDL reflect this.

EPA expects that the NPDES permitting authority will review the information provided by the TMDL, see 40 C.F.R. § 122.44(d)(1)(vii)(B), and determine whether the effluent limit is appropriately expressed using a BMP approach (including an iterative BMP approach) or a numeric limit. Where BMPs are used, EPA recommends that the permit provide a mechanism to require use of expanded or better-tailored BMPs when monitoring demonstrates they are necessary to implement the WLA and protect water quality.

Where the NPDES permitting authority allows for a choice of BMPs, a discussion of the BMP selection and assumptions needs to be included in the permit's administrative record, including the fact sheet when one is required. 40 C.F.R.§§ 124.8, 124.9 & 124.18. For general permits, this may be included in the storm water pollution prevention plan required by the permit. See 40 C.F.R. § 122.28. Permitting authorities may require the permittee to provide supporting information, such as how the permittee designed its management plan to address the WLA(s). See 40 C.F.R. § 122.28. The NPDES permit must require the monitoring necessary to assure compliance with permit limitations, although the permitting authority has the discretion under EPA's regulations to decide the frequency of such monitoring. See 40 CFR § 122.44(i). EPA recommends that such permits require collecting data on the actual performance of the BMPs. These additional data may provide a basis for revised management measures. The monitoring data are likely to have other uses as well. For example, the monitoring data might indicate if it is necessary to adjust the BMPs. Any monitoring for storm water required as part of the permit should be consistent with the state's overall assessment and monitoring strategy.

The policy outlined in this memorandum affirms the appropriateness of an iterative, adaptive management BMP approach, whereby permits include effluent limits (e.g., a combination of structural and non-structural BMPs) that address storm water discharges, implement mechanisms to evaluate the performance of such controls, and make adjustments (i.e., more stringent controls or specific BMPs) as necessary to protect water quality. This approach is further supported by the recent report from the National Research Council (NRC), *Assessing the TMDL Approach to Water Quality Management* (National Academy Press, 2001). The NRC report recommends an approach that includes "adaptive implementation," i.e., "a cyclical process in which TMDL plans are periodically assessed for their achievement of water quality standards" . . . and adjustments made as necessary. *NRC Report* at ES-5.

This memorandum discusses existing requirements of the Clean Water Act (CWA) and codified in the TMDL and NPDES implementing regulations. Those CWA provisions and regulations contain legally binding requirements. This document describes these requirements; it does not substitute for those provisions or regulations. The recommendations in this memorandum are not binding; indeed, there may be other approaches that would be appropriate

in particular situations. When EPA makes a TMDL or permitting decision, it will make each decision on a case-by-case basis and will be guided by the applicable requirements of the CWA and implementing regulations, taking into account comments and information presented at that time by interested persons regarding the appropriateness of applying these recommendations to the particular situation. EPA may change this guidance in the future.

If you have any questions please feel free to contact us or Linda Boornazian, Director of the Water Permits Division or Charles Sutfin, Director of the Assessment and Watershed Protection Division.

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Regions 1 - 10

Permit Branch Chiefs
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Storm Water Panel Recommendations to the
California State Water Resources Control Board

The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities

June 19, 2006

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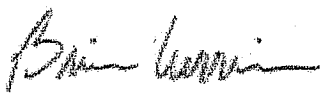

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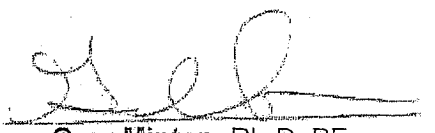

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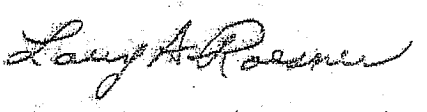

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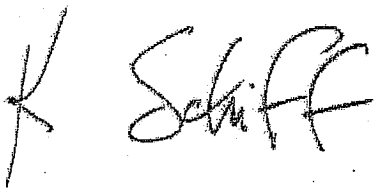

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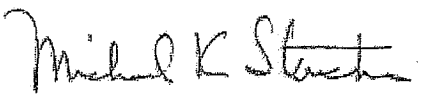

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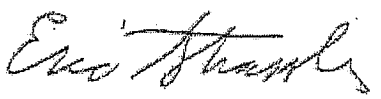

"The opinions I express are my own and do not represent official US EPA policy."

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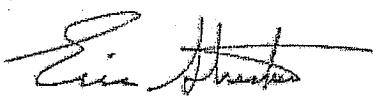

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Background

The NPDES storm water permit program came into being as a result of the 1987 amendments to the federal Clean Water Act and its implementing regulations. In California, the State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards (Regional Water Boards) implement the NPDES storm water program.

The Clean Water Act amendments, Section 402(p) require that discharges of storm water from large and medium municipal separate storm sewer systems (MS4s) and discharges of storm water associated with industrial activities be in compliance with NPDES permits. MS4 permits require that the discharge of pollutants be reduced to the maximum extent practicable (MEP). Discharges associated with industrial activities, were required to meet the technology based standards of best available technology economically achievable (BAT) or best conventional pollutant control technology (BCT), and to meet water quality standards.

In 1990, USEPA promulgated regulations (40 CFR Part 122.26) for the NPDES storm water program. These regulations clarified what industrial activities were subject to storm water permit. Construction that resulted in a land disturbance of five or more acres was included as an industrial activity subject to NPDES storm water permit. The regulations also delineated what was to be included in permit applications and the programmatic elements that were to be in a permit and storm water management program for MS4s or storm water pollution prevention plan for industrial activities.

California's Permits

In 1990, MS4 permits were issued to Santa Clara County by the San Francisco Bay Regional Water Board and to Los Angeles County by the Los Angeles Regional Water Board. These permits were appealed to the State Water Board. The primary basis of the appeals was the lack of numeric limits in the permits. The entities that brought the appeals argued that the permits needed to include numeric limits, as the discharges of pollutants must not only be reduced to the MEP, but they must also meet water quality standards. The State Water Board, in hearing these appeals, determined that it was not feasible at the time to develop numeric limits for MS4 permits, and that water quality standards could and should be achieved through the implementation of best management practices (BMPs). Since this ruling, the Regional Water Boards have typically not included numeric limits in storm water permits.

The State Water Board has adopted NPDES General Permits for the Discharge of Storm Water Associated with Industrial Activities and for the Discharge of Storm Water Associated with Construction Activities. Both of these permits contain language stating that developing numeric limitations is infeasible.

Court Decisions

In addition to these actions on MS4 permits at the State level, there have been a number of rulings from the federal courts regarding the NPDES Storm Water program.

One of the most significant is from the federal court, 9th District Court of Appeals from 1999. In its published opinion on Defenders of Wildlife vs. Browner, the Court held that MS4 permits need not require strict compliance with water quality standards. Rather, compliance was to be based upon the MEP standard. However, the permitting authority (the State Water Board/Regional Water Boards for California) could at their option require compliance with standards. The State Water Board through the permit and appeals process has in fact required that the discharges from MS4s meet water quality standards, but has stated that compliance with numeric standards can be achieved through the implementation of BMPs in an iterative fashion.

The Browner decision also found that discharges of storm water associated with industrial activities must be in strict compliance with water quality standards.

In 2004 the State Water Board conducted a public hearing on a draft General Industrial Storm Water permit. This draft permit met with significant opposition from non-government or non-industrial organizations (NGOs) due to the absence of numeric limits. Staff revised the draft permit to include the benchmarks contained in the USEPA multi-sector general permit. This change resulted in strong opposition from the regulated community.

The concerns that have been raised by the NGOs and the regulated community are similar, though they do not necessarily agree on the best way to address them. Both believe that permitting has become overly complex, and that it is extremely difficult, if not impossible to objectively determine if a facility, operation or municipality is in compliance with its permit requirements. The NGOs argue that requiring storm water permittees to comply with numeric effluent limits will result in an easier way to measure compliance. The regulated community agrees, to a degree, but they argue that it is not simply a matter of selecting a number that is suitable for a POTW or industrial waste discharge. Due to the unique nature of storm events and storm water discharges, any numeric limit that is placed in a storm water permit must take into consideration the episodic nature of storm events and be truly representative of storm water discharges. In addition, the regulated community has argued that there are going to be pollutants in storm water discharges that did not originate in the MS4 (run on) or that they do not have the means to control, and therefore should be given special consideration.

In response to these arguments, State Water Board directed staff to convene a panel of storm water experts to examine the feasibility of developing numeric

limits for storm water permits. Specifically, this panel of experts was asked to consider the following:

> "Is it technically feasible to establish numeric effluent limitations, or some other quantifiable limit, for inclusion in storm water permits? How would such limitations or criteria be established, and what information and data would be required?"
>
> "The answers should address industrial general permits, construction general permits, and area-wide municipal permits. The answers should also address both technology-based limitations or criteria and water quality-based limitations or criteria. In evaluating establishment of any objective criteria, the panel should address all of the following:
>
> (1) The ability of the State Water Board to establish appropriate objective limitations or criteria; (2) how compliance determinations would be made; (3) the ability of dischargers and inspectors to monitor for compliance; and (4) the technical and financial ability of dischargers to comply with the limitations or criteria."

Staff invited 10 individuals from the academic and scientific community to participate on the panel. Of the 10, eight agreed to participate. These eight met in a public session on September 14, 2005 and heard presentations from the regulated and NGO communities. They also heard comments from the public at large. They met again on September 15, 2005 to discuss the public comments and to begin to formulate a response. It was also decided at this meeting that they would form sub-committees to address municipal (MS4), industrial and construction discharges separately. These sub-committees worked on drafts statements for each of these, circulating them over the course of a number of months.

The panel met again in private session on April 3 and 4, 2006. The purpose of these meetings was to address unresolved issues and to develop the final response to the State Water Board. It was also decided to combine the three working statements into one Statement of Findings. The following discussion is the panel's findings and is broken into three program element areas: municipal, construction, and industrial.

Panel's Findings on Feasibility of Numeric Effluent Limits Applicable to Municipal Activities

Municipal Observations

1. The current practice for permitting, designing, and maintaining municipal stormwater treatment facilities (called BMPs herein) on the urban landscape does not lend itself to reliable and efficient performance of the BMPs because:

   - Permitting agencies, including EPA, States, and local governments, have rarely developed BMP design requirements that consider the pollutants and/or parameters of concern, the form(s) that the pollutants or parameters are in, the hydrologic and hydraulic nature of how they pollutants and flow arrive, and then the resulting unit processes (treatment and/or flow management processes) that would be required to address these pollutants or parameters.
   - The permitting agencies generally are not accountable for the performance of the BMP, and thus give much leeway to the developer with respect to the type of BMPs to be constructed, and to the details of the design, although some states do have detailed design standards and have conducted performance tests to identify acceptable devices for their area.
   - The developer is not responsible in most all cases for the performance of the BMP, so the treatment facilities are designed to minimize the cost and/or area of the facility and/or ease of permitting, not maximize the pollutant removal efficiency and/or flow management of the BMP
   - Because BMPs are not held to any, or very few, long-term performance criteria, they are typically not maintained except for aesthetic purposes. Very few stormwater agencies are responsible for BMP maintenance on private property, and public facilities are maintained mostly in response to clogging and/or resultant drainage or aesthetic problems. Even for stormwater agency facilities, maintenance is often limited.

2. The principal reasons for the failure of BMP performance is improper BMP selection, design and/or lack of maintenance.

   - The California BMP Handbooks and other local requirements leave too much of the BMP selection and design to the discretion of the designer, and thus do not address many if not all of the receiving water quality issues

- BMPs need to be *designed to facilitate maintenance*; this is rarely done because it costs the developer money and the BMP designer is rarely responsible for the maintenance.

- Given the amount of debris in urban runoff, and the fact that the hydraulic capacity of many BMPs may be exceeded several to many times per year, BMPs require more maintenance than other types of stormwater control facilities. Since urban BMP maintenance is generally left to untrained homeowner associations and maintenance personnel for commercial properties, inadequate maintenance is a near certainty. Even stormwater agencies often do not have and/or apply the resources necessary to maintain agency owned BMPs.

3. Improvements in the design of municipal BMPs, including residential and commercial as well as municipally owned facilities are necessary to ensure better performance (i.e. sizing, geometry, inlet and outlet design, etc.) and to specifically target receiving water quality issues.

The Problem with Existing Effluent Limit Approaches

Effluent limit approaches usually focus only on conventional water quality constituents that may not be solely or at all responsible for the receiving water beneficial use impairments in urban receiving waters. The important stressors that affect many use impairments can include one or more of the following and may vary in importance from system to system:

- The effect of increased flows and/or volumes (i.e. hydromodification) that can lead to stream channel erosion/sedimentation with resulting habitat destruction

- Sediment contamination (such as enrichment of urban stream sediments with fine-grained heavily polluted particulates; large organic debris masses causing low sediment DO; settled bacteria causing large bacteria gradients with sediment depth etc.)

- Impaired aesthetic value (caused by gross floatables, noxious sediments, etc.)

- Unsafe conditions (caused by dangerous debris, highly fluctuating stream flows and stages, etc.)

- Dissolved and suspended pollutants that are bioavailable in the water column and/or result in downstream sediment contamination

- Elevated temperatures from urban heating effects on runoff and on open conveyances and permanent pool BMPs

It is very difficult to determine specific causative agents or the level of control needed, for a specific beneficial use impairment in a receiving water body. The *Stormwater Effects Handbook: A Tool Box for Watershed Managers, Scientists, and Engineers* (Burton, G.A. Jr., and R. Pitt, ISBN 0-87371-924-7. CRC Press, Inc., Boca Raton, FL. 2002. 911 pages) was written to be used as a guide for stormwater managers to identify their local receiving water problems and to assist in identifying the causative factors. The methods described would need to be applied to a specific area or region to obtain an understanding of local conditions and problems. Although expensive, comprehensive investigations such as these should be considered an investment to help minimize wasteful expenditures due to the application of inappropriate control practices in a watershed.

Monitoring for enforcement of numeric effluent limits would also be challenging. While spot checks could be made at some of the many outfalls in an area, there is wide variation in stormwater quality from place to place, facility to facility, and storm to storm. Coefficients of variation approaching 1 or higher are not uncommon and there are few factors that can be used to significantly reduce this variation. Analysis of the National Stormwater Quality Database indicates that geographical location and land use are the most important factors affecting stormwater quality for most constituents. Some are also affected by the antecedent dry period before the rain and more highly developed watersheds (containing large fractions of impervious areas) often show elevated "first-flush" concentrations in the first portion of the storms for some, but not all pollutants. Since the storm-to-storm variation at any outfall can be high, it may be unreasonable to expect all events to be below a numeric value. In a similar circumstance, there are a number of storms each year that are sufficiently large in volume and/or intensity, to exceed the design capacity volume or flow rates of most BMPs. Assessing compliance during these larger events represents yet another challenge to regulators and the regulated community.

Technical Issues

Even for conventional pollutants, there presently is no protocol that enables an engineer to design with certainty a BMP that will produce a desired outflow concentration for a constituent of concern. A possible exception is removal of Total Suspended Solids in extended detention basins, and some types of media filters. The typical approach for evaluating BMP pollutant removal efficiency has been *percent removal*; but observed removal efficiencies vary greatly from facility to facility and it has been demonstrated that percent removal varies directly with the inflow concentration.

Few, if any, BMPs are designed using the first principles laws of physics, chemistry and/or biology for pollutant removal and/or flow-duration control. It will

take a substantial research effort, including data gathering on well-designed BMPs, to develop design criteria for the removal of pollutants with confidence intervals that enable us to make reliable estimates of the median and variance of the effluent concentrations to be expected from the various types of BMPs. Until this is done, it will be very difficult to assign legally enforceable numerical effluent limitations to any particular BMP.

Drawing upon the body of knowledge that currently exists regarding pollutant removal efficiency, it is possible to estimate mean effluent concentrations and variances for a number of constituents for different types of BMPs, albeit not in a legally enforceable sense. Effluent concentration distributions for a number of BMPs are available in the International BMP Database (www.bmpdatabase.org) from more then 250 studies throughout the US. The following outlines key issues that have been identified regarding the technical feasibility of setting objective criteria for both existing areas and new or redeveloping areas:

- Effluent concentration estimates could be made for a given constituent and a particular BMP from a larger number of BMPs than available in the BMP Database using literature values of percent removal and local or national data on stormwater runoff EMC data. However, the results from this work would be significantly less reliable then the BMP Database data as it could be biased if the influent concentrations for the studied BMP types did not match general urban runoff.
- Designing the facility more rigorously with respect to the physical, chemical and biological processes (e.g. unit processes) that are active in the BMP would give confidence that the BMP would perform at least as well, if not better than the average performance determined from the literature. A WEF/ASCE task force is currently updating their Urban Runoff Quality Management Manual of Practice; design guidance of BMPS will make better use of the physical, chemical, and biologic processes taking place in the BMP before, during and after a storm event. This manual will build upon recent research efforts employing a unit process based approach for BMP design and selection. These research efforts were supported by the Water Environment Research Foundation (WERF) and the National Cooperative Highway Research Program (NCHRP).
- A BMP *designed* and *constructed* according to a set of criteria described above, could be ***presumed*** to deliver an effluent with a mean constituent concentration and variance similar to the performance numbers developed from the literature ***if it is properly maintained***. Enforcement would comprise periodic inspection of the facility using a checklist of items to be inspected. While not an effluent limit, this seems practical and quantifiable.

- Most all existing development rely on non-structural control measures, making it difficult, if not impossible to set numeric effluent limits for these areas because little is known about the quantity and quality performance of non-structural controls. However, certain development characteristics in some existing development areas that minimize the amounts of impervious areas in a drainage area have been shown to be quite effective in reducing adverse hydromodifications in the receiving waters, and should be encouraged.

Municipal Recommendations

It is not feasible at this time to set enforceable numeric effluent criteria for municipal BMPs and in particular urban discharges. However, it is possible to select and design them much more rigorously with respect to the physical, chemical and/or biological processes that take place within them, providing more confidence that the estimated mean concentrations of constituents in the effluents will be close to the design target. Moreover, with this more rigorous design and an enforceable maintenance program, it can be presumed that these facilities will continue to deliver effluent qualities that are reasonably close to the design effluent concentrations over the life of the facility. And if proper maintenance is performed (enforced), the facilities can be expected to perform throughout their design life at the same or better efficiency as when newly constructed. Depending on the pollutants and parameters of concern and BMP choices, it is very likely that treatment trains of structural BMPs will be required in many cases.

For catchments not treated by a structural or treatment BMP, setting a numeric effluent limit is basically not possible. However, the approach of setting an "upset" value, which is clearly above the normal observed variability, may be an interim approach that would allow "bad actor" catchments to receive additional attention. For the purposes of this document, we are calling this "upset" value an ***Action Level*** because the water quality discharged from such locations are enough of a concern that most all could agree that some action should be taken. Action Levels could be developed using at least three different approaches. These approaches include: 1) consensus based approach; 2) ranked percentile distributions; 3) statistically-based population parameters.

The consensus-based approach would be to agree upon effluent concentrations that all parties feel are not acceptable. For example, most parties would likely agree that an average concentration of dissolved copper above 100 ug/l from an urban catchment would not be acceptable. This would be an Action Level value that would trigger an appropriate management response. This approach may not directly address the issue of establishing numeric effluent criteria and achieving desired effluent quality, but the consensus-based approach would ensure that the "bad actor" watersheds received needed attention.

The ranked percentile approach (also a statistical approach) relies on the average cumulative distribution of water quality data for each constituent developed from many water quality samples taken for many events at many locations. The Action Level would then be defined as those concentrations that consistently exceed some percentage of all water quality events (i.e. the 90th percentile). In this case, action would be required at those locations that were consistently in the outer limit (i.e. uppermost 10th percentile) of the distribution of observed effluent qualities from urban runoff.

The statistically based population approach would once again rely on the average distribution of measured water quality values developed from many water quality samples taken for many events at many locations. In this case, however, the Action Level would be defined by the central tendency and variance estimates from the population of data. For example, the Action Level could be set as two standard deviations above the mean, i.e. if measured concentrations are consistently higher than two standard deviations above the mean, an Action situation would be triggered. Other population based estimators of central tendency could be used (i.e. geomean, median, etc.) or estimates of variance (i.e. prediction intervals, etc.). Regardless of which population-based estimators are used (or percentile from above), the idea would be to identify the [statistically-derived] point at which managers feel concentrations are significantly beyond the norm.

The ranked percentile and population-based estimators are highly dependent upon the data sets used to calculate them. There are a number of options that were considered by the Panel, but ultimately they were broken into two distinct categories. The first category was for new development/redevelopment and the second was for built out urban environments. For new development/redevelopment, the panel recommends using the data set associated with the international BMP database (www.bmpdatabase.org). This data set represents the variety of water quality from the most up to date, best conducted and reported BMP studies. The database effort does not limit itself to BMPs types or designs; it focuses on technically sound monitoring studies and reporting information. Therefore there could be some screening of studies to those thought to be well designed BMPs to then develop effluent quality distributions and statistics on performance. Certainly, there is no expectation that urban stormwater managers could improve water quality beyond what would be reported in this dataset.

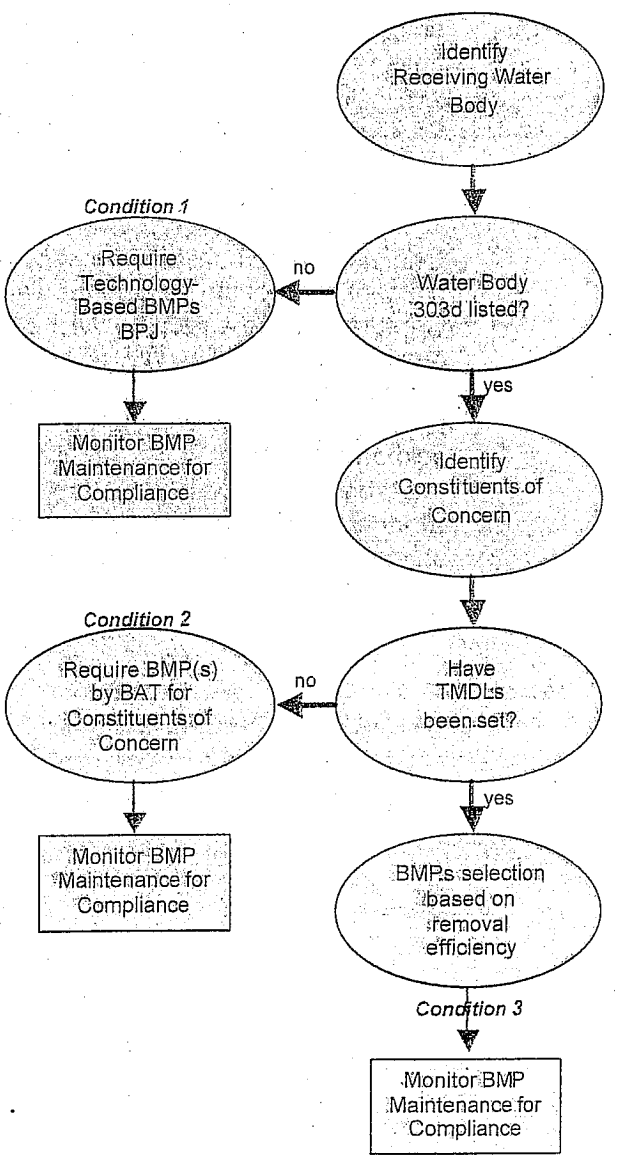
In built-out urbanized environments, there are greater opportunities to examine various data sets for setting Action Levels. For the Panel, these opportunities were a function of spatial scale. The first opportunity would be at the local scale. Some urban stormwater monitoring programs have been in existence for 10 years or longer. Examples include the Los Angeles County Department of Public Works, City of Sacramento, Orange County, San Diego County, amongst others. Using permit specific data sets may make sense if issues of climatic variability or

localized geomorphology are important. The next scale would be to combine these California municipal permit monitoring data sets, especially if lack of data for specific constituents of concern in any one location or region is an important issue. The largest scale would be the National Stormwater Quality Database (NSQD) from municipal monitoring programs across the nation (http://unix.eng.ua.edu/~rpitt/Research/ms4/Paper/Mainms4paper.html). This data set includes monitoring data from urban areas such as residential, commercial, industrial, freeway, institutional, and mixed use which is especially useful if small sample size limits the use of local data. One advantage of using smaller (and local), rather than larger, spatial scales is the ability to update data sets for revising Action Levels. The NSQD may not be updated for quite some time, but local data sets can be updated periodically (annual amendments, 10-year rolling averages, every permit cycle, etc). Ultimately, Action Levels would be expected to become lower as outliers are removed from data sets and as improved water quality data are collected through targeted management actions. It may be appropriate to eliminate older data sets as well over time.

One element to consider when comparing monitoring data to Action Levels is the concept of a design volume for water quality (also known as the Water Quality Capture Volume – WQCV, WEF #23 and ASCE publication #87, 1998) or a design flow rate. The WERF and NCHRP efforts mentioned above include recommendations regarding design sizing using continuous simulation techniques for both volume-based and rate-based BMPs. The Panel acknowledged that several to more times each year, the runoff volume or flow rate from a storm will exceed the design volume or rate capacity of the BMP. Stormwater agencies should not be held accountable for pollutant removal from storms beyond the size for which a BMP is designed.

A Technically Sound and Pragmatically Enforceable BMP Design and the Permit Process

The diagram below provides guidance for determining what BMPs are required in a newly developing watershed. Under ***Condition 1*** where the receiving water quality is not impaired, determination of the appropriate BMP would be by Best Professional Judgment (BPJ). Any of the "state approved" BMPs could be used. The permittee would be required to design the treatment facilities in accordance with the California BMP Handbook, ***which should be revised as a criteria manual***, rather than a guidance manual *and include more physiobiochemically based design criteria designed to address an agreed upon set of "Pollutants and Parameters of Concern" based upon knowledge of the pollutants and parameters that generally are of concern in urban runoff, with perhaps some differences on receiving water type.*



A detailed maintenance plan and schedule would be required that includes:

1. Actions to be taken and when,
2. Designation of the party legally accountable for the facility maintenance, and
3. A whole-life cost estimate for the facility that include maintenance.

Compliance with the design criteria and the maintenance plan and schedule would constitute achievement of the design effluent criteria. In the event of failure by the responsible party to perform the required maintenance and/or to perform it to the required level of quality, the whole-life cost schedule could be used to determine the consideration that the defaulting responsible party would pay to the new responsible party that takes over the maintenance.

Under ***Condition 2*** where water quality impairment exists but a TMDL has not yet been performed, BAT would be required, which means applying the BMPs that can practicably (to be defined) be employed to produce the lowest effluent concentrations (e.g. the lower grouping of BMP effluent quality) of the constituent(s) of concern. Several types of BMPs may fulfill the BAT standard if these BMPs have performance that is not statistically or practically differentiable. This case will allow flexibility in choosing among that sets of BMPs that demonstrate superior performance. As in the case of *Condition 1*, compliance with the maintenance plan and schedule would constitute compliance with the design effluent criteria.

Condition 3, which occurs when a TMDL has been specified for the BMP or for the tributary watershed, may (or may not be) actually be less stringent that *Condition 2* if the TMDL allows for a higher effluent concentration of the constituents of concern than that discharged by a BAT facility. The same requirements would apply for the design criteria, and the maintenance plan and schedule would constitute the guarantee of design effluent concentrations from the BMP.

Strategies for Stormwater Management to Protect Urban Water Environments

Stormwater effluent limits can become very complex if all the issues are to be directly addressed. If complex, they are not likely to be workable. However, too much simplification can also lead to ineffective programs. Therefore, a reasonable first step is needed, based on local data. Compliance monitoring (e.g. BMP inspections) is also needed to ensure that the goals are likely to be met. Most likely goals will have to be revised over time. The overall strategy should contain these objectives:

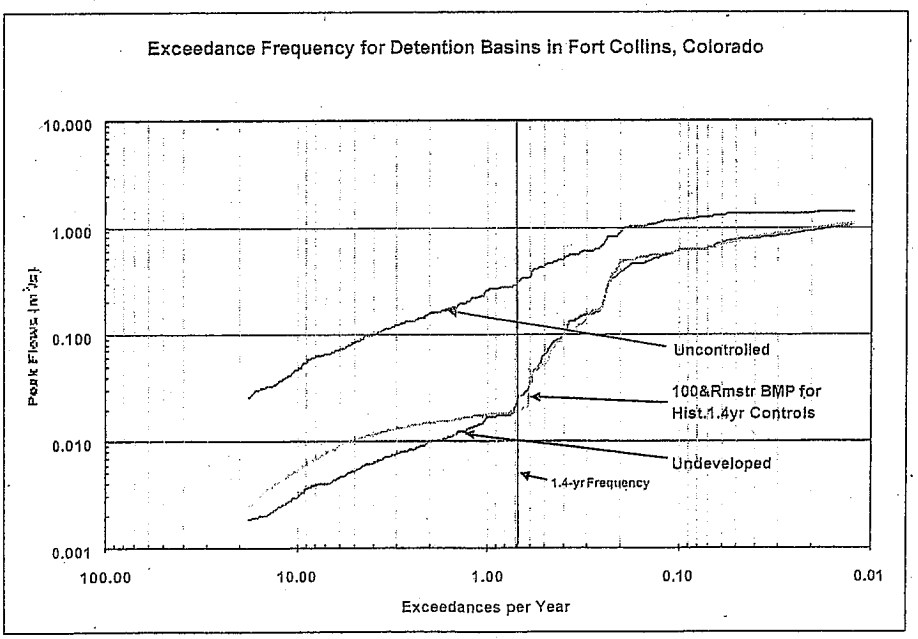
- Effectiveness
- Affordability
- Enforceability, and
- Flexibility

Table 1 - Effects of Urbanization on Hydrologic Regime in Colorado and Georgia

Location	Annual Precipitation	Mean Storm Depth*	Runoff Events per Year		Annual Runoff (mm)	
	Millimeters per Year	Millimeters	Undeveloped	Developed	Undeveloped	Developed
Fort Collins, CO	335	11	27	47	12	124
Atlanta, GA	1262	18	48	78	36	500
* Values obtained from Fig..5.3 ASCE MOP (1998)						

Runoff volume and peak flows have been recognized as two of the most important stormwater factors needing control. **Table 1** (Roesner and Nehrke) shows that urbanization dramatically changes the hydrologic regime of urban waterways. In both Atlanta (a higher rainfall area) and Fort Collins (a semiarid area), the number of runoff events per year on developed land increases by a factor of 2 times the number of runoff events that occur in the undeveloped state; and the runoff volume increases by a factor of ten! The peak flows also increase dramatically as shown in **Figure 1** below, but as also seen on the figure, the peak flow frequency curve can be adjusted back to its predevelopment character by the proper application of runoff controls. But while these controls restore the peak flow frequency to its natural regime, the duration of flows at the low end (but still channel "working") of the flow frequency curve is greatly increased, which raises potential for channel scour in stream channels with erosive soils.

Figure 1 - Exceedance Frequencies for Detention Basins in Fort Collins, Colorado



Since many of the stormwater pollutants are strongly associated with particulates, stormwater particulate control is also often a component of stormwater control programs. Therefore, an effective stormwater control strategy that could be encouraged is a combination of several practices, listed below in the order of increasing events:

- On-site stormwater reuse, evapotranspiration and infiltration for the smallest storms and up to specific targeted events, depending on site limitations (soil characteristics and groundwater contamination potential) (usually by conservation design emphasizing infiltration, disconnecting paved areas, etc.)
- Treatment of excess runoff that cannot be infiltrated, again, up to a specific targeted runoff volume (usually by sedimentation or filtration) For pollutants of concern, it should be demonstrated that the BMP(s) need to include the physical, biological, and/or chemical treatment processes that address the typical pollutants of concern and/or specific pollutants in the case of 303D listed water bodies or those with established TMDLs.
- Control of energy discharges for the channel forming events (such as through storage-release, focusing on flow-duration analyses and peak flow frequency analyses). To be most effective, this should to be completed under a watershed management plan and not site-by-site.
- Provide safe drainage for damaging events (conventional drainage, plus secondary drainage systems)
- In watersheds that are already experiencing damaging flow impacts to streams, it could be in many circumstances much more cost-effective (and effective period) to develop through a watershed plan a natural stream stabilization approach that could address both the existing development and the remaining smaller infill or otherwise smaller new development. In these cases, requiring the remaining new development to implement flow-duration control would not solve the issue in a measurable way and resources would be better spent restoring the functions of the creek with instream enhancements.

Panel's Findings on Feasibility of Numeric Effluent Limits Applicable to Construction Activities

Construction Observations

Regarding the question of the technical feasibility of Numeric Limits for stormwater discharges from construction activities, the Panel bases its recommendations on the following observations.

1. Limited field studies indicate that traditional erosion and sediment controls are highly variable in performance, resulting in highly variable turbidity levels in the site discharge.
2. Site-to-site variability in runoff turbidity from undeveloped sites can also be quite large in many areas of California, particularly in more arid regions with less natural vegetative cover and steep slopes.
3. Active treatment technologies involving the use of polymers with relatively large storage systems now exist that can provide much more consistent and very low discharge turbidity. However, these technologies have as yet only been applied to larger construction sites, generally five acres or greater. Furthermore, toxicity has been observed at some locations, although at the vast majority of sites, toxicity has not occurred. There is also the potential for an accidental large release of such chemicals with their use
4. To date most of the construction permits have focused on TSS and turbidity, but have not addressed other, potentially significant pollutants such as phosphorus and an assortment of chemicals used at construction sites.
5. Currently, there is no required training or certification program for contractors, preparers of soil erosion and sediment control Stormwater Pollution Prevention Plans, or field inspectors.
6. The quality of stormwater discharges from construction sites that effectively employ BMPs likely varies due to site conditions such as climate, soil, and topography.
7. The States of Oregon and Washington have recently adopted similar concepts to the Action Levels described earlier.

Construction Recommendations

It is the consensus of the Panel that active treatment technologies make Numeric Limits technically feasible for pollutants commonly associated with stormwater discharges from construction sites (e.g. TSS and turbidity) for larger construction sites. Technical practicalities and cost-effectiveness may make these technologies less feasible for smaller sites, including small drainages within a larger site, as these technologies have seen limited use at small construction sites. If chemical addition is not permitted, then Numeric Limits are not likely feasible. Whether the use of Numeric Limits is prudent, practical or necessary to more effectively achieve nonpoint pollution control is a separate question that

needs to be answered, but is outside the scope of this Panel. However, Action Levels are likely to be more commonly feasible. For small sites or smaller drainages within larger sites, or where chemicals cannot be used, the Panel recommends that Action Levels be specified.

Advanced systems lend themselves to Numeric Limits because of historically reliable treatment, while non-active controls are less predictable. Advanced systems have been in use in some form since the mid-1990s. At this time, there are two general types of systems. With each general system the stormwater is retained on-site, treated, and released more slowly. One system employs polymer coagulation and sedimentation. The second system employs polymer coagulation with direct filtration. Both types of systems are considered reliable, and can consistently produce a discharge less than 10 NTU. These systems have been used successfully at many sites in several states since 1995 to reduce turbidity to very low levels. Non-active erosion and sediment control BMPs, while effective when applied and adequately maintained, produce more highly variable in effluent quality, making setting Numeric Limits difficult, if not impossible.

An important consideration in setting Numeric Limits or Action Levels is that in many locations in California the natural background turbidity and/or TSS levels in stormwater runoff are quite high. This is particularly true in semi-arid or arid regions, which tend to have less vegetative cover. For example, natural runoff concentrations in Emerald Creek, on the Newport Coast, above any developed areas have been over 5,000 mg/l during runoff events. The Los Angeles County Monitoring Data sets included an open land use watershed that also showed TSS levels significantly above other types of urban land uses. Therefore, it is important to consider natural background levels of turbidity or TSS in setting Numerical Limits or Action Levels for construction activities. The difficulty in determining natural background concentrations/levels for all areas of the state could make the setting of Numeric Limits or Action Levels impractical from an agency resource perspective.

While the Panel concludes that Numeric Limits or Action Levels are technically feasible, the Panel has several reservations and concerns.

1. The active treatment systems have generally been employed on sites five acres or larger. While the systems are technically feasible for sites of any size, including sites or drainages as small as an acre or less, the cost may be prohibitive. The cost-effectiveness of active treatment systems is greatly enhanced for large drainage areas, at which construction occurs for an extended period of time, over one or more wet season. There is also a more "passive" active system that is employed in New Zealand that uses captured rainfall to release the chemical into flows entering a detention system that requires less instrumentation and flow measurement infrastructure. Even more passive systems such as the use of polymer

logs and filter bags are currently under development for small sites. Regardless, the Panel recommends that the Board give particular attention to improving the application of cost-effective source controls to small construction sites.

2. In considering widespread use of active treatment systems, full consideration must be given to whether issues related to toxicity or other environmental effects of the use of chemicals has been fully answered. Consideration should be given to longer-term effects of chemical use, including operational and equipment failures or other accidental excess releases.
3. Consideration should be given to the seasonality of applying Numerical Limits. There may be sites where summer only construction that complies with Action Levels may be preferred to year-round that sites that include winter construction that complies with Numeric Limits. In such cases, applying Numeric Limits to summer construction may be a disincentive to scheduling active grading during dry periods. Allowing summer only construction sites to comply with action levels would discourage winter construction activities.
4. Consideration should be given to whether Numeric Limits would apply to all construction sites or only those with significant disturbed soil areas (e.g. active grading, un-vegetated and/or un-stabilized soils). A site could meet certain conditions to be considered "Stabilized" for the runoff season.
5. Where Numeric Limits are not feasible or where they would not apply during designated seasons or site conditions, the Panel recommends that the Board consider the concept of Action Levels for sites where only traditional erosion and sediment controls are applied or construction sites that are considered "stabilized" for the runoff season. An Action Level indicates a failure of BMPs (within some storm size limits).
6. The Board should consider Numeric Limits or Action Levels for other pollutants of relevance to construction sites, but in particular pH. It is of particular concern where fresh concrete or wash water from cement mixers/equipment is exposed to stormwater.
7. The Board should consider the phased implementation of Numeric Limits and Action Levels, commensurate with the capacity of the dischargers and support industry to respond.
8. The Panel recommends that a Numeric Limit or Action Level should be compared to the average discharge concentration. The minimum number of individual samples required to represent the average discharge concentration for a storm will need to be defined.
9. The Board should set different Action Levels that consider the site's climate region, soil condition, and slopes, and natural background conditions (e.g. vegetative cover) as appropriate and as data is available. With active treatment systems, discharge quality is relatively independent of these conditions. In fact, active treatment systems could result in turbidity and TSS levels well below natural levels, which can also be a problem for receiving waters.

10. The Board should consider whether the Numeric Limits or Action Levels should differ between receiving waters that are water quality limited with respect to turbidity, sediment or other pollutants associated with construction, from those water bodies that are not water quality limited.
11. The Panel recommends that Numeric Limits and Action Levels not apply to storms of unusual event size and/or pattern (e.g. flood events). The determination of Water Quality Capture Volume should consider the differing climate regions to specify these events.
12. The Board should set Numeric Limits and Action Levels to encourage loading reductions as appropriate as opposed to only numeric concentrations. Examples include phased construction (e.g. limited exposed soil areas or their duration), infiltration, and spraying captured runoff in vegetated areas as means to reduce loading.
13. The Panel is concerned that the monitoring of discharges to meet either the Action Levels or Numeric Limits may be costly. The Panel recommends that the Board consider this aspect.

Panel's Findings on Feasibility of Numeric Effluent Limits Applicable to Industrial Activities

Industrial Observations

The Panel believes that Numeric Limits are feasible for some industrial categories. Industries have control over their facilities. They control access, construction practices, product substitution to affect pollution prevention and the types of treatment systems to be used to mitigate stormwater runoff. There are many treatment systems or prevention practices that have been in place for lengthy periods, extending back to the 1980s in many cases. For example, there is much known today about construction materials, such as roofing materials (roofing composition, gutters, paints and coatings, products that abrade or tend to create solids or litter, etc). Other examples include development of pervious surfaces, or infiltration methods.

The decision for the value of Numeric Limits should be made in one of two ways. When there is a TMDL that defines the permissible load for a watershed, the Numeric Limits should be set to meet the TMDL. Consideration must be given for both the pollutant concentration as well as the volume of runoff, since both contribute to the impacts that required the TMDL to be implemented.

When there is no TMDL, the Numeric Limits should be based upon sound and established practices for storm water pollution prevention and treatment, using an approach analogous to that used in the NPDES wastewater process in the 1970s. In this approach phased, Numeric Limits were first set that were based upon the use of best currently available technology, and permittees were given a defined period for compliance. Permits were established based upon industry types or categories, with the recognition that each industry has its own specific problems and financial viability.

To establish Numeric Limits for industrial sites requires a reliable database, describing current emissions by industry types or categories, and performance of existing BMPs. The current industrial permit has not produced such a database for most industrial categories because of inconsistencies in monitoring or compliance with monitoring requirements. The Board needs to reexamine the existing data sources, collect new data as required and for additional water quality parameters (the current permit requires only pH, conductivity, total suspended solids, and either total organic carbon or oil and grease) to establish practical and achievable Numeric Limits.

In cases where the industrial activity is similar to activities covered by the MS4 permit (roofs, parking lots, etc), the approach or limits for industries should be the same as for MS4 permittees. In cases where the industrial activity is similar to land disturbance activities (e.g. landfills, gravel mines, etc.), there exists data and design experience with runoff control, capture and advanced treatments systems (e.g. systems using polymer to enhance total suspended solids removal – see

the construction section) that may make Numeric Limits feasible for new facilities, and the approach and limits should be the same as for construction permittees. The same conditions and issues related to active treatment discussed in the construction section apply here.

In cases where there is less certainty in the data for both stormwater characterization or BMP performance to establish Numeric Limits, there maybe sufficient data to establish Action Levels. Action Levels set for industrial sites that discharge to MS4s should not exceed those set for MS4 permittees.

The Panel recognizes that existing and new facilities may have to be treated differently and recommends the approach in **Table 2**.

Table 2- Approach to Establish Numeric Limits or Action Levels at Existing or New Facilities

		Numeric Limits	Action Levels	Notes
Existing Facility	Indoor	No	Yes, similar to MS4	
	Outdoor	Yes if data are adequate for the specific industrial activity and BMP	Yes, using industrial database	Action Levels should approach MS4 action levels.
New Facility	Indoor	Yes – BMP Database		Technology based, similar to MS4 New Development
	Outdoor	No, unless sufficient data exist for the specific industrial activity and BMP	Yes when sufficient data are available	

Industrial Recommendations

The Panel has several reservations and concerns:

- The Panel recognizes the inadequacy of current monitoring data sets and recommends improved monitoring to collect data useful for establishing Numeric Limits and Action Levels.
- Required parameters for future monitoring should be consistent with the type of industrial activity instead of the current parameters (i.e., monitor for heavy metals when there is reasonable expectation that the industrial activity will cause greater heavy metals concentrations in the storm water).
- Insofar as possible, the Panel prefers the use of California data (or National data if it can be shown to be applicable to CA) in setting Numeric Limits and Action Levels.
- The Panel recognizes that economies of scale exist for large facilities and large groups of single facilities.
- Industrial facilities that do not discharge to MS4s should have to implement BMPs for their non-industrial exposure (e.g., parking lots, roof runoff) similar to commercial facilities in MS4 jurisdictions.
- Regardless of Action Levels or Numeric Limits, the permittees should implement a suite of minimum BMPs – good housekeeping, employee training, preventing materials from exposure to rain, etc.
- SIC categories are not a satisfactory way of identifying industrial activities at any given site. The Board should develop a better method of characterizing industrial activities that can impact storm water.
- The Panel recognizes this is a large task and recommends prioritizing the implementation of this approach to achieve the greatest reduction of pollutants statewide.
- Increasingly, a number of industries have moved industrial activities indoors, preventing storm water pollution. The Panel recognizes that these facilities should be granted some sort of regulatory relief from industrial Numeric Limits or action levels, but should still be required to comply with MS4 permit requirements.

The Panel recognizes the need to make progress in monitoring and reducing storm water discharge from industrial facilities, but urges the Board to consider the total economic impact and not unduly penalize California industries with respect to industries outside of California.

Mother's Beach and Back Basins Bacteria TMDL Non-Point Source Study

FINAL REPORT

Prepared by:

WESTON SOLUTIONS

February 2007

Prepared for:

County of Los Angeles Department of Public Works

County of Los Angeles Department of Beaches and Harbors

California Department of Transportation

City of Los Angeles

City of Culver City

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Final Report

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AB	Assembly Bill
APHA	American Public Health Association
ASPH	Association of Schools of Public Health
BMP	Best Management Practices
BST	Bacterial Source Tracking
°C	Degrees Celsius
Cm	Centimeter
COC	Chain of Custody
Ct	Cycle threshold
DNA	Deoxyribonucleic acid
ELAP	Environmental Laboratory Accreditation Program
Etc.	et cetera
FIB	Fecal Indicator Bacteria
g	gram
GB	General Bacteroides
GPS	Global Positioning System
ID	Identification
IEH	Institute of Environmental Health
Isolate	Single bacterial cell isolated on a Petri plate and grown into a colony
MdR (MdRH)	Marina del Rey/Marina del Rey Harbor
mFC	Modified fecal coliform media
mg/L	milligrams per liter
mL	milliliters
mm	millimeter
mph	miles per hour
MPN	Most Probable Number
MST	Molecular Source Tracking
NELAP	National Environmental Laboratory Accreditation Program
PBS	Phosphate Buffered Solution
pH	Potential of Hydrogen
ppt	Parts per thousand
QAPP	Quality Assurance Project Plan
Q-PCR	Quantitative Polymerase Chain Reaction
rRNA	ribosomal RNA (ribonucleic acid)
RT-PCR	Real time polymerase chain reaction
RW	Receiving water
SAP	Sampling and Analysis Plan
SD	Storm Drain
SM	Standard Methods
SOP	Standard Operating Procedures
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
USEPA	United States Environmental Protection Agency
UV	ultraviolet

INTRODUCTION

Marina del Rey Harbor (MdRH) is the largest artificial small-craft harbor in the United States and is surrounded by a watershed comprising a total of 2.9 square miles including the City of Los Angeles and Culver City, as well as unincorporated areas of Los Angeles County. Mothers' Beach is located in the back of MdRH at the end of Basin D and is a shallow, low-energy beach that is popular among families with small children. Mothers' Beach and the back basins of MdRH were placed on the State of California's 303(d) list of impaired water bodies in 2002 due to high levels of fecal indicator bacteria. As a consequence of this listing, a Total Maximum Daily Load (TMDL) was generated requiring measures be taken to reduce bacterial indicator densities at Mothers' Beach and the back basins of Marina del Rey. The TMDL was incorporated into the Water Quality Control Plan in 2003 by the California Regional Water Quality Control Board (RWQCB), Los Angeles Region. In doing so, the RWQCB required the responsible jurisdictions and agencies of the Los Angeles region to conduct a study to determine the relative bacterial loading to the harbor from sources including but not limited to stormdrains, boats, birds, and other non-point sources. This study was to be completed within a three year time period prior to the RWQCB's review of the TMDL.

In order to meet the requirements of the TMDL, Los Angeles County and associated stakeholders, including California Department of Transportation and the Cities of Culver City and Los, contracted Weston Solutions to conduct a study of the bacterial sources that impact water quality at Mothers' Beach and the back basins and to attribute loads to these sources. To analyze the sources contributing bacteria to the harbor receiving waters, Weston Solutions employed a weight-of-evidence approach. Visual observations, a public questionnaire, temporal and spatial bacteria sampling studies during both wet and dry conditions, an illicit boating discharge investigation, hydrologic modeling, sewerage infrastructure inspections, and a novel approach to bacterial source tracking known as the 'toolbox approach' using the Quantitative Polymerase Chain Reaction (Q-PCR) and ribotyping techniques were used to determine the significant non-point sources of contamination continually affecting the quality of the waters within the back basins of MdRH and Mothers' Beach. Upon completing the source identification aspect of this study, loading was assessed for the primary contributors of bacterial pollution. This study, involving source identification and load assessments, is among the first of its kind. A brief summary of the findings of these studies follows.

MAJOR TASKS OF THIS STUDY

Spatial and Temporal Bacterial Investigation

A literature review and the findings in this investigation determined that circulation within MdRH is relatively poor in the back basins and limited in general. The highest concentration of fecal indicator bacteria occurred in Oxford Flood Control Basin and the Boone-Olive Pump Plant during the dry weather monitoring events; and Oxford Flood Control Basin, Boone-Olive Pump Plant, and Basin E during the wet weather monitoring events. Q-PCR analysis showed little human contamination throughout the back basins. The majority of positive human results were

attributed to Basin E and mainly during wet weather. Ribotyping analyses determined that the majority of bacteria contained in water samples collected from Basins D, E, and F during both dry and wet weather were avian in origin (Figure ES-1). Rodent and canine were secondary to avian sources during both dry and wet weather. Human sources (direct human and/or sewage) were found to attribute 3% for both wet and dry weather overall.

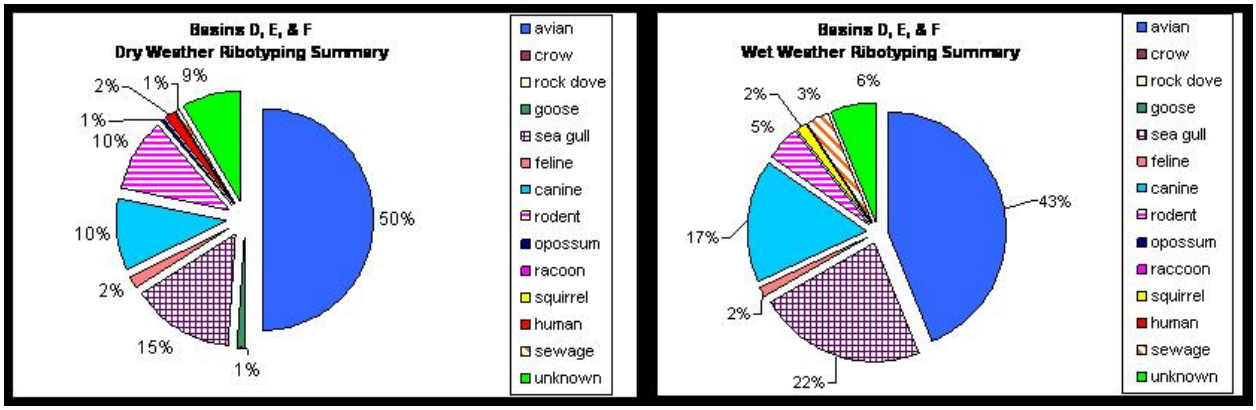

Figure ES-1. Dry and wet weather host sources for Basins D, E and F combined.

Based on visual observations and spot sampling, dumpster, restaurant, and restroom wash down practices in Basin D were found to contribute fecal coliforms and enterococci. However, direct avian sources at Mothers' Beach were found to be the major contributors to the contamination in this area. Basin E had the most complex contamination issues. Primary sources were found to be discharge from the Boone Olive Pump Plant and flow back and forth from Oxford Basin. In addition, parking lot wash down, restaurant runoff and irrigation were also sources of bacterial contamination. Basin F has shown to be the area of least concern. Very little fecal indicator bacteria and no human bacteroides were found. The greatest contribution of the small concentrations of bacteria to this area was from birds, rodents and dogs. While Basin F had the highest percentage of human ribotypes, the limited bacteria found in this basin do not make it a great cause for concern. As can be seen, one of the major findings of this study is that each of the back basins appears to be affected by contamination sources local to the basins themselves.

Sewerage Infrastructure Investigation

The sewerage infrastructure investigation determined that the sanitary sewer lines surrounding the back basins of MdRH did have structural defects and operational and maintenance problems. A remote camera was used in conjunction with a closed circuit television monitor and a software program to identify structural and maintenance problems within the sewer system serving areas adjacent to MdRH and Oxford Basin. The most problematic sewer line segment within the Marina del Rey basin was determined to be the segment leading from the Marriot to the main sewer line. This segment runs below a bike path at Mothers' Beach and contains major fractures in close proximity to Mothers' Beach that may be contributing bacteria to the surrounding soil and groundwater which may in turn be infiltrating the receiving waters of the Harbor. The sewer line segment running south of Basin E is also recommended for maintenance due to holes in the lining and cracks and fractures within the lateral connections. Other potential problems that were noted included grease buildups, small cracks and fissures, and water level sags in the lines.

Illicit Boat Discharge Investigation

The boat discharge investigation occurred simultaneously with the last three dry weather sampling events. Results of the illicit boat discharge investigation included visual observations, analyzing for fecal indicator bacteria to determine high levels of contamination, and testing for bacteroides and ribotyping to determine the potential for human contamination. Results based on this weight-of-evidence approach indicate that illegal discharges of sewage from boats in Basins D, E, and F were not likely a major cause of contamination. However, because illegal discharges of sewage from boat holding tanks is inherently episodic, results of this study do not rule out the potential for isolated events.

Sediment Investigation

Results from the sediment investigation conducted at Mothers' Beach indicate that the surficial sediments in the inter-tidal zone are generally low in fecal indicator bacteria based on two sampling events conducted in dry weather of the winter and summer months of 2006. The majority of the beach face had fecal coliform and enterococci densities that were at or near detection limits, indicating that it is unlikely that sediment re-suspension resulting from beach activity would contribute large amounts of bacteria to the water.

Bacterial Loading Estimates

This task addresses loading from several sources including avian, boat discharge, local drainages and contributions from Oxford Basin and Boone Olive effluent among others. Results from bacterial loading estimations support several conclusions. First, loading calculations indicate that the Oxford Flood Control Basin contributes the majority of the bacterial load to the Marina del Rey back basins. Secondly, the bacterial loading contributions emanating from *direct* avian sources are relatively small when compared to bacterial loads discharged from the major drainages of Oxford Basin and the Boone Olive Pump Plant (which carry avian sources to the back basins indirectly). Lastly, as was expected, the calculated annual wet weather bacterial loadings were significantly higher than the calculated loadings occurring during dry weather.

Additional Studies

The bacterial results of a one-day comprehensive bacterial sampling event, coupled with the sampling of four upstream sampling locations within the MdRH watershed was incorporated into a hydrologic mass balance model in order to estimate bacteria concentrations in Oxford Basin and Basin E during dry weather. The model results suggest some of the greatest impacts to fecal coliform loads are attributable to effluent from Oxford Basin as it drains into Basin E. Additionally, the high bacteria concentrations emanating from the Boone-Olive Pump Plant appear to have a direct impact on the water quality in Basin E, and during flooding tides, may also be impacting Oxford Basin.

RECOMMENDATIONS

Recommendations for eradicating sources of fecal indicator bacteria within Marina del Rey and the back basins are listed below and are described in greater detail in the recommendations sections. Some of the recommendations are non-structural in nature and can be effectively employed with minimal time and capital investment. Other recommendations address structural

problems, such as sewer line repairs and diversion strategies that may require greater time and expenditure.

Birds and Other Wildlife

The majority of the enteric bacteria detected in the Marina del Rey Harbor back basins originates from birds and other wildlife. Therefore, one of the most effective management solutions would involve the implementation of best management practices (BMPs) to deter birds from landing in the low-circulation areas of the back basins and to remove bird waste, especially at Mothers' Beach. Other recommendations include extending bird exclusion poles at Mothers' Beach, removing trash and covering bins, posting signs not to feed the wildlife, trapping nuisance rodents, and installing bird exclusion devices on docks, roofs, and other popular perches.

Illicit Boat Discharges

Evidence of illicit boat discharges was neither observed nor detected by Q-PCR in the three sampling events conducted in the back basins of MdRH. However, based on questionnaire responses, the future installation of a pumpout station in the vicinity of Basins D, E, and F should be considered. This might help alleviate sporadic illicit discharges from boaters in this area who feel that the locations of the harbor's current pumpout stations are inconvenient.

Irrigation

Irrigation as a source to MdRH can be caused by direct local runoff, or indirectly through upper watershed runoff as avian sources are. Until BMPs can be instituted to deal with upper watershed runoff, it is recommended that irrigation be reduced through education and incentives. These would include employing efficient landscape watering techniques such as using soaker hoses or drip irrigation rather than sprinklers. Installing low volume irrigation systems and employing water conservation devices, such as moisture content sensors and rain shut off devices, would also help to significantly curb irrigation runoff. Lastly, employing landscape water conservation guidelines to promote efficient irrigation water use would educate maintenance crews on the importance of hydro-zoning plant material, maintaining proper operation of system components, and determining irrigation run times from plant water requirements and zone precipitation rates.

Sediment

The findings of the sediment study revealed little contribution of bacteria to the receiving waters of Mother's Beach through beach sediments and therefore, the only recommendation for further reducing the possibility of sediment contributing to poor water quality at Mothers' Beach would be to remove bird fecal matter from the beach face on a periodic basis.

Restroom, Restaurant, Parking Lot, and Boat Wash Down

It is recommended that restroom, restaurant, and parking lot maintenance staff be educated on the potential bacterial contributions of wash water entering the Harbor, and that current wash down practices be improved. For restaurants, restrooms and parking lots, dry methods of cleaning decks, outdoor areas, and exterior surfaces should be used whenever possible. Dumpsters should be checked for leaks and should never be hosed down. Restaurant oil and grease should be properly disposed of in grease traps or interceptors while mop water and other

cleaning agents should be dumped only into drains that lead into the sanitary sewer rather than into a storm drain. In cases where it is necessary to use water to wash an area, runoff water should be vacuum-pumped away from storm drains and receiving waters. Boat wash down areas should post signage reminding boaters of consequences of illicit discharges and should enforce the use of tarps during dust-producing maintenance operations.

Sewerage Infrastructure

The sewer segment running from the front of the Marriot on Admiralty Way to the main line that leads under Mothers' Beach is cracked in several places and should be repaired or replaced as soon as possible to avoid human contamination to the beach. Four other sewer segments were also found to be in need of repair due to holes and fractures observed in video footage from within the sewer system. Lesser cracks and fissures were also identified in various other sewer lines and while they may not pose immediate contamination risks, it is recommended that their maintenance be addressed in the near future.

Boone Olive Pump Plant and Oxford Basin

Based on the modeling results, several recommendations for source control BMPs and storm water treatment BMPs should be considered. These include vegetated swales and strips, sand filters, media filters, infiltration trenches and strips, infiltration basins, wet ponds and dry ponds, and constructed wetlands. Runoff diversion and effluent diversion into sanitary sewers during dry weather should also be considered.

Overall, the results of this study suggest that the majority of the indicator bacteria in Marina del Rey Harbor originates from direct and indirect (i.e., through stormdrains) avian sources. Because little can be done about the number of birds in Marina del Rey, recommendations for reducing bacterial densities in the back basins is focused on the above seven areas. The County and associated stakeholders are actively pursuing management actions to address these recommendations.

1.1 Background

Marina del Rey Harbor (MdRH) is an active harbor for pleasure craft located in Santa Monica Bay, Los Angeles County, California. Formally dedicated in 1965, the marina was developed in the area that was once known as the Playa del Rey estuary and inlets. It is now the largest artificial small-craft harbor in the United States and a treasured Southern California recreational area. With more than 6,000 wet-berthed slips for private and commercial vessels, dry storage of approximately 3,000 boats, and launch facilities that provide access to approximately 240 trailered boats daily, the area is highly prized by nautical enthusiasts. MdRH's surrounding watershed comprises a total of 2.9 square miles and includes the City of Los Angeles and Culver City, as well as unincorporated areas of Los Angeles County. A map depicting the various land uses in the watershed is provided in Figure 1-1.

A temperate climate and idyllic beaches serve to make Marina del Rey an attraction for families. Mothers' Beach, located in the back of the harbor at the end of Basin D, is a shallow swimming beach with low wave energy. Because of the lack of surf, the presence of on-duty lifeguards, and the large expanse of flat sandy beach, Mothers' Beach is popular among parents with small children. Numerous restaurants, hotels, children's playgrounds, picnic shelters, and recreational equipment rental opportunities surround this beach and add to the appeal of this area as a preferred destination for family activities. Tourists, business travelers, day visitors, and local residents are drawn to the harbor to engage in some of its popular boating, fishing, and wildlife viewing activities. As a result, seasonal populations within the harbor frequently exceed 30,000 people.

The popularity of MdRH and its associated development, however, has not gone without impacts to the harbor's receiving water. Anthropogenic activities have resulted in increases in polluted runoff to the Harbor. Similarly, due to increases in impervious surfaces within the watershed, the majority of rainwater no longer infiltrates the soil surrounding MdRH, resulting in excessive runoff flowing directly into the harbor's receiving waters. Additionally, waste material from resident and migratory wildlife contributes contaminants such as fecal bacteria to the receiving waters through irrigation and storm water runoff.

These combined factors led to Mothers' Beach and the back basins of MdRH being placed onto the state's 2002 303(d) list for impaired water bodies. Marina del Rey waters were considered to be impaired based upon bacterial standards listed in the Water Quality Control Plan for Ocean Waters of California (Table 1-1). As a result of the 303(d) listing, a Total Maximum Daily Load (TMDL) for Marina del Rey was finalized in September, 2003, by the California State Water Resources Control Board (SWRCB), entitled: Total Maximum Daily Load to Reduce Bacterial Indicator Densities at Marina del Rey Harbor Mothers' Beach and Back Basins.

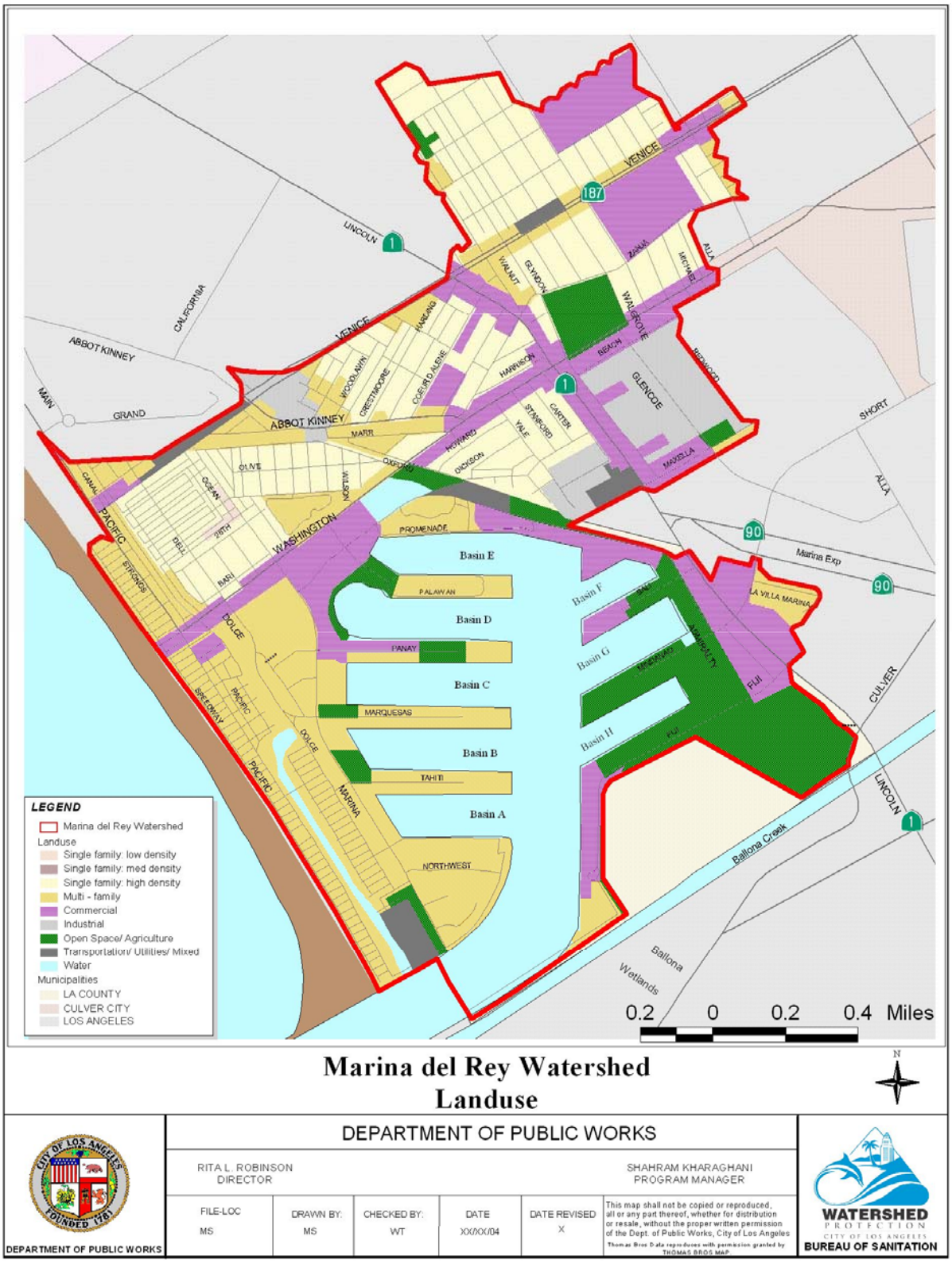

Figure 1-1. Map of Marina del Rey Harbor.

Table 1-1. Water quality impairments in Marina del Rey sub-watershed for total maximum daily loads (TMDL).

Waterbody	Watershed	Beach Closures	Fecal Coliform	Total Coliform
Santa Monica Bay	Marina del Rey Mothers' Beach and Back Basins	X	X	X

The final document states the following goal (page 1):

> "The goal of this TMDL is to determine and set forth measures needed to prevent impairment of water quality due to bacteria at Mothers' Beach and MdRH back basins."

One of the key steps in producing the TMDL was to define waste load allocations (WLAs) and load allocations (LAs) for the listed area. In this TMDL, WLAs and LAs are expressed as the number of daily or weekly sample days that may exceed the single sample targets (identified in Section 7 of the TMDL).

On August 7, 2003 the California Regional Water Quality Control Board (RWQCB), Los Angeles Region, adopted an amendment to the Water Quality Control Plan to incorporate the Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL (Attachment A of Resolution No. 2003-012 of the TMDL). The amendment states the following (page 9):

> "… the MdR responsible jurisdictions and responsible agencies are required to conduct a study to determine the relative bacterial loading from sources including but not limited to stormdrains, boats, birds, and other non-point sources. Once this study is completed in three years, the Regional Board will adjust the WLAs, if appropriate, based on the study, during the scheduled review of this TMDL."

The deadline for the final non-point study is within three years of the effective date of the TMDL (March 18, 2007). As such, Weston Solutions, Inc. was contracted by the County of Los Angeles and associated stakeholders including California Department of Transportation and the Cities of Culver City and Los Angeles, to perform the Mothers' Beach and Back Basin's Bacteria TMDL Non-Point Sources Study. This report presents the findings of the investigation that was conducted in MdRH between July 1, 2005 and July 31, 2006.

1.2 Bacterial Standards

To have a complete understanding of the issues related to bacterial densities at Mothers' Beach and in the back basins of MdRH, it is important to include a discussion of the criteria used to determine when a water body is considered out of compliance. The primary criteria used to assess bacteria levels in coastal waters in Southern California are based upon the densities of groups of bacteria: such as fecal coliforms, and enterococci. Collectively, these bacteria are referred to as indicator bacteria because their abundance in the environment provides an

indication of the possible presence of pathogenic microorganisms and may indicate fecal contamination. The numeric standards for the indicators used in this study, known as AB411 criteria, are presented in Table 1-2.

Table 1-2. Assembly Bill 411 (AB411) bacteriological standards.

Bacterial Indicator	30-Day Limit[1]	Single Sample Limit
Fecal Coliform	200 MPN/ 100mL	400 MPN/ 100mL
Enterococci	35 MPN/ 100mL	104 MPN/ 100mL

1 = 30-day limit is based on the geometric mean of at least five weekly samples
2 = MPN is Most Probable Number
3 = Total coliform single sample limit of 10,000 MPN drops to 1,000 when the fecal coliform value is greater then 10% of total coliform value

Assembly Bill 411 (AB411), also known as "The Right to Know Bill", was sponsored by Assemblyman Howard Wayne and was enacted in October of 1997. The Bill requires that for the months of April through October, weekly bacterial monitoring be performed at all beaches with more than 50,000 annual visitors that are adjacent to stormdrains with summer flow. Any beaches found to exceed the bacterial limits enforced by the Bill are posted with warning signs to notify the public of potential health risks. The criteria set forth in AB411 were in effect years before the Bill was passed. However, the Bill was created to update and enforce bacteriological safety standards set forth in the California Code of Regulations to provide a regulatory framework by which the numerical limits can be stringently enforced. The criteria established for fecal coliforms, and enterococci were derived separately over the past several decades. The basis for the fecal coliform and enterococci criteria are discussed below.

Fecal Coliforms. AB411 criteria include a single sample standard of 400 fecal coliforms per 100mL and a 30-day geometric mean of 200 fecal coliforms per 100mL. These numeric standards were based on a study of the Ohio River (USEPA, 1986). This study compared illness observed in bathers exposed for three days to water with high and low coliform densities. In this study, it was determined that approximately 18% of the total coliforms found in the Ohio River were of the fecal coliform group. The EPA summary of total coliforms found a limit of 2,300 total coliforms to be the point above which illness significantly increased. Interestingly, the limit of 400 fecal coliforms per 100mL was generated by simply multiplying the value for total coliform (2,300 per 100mL) by 18%. The National Technical Advisory Committee of the Department of the Interior was authorized to make recommendations regarding the safety of recreational waters and argued that a detectable increase in disease was not acceptable. Therefore, the criteria of 400 fecal coliform per 100mL was set at 200 per 100mL as the 30-day geometric mean criteria. The Santa Monica Bay epidemiological study (Haile et al., 1996) found the 400 fecal coliform per 100mL limit to be reasonable. It was found that exposures to levels greater than that were related to an 88% increase in the risk of skin rashes. The fecal coliform limits expressed above are consistent with the SWRCB's California Ocean Plan used today.

Enterococci. AB411 standards for enterococci include a single sample standard of 104 enterococci per 100mL, with a 30-day geometric mean of 35 per 100mL. In the 1970s, the EPA performed epidemiological studies involving 27,000 people at several beaches in New York, Louisiana, and Massachusetts (Cabelli, 1983). The investigators found that enterococci was the best of the three indicator bacteria for the prediction of human illness associated with recreational waters (gastrointestinal illnesses were related to enterococci densities by correlation coefficients of 0.75 to 0.96, compared to 0.12 to 0.46 for total coliforms and 0.01 to 0.51 for fecal coliforms). The study was used by the EPA in 1986 to estimate that swimmers exposed to enterococci in water at levels of 104 per 100mL (or 35 per 100mL for the 30-day mean) would result in 19 cases of gastrointestinal illness or other effects per 1,000 people exposed. In 1986, these limits were entered in the U.S. EPA Ambient Water Quality Criteria for Bacteria Guidance. In 1996, the Santa Monica Bay epidemiological study helped to confirm the enterococci criteria (Haile et al., 1996). The study found that when instantaneous enterococci maximum limits were exceeded (the study used 106 as the limit, versus 104), exposed swimmers experienced a 323% increase in diarrhea with blood and a 44% increase in vomiting and fever.

The bacterial limits for recreational water quality enforced by AB411 have been well established and confirmed over the past five decades. What continues to change and improve with time is the enforcement of these limits. In 2000, Assemblyman Howard Wayne created AB1946 as a follow-on bill to AB411. This Bill improves on requirements for data collection and public notification. As of January 1, 2001, this Bill requires the state to collect more accurate information on the actions taken at beaches found to be contaminated. The Bill requires the SWRCB, the primary agency responsible for regulating AB411 criteria, to post beach data from throughout the state on a monthly basis. In addition, every June the SWRCB compiles all data into an annual report, which is made available on its website.

In this study, water sample test results will be compared to the Water Quality Control Plan (Basin Plan, RWQCB, 1994) for the Los Angeles Region and Title 40 of the Code of Federal Regulations (Part 131; Water Quality Standards) (USEPA, 2000a) to determine instances of exceedance due to storm water or urban runoff to MdRH receiving waters. Table 1-3 lists the constituents that were monitored during this study and the associated water quality objectives.

Table 1-3. Major water quality constituents and applicable criteria.

Constituent	Criteria	Source
Fecal coliform	200 MPN/100mL and 400 MPN/100mL (a)	MdR Bacteria TMDL (2005)
Enterococci	35 MPN/100mL and 104 MPN/100mL (a)	MdR Bacteria TMDL (2005)
E. coli (b)	126 MPN/100mL and 235 MPN/100mL	MdR Bacteria TMDL (2005)
Bacteroides spp. (c)	Presence/Absence	N/A

(a) 30-Day Geometric Mean and Single Sample, respectively.
(b) *E. coli* not enumerated. Samples will be filtered for the purposes of obtaining individual *E. coli* colonies for ribotyping only.
(c) No current water quality criteria exist for the enumeration of Bacteroides species. Samples will be analyzed for general Bacteroides, present in all warm-blooded animals. Upon the detection of the general marker, the sample DNA will be further analyzed to determine if it is human in source.

1.3 Study Objectives

As stated above, this study was required by the SWRCB to determine sources of indicator bacteria likely impacting Mothers' Beach and the back basins of Marina del Rey Harbor. Specifically, the objectives of this study were to:

1) determine the relative loadings of indicator bacteria to the water bodies listed in the TMDL (California Regional Water Quality Control Board, Los Angeles Region, 2003) from sources including but not limited to stormdrains, boats, birds, and other point and non-point sources;

2) determine the bacterial host origins (human, bird, rodent, etc.) of the detected fecal indicator bacteria;

3) based on the information gathered from source assessments and loading estimates, make recommendations on the best ways to reduce bacteria loading in order to achieve compliance with the TMDL.

The purpose of this project was to accomplish the objectives listed above. To this end, total coliform was replaced with enterococci. Enterococci were used for their stability in the marine environment, rapid (24-hour) results and lower cost to process. This allowed for a greater number of samples to be analyzed and a richer data set from which to make assessments.

The project was designed to produce results that would provide LADPW and other stakeholders with a clear understanding of the bacterial loads from the major sources impacting the back basins of the Harbor, the host origin of the bacteria, and a depiction of the sources of the bacteria to the receiving waters of the Harbor affected by the TMDL. These objectives were met through an adaptive, weight-of-evidence approach that utilized a series of specific tasks, in the back basins of MdRH. During the course of this study, numerous observations and study results were compiled to identify any practices or problems that were observed and could be readily changed to reduce bacterial indicator inputs. These observations and findings were routinely shared during the regularly scheduled stakeholder meetings and were often met with immediate action. The tasks for the overall Mothers' Beach and Back Basin's Bacteria TMDL Non-point Source Study included:

- Task 1: dry and wet weather monitoring surveys that incorporated load estimates and host origin assessment from the major sources and the receiving waters;
- Task 2: an inspection of the sewer lines surrounding the Harbor using closed circuit television (CCTV);
- Task 3: an illicit boat discharge survey;
- Task 4: an investigation to determine whether the sediment at Mothers' Beach acts as a reservoir for bacteria;

- Task 5: additional corroborative studies investigating upstream bacterial contributions, modeling of Oxford Basin and the Boone Olive Pump Plant effluent; and
- Task 6: data analysis and reporting.

These tasks are further described in Sections 1.4.1 through 1.4.6. Results of this study will provide information to the SWRCB regarding any possible changes that may be called for regarding MdR load allocations during the scheduled review of this TMDL. All meaningful non-point sources that impact the water bodies listed in the MdR TMDL were examined. For these purposes, "natural" sources of bacterial contamination will be distinguished from those that are influenced by anthropogenic constructs.

1.4 Study Approach

The objectives of this study were to determine the relative loadings and host origin of indicator bacteria to the back basins of MdR in order to produce recommendations that would optimize efforts to reduce bacteria loading, and ultimately to achieve compliance with the TMDL. One of the first steps in this process was to review the major data sources on bacterial levels and fate and transport models/studies conducted in the Harbor. The data review revealed that several hydrodynamic models have been constructed for the Harbor in the past in addition to several monitoring studies. One such study, a recent Mothers' Beach water quality improvement project that examined bacterial sources was presented to and reviewed by the stakeholder group.

It was clear from the data review that circulation in MdRH is very limited. All of the modeling studies that were reviewed suggested that contaminants (e.g., bacteria) that originate near the Harbor entrance tend to stay near the entrance due to low flushing rates. For this reason, they do not have a large impact on the back basins. Similarly, bacteria that originate from the Oxford Flood Control Basin and the Boone-Olive Pump Plant during dry weather flows primarily remain near their point of discharge within Basin E and do not have a meaningful effect on Mothers' Beach in Basin D. The conclusions of the modeling efforts are supported by long-term monitoring data and recent source tracking investigations in the back basins. The most recent investigations concluded that "the general level of indicator bacteria present in Marina waters do not explain frequent exceedances measured at the swash zone of Marina Beach except during storm events where discharges are present in Basin D as well as throughout the Marina" (Kinnetic Laboratories, 2004).

Taken together, these studies suggest that bacterial contamination found within the back basins originates from sources within the basins rather than from sources elsewhere in the Harbor. For this reason, the present study focused on the back basins of Marina del Rey rather than assessing and trying to link all of the sources throughout the Harbor to elevated bacterial densities in the back basins through extensive modeling.

As explicitly required by the TMDL, an emphasis was placed on sampling the major drainages to the back basins. On August 7, 2003 the California Regional Water Quality Control Board, Los Angeles Region adopted an amendment to the Water Quality Control Plan to incorporate the

Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL (Attachment A of Resolution No. 2003-012 of the TMDL). The amendment states the following (page 3 under Source Analysis):

> "Dry weather urban runoff and storm water conveyed by stormdrains are the primary sources of elevated bacterial indicator densities to MdRH and Mothers' Beach back basins during dry and wet-weather."

It was clear from the literature review that the effluent from two major drainages has the greatest influence on bacterial densities in the back basins: the stormdrain (tide gate) that drains the Oxford Flood Control Basin and the stormdrain that drains effluent from the Boone-Olive Pump Plant. Both of these major sources of bacteria discharge to Basin E (Figure 1-2). Because a relatively large bacteria load was expected from these sources, the load from each of these stormdrains was quantified in both dry and wet weather. Additional locations for the receiving water samples were also located near other stormdrain outlets in the back basins because they also represent a potentially large source of bacteria from the surrounding sub-watersheds.

1.4.1 TASK 1 – Spatial and Temporal Surveys

Extensive spatial and temporal surveys comprised a significant portion of this project. These were conducted to determine the host origins of bacteria impacting Mothers' Beach and the back basins of MdR, as well as to assess the relative loads from these sources. Task 1 consisted of a series of five dry weather surveys and two wet weather surveys that were conducted in MdRH between July 1, 2005 and July 31, 2006. Survey locations were chosen to evaluate five main areas:

1) Effluent from the Boone-Olive Pump Plant, which discharges to Basin E
2) Effluent from the Oxford Basin Outlet, which discharges to Basin E via tide gates
3) The receiving waters of Basin D at Mothers' Beach
4) The receiving waters of Basin E
5) The receiving waters of Basin F

Each of the five dry weather surveys was conducted over a 24-hour period to accurately quantify bacterial loads entering the back basins of Marina del Rey. Because variable bacteria loading is common in urban settings, conducting 24-hour surveys allowed for these variations to be incorporated into the total load estimate. The dry weather surveys consisted of visual observations of potential bacterial sources, receiving water and stormdrain monitoring, library sampling, and bird surveys.

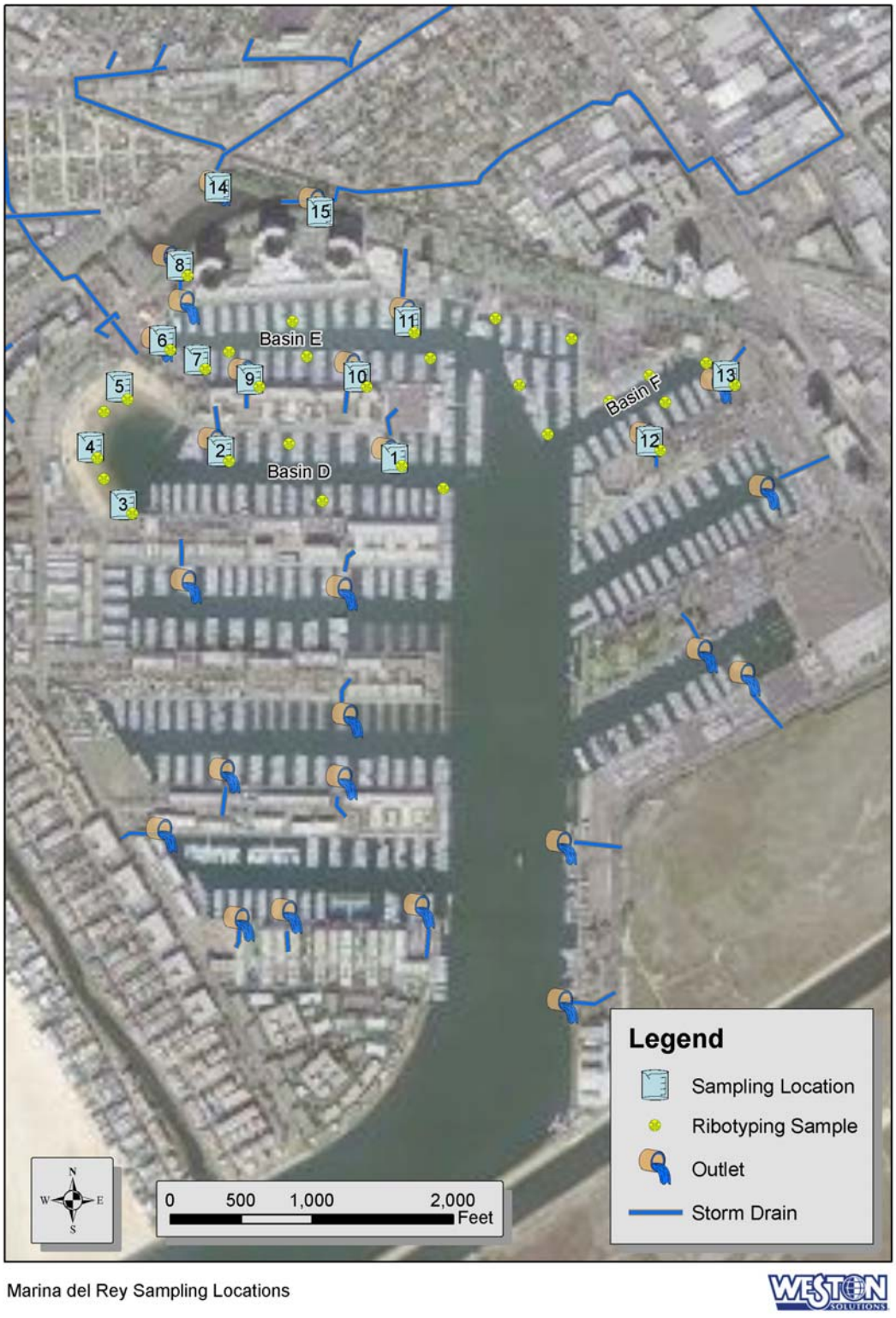

Figure 1-2. Marina del Rey map showing sampling locations, stormdrains, and outlets.

The purpose of the visual observations was to assess the numerous sources of bacteria that may be cumulatively impacting the receiving water. Field samplers used a comprehensive visual observation checklist that was developed using input from the stakeholder group and other knowledgeable individuals about potential sources of bacteria that might be found in the back basins of Marina del Rey Harbor. This visual monitoring was conducted in conjunction with water quality observations. While visual observations were being conducted, samples of any suspected bacterial source were collected as "spot samples" and were analyzed for fecal indicator bacteria levels in the same manner as grab samples collected from assigned sample locations. A short written description of the spot sample collection point was included in the field log and was used to help assess and quantify the bacterial loads from the sample sources. In addition to the visual observations and spot samples, a questionnaire was used to "interview" individuals knowledgeable about the sources of bacteria within the Harbor in and effort to identify and investigate potential non-point sources of bacteria.

The purpose of the receiving water and stormdrain monitoring was to determine the bacterial loadings from the major bacterial sources to the back basins of Marina del Rey Harbor and to identify the host origin of the bacteria. In addition to receiving water stations, two major stormdrains (Boone-Olive and Oxford Basin) were sampled. Flow sensors were mounted in the bottom channels of each of the stormdrains so that velocity and water volume could be measured continuously over the 24-hour period. During the surveys, samples were collected for bacterial enumeration and characterization from each of the sampling areas. Samples were analyzed as follows:

Fecal Indicator Bacteria (fecal coliform and enterococci) were enumerated at each station. Load estimates (flow x concentration) over the 24-hour period were made for each of the two major stormdrains to produce an estimate of total daily load. This information combined with the spot sampling and load estimates during the visual observations allowed for a characterization of all of the bacterial sources identified during each survey. The samples collected at the receiving water stations provided important information on the spatial distribution of the bacteria throughout the back basins. This information is extremely important in determining the impact from the bacterial sources on the receiving waters identified in the TMDL.

The Quantitative Polymerase Chain Reaction (Q-PCR) technique is used to amplify the DNA of a bacterium (bacteroides) found in the fecal material of all warm blooded animals. This technique was used to determine if there was a presence of recent fecal contamination and to further identify if it originated from human sources.

Ribotyping is a molecular technique that compares the genetic make-up of a single bacterial cell to a "library" or collection of individual cells of known origin. This project used the largest library available in North America, maintained by the Institute of Environmental Health in Seattle, Washington. In addition, site-specific library samples (fecal material from known sources in the Marina del Rey area) were collected. Ribotyping was used to determine the host origin of bacteria in the receiving waters and the two major identified stormdrains.

As described above, a library of bacterial cells is necessary to identify the host origin of bacteria in a given sample using the ribotyping technique. The strength of the technique relies in large part on the size of the library (the larger the library the greater the probability of matching a sample bacteria to one in the library). As such, library samples of fecal material were collected from known sources (e.g., birds identified to species) within Marina del Rey and the surrounding watershed every two to three weeks from July 2005 through June 2006. During this time, bird surveys were also conducted within Marina del Rey Harbor in order to provide a continuous record of birds in the area. This information was used to assess the extent to which birds contribute to bacterial loading at the beach.

The wet weather surveys consisted of visual observations and monitoring during two storm events: November 10, 2005 and February 20, 2006. Flow was measured over each storm event for the Boone Olive Plant and Oxford Basin. In addition, grab samples were collected at these stations as well as the receiving waters over the duration of the storms. All samples were analyzed for fecal coliform and enterococci bacteria and bacteroides using Q-PCR. This data was then combined with in-flow and out-flow measurements taken at the Oxford Flood Control Basin and at the Boone-Olive Pump Plant holding tank and outfall pipe so that bacterial loads over the course of the storm could be estimated. The receiving water samples collected in Basins D, E, and F provided spatial information on the impact of the various stormdrains that discharge to the area during storm events and also provided important temporal information on how bacterial densities change over the course of a storm. Ribotyping samples were collected and composited for the major drainages and back basins in order to identify sources for bacteria in these regions.

1.4.2 TASK 2 – Inspection of Sewage Infrastructure

The purpose of this Task was to assess the extent to which leaking sewage infrastructure impacts receiving water quality by inspecting the structural integrity of the sewage lines in the area of Mothers' Beach. To accomplish this Task, a closed-circuit television (CCTV) camera investigation was conducted to identify cracks, tree roots, sedimentation, grease buildup, and other evidence of integrity problems in sewer lines adjacent to Mothers' Beach.

1.4.3 TASK 3 – Illicit Boat Discharge Investigation

The purpose of this Task was to assess the extent to which leaking boat holding tanks or illicit discharge of sewage from boats may impact receiving water quality. To investigate the contribution of boating activities to contamination, a monitoring study was conducted to collect samples at locations in and around the boat slips and at nearby shoreline locations. The final design of the illicit boat discharge investigation was based on a combination of results from the Questionnaire (Appendix I) and a consultation with knowledgeable members of the stakeholder group. A decision was made to emphasize collecting samples near stationary houseboats and conducting the investigation at night when illicit discharges are most likely to occur.

Three surveys were conducted using an inflatable boat along a series of transects within Basins D, E, and F in and around the recreational and commercial boats in these areas. Samples were

collected for the analysis of fecal indicator bacteria to identify areas of highest concentration. Additionally, Q-PCR was used to determine if bacteria detected in the water samples originated from human sources.

1.4.4 TASK 4 – Sediment Investigation

Because several studies have suggested that beach sediments can act as a reservoir for indicator bacteria, a sediment investigation was conducted to determine if the sediment at Mothers' Beach may be acting as a reservoir for fecal indicator bacteria. Two surveys were conducted: one during the 'summer-dry' period before the first rains of the season, and another during the 'winter-dry' period preceded by at least five days of no rain. Samples of surficial sediment were collected during low tide along a series of transects positioned along the beach face perpendicular to the waterline and analyzed for both fecal coliform and enterococci bacteria. During each survey, observation forms were also filled out to record the number of birds on the beach, the presence of fecal matter, locations of groundwater springs, and other information that could be used to identify potential bacterial sources.

1.4.5 TASK 5 – Additional Studies

With many bacterial source investigations, it is often difficult to account for all of the sources at a particular site prior to the initiation of the investigation. The purpose of this Task was to allow for some flexibility in the study design in order to adapt to results as they were collected and to conduct additional, corroborative studies based on these initial results. Additional "follow-up" studies were designed to answer very specific questions about localized suspected bacterial sources. The primary aspect of the special studies was a model created to understand the contributions of Boone Olive and Oxford Basin discharge on Basin E. Leaving a small portion of the budget for follow-up studies allowed for a more thorough investigation and contributed to the weight of evidence approach. As initial results were analyzed and new questions arose, the LADPW, the Regional Board, and the other appropriate stakeholders were consulted for approval of further sampling efforts.

1.4.6 TASK 6 – Data Analysis and Quality Assurance

Data analysis is included in all tasks of the project, and therefore a more detailed description of the analysis used is provided in individual sections. Quality Assurance measures were followed to assure the quality of project data.

1.5 Report Organization

The report is organized into ten discrete sections. An executive summary at the beginning of the document summarizes the major findings of the study, the study's conclusions, and recommendations to LADPW for reducing bacterial levels at Mothers' Beach and the back basins of MdRH. Following the executive summary, the report is broken out into individual chapters detailing different components of the overall study.

This report provides the following information:

- **Chapter 1: Introduction:** includes a statement of purpose, the scope of the project, and a brief description of the approach and techniques used during the project.
- **Chapter 2: Spatial and Temporal Surveys**: includes the methods, results, and discussion from wet and dry weather monitoring studies. Q-PCR, ribotyping, fecal indicator bacteria analyses and visual observations were used to investigate the spatial and temporal extent of bacterial contamination within Marina del Rey Harbor and its surrounding watershed.
- **Chapter 3: Sewer**: includes an investigation of the sewer line infrastructure. A closed-circuit television (CCTV) camera was snaked throughout the sewer system to identify cracks, tree roots, sedimentation, grease buildup, and other evidence of integrity problems in sewer lines adjacent to Mothers' Beach and the back basins.
- **Chapter 4: Illicit Boat Discharge Investigation**: includes the methods, results, and discussion of a boat discharge study designed to assess boater contributions to bacterial contamination within the harbor.
- **Chapter 5: Sediment Investigation**: includes the methods, results, and discussion of sediments as a potential contributor of bacteria to Mothers' Beach from two sediment surveys conducted during the summer and winter dry seasons.
- **Chapter 6: Loading**: includes estimates of bacterial loadings for fecal coliform and enterococci at various locations within the Marina del Rey watershed based on water quality sampling, flow rates, precipitation, and other information.
- **Chapter 7: Additional Studies**: includes studies and models not addressed in the original scope. The primary focus of this section is to discuss a model created to understand the influences of Oxford Basin and the Boone Olive Pump Plant on the contamination of Basin E. Structural and non-structural BMPs are also discussed within this chapter and their effect on fecal coliform loads evaluated through use of the model. The model is based on dry weather findings, though wet weather applications of the model are discussed.
- **Chapter 8: Conclusions**: includes an overview of the major findings of the overall study as well as the individual studies contained within each chapter and provides context to their results relative to other similar studies and the TMDL.
- **Chapter 9: Recommendations**: includes specific management recommendations to reduce bacterial loading from the identified sources (e.g., structural and non-structural BMPs).
- **Chapter 10: References**: includes references to the citations listed in the report.

The appendices include full reports of the major investigative tasks, analytical laboratory reports, chain of custody forms used in field and laboratory sampling, and field logs and data sheets.

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Figure 1-2. Marina del Rey map showing sampling locations, stormdrains, and outlets. 1-9

Table 1-1. Water quality impairments in Marina del Rey sub-watershed for total maximum daily loads (TMDL). 1-3
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Table 1-3. Major water quality constituents and applicable criteria. 1-5

The two primary objectives of the non-point source investigation study were to determine the host origin of bacteria impacting Mothers' Beach and the back basins of Marina del Rey Harbor (MdRH) and to assess the relative loads from these sources. The spatial and temporal surveys represent the largest effort in addressing these objectives.

The surveys involved five dry and two wet weather sampling events, including visual observations by trained staff as well as a public questionnaire distributed through Santa Monica Baykeeper, traditional bacterial analysis, host-tracking assessments, flow monitoring of Oxford Basin and the Boone-Olive Pump Station to assess loading, and spot samples taken at sites suspected to be contributing to bacterial runoff and contamination. Table 2-1 presents an overview of the tasks conducted. This section describes the methods, results, and a discussion of the findings from the spatial and temporal surveys.

Table 2-1. Overview of temporal and spatial surveys.

Key Elements	Description	
Dry Weather Surveys		
Five 24-hour Monitoring Events	Bacterial Sampling	▪ Fecal indicator bacteria enumeration ▪ Ribotyping ▪ Quantitative Polymerase Chain Reaction (Q-PCR) technique to determine bacteria origin from human or non-human sources
	Flow Monitoring	▪ Storm drains into Oxford Basin ▪ Flood gate between Basin E and Oxford Basin ▪ Boone Olive Pump Station ▪ Spot samples suspected of contributing contamination
	Visual Observations/Spot Sampling	
Library Sampling/ Bird Surveys	Eighteen library sample collection events and bird surveys conducted in support of ribotyping	
Questionnaire	Additional tool to collect visual observations and information from local individuals familiar with Marina del Rey Harbor	
Wet Weather Surveys		
Two 12-hour Monitoring Events	Bacterial Sampling	▪ Fecal indicator bacteria enumeration ▪ Ribotyping ▪ Polymerase chain reaction (Q-PCR) technique to determine bacteria origin from human or non-human sources
	Flow Monitoring	▪ Storm drains into Oxford Basin ▪ Flood gate between Basin E and Oxford Basin ▪ Boone Olive Pump Station ▪ Spot samples suspected of contributing contamination
	Visual Observations/Spot Sampling	

2.1 Methods

A literature review was conducted to evaluate the major existing data sources on bacterial levels and fate and transport models for MdRH. Several hydrodynamic models have been constructed for the Harbor, as well as extensive monitoring and a recent Mothers' Beach water quality improvement project that included bacterial source studies. These latter documents pertaining to the potential impact to the back basins from bacterial sources originating elsewhere in the Harbor were presented to, and reviewed by, the stakeholder group prior to the start of this study.

It was apparent from this detailed review that circulation in MdRH, particularly the back basins, is very limited. All of the reviewed modeling studies suggest that contaminants (e.g., bacteria) originating near the Harbor entrance tend to stay near the entrance due to low flushing rates, and therefore do not have a large impact on the back basins. Similarly, bacteria that originate from the Oxford Flood Control Basin and the Boone-Olive Pump Plant during dry weather flows primarily remain where they discharge within Basin E and do not appear to have a meaningful effect on Mothers' Beach in Basin D. The conclusions of the modeling efforts are supported by long-term monitoring data and recent source tracking investigations in the back basins. The most recent investigations concluded that "the general level of indicator bacteria present in Marina waters do not explain frequent exceedances measured at the swash zone of Marina Beach except during storm events where discharges are present in Basin D as well as throughout the Marina" (Kinnetics Laboratories, 2004).

Taken together, these studies suggest that bacterial contamination found within the back basins originates from sources within the basins rather than from sources elsewhere in the Harbor. For this reason, the present study focused on the back basins of MdRH rather than assessing all of the sources throughout the Harbor and then attempting to link those sources to elevated bacterial densities in the back basins through extensive modeling.

2.1.1 Dry Weather Survey Methods

2.1.1.1 Sample Locations

Figure 2-1 presents the sampling locations for the dry weather spatial and temporal surveys. Originally, only sites 1 through 13 were to be sampled for indicator bacteria and Q-PCR analyses. However, as part of the adaptive nature of the monitoring plan, four sites in Oxford Basin (Sites 14, 15 [previously planned only for wet weather monitoring], 18, and 19) and Site 16 at the Boone-Olive Pump Station were added to gather more information about the bacterial types and densities in the influent. In addition, the collection of samples for indicator bacteria was added at two of the original ribotyping-only sites in Basin F (Sites K and N) to verify preliminary findings. To determine bacterial host origin, ribotyping analysis requires the compositing of several samples over broader spatial scales. Samples were therefore collected at ten sites throughout each of Basins D, E and F for compositing as well as from Site 16 at the Boone-Olive Pump Station and Site 8 where Oxford Basin drains into Basin E. The compositing structure will be discussed in the following section. Table 2-2 presents a detailed description of each sampling site. Grey shading indicates sites where only ribotyping samples were collected.

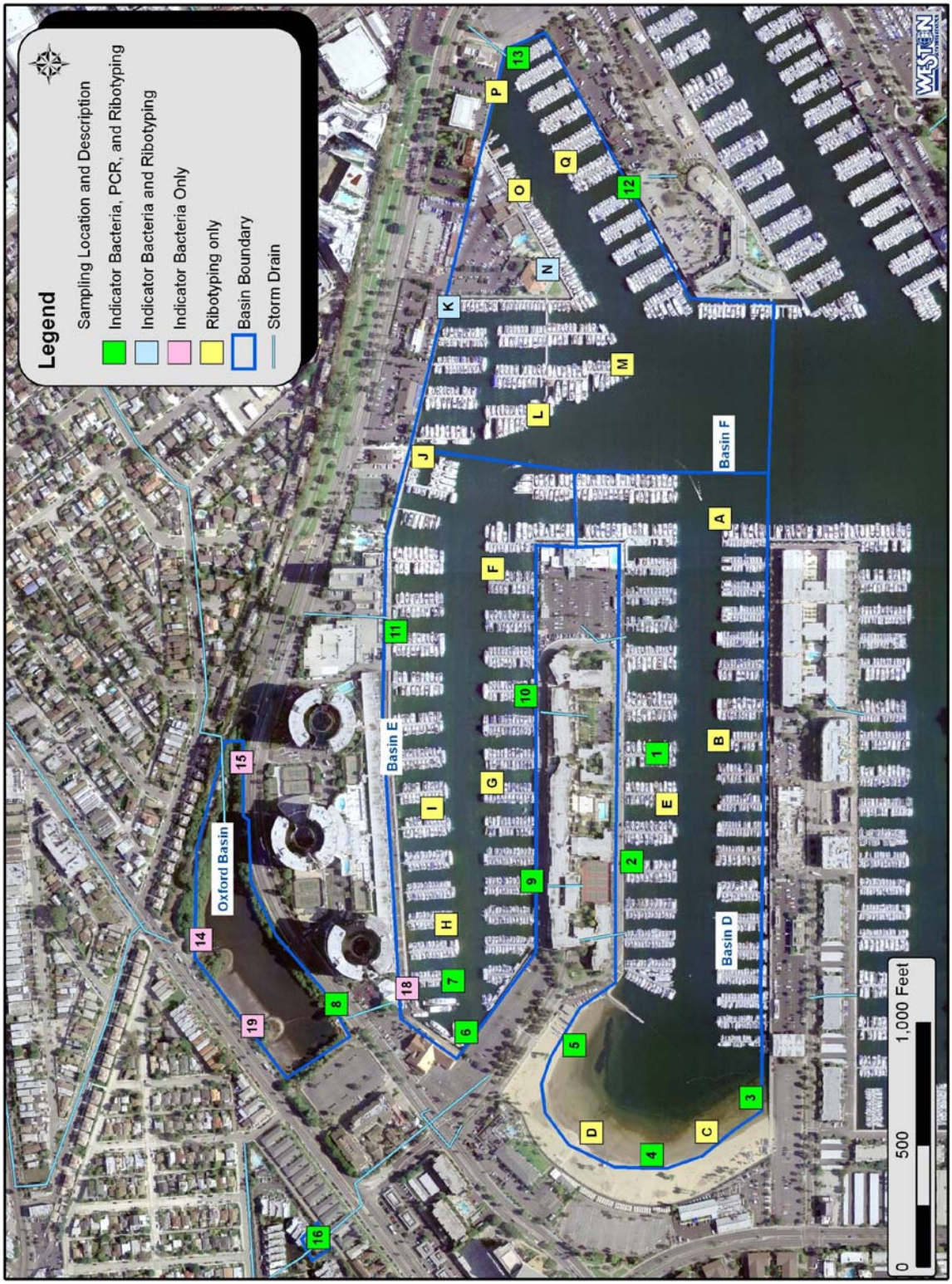


Figure 2-1. Sampling locations for the dry weather spatial and temporal surveys

Table 2-2. Spatial and temporal survey site descriptions.

Site ID	Description
BASIN D	
1	D1400; storm drain present; near 'wrong way' sign; sample taken at the END of the pier
2	Past D2000; placard DN10; sample taken at the storm drain
3	Placard DS4 at storm drain
4	In front of blue lifeguard tower
5	In front of 2nd sign (walking from 3 to 5) with 5 palm trees around it
A	D100; end of pier of the right (main channel) side
B	D1500/1300; right pier at the stern of the live-aboard boat
C	In between two no-birds poles
D	In front of "WAY COOL" lifeguard tower
E	D1600; sample taken at the END of the pier
BASIN E	
6	Boone-Olive Pump Station outlet; access from public parking lot; in front of flag pole
7	E3400; sample taken at the end of the pier[2]
9	E1900 at the storm drain
10	Left of E900 at the storm drain
11	Placard EN31 at the storm drain; in front of the Ritz-Carlton
18	At basin wall where Oxford Basin flushes out
F	E1100; sample taken at end of pier on the right[1]
G	E1500; sample at end of pier near the houseboat
H	E3000; sample at the end of the pier
I	E2000; sample at the end of the pier
BASIN F	
12	Left of placard FS15 at the storm drain
13	Placard FE2 at the storm drain closest to the corner
J	End of E600 at the house boat
K	In the corner of 900 dock; California Yacht Club (CYC)
L	End of 3300 CYC
M	End of 1500 CYC
N	End of 1900 CYC
O	Between hoists at the end of the dock; in front of the Warehouse Restaurant
P	Placard FE5 in corner; in front of MdR Library
Q	End of F1800
BOONE-OLIVE	
16	Boone Olive Pump Plant; drive through the alley between Beach and Wilson paralleling Washington
OXFORD BASIN	
8	At Oxford Basin tide gates; sample the sluiceway closest to the parking lot
14	Big trash gate at end of Mildred Street
15	Little trash gate off Admiralty Way through the parking lot past the yellow gate at the bike trail
17	Oxford Pump Station off of the bike path; if flowing
19	Near the duck pond off Washington Blvd. Sample on the furthest side of the peninsula

1 - Site F was originally at E300, however access to Del Rey Marina was only available during operating hours. Therefore, the site was moved to the nearest accessible dock for consistency.
2 - Site 7 was originally at the end of the private dock with Regent-Sea and Dandeana which was only accessible during operating hours. Therefore, the site was moved to the nearest accessible dock for consistency.

2.1.1.2 Sample Frequency

Five dry weather surveys were conducted between July 1, 2005 and June 30, 2006. Table 2-3 presents the dates and start times of the five 24-hour dry weather sampling events. The possibility of rain between January and the beginning of April limited the scheduling of the dry weather events.

Table 2-3. Dry weather sampling event information.

Day(s) of the Week	Dates	Start Time (Set 1 Start)
Saturday – Sunday	October 1 – 2, 2005	13:30
Wednesday – Thursday	November 30 – December 1, 2005	12:00
Thursday – Friday	April 20 – 21, 2006	08:00
Wednesday – Thursday	May 17 – 18, 2006	12:00
Saturday – Sunday	June 17 – 18, 2006	08:00

Dry weather flows and associated bacterial loads often vary greatly over a 24-hour period due to the timing of irrigation practices, particularly in urban settings. To accurately quantify this variable loading of bacteria to the back basins of MdRH, each of the five surveys was conducted over a 24-hour period by four teams of two samplers. Originally, the teams were to sample each site every three hours. After the first dry weather event, it was determined that this was not adequate time to collect samples and complete visual observations. The sampling frequency was decreased to a total of six sets to be sampled every four hours. Statistical analysis was completed and it was concluded that reducing the sampling frequency would not have a statistically significant effect on the end results.

2.1.1.3 Sample Handling and Processing

In order to provide a weight-of-evidence approach, three bacterial analyses were completed during the seven surveys: enumeration of fecal indicator bacteria (fecal coliform and enterococci), ribotyping, and quantitative polymerase chain reaction (Q-PCR) analysis for bacteroides. Traditional bacterial samples were taken in order to determine the spatial and temporal distribution of fecal indicator bacteria as well as to identify locations of greatest contamination or "hot spots". Throughout the course of the study double-restriction enzyme ribotyping was also performed. This included building a library of known fecal sources from all warm-blooded animals believed to be contributors to bacteria in the watershed, and analysis of receiving water samples to match to bacteria from the library created. Lastly, presence/absence analysis of bacteroides was performed utilizing the Q-PCR method. This method analyzes for the presence of recent fecal contamination by the presence of a general marker and further determination of whether the source is of human origin. There are two benefits to utilizing this method: it provides rapid results for determination of potential human contamination and allows for confirmation of findings of the ribotyping methodology.

Fecal Indicator Bacteria

Fecal indicator bacteria are traditional constituents monitored to determine water quality criteria. Enumeration of these bacteria allows for an understanding of overall water quality, and in this study is also used for calculating loads into MdRH. Two forms of fecal indicator bacteria were enumerated at each station identified in Figure 2-1: fecal coliform and enterococci. Field technicians wearing clean, disposable gloves collected grab samples in sterile, plastic containers. At locations where sampling by hand was not feasible, such as over the basin walls, an extension grab pole was used. Prior to each sample, the pole was decontaminated with ethanol and then wiped down with Kimwipes®. The bottle was submerged open-end down below the water surface and then turned face-up and allowed to fill. The bottle was closed and placed in a plastic bag, sealed, and placed on ice. Each sample was labeled and identified with the project title, appropriate identification number, and the date and time of sample collection. The samples and corresponding chains of custody were delivered to Weston's Microbiology Laboratory where analysis was initiated within the maximum holding time of six hours.

Quantitative Polymerase Chain Reaction (Q-PCR)

Molecular source tracking (MST) methods have been developed for discriminating between human and non-human sources of fecal contamination. These methods, while still being researched, have proven to be powerful tools for tracking bacterial sources and have been used successfully in studies where common bacterial indicators (total coliform, fecal coliform, and enterococci) have provided limited results. Quantitative polymerase chain reaction (Q-PCR) is a more rapid and technologically advanced version of PCR and was used in this investigation to identify potential human contamination at Mothers' Beach and in the back basins of MdRH. This technique provides rapid presence/absence results for determining if recent fecal contamination is present as well as if that source is at least partially human in origin.

The quantitative polymerase chain reaction technique takes advantage of host-specific genetic differences in the 16S rRNA gene of the anaerobic bacterium, bacteroides, a major bacterial resident present in the feces of all warm-blooded animals. Bacteroides comprises approximately one-third of human fecal microflora (Noble et al., 2005). Analysis for bacteroides has advantages over simply detecting for standard fecal indicator bacteria. Since bacteroides are obligate anaerobes they are unable to survive long outside of the intestinal tract, and since they are more abundant in the feces of warm-blooded animals, they provide a stronger indicator for recent fecal pollution (Dick and Field, 2004). This method is applied to determine the presence or absence of fecal contamination in water. Two separate Q-PCR assays are performed; one to detect a "general" marker present in all bacteroides, and the second to detect a marker only present in the bacteroides residing in humans. This three-phase method includes sample filtration, DNA extraction, and DNA amplification by Q-PCR. Data are reported to indicate presence or absence of each marker. The presence of these markers indicates whether general, or more specifically human, fecal contamination is present in a sample.

While this methodology has proven highly beneficial for indicating possible general and/or human contamination, it should be noted it is still undergoing research. In addition, it should be noted that the bacteria of interest can be detected anywhere from a few days to weeks (length of detection time depends on environmental variables and is still being researched) therefore this method primarily detects recent fecal contamination. For these reasons, this and all bacterial

source tracking methodology should be used as a general guideline, and part of a "weight of evidence" approach. This includes using more than one method and pairing it with traditional microbiology sampling, visual observations, spot sampling and special investigations (i.e. CCTV, boat discharge studies, etc.) whenever possible.

Q-PCR analysis for bacteroides is presence/absence. Therefore, the genetic material from one single bacterium could potentially cause a false-positive result for human contamination. For this reason, only well-trained technicians may sample for this method. The sampling technique is as follows. Samples were collected with the following strict "clean hands" aseptic technique similar, but more precise than that required by the Regional Board Surface Water Ambient Monitoring Program (SWAMP) protocols. This procedure involved well-trained technicians using a sterile double-glove technique. First, the exterior of the Ziploc® bag containing the Q-PCR bottle was labeled with sample identification, sample location, sample date, sample time, and name of collector using black, waterproof ink. The sampler's hands were sprayed with ethanol and dried. The first pair of gloves was put on and sprayed with DNA *AWAY*™, a DNA destabilizing reagent, and wiped dry with Kimwipes®. The second pair of gloves was put on over the first pair, sprayed with DNA *AWAY*™, and wiped dry with Kimwipes®. Decontaminated Ziploc® bags were used to store the 250mL irradiated nuclease-free plastic containers before and after sampling. All sample containers were double-bagged. Prior to opening the outer Ziploc® bag, a Kimwipe® was sprayed with DNA *AWAY*™ and the seal of the bag was wiped and allowed to dry. The inner Ziploc® bag was then opened and the bottle removed.

The sample container was carefully opened and the cap held carefully face down to prevent aerial contamination. The sampling container was inverted and allowed to fill and then capped and held in one hand. Excessive water was removed from the sample container using Kimwipes® and transferred to the other hand. The outside glove of the hand that held the bottle during sampling was removed. The sample bottle was sprayed with DNA *AWAY*™, wiped dry with Kimwipes® and placed in the inner Ziploc® bag. The hand that placed the bottle into the inner Ziploc® bag sealed the inner bag. The outer Ziploc® bag was then sealed with both hands and gloves were removed.

These steps were performed for each sample collected and gloves were used only once. During sampling, if gloved hands touched anything other than the sampling bottle or Ziploc® bag, the gloves were discarded and the procedure was repeated. The sealed Ziploc® bags containing the Q-PCR samples were placed in a cooler with blue-ice and transported to Weston's Molecular Laboratory in Carlsbad, CA with all other bacteria samples.

One sterile field blank was performed by each sampling technician during each sampling event to ensure sterile techniques. The same sampling techniques as above were used. For the blank, nuclease-free water was substituted for the channel water sample. If the field blank was found to be contaminated, all results for that Q-PCR set would have been considered invalid and none of the results reported or used. No field blanks were contaminated at any time throughout this study.

Upon arrival at Weston's Molecular Laboratory, water samples for Q-PCR analysis were stored at 4ºC until analysis. When performing the three-phase Q-PCR procedure, care was taken to avoid any contamination. All surfaces and instruments were first sterilized using ethanol and then wiped again with DNA *AWAY*™. Kimwipes® were used to dry the surfaces and equipment during the sterilization process. Samples collected for Q-PCR analysis were processed according to Weston's Standard Operating Procedures for bacteroides following the methods described in Dick and Field's 2004 paper: *The Rapid Estimation of Fecal Bacteroidetes by the Use of a Quantitative PCR Assay for 16s rRNA Genes*.

Upon receipt of all samples to the lab, the sample water was filtered, and DNA extracted from the filters was then analyzed by Q-PCR using two primer sets that amplify targets from the bacteroides group of fecal bacteria. These included a general bacteroides probe and primer set, which assay for the presence of fecal contamination from any warm-blooded animal source (general marker), and a human-specific primer set, which tests specifically for the presence of human fecal contamination (human marker). Samples were considered positive for general bacteroides when their level of fluorescence exceeded a defined fluorescence cycle threshold.

Samples for Q-PCR analysis were collected from each of the stations identified in Figure 2-1. Two composite samples were analyzed from each site per survey: one consisting of the samples collected during the nighttime (6:00 pm to 6:00 am) sampling rounds and the other composite of daytime (6:00 am to 6:00 pm) samples.

Ribotyping

Ribotyping is a molecular technique that compares the genetic make-up of the ribosomal DNA of a single bacterial cell found in a water sample against those of a host "library" or collection of individual cells of known origin in order to find a matching host "fingerprint". While all methods of tracking bacteria in water continue to be researched, this methodology has been used successfully for decades in the food quality industry for tracking bacterial outbreaks in humans back to sources such as farms and dairies using poor handling practices. As has been shown in a number of successful studies, when used in conjunction with traditional bacterial sampling and visual observations, ribotyping has proven a very powerful tool to indicate overall sources of contamination. As discussed above for Q-PCR, this and all bacterial source tracking methodology should be used as a general guideline, and part of a "weight of evidence" approach. This includes using more than one method and pairing it with traditional microbiology sampling, visual observations, spot sampling and special investigations (i.e. CCTV, boat discharge studies, etc.) whenever possible.

In this study, double restriction-enzyme ribotyping was used to assess the relative percent contribution of bacteria from potential sources including but not limited to humans, birds, dogs, and rodents to the receiving waters of Basins D, E, F, Oxford Basin and the Boone-Olive Pump Plant. For this method, Weston Solutions utilized the Institute for Environmental Health (IEH) at the University of Washington. The library at IEH contains over 120,000 isolates and is the largest of its kind in North America, lending to the greatest specificity available for this method. In addition, fecal material from positively identified sources within the Marina del Rey Watershed were collected to add to the IEH library and improve specificity on a localized level. Eighteen library sample collection events were conducted and are discussed in the next section.

The sampling method for fecal indicator bacteria was also followed for ribotyping sampling. The stations sampled for ribotyping are identified in Figure 2-1, and were selected to represent five different areas:

1. the discharge from the tide gate that drains Oxford Basin into Basin E,
2. the discharge from the Boone-Olive Pump Plant that drains into Basin E,
3. the receiving water of Basin D,
4. the receiving water of Basin E, and
5. the receiving water of Basin F.

To produce meaningful results using the ribotyping technique, it is extremely important to have good spatial and temporal representation of the water body under investigation. Because one aspect of the study was to investigate bacterial sources from Boone-Olive and Oxford Basin as it empties into Basin E, which could only be sampled at a single point, there was no additional spatial component to the effluent sampling. However, for the receiving water areas (Basins D, E, and F) it was imperative to sample several sites within each basin so that the entire basin was represented rather than just a single location.

Samples for ribotyping were collected during all five 24-hour dry weather surveys. As with indicator bacteria, samples for ribotyping were collected during six rounds of sampling (once every four hours over a 24-hour period). The samples were then delivered to Weston's Molecular Laboratory in Carlsbad, CA where they were composited into the five distinct areas above, filtered and grown on fecal coliform media. The filters were incubated until the growth of colonies (a colony represents many clones of a single bacterial cell) was observed. For each of the five sampling areas, enough filters were created to provide 20 distinct *E. coli* isolates per event, for a total of 100 isolates per dry weather event. Throughout the dry weather surveys, a total of 500 bacterial cells (100 per event), were chosen to characterize the effluent from the Boone-Olive Pump Plant, Oxford Basin, and Basins D, E and F. A schematic for a single sampling event in a basin (e.g., 4:00 am in Basin D) during one of the five surveys is shown in Figure 2-2.

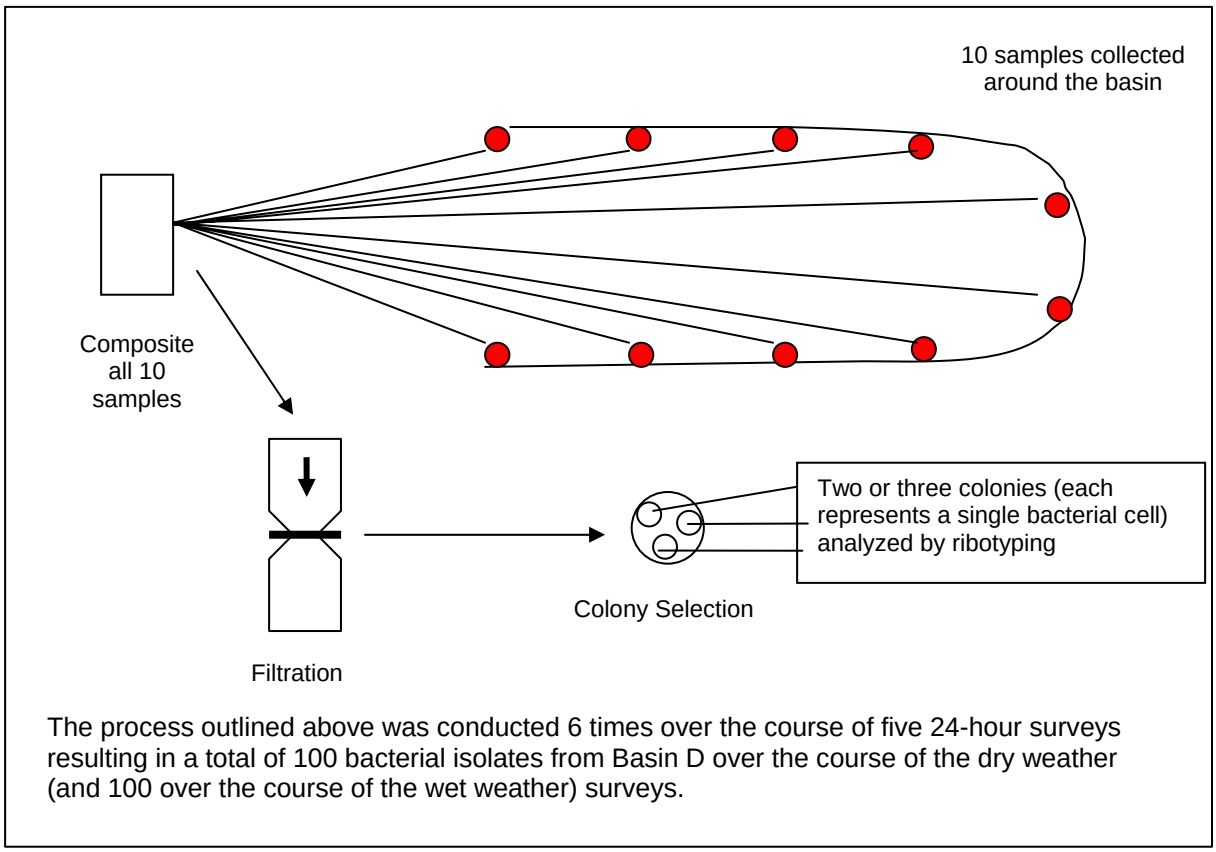


Figure 2-2. Schematic showing receiving water sampling for ribotyping analysis during one sampling event (e.g., 4:00 am at Basin D).

The final results of the dry weather ribotyping analysis include five pie charts (one for each Boone-Olive, Oxford Basin and Basins D, E, and F) showing the host origin (human, bird, dog, etc.) of the bacteria at each of the five locations. Results are discussed later in Section 2.2.

Library Sampling and Bird Surveys

As previously described for this method, a library of bacterial cells is necessary to identify the host origin of bacteria in a given sample. The strength of the technique relies in large part on the size of the library (the larger the library the greater the probability of matching a sample bacteria to one in the library). The library of known cells used for this study is the largest library in North America, created and maintained by the Institute of Environmental Health in Seattle, Washington. To augment this library with sources pertinent to the present investigation, site-specific library samples were collected every two to three weeks from July 2005 through June 2006. Fecal material was collected from known sources (e.g., birds identified to species) within MdRH and the surrounding watershed. During this time, bird surveys were conducted within MdRH. The surveys provided a continuous record of birds in the area that was later used to assess the extent to which they may contribute to bacterial loading at the beach.

Appendix A contains the Ribotyping Library Sampling Procedures and corresponding data sheets.

2.1.1.4 Visual Observations

The purpose of the visual observations during the 24-hour events was to assess the numerous, usually small sources of bacteria that potentially impact the receiving water. The visual observations were conducted using an extensive form intended to cover all potential bacterial sources, including but not limited to boating activity and practices that may attract wildlife, observations of illegal sewage discharge, wildlife distribution patterns, accumulation and runoff of fecal material from parking lots or other areas, boat or dock wash down, small drain discharges, maintenance practices related to restaurants or other operations near the water, surface runoff, and visitor behavior. Over the course of the 24-hour sampling period, visual observations were conducted continuously throughout the study area in conjunction with the bacterial sampling.

As the visual observations were conducted, samples were collected from any observed potential sources (e.g., storm drain effluent, boat or dock washing effluent, irrigation runoff, etc.). In this way, the visual observations provide a written assessment of all of the potential bacterial sources impacting the back basins as well as "spot samples" for bacterial analyses. Field crews utilized standardized recording protocols and prepared checklists in field notebook formats. The visual observation form is presented in Appendix B.

2.1.1.5 Questionnaire

In addition to the visual observations that were performed during each survey, a questionnaire was created to investigate non-point sources of bacteria that might be difficult to identify. The questionnaire contains a series of questions designed to identify potential bacterial sources and is presented in Appendix C. It was used to "interview" individuals knowledgeable about the sources of bacteria in the Harbor, including boat owners, the dock master(s), park and recreation staff, Beaches and Harbors staff, water quality monitoring groups or other individuals that may have valuable information. The questionnaire consisted of 39 questions divided into seven types of observations: boater practices, pump-out station practices, general harbor maintenance practices, harbor wildlife, visitor behavior, storm drain and runoff observations, and sewerage infrastructure.

The survey was available in a hard copy format as well as posted on the internet for ease in accessing from mid-September through mid-March. Flyers were created and posted around the Harbor by Santa Monica Baykeeper to encourage participation. In addition, during library sampling surveys, field crews directed any interested parties to the website to participate. The link for the survey was on the County's website at www.ladpw.org. The online portion of the survey was created using www.surveymonkey.com.

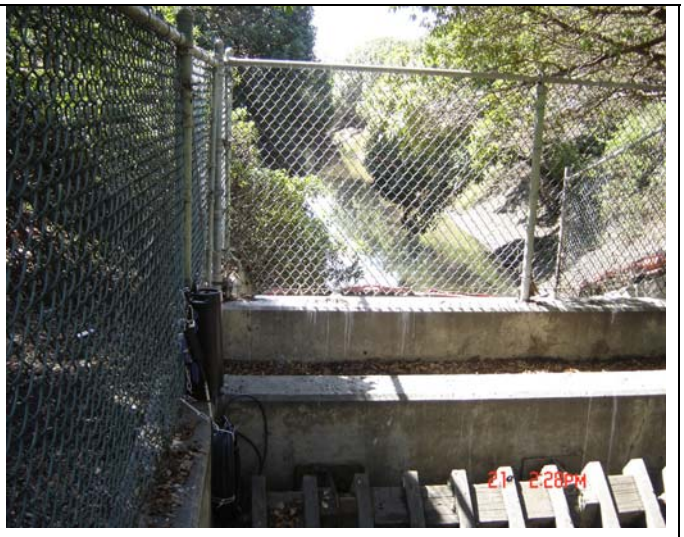
2.1.1.6 Flow Equipment

In order to assess bacterial loading, both bacterial concentration and flow must be calculated. Because of the constant tidal influence in Oxford Basin, the flow out of the basin is not easily measured with one flow meter. Therefore, a mass balance approach was used to estimate the net

flow out of Oxford Basin to Basin E. The three point source flows into Oxford Basin were measured along with the flow between the flood basin and Basin E.

In Oxford Basin, automated flow meters were installed at the two storm drain outfalls. To measure flow coming into Oxford Basin from the watershed, the sensor would ideally be mounted out of tidal influence. Because the storm drains are tidally influenced blocks above the flood basin, the sensors were mounted at the outfalls, downstream of the trash racks. The sensors were attached to American Sigma 920 flow meters which continuously monitored flow, both positive and negative, for the duration of the study period. The third outfall to influence Oxford Basin is from the Oxford Basin Pump Station, which is continuously monitored by the County. Telemetry data for this pump station was made available for the study, rendering flow monitoring equipment unnecessary.

Site 14: Big Trash Grate



Site 15: Little Trash Grate

To complete the mass balance equation, a flow meter was installed at the tide gate between Oxford Basin and Basin E. The sluiceway that runs under Admiralty Way consists of two tide gates; neither of which is water-tight. The remaining flow meter was installed on the outfall, or Basin E side, of the primary tide gate. While some flow is presumed to surge through the secondary gates, it is assumed this flow is minimal compared to the primary tide gate. Further discussion of the methods used in the loading analysis is presented in Section 6.

Site 18: Outfall of Oxford Basin

2.1.1.7 Data Analysis

Mothers' Beach (located in Basin D) and the back basins of MdRH were listed on California's 2002 Section 303(d) List as impaired due to bacteria for two reasons: the total and/or fecal coliform water quality standards contained in the Water

Quality Control Plan for Ocean Waters of California were exceeded based on monitoring data and there were one or more beach closures during the period assessed. In the assessment that led to the listing of MdRH, beaches were listed due to bacteria for the entire data set because the fecal coliform standard of 400 organisms per 100mL and/or the total coliform standard of 10,000 MPN/100mL was exceeded in more than 10% of samples with a confidence level of 90 percent using a binomial distribution and/or 2) was exceeded in more than 20% of samples. In addition, Mothers' Beach was listed due to beach closures.

The fecal indicator bacteria results are compared to the standards set in the Water Quality Control Plan (Basin Plan, RWQCB, 1994) for the Los Angeles Region and Title 40 of the Code of Federal Regulations (Part 131; Water Quality Standards) (USEPA, 2000a) to determine the number of exceedances from storm water or urban runoff to MdRH receiving waters. Table 2-4 lists the constituents monitored during this project and the associated water quality objectives. Although Q-PCR analysis does not have a water quality objective, it is useful in the determination of the host origin of bacteria found. Ribotyping results are also used in this manner.

Table 2-4. Major water quality constituents and applicable criteria.

Constituent	Criteria	Source
Fecal coliform	200 MPN/100mL and 400 MPN/100mL (a)	MdR Bacteria TMDL (2005)
Enterococci	35 MPN/100mL and 104 MPN/100mL (a)	MdR Bacteria TMDL (2005)
Bacteroides (b)	Presence/Absence	N/A

(a) 30-Day Geometric Mean and Single Sample, respectively.
(b) No current water quality criteria exist for the enumeration of bacteroides species. Samples are analyzed for general bacteroides, present in all warm-blooded animals. Upon the detection of the general marker, the sample DNA is further analyzed to determine if it is of human origin.

2.1.2 Wet Weather Surveys

2.1.2.1 Sample Locations

Figure 2-3 presents the wet weather sampling locations. Although the wet weather site locations were the same as those monitored during dry weather (Table 2-2), the bacterial analyses performed at each site shifted slightly. As with the dry weather sampling, Sites 1 through 13 and Site 16 were evaluated using all three analyses (indicator bacteria, Q-PCR, and ribotyping) during both wet weather events. However, Site 18 (directly in front of the outfall from Oxford Basin) was added during the second wet weather event and was also analyzed using all three methods (versus only indicator bacteria during dry weather). Additionally, Sites 14, 15, and 17 were evaluated for indicator bacteria and Q-PCR. Sites A through Q were only sampled for ribotyping (see Figure 2-3).

2.1.2.2 Sample Frequency

Two storm events were monitored between November 1, 2005 and March 31, 2006 (wet weather season as defined by the SWRCB). A storm event is described as 0.1 inches of rainfall or greater. Table 2-5 presents the dates and start times of the two 12-hour dry weather sampling events. Originally, grab samples were to be collected at each sample location every two hours over the duration of the storm. However, due to the knowledge gained regarding time needed to properly take samples during the first dry weather event, the frequency decreased to every three hours over a 12-hour period. To complete the required sampling in this time-frame, an additional team was added for wet weather surveys, requiring three teams of two samplers.

Table 2-5. Wet weather sampling event information.

Day(s) of the Week	Dates	Start Time (Set 1 Start)
Wednesday	November 9, 2005	10:50
Saturday-Sunday	February 18-19, 2006	20:50

2.1.2.3 Sample Handling and Processing

The same weight-of-evidence approach used during the dry weather surveys was also employed during the wet weather surveys. This included analyses for fecal coliform and enterococci enumeration, Q-PCR, and ribotyping. Grab samples were collected using the same protocols described for the dry weather survey in Section 2.1.1.3.

All samples collected during the four three-hour sampling intervals at Sites 1 through 18 were analyzed for indicator bacteria and Q-PCR. The samples collected for Q-PCR over the entire storm event were composited by station in the laboratory and analyzed as a single sample for each station over the course of the storm. Composite sampling was chosen for the Q-PCR technique during storm events for three reasons:

Figure 2-3. Wet weather sampling locations

1. The human/non-human information obtained by the Q-PCR technique can identify whether bacteria present in the receiving water during a storm is derived from human sources and can verify the ribotyping results.

2. Composite sampling is the most efficient and cost effective way to provide evidence of bacteria originating from human sources within the sub-watershed represented by each influent. In addition, composite sampling at the receiving water stations provides the spatial information that leads to source identification.

3. Archived individual samples can be analyzed individually if a composited sample is positive for human contamination. In this study, individual samples were broken out when positives were found in several instances, which allowed for determining when a human contamination event occurred, as opposed to only where.

For the ribotyping analysis of storm events, grab samples were collected during the same three hour intervals over the course of each storm. For the two large sources that impact Basin E directly (Site 16 at the Boone-Olive Pump Plant and effluent from the Oxford Flood Control Basin at Site 8), samples were filtered individually in the laboratory so that discrete colonies could be analyzed (as previously described above for the dry weather surveys). A total of 50 bacterial isolates were obtained from the filters from each of these locations. Thus, for the two storm events, 100 isolates were analyzed from each of the two main drainages that directly impact the back basins of Marina del Rey.

In the receiving waters of Basins D, E, and F, samples were also collected at three hour intervals over the course of each storm. During each sampling interval, a total of 10 samples were taken for ribotyping in each basin at the locations shown in Figure 2-3. These samples were then composited in the laboratory and filtered as previously described for the dry weather surveys (Figure 2-2), producing a total of 50 isolates from each of the three back basins during each of the two storm events. Thus creating 250 isolates per storm, and 500 total isolates for wet weather events overall. This design allowed for the best spatial and temporal coverage to accurately represent the host origins of bacteria impacting the back basins during storm events. As with the dry weather surveys, ribotyping analysis for wet weather resulted in five pie charts (one for each main discharge into Basin E and one each for Basins D, E, and F) showing the host origin (human, bird, dog, etc.) of the bacteria at each of the five locations. Results are discussed in Section 2.2.

The documentation of visual observations during wet weather followed the same procedure used during dry weather events. The data sheet is presented in Appendix B. Along with visual observations, any additional observed runoff was collected as a grab or "spot" sample and analyzed for fecal coliforms and enterococci.

2.1.2.4 Data Analysis

The same water quality criteria used to analyze dry weather data was also applied to wet weather results (Table 2-4). The fecal indicator bacteria were compared to these criteria to determine exceedances. Although the Q-PCR and ribotyping analyses do not have associated water quality criteria, they were used to aid in the determination of bacterial host sources.

2.2 Results

Five dry and two wet weather sampling surveys were completed between July 1, 2005 and June 30, 2006. Each dry weather event consisted of routine 24-hour sampling, while wet weather monitoring was performed over 12-hour periods. Dry weather events were characterized by three antecedent days without rain, whereas wet weather was qualified as a rain event with at least 0.1 inches. Figure 2-4 presents a summary of the total rainfall for October 2005 - June 2006, as recorded at the Ballona Creek rain gauge, including dry and wet weather sampling dates.

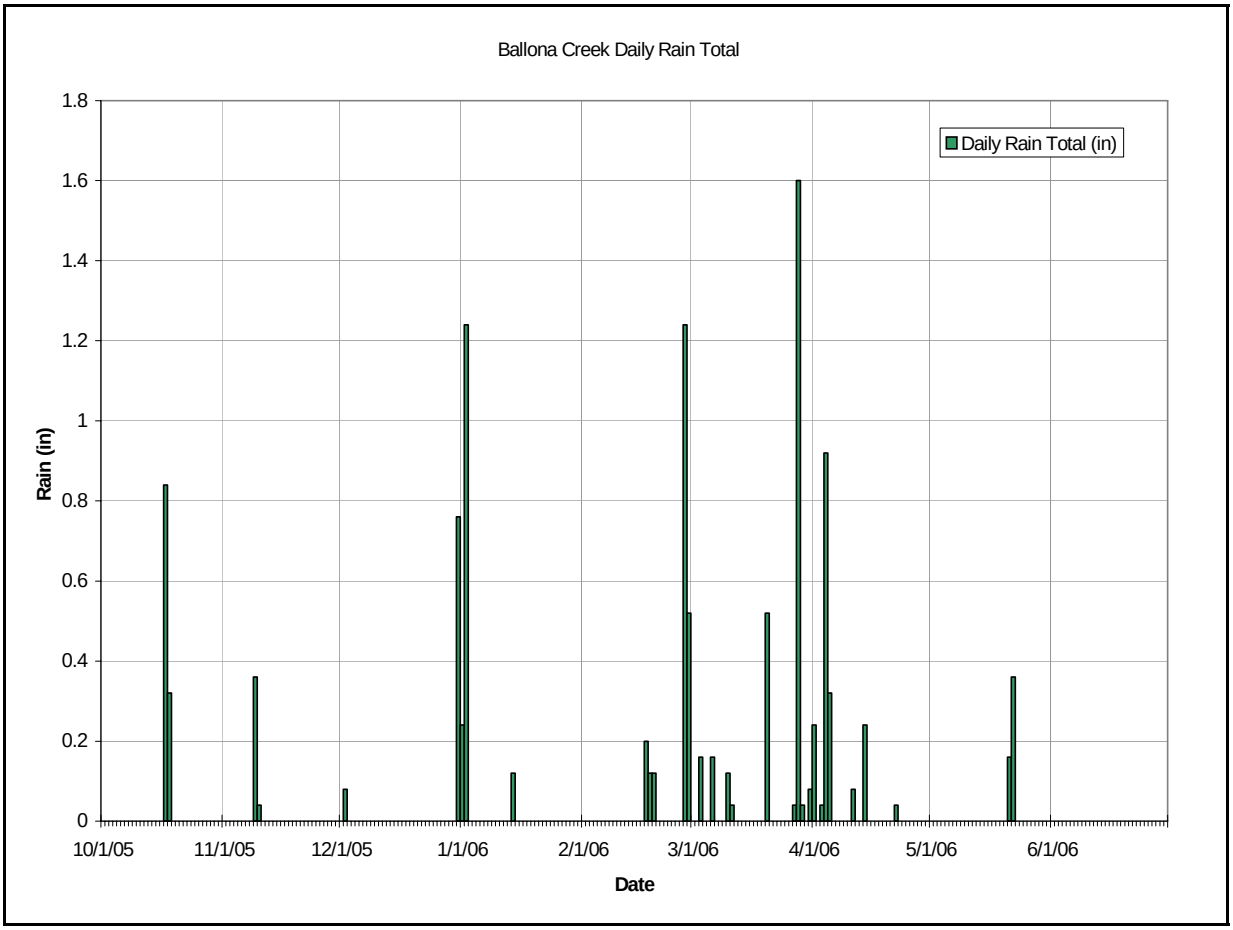


Figure 2-4. Summary of the total rainfall in 2005-2006 as recorded at the Ballona Creek rain gauge.

In addition to sampling for indicator bacteria, Q-PCR, and ribotyping analyses, both dry and wet weather sampling events also included the collection of visual observations and spot samples. Library sampling was also completed and a Harbor use questionnaire was distributed. The results of these sampling events and questionnaire responses are provided in the following sections.

2.2.1 Dry Weather

Five dry weather surveys were completed, including sampling events during the months of October and November 2005 and April, May, and June 2006. Per dry weather sampling protocols, no sampling was performed prior to the required 72-hour waiting period.

2.2.1.1 Dry Weather Indicator Bacteria Results

As shown in Table 2-6, the majority of the sites were sampled during all five dry weather events for a total of 32 individual results per site. Site 16, Boone-Olive Pump Station was not sampled during the first dry event, but was sampled during the remaining events, for a total of 24 individual results. Sites 14, 15, 18, 19, K and N were added during the last three events as more information was warranted in Oxford Basin and Basin F. These sites have a total of 18 individual results.

Table 2-6. Number of samples collected per site during each dry weather event for indicator bacteria analyses.

Event	Station ID																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	K	N
1	8	8	8	8	8	8	8	8	8	8	8	8	8	NS	NS	NS	NS	NS	NS	NS
2	6	6	6	6	6	6	6	6	6	6	6	6	6	NS	NS	6	NS	NS	NS	NS
3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**18**	**18**	**24**	**18**	**18**	**18**	**18**

NS = Not sampled

A summary of the dry weather results including the minimum bacterial density, the maximum bacterial density, and the geometric mean per site for fecal coliform and enterococci results is presented in Table 2-7. The geometric mean was calculated for each site from all of the dry weather events and sets sampled. While the 30-day geometric mean water quality criteria is not directly applicable due to the expanded timeframe of the data collected, it is used here as a point of reference. The full laboratory reports are presented in Appendix D.

With the exception of Site 15 in Oxford Basin and Site 16 at the Boone-Olive Pump Station, all of the sites had at least one undetectable bacterial concentration. Interestingly, the lowest detected enterococci density at Site 16 was greater than the single sample standard. Most of the sites also resulted in a concentration that exceeded the single sample standards at one time during the survey. The range of results from below the detection limit to above water quality criteria at the majority of the sites shows the extreme variability of bacteria densities in the area. Because bacteria are ubiquitous living organisms, population densities are variable in the environment

and fluctuate from sample to sample and event to event. Differences in bacterial densities are generally only considered seen when there is an order of magnitude between results.

Table 2-7. Summary of bacterial densities collected during the dry weather surveys.

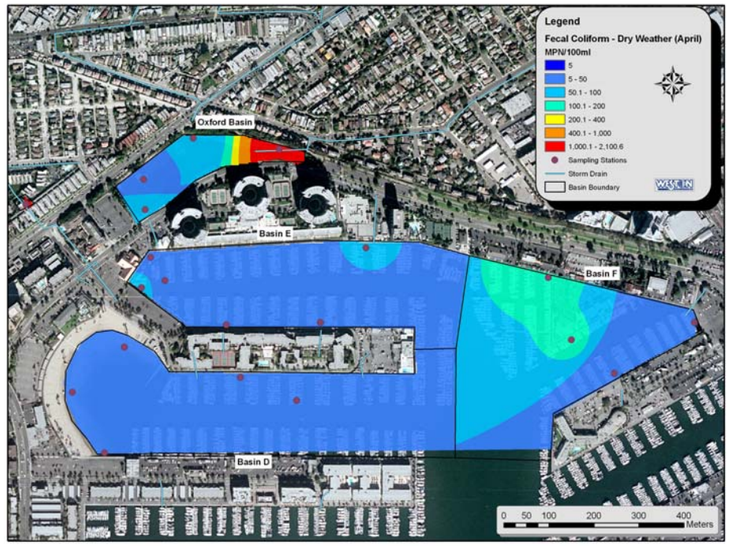
Station ID		Fecal Coliform (MPN/100mL)			Enterococci (MPN/100mL)		
		Minimum Density	Maximum Density	Geometric Mean	Minimum Density	Maximum Density	Geometric Mean
Basin D	1	<20	230	15	<10	63	7
	2	<20	300	17	<10	1,872	7
	3	<20	1,100	17	<10	110	7
	4	<20	1,300	27	<10	857	15
	5	<20	1,300	50	<10	313	15
Basin E	6	<20	16,000	95	<10	1,782	**39**
	7	<20	3,000	74	<10	24,196	**39**
	9	<20	800	33	<10	96	10
	10	<20	300	18	<10	199	12
	11	<20	1,700	41	<10	697	14
	18	<20	2,200	91	<10	367	23
Basin F	12	<20	40	12	<10	467	7
	13	<20	40	13	<10	41	9
	K	<20	16,000	109	<10	14,136	26
	N	<20	80	16	<10	31	8
Boone-Olive	16	80	35,000	**1,872**	156	5,475	**1,021**
Oxford Basin	8	<20	1,300	53	<10	1,106	**35**
	14	<20	11,000	62	<10	2,143	**51**
	15	80	300,000	**8,195**	41	2,755	**686**
	19	<20	300	41	<10	1085	18

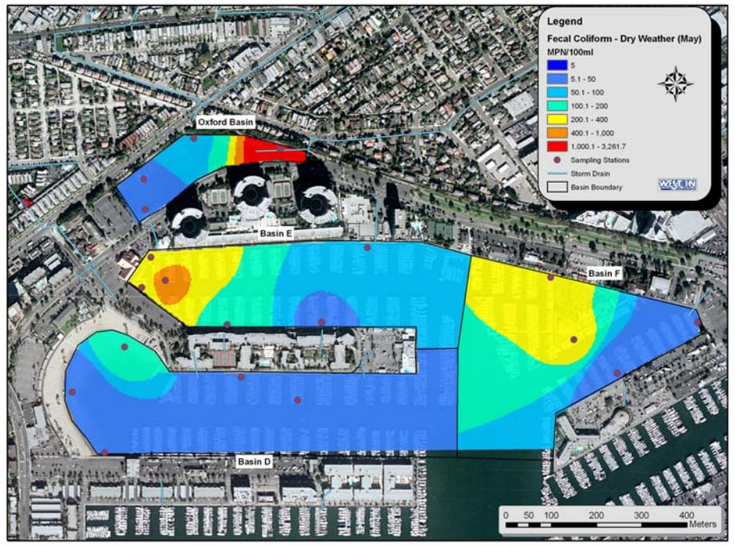
Values in red indicate exceedances of the single sample standard (maximum density).
Values bolded indicate a result greater than the 30-day geometric mean.

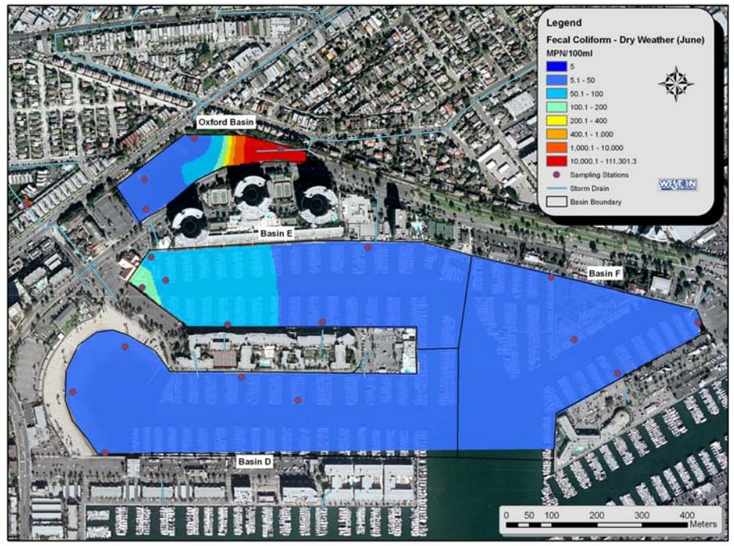
For fecal coliform, the geometric means calculated for the entire survey period were greater than the 30-day geometric mean at the Boone-Olive Pump Station (Site 16) and at Site 15 in Oxford Basin. The enterococci geometric means were greater than the 30-day geometric mean criteria in these two sites, as well as Sites 8 and 14 in Oxford Basin, and Sites 6 and 7 in Basin E.

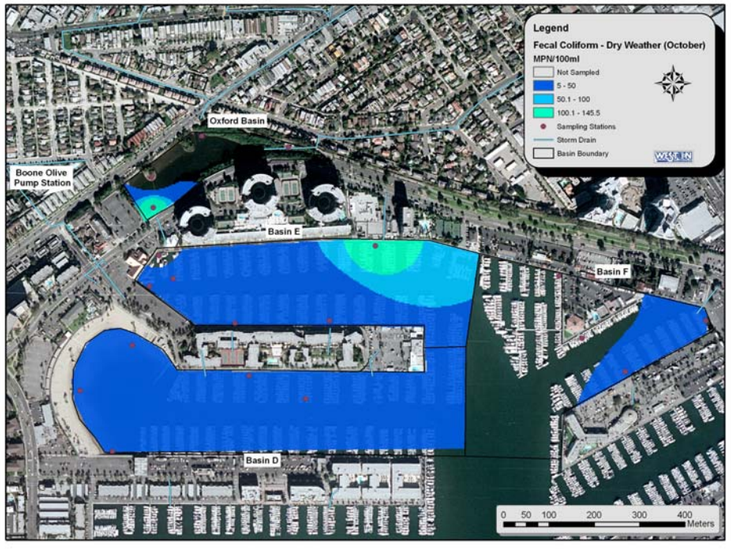
To illustrate the changes in geomean over the course of the five dry weather events, inverse distance-weighted (IDW) interpolation maps were created for the geomean of each 24-hour event for each basin. Figure 2-5 presents the interpolations for the geomean fecal coliform results and Figure 2-6 presents the interpolations for the enterococci geometric mean results. High concentrations of both fecal coliform and enterococci are observed in the eastern portion of Oxford Basin during April, May, and June events (that area was not sampled during October and November.)

Figure 2-7 presents another compilation of the five dry weather event results by site. The box and whisker plots present the minimum and maximum concentration, as well as the red area indicating the values in the 25th to 75th percentiles. The bar in the middle is the median density of the dry weather results. The lower extension of the whiskers represents the method detection limits. Therefore, if red box is not apparent for a particular site then 75% of the samples results were undetectable.









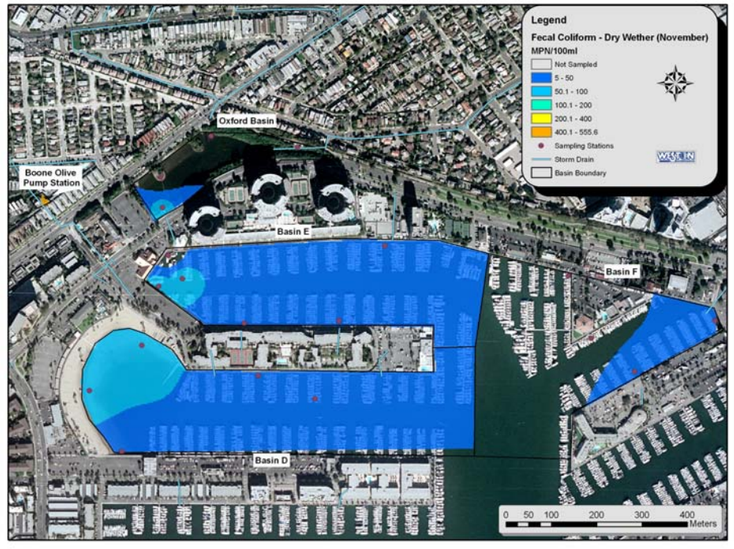
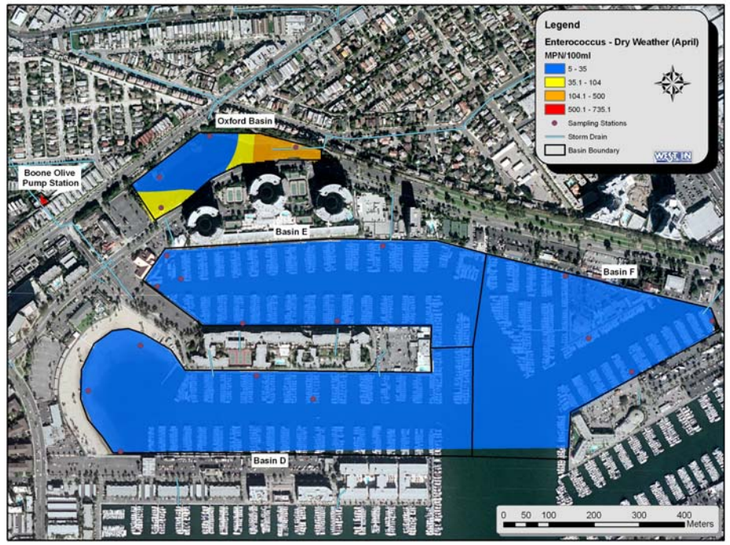
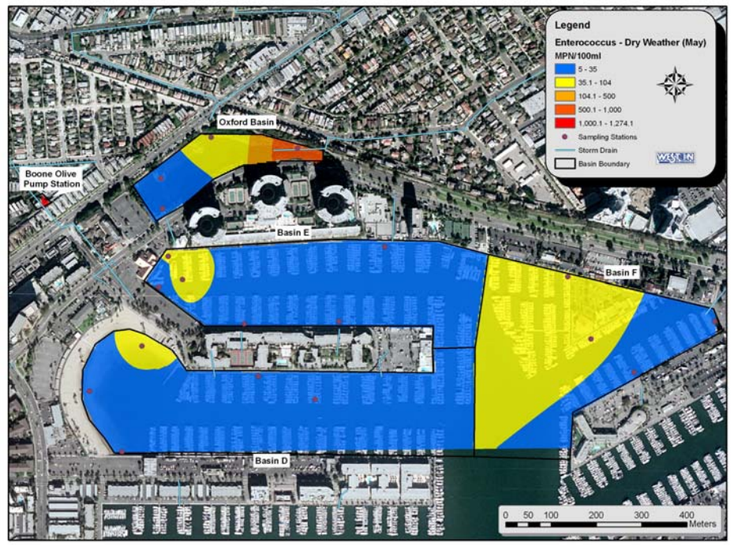
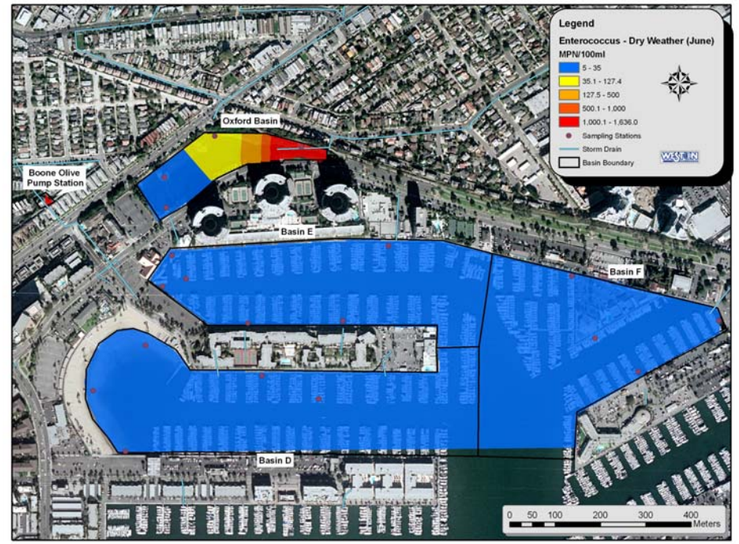
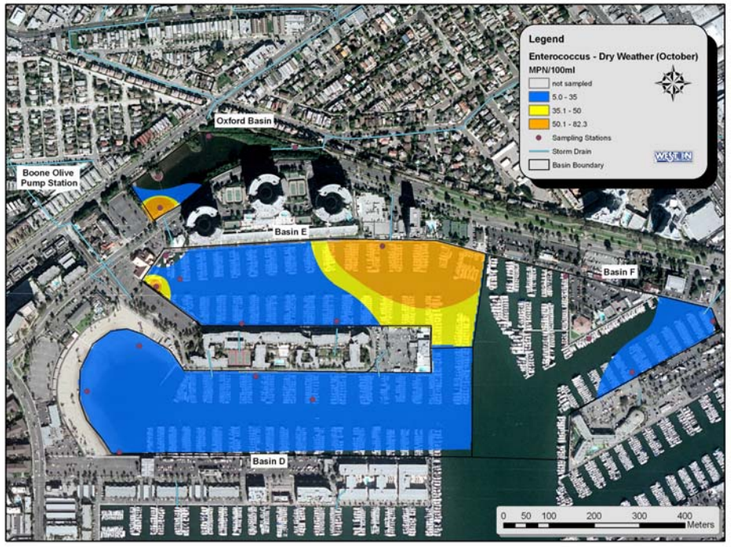


Figure 2-5. Dry weather interpolation for fecal coliform for April, May, June, October, and November.









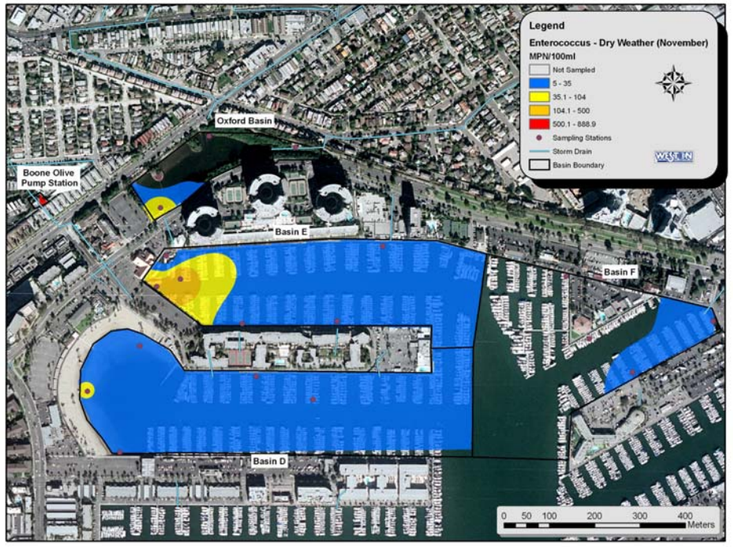


Figure 2-6. Dry weather interpolations for enterococci for April, May, June, October, and November.

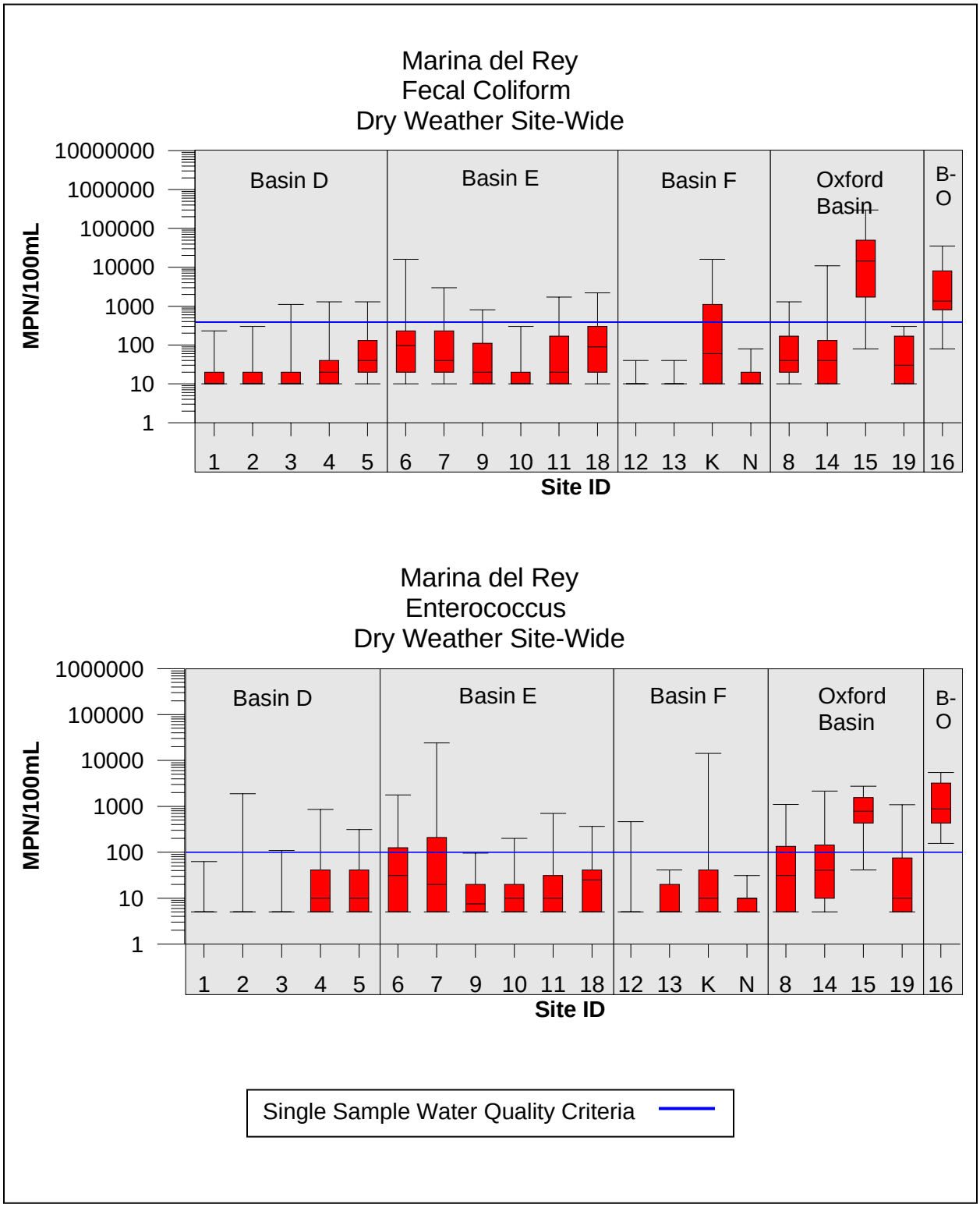


Figure 2-7. Box and whisker plots for dry weather surveys.

The fecal coliform results show that 75% of the results for each site are below the single sample water quality objective (WQO) of 400 MPN/100mL for all of the sites in Basins D and E. Site K in Basin F had an upper quartile value of 900 MPN/100mL. Site 15 in Oxford Basin and Site 16 at the Boone Olive Pump Station each had more than 75% of the results above the WQO.

The box and whisker plots show that enterococci densities for Sites 1, 2, 3, and 12 were undetectable in more than 75% of the samples collected throughout the survey. And again at Sites 15 and 16, 75% of the results were above the enterococci WQO of 104 MPN/100mL.

Statistical analyses were completed on the fecal indicator bacteria data sets. Diurnal comparisons were tested using the normal approximation of the Wilcoxon rank sum test. This is a non-parametric test which can account for the number of non-detects present in this dataset. Data were grouped by basin, and then divided into day and night by the hours of 6:00 am to 6:00 pm as day and 6:00 pm to 6:00 am as night. The four basins examined were Oxford Basin, Basin E, Basin D, and Basin F. The results of this test indicated that there was no statistical difference between night and day bacterial densities in any basin.

Qualitative statistical analyses were also performed to examine potential differences in bacterial concentrations by tidal changes. Data was tested for Mothers' Beach for all five dry weather events. While the bacterial concentrations were found to be slightly higher during ebbing tides, the results of these tests showed no statistical difference between flooding and ebbing tides.

2.2.1.2 Dry Weather Q-PCR Results

As shown in Table 2-8, the majority of the sites were sampled during all five dry weather events for a total of 32 individual results per site. Site 16, Boone-Olive Pump Station was not sampled during the first dry event, but was sampled during the remaining events, for a total of 24 individual results.

Table 2-8. Number of samples collected per site during each dry weather event for Q-PCR analyses.

Event	Site													
	1	2	3	4	5	6	7	8	9	10	11	12	13	16
1	8	8	8	8	8	8	8	8	8	8	8	8	8	NS
2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
3	6	6	6	6	6	6	6	6	6	6	6	6	6	6
4	6	6	6	6	6	6	6	6	6	6	6	6	6	6
5	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**32**	**24**

NS = Not sampled

The results of the Q-PCR analyses for presence/absence of human bacteroides during the five dry weather events are presented in Table 2-9 and Figure 2-8. The sets were composited by time of day (day and night, as described above). Although the additional sites in Oxford Basin and Site 18 in Basin E were added for fecal indicator bacteria they were not included for Q-PCR analysis. Sites 1, 9, 16 and 2 had a positive result for the presence of human bacteroides.

The result for the Site 1 day composite in Basin D at the end of dock D1400 was positive for the day composite, however, a qualifier from the laboratory indicates a possible false positive. The fecal indicator bacteria results were low, with only one detectable fecal coliform result of 40 MPN/100mL and all of the enterococci results undetectable. Thus, this positive result is most likely a false positive, and it is unlikely that human bacteria were present.

Table 2-9. Summary of human bacteroides presence during dry weather surveys.

Station ID		Human Bacteroides (Presence/Absence)									
		October 1 - 2, 2005		November 30-December 1, 2005		April 20 - 21, 2006		May 17 - 18, 2006		June 17 -18, 2006	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Basin D	1	+*	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	+	-	-	-
	3	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-	-
Basin E	6	-	-	-	-	-	-	-	-	-	-
	7	-	-	-	-	-	-	-	-	-	-
	9	-	-	+	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	-	-	-	-
	11	-	-	-	-	-	-	-	-	-	-
Basin F	12	-	-	-	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-	-	-	-
Boone-Olive	16	N/S	N/S	-	-	+	+	-	-	-	-
Oxford Basin	8	-	-	-	-	-	-	-	-	-	-

***** After re-running in triplicate, this site is technically positive. Laboratory results however were questionable and may represent a false positive.

Figure 2-8. Human bacteroides hits for all dry and wet weather events with positive results.
(There were no positive human hits for the 5th dry weather event.)

At Site 9 (taken from dock E1900 in front of the storm drain), a positive result for the presence of human bacteroides was found in the day composite sample collected during the second dry weather event. Although the receiving water samples for this site were at or below 20 MPN/100mL for fecal coliforms and 31 MPN/100mL for enterococci, a spot sample was collected across the street from the storm drain with high bacterial indicator results. Spot Sample 3 taken during Set 1 was collected from the condominium parking garage wash down. Fecal coliform results were 1,600,000 MPN/100mL and enterococci results were 13,958 MPN/100mL; the third highest bacterial levels collected from spot samples. Fecal coliform levels greater than one million MPN/100mL generally indicate human sewage. The runoff was coming from the parking deck and running into the storm drain across at Site 9. Therefore, although the receiving water bacterial results are low, the presence of human bacteroides is supported by the results of the spot sample collected.

During the third dry weather event, Site 16 at the Boone-Olive Pump Station was positive for both the day and the night sets. To verify these results, the individual sets from Site 16 were then analyzed. All but one set (Set 2 at 12:00) was positive for human bacteroides.

During the fourth dry weather event, Site 2 resulted in the presence of human bacteroides in the day composite. Two of the three sets composited for the day results individually had positive results for the presence of human bacteroides, including Sets 1 (12:00) and 2 (16:00). The fecal indicator bacteria results were low for these sets; equal to or less than 20 MPN/100mL for fecal coliforms and non-detect for enterococci. There were no visual observations or odors that indicate a source for the positive result.

2.2.1.3 Dry Weather Ribotyping Results

The most significant factor in the dry weather ribotyping findings is that birds are shown to be the major contributor of bacterial contamination in the back basins, and human impacts are minimal (Table 2-10). Dry weather results for Basins D, E, and F combined were found to be 66% bird, 10% canine, 10% rodent, 2% feline, 2% human, 1% sewage and 9% unknown (Figure 2-9).

In Basin D, the overall contribution is 72% bird, 7% canine, 10% rodent, 2% human, 2% sewage and 5% unknown (Figure 2-10). Sewage and human influences are identified separately by their sources. When the library is created, samples taken directly from sewer sources are identified as such, while sources taken directly from human fecal samples only are labeled as human. This allows for differentiation of source (i.e. potential homeless encampment) and, as sewage may not only contain human waste (i.e. flushing of cat waste down a toilet), this prevents mis-identification.

Basin D for dry weather had the highest number of bird isolates at 72%, with Oxford Basin directly behind at 71%. Basin E for dry weather had the highest contribution of canine sources at 15%. The remainder was 2% feline, 7% rodent, 11% unknown and no human. Basin F was 57% bird (16% lower than in wet weather), 2% feline, 11% canine, 2% opossum, 2% human and 11% unknown. Basin F for dry weather had the highest contribution to rodent sources in the study with 15% (Figure 2-10).

Oxford Basin had high bird and domestic animal counts, with 71% bird, 11% canine, 2% feline, 8% rodent, 2% human and 6% unknown. Boone Olive had high bird, canine and rodent ribotypes with 65% of its isolates attributed to birds, 1% feline, 12% canine, 11% rodent, 2% human and 6% unknown.

It is interesting to note that goose ribotypes appeared only during dry weather with the largest percentage in Oxford Basin which had 10% goose, while Basin E and F both had 2%. The overall findings of this study are that Boone Olive and Oxford Basin both have affects on the contamination in Basin E.

Table 2-10. Ribotyping analysis results for Basins D, E, F, Oxford Basin, and Boone Olive pump plant.

	Site	Basin D/Mothers' Beach		Basin E		Basin F		Oxford Basin Effluent		Boone Olive Pump Plant	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Bird	Avian	57	42	41	37	49	28	56	17	51	43
	Seagull	15	14	22	39	6	45	5	37	13	22
	Crow		10		3				3		
	Rock Dove									1	
	Goose			2		2		10			
	Bird Total %	**72**	**66**	**65**	**79**	**57**	**73**	**71**	**57**	**65**	**65**
Rodent/ Wild Mammal	Rodent	10	4	7	3	15	2	8	7	11	5
	Opossum					2					
	Squirrel								3		2
	Rodent Total %	**10**	**4**	**7**	**3**	**17**	**2**	**8**	**10**	**11**	**7**
Dog/ Cat	Feline	2		2		2	6	2	3	1	2
	Canine	7	12	15	12	11	9	11	22	12	17
	Domestic Total %	**9**	**12**	**17**	**12**	**13**	**15**	**13**	**25**	**13**	**19**
Human	Human	2			2	2	2	2			
	Sewage	2	2		2		6			2	3
	Human Total %	**4**	**2**	**0**	**4**	**2**	**8**	**2**	**0**	**2**	**3**
	Unknown	5	16	11	2	11	2	6	8	9	6
	TOTAL %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

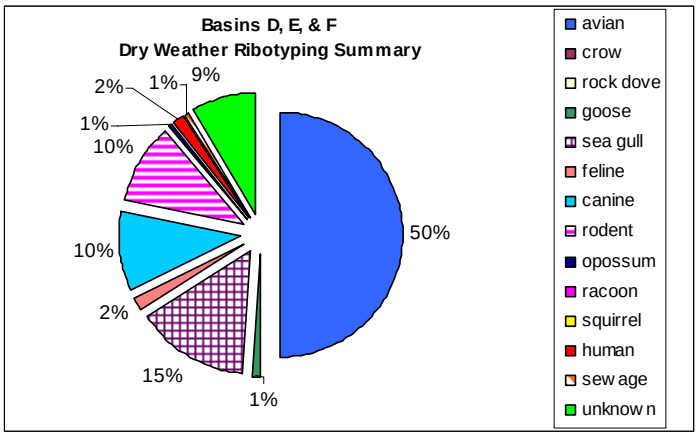


Figure 2-9. Dry weather ribotypes for Basins D, E, and F combined.

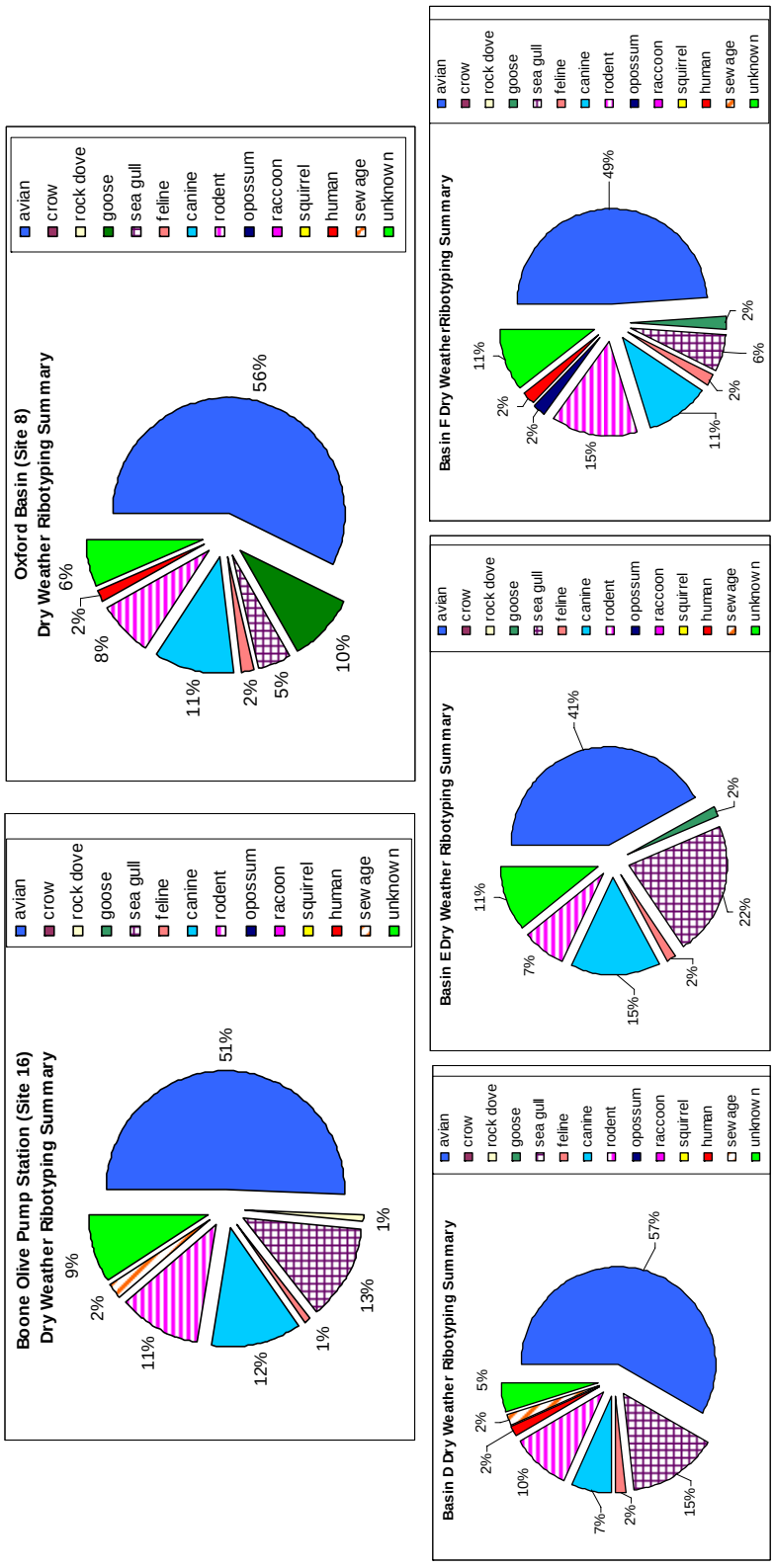


Figure 2-10. Ribotyping pie-charts for dry weather.

2.2.1.4 Dry Weather Visual Observations and Spot Samples

During the dry weather surveys, visual observations were recorded for each event. In addition, approximately 67 'spot' samples were collected. The visual observations revealed numerous ways in which MdRH is used and enjoyed. Some of these activities, however, could be contributing to the contamination found at Mothers' Beach and in the back basins. The following results of visual observations are presented based on two categories of potential bacterial sources: people, pets, and wildlife in direct contact with the water or adjacent land (Table 2-11), and less direct but equally important observations of boating activities, trash, sources of runoff, and storm drain flow characteristics (Table 2-12).

Table 2-11. Visual observations of people, pets, and wildlife during dry weather.

Dry Weather Visual Observations	
BATHERS/CHILDREN	**# of observations**
Swimmers (3+ yrs)	89
Toddlers in diapers	5
Toddlers without diapers	5
PETS	
Dog walkers	137
Pets in the water	NONE
Pet wastes disposed of improperly	15
Pet waste piles	25
BIRDS	
Ducks	202
Gulls	208
Pigeons	37
Pelicans	2
Shorebirds	165
Other birds	154
Bird waste piles	>1000
Birds flying	35
Birds swimming	36
Birds feeding in water	20
Birds shore feeding	12
Birds picking through litter	1
Dead or injured birds	NONE
Other bird behavior	8
OTHER ANIMALS	
Rodents	4
Marine mammals	NONE
Marine animals	26
Animals picking through litter	NONE
Other animal behavior	5
Behavior of marine mammals	NONE

Table 2-12. Visual observations of anthropogenic activities during dry weather.

Dry Weather Visual Observations	
BOATS	**# of observations**
Hosing down of boats	61
Illegal discharge	NONE
Sewage odor	12
Sewage pumpout station problems	NONE
Illegal dumping from boats	NONE
TRASH	
Trash removal observed	10
Debris from trash removal observed	4
Trashcans/dumpsters uncovered	46
Trashcans/dumpsters overflowing	9
FOOD WASTE	
Food waste on ground	5
Food waste in water	4
Non-food waste on ground	2
Non-food waste in water	9
Other problem behaviors, i.e. public urination, car washing, etc.	3
RUNOFF	
Runoff near restrooms	0
Runoff near parking areas	7
Runoff near restaurants	9
Runoff entering harbor	5
Broken sprinklers	5
Other runoff	10
Number of samples taken	19
STORM DRAINS	
Ponded water	21
Trickle flow	14
High flow	11
Sparse vegetation	13
Extensive vegetation	9
Algae in storm drain water	35
Oily sheen	122
Suds	46
Garbage	114
Leaves	19
Algae	16
Suds	8
Scum	8
Fecal material	1
Musty odor	3
Gasoline odor	10
Sewage odor	11
Unusual pipes	1
Plugged storm drain	NONE

There were a total of 89 people over the age of three found swimming in the study area throughout the five dry weather surveys. Five toddlers were observed in diapers over the course of the investigation, but on one day (Event 5), five toddlers were observed without diapers. Though small in number, such instances provide a potentially direct source of human bacteria to the receiving waters. Samples collected in conjunction with this observation resulted in a fecal coliform density of 170 MPN/100mL. Enterococci in this sample was found at a density of 122 MPN/100mL, which exceeds the WQO of 104 MPN/100mL. No samples were found positive for human bacteroides in these samples.

In addition to family outings, dog walking is extremely popular around the Harbor, as evidenced by 137 observations of this activity. None of the pets were immersed in the water. Neglect of proper pet waste disposal was observed on 15 occasions, and 25 instances of pet waste were documented. Pet waste was most problematic at Site 13, where improper disposal practices or piles of waste were observed seven times throughout the study period. Interestingly, this site consistently had low levels of indicator bacteria. Pet waste/disposal practices were noted three times at Site 3, which had only one exceedance of WQOs for fecal coliform and otherwise generally low results. Site 7 also had three observations of pet waste, yet this site had several exceedances throughout the study period and had an overall geometric mean for enterococci that was greater than the 30-day standard. Similarly, a lack of pet waste disposal was noted two times at Sites 6, 11, and 12. Although pet waste is not likely the main source of bacteria at any of these sites, it likely contributes to ambient environmental loading and dog owners should be reminded and reinforced to responsibly dispose of their pet waste.

Observed wildlife primarily consisted of birds. Bird enumeration surveys conducted during dry weather sampling revealed large populations of gulls, ducks, shorebirds, and other birds. Gulls were observed throughout the Harbor, with a total count of 208. Of the 202 duck observations, 39% were seen at Site 8 and 20% were seen at Site 19. The remainder was observed throughout the Harbor. Shorebirds, with a total of 165 observations, were seen mostly at sites 14, 15, and 8, while other, unidentified birds (154 total) were seen at these sites as well as Sites 7 and 18. Additionally, observers noted 37 pigeons and two pelicans. The predominant observed bird activities were flying and swimming. Field samplers counted greater than 1880 instances of bird waste. Overwhelmingly, these observations were made at Sites 14 and 15. Site 14 alone had greater than 1000 collective counts, while Site 15 had an additional 800+ counts. Bacterial densities at these sites were consistently high through the study period, indicating that bird waste could be a potentially large source of bacteria to the receiving water at these sites.

No dead or injured birds were found during the study. Although no marine mammals were observed, 26 marine animals were present along with four rodent sightings. Only one bird was picking through the trash; no other animals exhibited this behavior.

Heavy usage of the marina is expected during dry weather periods. Observers of boating activities recorded people hosing down their boats 61 times. Although a sewage odor was noted 12 times, there were no observations of illegal discharges or dumping from boats, as well as no problems with the sewage pump-out stations. Samples collected in association with the sewage odor observation did not provide further evidence of a discharge. Most of the results were below the method detection limit for both indicator bacteria; however, one result of 300 MPN/100mL

for fecal coliform was found at Site 11 during dry Event 4 on May 17, 2006, though the samples were not positive for human bacteroides. The lack of other supporting evidence makes it difficult to assert whether this result was related to the detected odor.

The popularity of the Harbor during warm weather brings associated burdens of increased waste disposal requirements. Trash removal was observed 10 times, with debris related to this activity found 4 times. Uncovered trashcans/dumpsters were found 46 times and 9 were overflowing. Sites 12 and 13 were most commonly seen with uncovered disposal areas, with respective counts of 13 and 6 individual observations. Although these sites had relatively low levels of indicator bacteria throughout the dry weather surveys, covering the trashcans/dumpsters is an easy and effective BMP that could be implemented at these sites to reduce potential bacterial contribution during wet weather or via attraction of scavenging wildlife. Garbage was primarily observed in the water (9 items of non-food waste and 4 food-waste items) versus 7 instances of food or non-food waste on the ground. Other potentially problematic public behaviors were also noted, including public urination and a possible engine flush.

During dry weather, runoff was never observed near the restrooms but was found 7 times near parking areas and 9 times near restaurants. Five broken sprinklers were found and other runoff was observed 10 times. Only 5 instances of runoff entering the Harbor were observed. Water in storm drains was mostly ponded (21 observations), with 14 additional observations of trickle flows and 11 high flows. Vegetation found growing in or around the storm drains was mostly sparse, but algae were observed in the storm drain water 35 times. Flows were primarily characterized with an oily sheen and garbage (122 and 114 observations, respectively), while less frequent floatables included suds, leaves, algae, and scum. Though observed only once, fecal material was documented in one of the flows. This observation occurred during the dry weather sampling event on December 1, 2005. Field samplers noted an odor of sewage 11 times, gasoline 10 times, and a musty odor 3 times. Interestingly, the majority of the sewage odor observations were from Site 11, which was previously noted as having the same odor related to boating activity visual observations. Three sets of samples collected at this site on October 1, 2005 had fecal coliform densities ranging from 170 – 300 MPN/100mL, and all results for enterococci exceeded WQOs. At no time throughout the study was this area found to be positive for the human bacteroides marker. Three additional samples were collected at this site in association with the odor observation; only one of these had a detectable level of fecal coliform (300 MPN/100mL) and another with detectable enterococci (10 MPN/100mL). None of the storm drains were found to be plugged during dry weather.

Spot sample visual information and results were used to help explain exceedances of WQOs and to identify occurrences or practices within the back basins of MdRH that may contribute to these exceedances. The spot samples with the highest fecal indicator results were plotted on an aerial view of the back basins of the Harbor in Figure 2-11 and are described in Table 2-13. The remaining spot sample results are included in Appendix E.

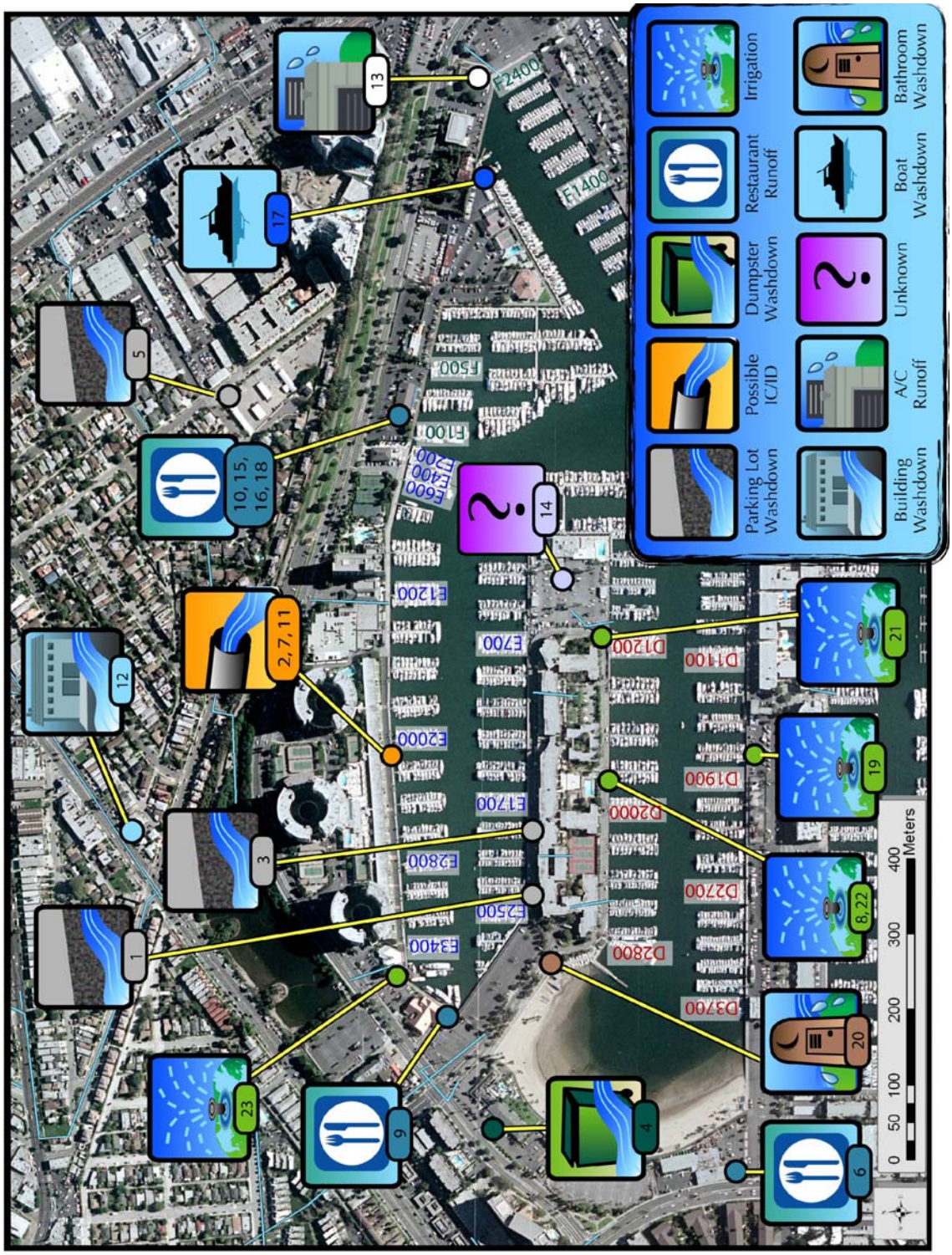


Figure 2-11. Spot sample information and results.

Table 2-13. Spot sample descriptions.

Spot Sample ID	DRY Event #	Fecal Coliforms (MPN/100mL)	Enterococci (MPN/100mL)	Primary Type	Secondary Type	Comment	Sub-Watershed
1	5	2,200,000	>24,1960	Washdown	Parking Lot Washdown	Sump pump discharge from underground garage cleaning; circle at Palawan toward Basin E; soapy water; squigy, pump.	Basin E
2	4	1,700,000	5,731	Possible Illicit Connection	Possible IC/ID	Taken between EN20 and EN21; storm drain.	Basin E
3	2	1,600,000	13,958	Washdown	Parking Lot Washdown	Sampled water being hosed down and pushed off from parking garage across from E1900.	Basin E
4	5	500,000	2,559	Washdown	Dumpster washdown	Best Western, Jamaica Bay Inn dumpsters; appears to be from dumpster area cleanout; wash down was not observed.	(Basin D)
5	5	170,000	16,785	Washdown	Parking Lot Washdown	End of Thatcher Street; past Princeton St.; lot cleaning; high rise parking lot; power washing.	Oxford Basin
6	4	80,000	3,130	Washdown	Restaurant Runoff	Cheesecake Factory	Basin D
7	3	50,000	1,145	Possible Illicit Connection	Possible IC/ID	Water flowing out of pipe b/w EN20 and EN21. Had been flowing for at least 4 hours.	Basin E
8	5	30,000	9,097	Irrigation	Irrigation	Possible irrigation runoff; water on side of road; lots of vegetation.	Basin D
9	2	28,000	98,039	Washdown	Restaurant Runoff	Near Site 6 and Site 7, appeared to be restaurant washdown from the 2nd floor.	Basin E
10	2	17,000	16,695	Washdown	Restaurant Runoff	Tony P's runoff; sampled downstream at storm drain; smells and looks like grease.	Basin F
11	5	17,000	1,043	Possible Illicit Connection	Possible IC/ID	"Storm drain by dock E2000"; same as Spot 3 and 7.	Basin E
12	5	>16,000	74	Washdown	Building washdown	Washout of building/store; Near 730 Washington Blvd.	Oxford Basin

Table 2-13. Continued.

Spot Sample ID	DRY Event #	Fecal Coliforms (MPN/100mL)	Enterococci (MPN/100mL)	Primary Type	Secondary Type	Comment	Sub-Watershed
13	5	**12,339E**	**3,076**	Other	**A/C Runoff**	Library on Admiralty and Bali; appears to be runoff from A/C unit on roof.	Basin F
14	4	**8,000**	**2,909**	Unknown	**Unknown**	Meter(?) in front of Del Rey Yacht Club; ponded water.	Basin D
15	2	**5,000**	**36,540**	Washdown	**Restaurant runoff**	Tony P's runoff; sampled upstream near restaurant dumpster; smells and looks like grease.	Basin F
16	5	**5,000**	**2,909**	Washdown	**Restaurant runoff**	Runoff into drain; appears to be clogging with grease (located at Tony P's) approx. 15 feet from Spot 29.	Basin F
17	4	**5,000**	**420**	Washdown	**Boat Washdown**	Boat parking lot near O, boat wash off runoff.	Basin F
18	2	**3,000**	**43,517**	Washdown	**Restaurant runoff**	Tony P's runoff; sampled upstream near restaurant dumpster after JU when flow increased; smells and looks like grease.	Basin F
19	4	**3,000**	**437**	Irrigation	**Irrigation**	Irrigation runoff over parking lot; sampled at grate; near site B.	Basin D
20	5	**2,300**	**27,230**	Washdown	**Bathroom Washdown**	Palawan restroom; runoff to beach, 4 flows (PCR sample taken - neg for gen and human).	Basin D
21	1	**2,300**	**712**	Irrigation	**Irrigation**	Spot sample D1200 - irrigation runoff entering drain.	Basin D
22	2	**900**	**9,075**	Irrigation	**Irrigation**	Looks like irrigation runoff from across the street from Site 2.	Basin D
23	4	**900**	**3,873**	Irrigation	**Irrigation**	Near Site 18, runoff near planters, ponded; broken sprinkler.	Basin E

Spot Sample 8: Irrigation runoff

In Basin D, the majority of spot samples were from suspected irrigation sources. These samples were taken after irrigation water ran over a road or parking lot, thereby resuspending particulates, debris, and associated bacteria. Spot Sample 8, with a fecal coliform result of 30,000 MPN/100mL and an enterococci result of 9,097 MPN/100mL, was ponded water containing organic matter such as leaf debris. The other three spot samples consisted of runoff that was flowing into storm drains. Other sources of runoff observed in Basin D were from restrooms, restaurants, and dumpster wash down. Spot Sample 4, collected from suspected dumpster area wash out, had a fecal coliform result of 500,000 MPN/100mL and an enterococci result of 2,559 MPN/100mL. While actual wash down was not observed, runoff found during the morning hours appeared to be from the dumpster area cleanout of the Best Western and Jamaica Bay Inn. Visual observations of the area indicated that the ground surrounding the dumpsters was stained with apparent bird feces. At the Cheesecake Factory, during the fourth dry weather event, runoff from the restaurant was sampled at approximately midnight. The objects being washed down were not identified, but there was overland flow into the parking area. It did not appear that the runoff was reaching a storm drain. The fecal coliform results were 80,000 MPN/100mL and the enterococci results were 3,130 MPN/100mL.

Spot Sample 4: Dumpster Wash Down

Two restroom facilities are located on Mothers' Beach; one in the picnic area and one to the east at the kayak storage area. Spot samples were taken from both of these locations during the course of the study. The spot sample collected from the restrooms at the kayak storage area off

of Palawan Way had a fecal coliform result of 2,300 MPN/100mL and an enterococci result of 27,230 MPN/100mL. It was also observed that the Palawan Way restrooms do not have floor drainage. Therefore, whenever this facility is cleaned, the runoff runs along the sidewalk, down the ramp and onto Mothers' Beach. A spot sample of runoff was collected from the other facility located in the middle of the picnic area on Mothers' Beach during the second sediment survey, but is included in the list of dry weather spot samples. It had a fecal coliform result of 500 MPN/100mL and an enterococci result of 243 MPN/100mL. Due to these relatively lower densities, this sample was not listed in the top 23 highest bacterial spot sample results.

Palawan Way Restroom Wash Out

Runoff from Restroom Wash Out

The three highest spot sample results found during the study were collected within the drainage area of Basin E. Two areas stood out for high fecal indicator bacteria spot samples; one on the southwestern side of Basin E near Site 9 and the other on the northern basin wall between Sites 7 and 11. Spot Samples 1 and 3 were collected during two different sampling events, both from the wash down of a condominium parking garage. The condominium building is located across the street from Site 9 and is part of the small drainage area for the storm drain at this sampling location. The fecal coliform results were 2.2 million MPN/100mL and 1.6 million MPN/100mL for Spot Samples 1 and 3, respectively. These values indicate the likely presence of human sewage. Corresponding enterococci results were greater than 241,960 MPN/100mL (higher than the maximum detection range) for Spot Sample 1 and 13,958 MPN/100mL for Spot Sample 3. Spot Sample 1 was collected from a sump pump discharging wash down water from the underground portion of the parking garage onto Palawan Way. Spot Sample 3 was collected from wash down water running off of an upper level of the parking garage. Previous reports of sewage overflows have been linked to this building. The combination of a possible sewage overflow along with a maintenance practice that allows the runoff water from washing the parking garage to enter the street and in turn, the Harbor, is a possible contributor to the bacterial contamination in Basin E.

Spot Sample 1: Basement Parking Garage Wash Out

Spot Sample 3: Parking Garage Wash Out

The other significant area on the northern wall of Basin E was a small drain that was first seen flowing during the third dry weather event on April 20, 2006. It was sampled during the third, fourth, and fifth dry weather events for fecal indicator bacteria enumeration, and Q-PCR analysis was completed during the fourth dry weather event because of a sewage odor. During the fourth event the fecal coliform result was 1.7 million MPN/100mL and the enterococci result was 5,731 MPN/100mL. In addition, the Q-PCR analysis was positive for human bacteroides. This possible source was brought to the Stakeholder's attention and an investigation into the possible illicit sewer connection was initiated (Spot Sample 4).

Spot Sample 4: Possible Sewer Connection

In addition to these problematic areas in Basin E, two other sources of runoff were sampled, including one originating from a restaurant and the other from irrigation. Runoff collected from the Harbor House Restaurant appeared to be from the wash down of the second story deck (Spot Sample 9). However, the actual deck washing was not observed. The results for enterococci were the second highest of the project at 98,039 MPN/100mL. Fecal coliform results were 28,000 MPN/100mL. Additionally, in the back corner of Basin E near Site 18 there was evidence of irrigation runoff (Spot Sample 23). The water was near a planter box and was ponded, possibly from a broken sprinkler head.

Spot Sample 9: Possible Restaurant Runoff

Spot Sample 23: Irrigation Runoff

Spot sampling in Basin F consisted of two occurrences of restaurant runoff (one with three spot samples taken during the same event), wash down of a boat in dry storage, and overland flow that appeared to originate from an air conditioning unit. During the second dry weather event, Spot Samples 10, 15, and 18 were collected of runoff flowing from the dumpster area at Tony P's Restaurant. Spot Samples 15 and 18 were taken near the dumpsters. Spot Sample 15 had an enterococci result of 36,540 MPN/100mL. The flow increased and Spot Sample 18 was collected. Spot Sample 18 had an enterococci result of 43,517 MPN/100mL. Fecal coliform results for Spot Samples 15 and 18 were 5,000 MPN/100mL and 3,000 MPN/100mL, respectively. A downstream sample was then collected at the storm drain (Spot Sample 10). The results for fecal coliform and enterococci were 17,000 MPN/100mL and 16,695 MPN/100mL, respectively.

Spot Samples 10, 15, 18: Restaurant Runoff

Spot Sample 16 was collected during the fifth dry weather event from Tony P's. The runoff represented by this sample most likely resulted from windows and/or deck washing. Three spot samples were collected during this occurrence. The first was taken from the ponded water under the deck. The results were 20 MPN/100mL and 723 MPN/100mL for fecal coliform and enterococci, respectively. The runoff was then sampled approximately 15 feet downstream near the storm drain. The results were 5,000 MPN/100mL and 2,909 MPN/100mL for fecal coliforms and enterococci, respectively. The third sample was a receiving water sample collected at the storm drain outfall. The results were 1,300 MPN/100mL and 3,129 MPN/100mL for fecal coliforms and enterococci, respectively.

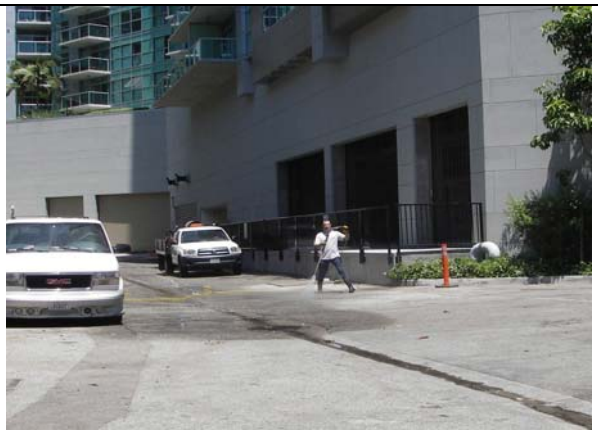
Spot Sample 16: Restaurant Runoff

Spot Sample 17 was collected from a dry dock yard to the east of the California Yacht Club. There were several hoses present and runoff flowing overland toward a storm drain. The sample was collected from a pool of water upstream of the drain. The results were 5,000 MPN/100mL and 2,909 MPN/100mL for fecal coliform and enterococci, respectively. East of this site, at the Marina del Rey Public Library, runoff was observed at night from a small drain in the sidewalk next to the building. The runoff was sampled and the results were 12,339 MPN/100mL and 3,076 MPN/100mL for fecal coliform and enterococci, respectively. The source of the runoff was unverified, but appeared to be from the building's air conditioning unit. While air conditioning condensate is not expected to have high bacterial densities, runoff from this unit may be contributing to contamination by providing a moist area where bacteria can grow.

Spot Sample 17: Boat Wash Down

An investigation of sources contributing to bacterial densities in Oxford Basin and the Boone Olive Pump Station was not directly within the scope of this study. However, during the fifth sampling event, a designated observer was posted in the Harbor, in addition to the two teams of

samplers. This allowed for greater special and temporal coverage during the 24-hour event, including the upper watersheds of Marina del Rey. Two spot samples resulting in high bacterial densities were taken in the Oxford Basin watershed. One consisted of runoff from parking lot wash down and the other from building wash down. Spot Sample 5 was taken at the end of Thatcher Street where a parking lot was being power washed. Results from this spot sample were 170,000 MPN/100mL and 16,785 MPN/100mL for fecal coliforms and enterococci, respectively. Spot Sample 12 was collected of runoff that appeared to originate from the wash down of a garage or building near 730 Washington Boulevard. The results were 74 MPN/100mL for enterococci and greater than the maximum detection range of 16,000 MPN/100mL for fecal coliform.



Spot Sample 5: Parking Lot Wash Out

Spot Sample 12: Possible Garage/Building Wash Out

The overall contribution of bacterial contamination from dry weather runoff was not directly assessed by these spot samples. However, Section 6 discusses the loading from these potential sources and offers recommendations on how to reduce runoff from these practices. The majority of the spot samples identified were from an activity involving the wash down of decks, parking lots, or buildings. With education and enforcement, these maintenance practices can be altered to eliminate their contribution of bacteria to the Harbor.

2.2.1.5 Library Sampling

A list of the animals from which library samples were collected over the survey period is presented in Appendix F. The visual observation results are presented in Appendix G.

Duck Pond Behind Oxford Basin

In addition to the collection of library samples, field technicians were able to further investigate Marina del Rey through additional visual observations. While conducting library sampling, field technicians discovered two duck ponds located inside the fence around Oxford Basin. In the winter, 10 to 20 ducks at a time would gather there, in addition to snowy egrets and other birds, to utilize the constant source of fresh, flowing water provided by the pond. The water would slowly overflow the concrete walls of the pond, which were covered in bird feces. The duck pond was sampled on two occasions; October 19, 2005 and December 14, 2005. The results are presented below (Table 2-14).

Table 2-14. Duck pond results.

Date	Sample ID	Description	Fecal Coliform (MPN/100mL)	Enterococci (MPN/100mL)
October 19, 2005	DP 1	Taken from bubbling part of duck pond, where fresh water is entering concrete area.	<20	<10
October 19, 2005	DP 2	Outfall from duck pond.	300	10
October 19, 2005	DP 3	Receiving water in mixing area.	**1,100**	**309**
December 14, 2005	DP 1	Outfall from pond (No birds present at time of sampling).	<20	<10
December 14, 2005	DP 2	Receiving water in mixing area.	330	85

The water source to the pond had undetectable amounts of bacteria. It appears that, depending on the number of birds present, there is the potential for the fresh water to become contaminated by fecal indicator bacteria. During the December sampling, the concrete pond walls had been cleaned and the fecal indicator results decreased. The receiving water results were still generally higher than the effluent and the duck ponds are therefore not the main source of contamination in Oxford Basin. This conclusion was reinforced by the fact that midway through the survey, the duck ponds were drained and the water source was therefore eliminated. Oxford Basin continued to have high fecal coliform and enterococci results.

Outfall from duck pond

Receiving Water in Oxford Basin

2.2.1.6 Questionnaire

The questionnaire was available online through the LADPW website from mid-September through mid-March. Fifty nine online responses and one hardcopy response were received. The first response was received on November 8, 2005 and the last on March 10, 2006.

The responses were extremely variable. One of the online responders did not answer any questions. Another respondent simply commented, "Clean up Manhattan Beach." The responses that identified specific locations in the Harbor are represented in Figure 2-12. The majority of the comments regarding each basin were boat discharges. These discharges included boat washing, bilge pumping, and possible waste discharge.

Because the questionnaire was not exclusively limited to the back basins, many of the comments pertained to activity outside the realm of this study. However, Basin E was identified in 26 of the surveys specifically as an area with discharges, odor, trash, floatables, and dog walkers. These observations are supported by the visual observations performed during the dry and wet weather studies. In addition to the human behavior and maintenance practices, the presence of wildlife and their behavior was recorded.

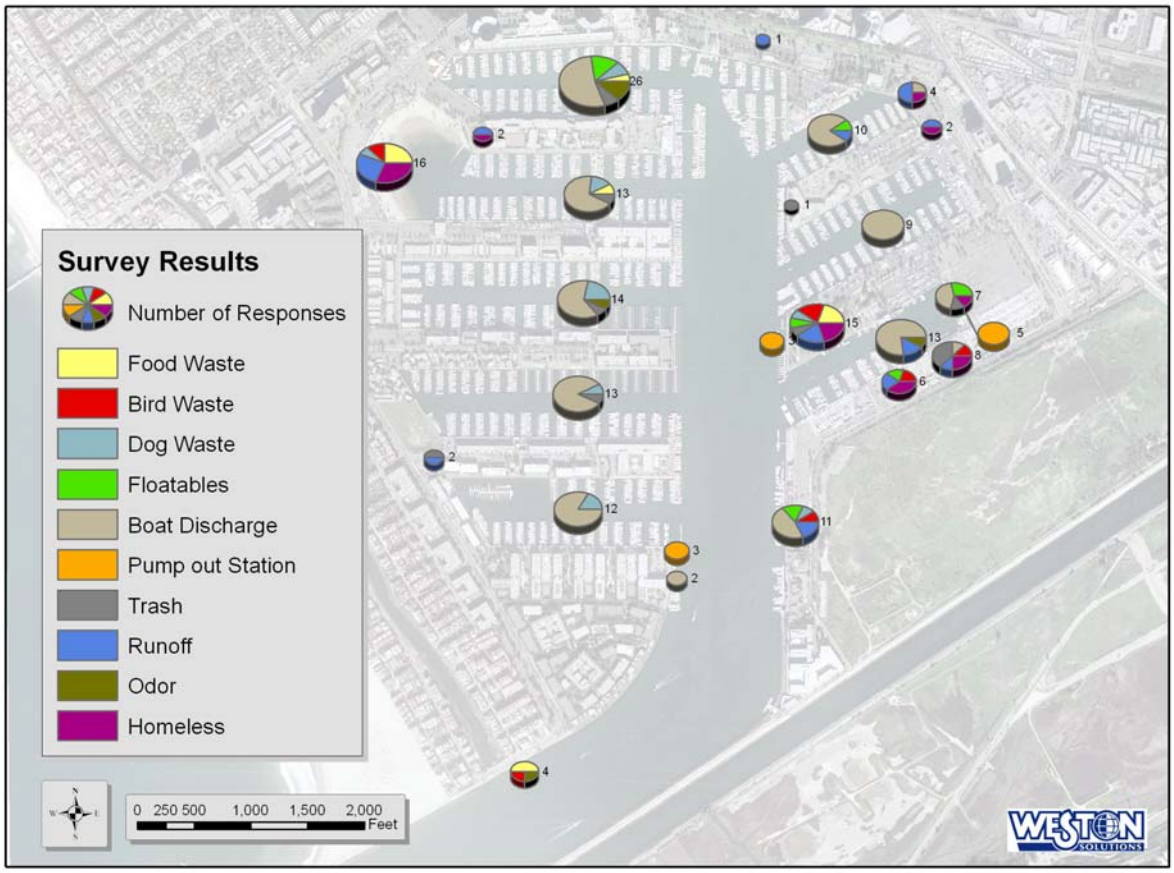


Figure 2-12. Questionnaire results.

2.2.2 Wet Weather

The two wet weather surveys were completed on November 9, 2005 and February 19, 2006. The nearest rain gauge, located in Ballona Creek, recorded 0.36 inches and 0.2 inches, respectively, for each storm event. Figure 2-13 presents a summary of the rainfall for the entire 2005-2006 wet weather season.

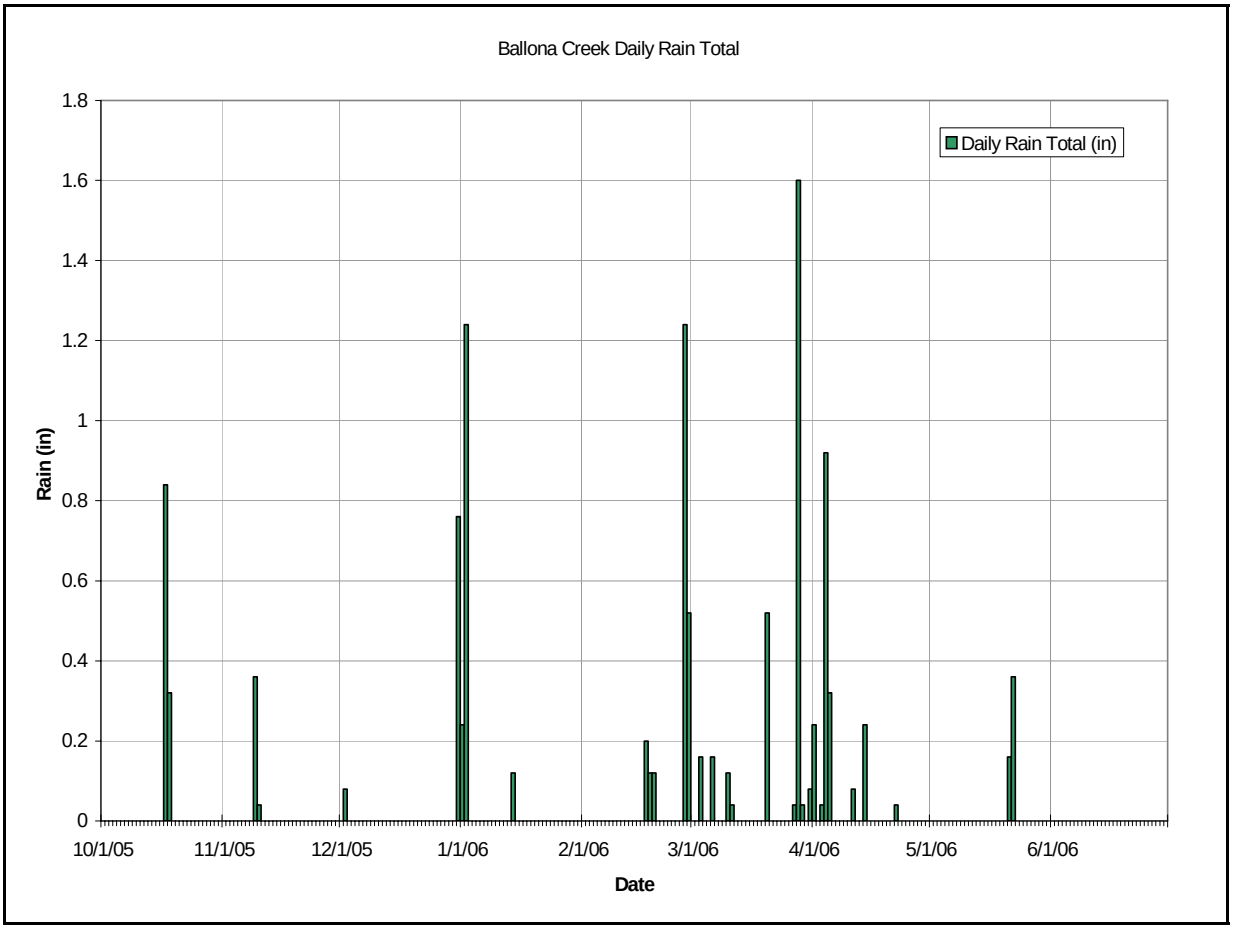


Figure 2-13. Summary of the total rainfall in 2005-2006 as recorded at the Ballona Creek rain gauge.

2.2.2.1 Wet Weather Indicator Bacteria Results

As shown in Table 2-15, Sites 1 through 16 were sampled during both wet weather events, resulting in eight individual concentrations for each site. However, due to field technician error during one round of the second wet weather event, samples at Sites 9 and 11 were taken of effluent rather than receiving water. Because the results are not reflective of conditions in the receiving water, the samples were not included in the site summaries. Site 17, the Oxford Basin Pump Station, was only flowing once and therefore only one sample during the wet weather

survey is recorded. Site 18 was added after the first storm event so four individual results for this site are included in the result summaries below.

Table 2-15. Number of samples collected per site during each wet weather event for indicator bacteria analyses.

Event	Site																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	NS	NS
2	4	4	4	4	4	4	4	4	3*	4	3*	4	4	4	4	4	1	4
Total	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**7**	**8**	**7**	**8**	**8**	**8**	**8**	**8**	**1**	**4**

* One sample collected during the fourth set of the February 19, 2006 storm event was from the effluent of the storm drain and was not included in this analysis.
NS = Not sampled

A summary of the wet weather results including the minimum bacterial density, the maximum bacterial density, and the geometric mean per site for fecal coliform and enterococci results is presented in Table 2-16. The geometric mean was calculated for each site from all of the wet weather events and sets sampled. While the 30-day geometric mean standard is not directly applicable due to the expanded timeframe of the data collected, it is used here as a point of reference. The full laboratory reports are presented in Appendix D.

Table 2-16. Summary of bacterial densities collected during the wet weather surveys.

Station ID		Fecal Coliform (MPN/100mL)			Enterococci (MPN/100mL)		
		Minimum Density	Maximum Density	Geometric Mean	Minimum Density	Maximum Density	Geometric Mean
Basin D	1	<20	80	20	<10	389	**37**
	2	<20	13,000	141	<10	5,475	**302**
	3	<20	300	86	10	1,014	**83**
	4	20	500	113	<10	153	34
	5	<20	80	32	<10	733	32
Basin E	6	230	80,000	**8,422**	670	12,007	**4,173**
	7	220	130,000	**6,261**	86	6,701	**1,279**
	9*	130	23,000	**1,246**	197	>241,960	**5,398**
	10	40	5,000	**412**	<10	11,874	**354**
	11*	<20	8,000	159	10	2,603	**269**
	18	2,300	30,000	**7,202**	2,359	5,436	**3,834**
Basin F	12	<20	5,000	117	<10	512	**35**
	13	<20	230	24	<10	738	26
Boone-Olive	16	1,300	300,000	**66,460**	5,539	173,289	**42,813**
Oxford Basin	8	13,000	1,300,000	**68,954**	1,968	26,125	**7,946**
	14	7,000	1,400,000	**56,486**	3,448	36,087	**9,432**
	15	1,300	70,000	**12,132**	932	26,025	**6,061**
	17	13,000	13,000	**13,000**	10,758	10,758	**10,758**

Values in red indicate exceedances of the single sample standard (maximum density).
Values bolded indicate a result greater than the 30-day geometric mean.
* One sample collected during the fourth set of the February 19, 2006 storm event was from the effluent of the storm drain and was not included in this analysis.

To illustrate the changes in geomean over the course of the two wet weather events, inverse distance-weighted interpolation maps were created for the geomean of each 24-hour event for each basin. Figure 2-14 presents the interpolations for the geomean fecal coliform results and Figure 2-15 presents the interpolations for the enterococci geometric mean results. High concentrations of fecal coliform and enterococci are observed in both Oxford Basin and Basin E.

Fecal indicator bacteria results are expected to be higher during wet weather than dry weather. Precipitation falling in the watershed washes bacteria from natural and anthropogenic sources into the receiving waters of MdRH. The fecal indicator bacteria results show that Oxford Basin and the Boone-Olive Pump Station consistently exceeded the water quality objectives for the single sample standards and were greater than the 30-day geometric mean standards. None of the eight sampling sets resulted in a concentration below these objectives during a storm event. With both of these sources then being pumped or flushed into Basin E, it is not surprising that the majority of sites in Basin E were also greater than the single sample standards and the geometric mean. In Basins D and F, there were occasional exceedances of the fecal coliform single sample standard, but none of the sites were greater than the geometric mean objective. Results for enterococci, a bacteria which is known to survive longer in saltwater than fecal coliform, exceeded the single sample standard and were greater than the geometric mean standard in three of the Basin D sites and one Basin F site.

Figure 2-16 presents another compilation of the two wet weather event results by site. The box and whisker plots present the minimum and maximum concentration, as well as the red area indicating the values in the 25^{th} to 75^{th} percentiles. The bar in the middle is the median density of the wet weather results.

Figure 2-16 reiterates that Basins D and F had the lowest bacterial concentrations. In Basin D, the highest bacterial value was found at Site 2 which is located in close proximity to a storm drain outfall. Approximately 75% of the enterococci results from this site were above the single sample WQO of 104 MPN/100mL. Furthermore, the figure shows that results from sites in Basin E were higher near the outfalls of Boone Olive Pump Station and Oxford Basin. Both fecal coliform and enterococci densities were the greatest at sites 6, 7, 9, and 18, which are all located toward the back end of the basin. Though the results were still elevated, sites closer to the center of the basin and main channel (Sites 10 and 11) had slightly lower densities. The Boone Olive Pump Station and the sites sampled within Oxford Basin exceeded the WQOs for fecal coliforms and enterococci in every sample.

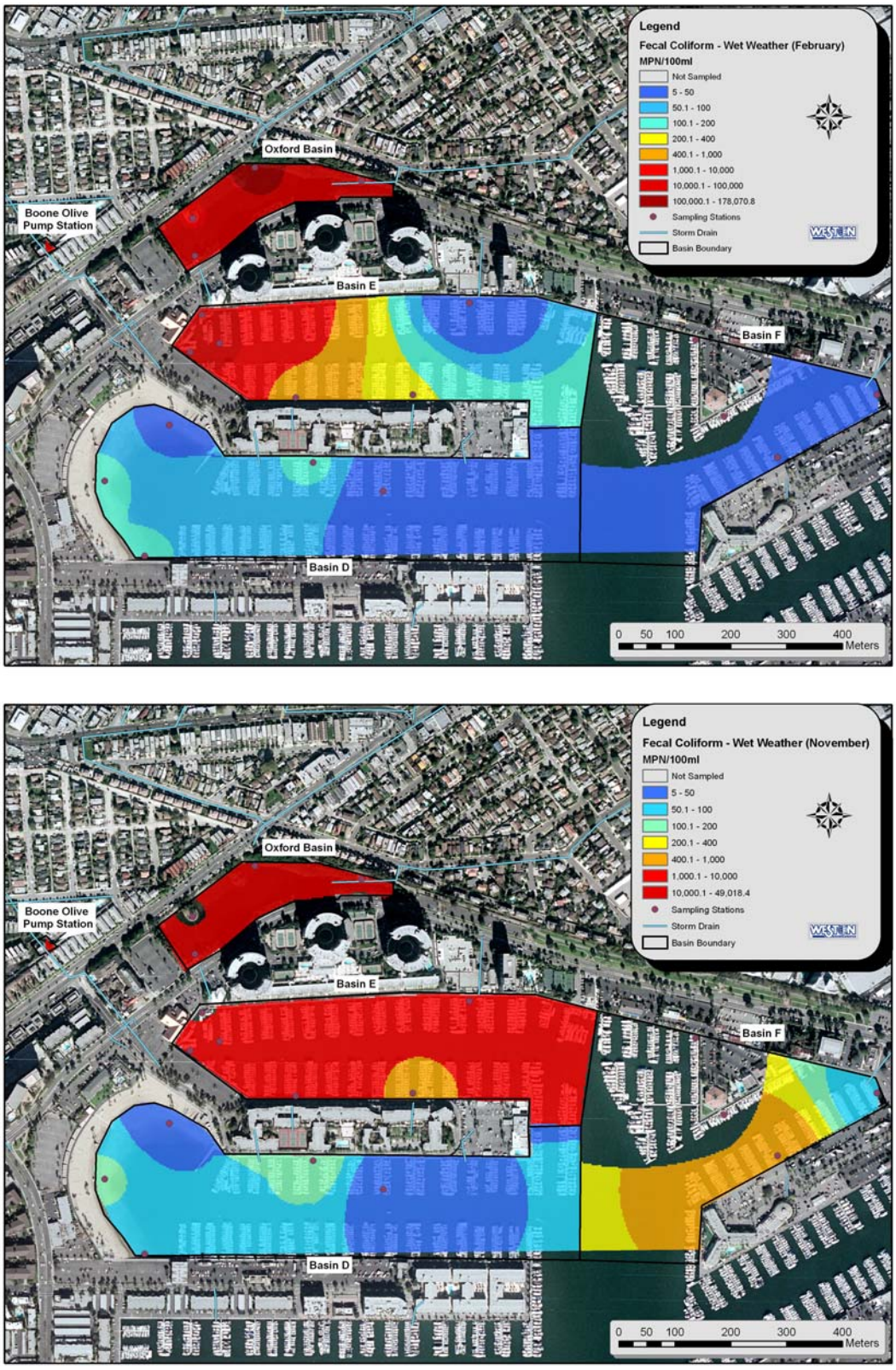
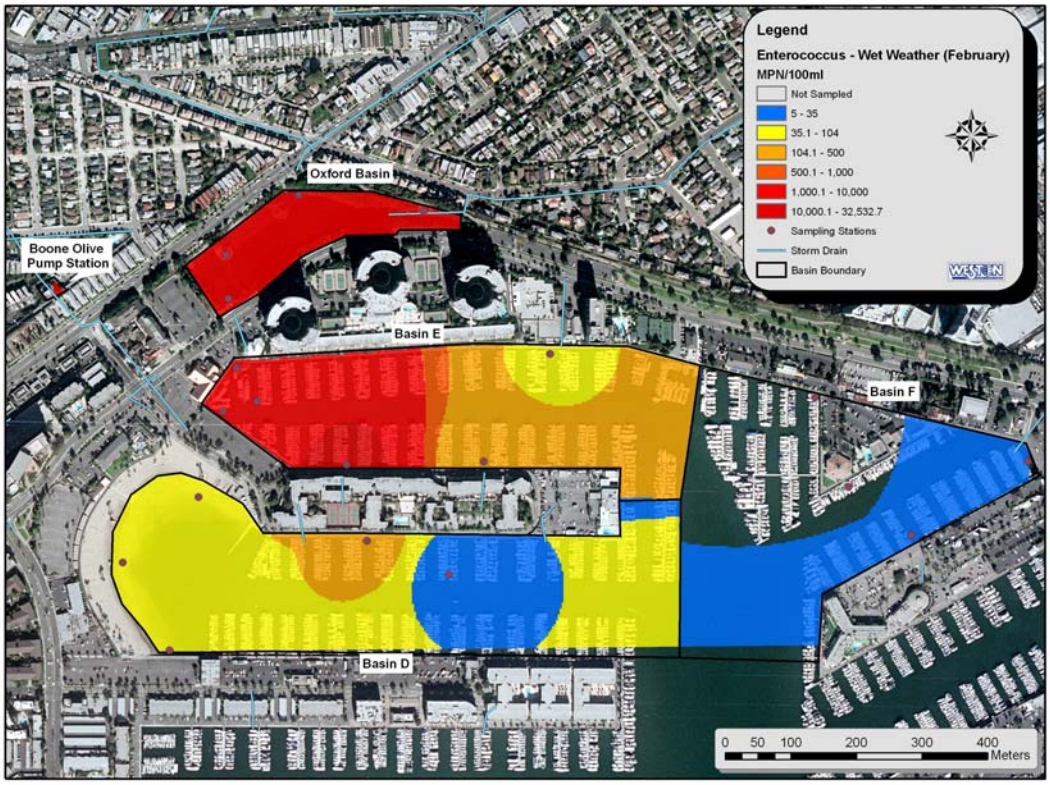


Figure 2-14. Wet weather interpolation for fecal coliform.



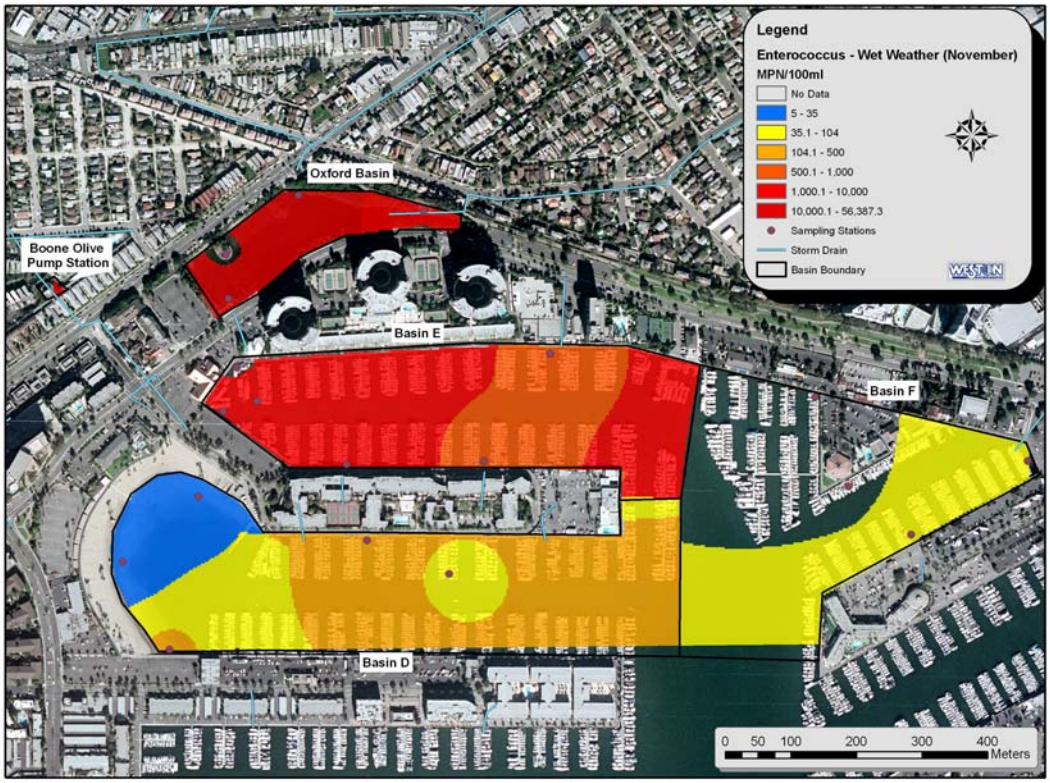


Figure 2-15. Wet weather interpolation for enterococci.

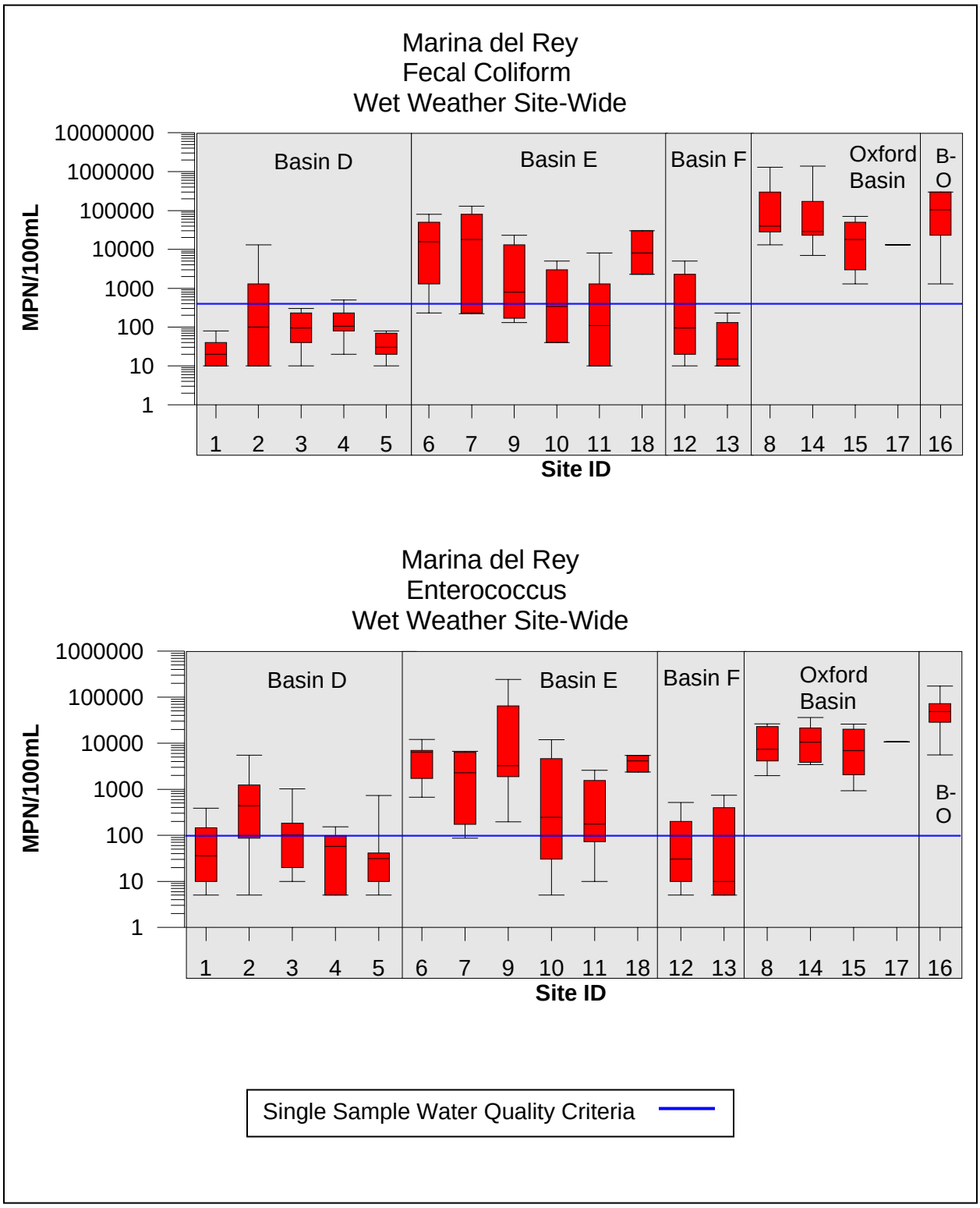


Figure 2-16. Box and whisker plots for wet weather surveys.

2.2.2.2 Wet Weather Q-PCR Results

Q-PCR analysis was completed during the wet weather events to assist in the identification of bacterial sources. Table 2-17 provides a summary of the samples that were collected at each site during both wet weather events. Sampling for Q-PCR was conducted directly in line with indicator bacteria sampling, so the exact number of samples were obtained at each site for both analyses.

Table 2-17. Number of samples collected per site during each wet weather event for Q-PCR analyses.

Event	Site																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	NS	NS
2	4	4	4	4	4	4	4	4	3*	4	3*	4	4	4	4	4	1	4
Total	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**8**	**7**	**8**	**7**	**8**	**8**	**8**	**8**	**8**	**1**	**4**

* One sample collected during the fourth set of the February 19, 2006 storm event was from the effluent of the storm drain and was not included in this analysis.
NS = Not sampled

Both general bacteroides and human bacteroides were analyzed. All of the sites sampled, with the exception of one, during both of the wet weather surveys were positive for general bacteroides, indicating the presence of recent fecal pollution. The sample collected from Site 2 during the second wet weather event on February 19, 2006 was the only negative result for general bacteroides. The corresponding fecal indicator bacteria results did exceed WQOs for enterococci and fecal coliforms during that event.

Table 2-18 and Figure 2-17 present the results of the human bacteroides analyses. Site 7 in Basin E was positive during both wet weather events. In addition, Sites 6 and 9 were positive for human bacteroides during one of the two storm events. While Site 18 was only sampled during the second survey, it also had a positive result. Sites 7 and 18 are the closest to Oxford Basin. Oxford Basin had two positive results for human bacteroides during the two surveys; one at Site 14 during the second event and one at Site 15 during the first event. The Boone Olive Pump Station did not have a positive human result during either of the surveys. The two sites in Basin F also did not have a positive human bacteroides result.

In Basin D, Site 1 was positive for human bacteroides during the first storm event. The corresponding fecal indicator bacteria results

Table 2-18. Summary of human bacteroides presence during wet weather surveys.

Station ID		Human Bacteroides (Presence/Absence)	
		November 9, 2005	February 18 - 19, 2006
Basin D	1	+	-
	2	-	-
	3	-	-
	4	-	+
	5	-	-
Basin E	6	-	+
	7	+	+
	9	+	-
	10	-	-
	11	-	-
	18	NS	+
Basin F	12	-	-
	13	-	-
Boone-Olive	16	-	-
Oxford Basin	8	-	-
	14	-	+
	15	+	-
	17	NS	-

NS – Not sampled during the first wet weather event.

do not reflect any exceedances of fecal coliforms and only slight exceedances of enterococci. The highest fecal coliform concentration during the first event was 80 MPN/100mL and the highest enterococci concentration during the first event was 389 MPN/100mL. Similarly, at Site 4, there were no exceedances of fecal coliform standards and only one of enterococci. The highest fecal coliform concentration during the second storm event was 170 MPN/100mL and the highest enterococci concentration was 153 MPN/100mL. The Q-PCR method for bacteroides is a presence/absence method. Because it cannot be quantified, general trends in the data are determined. As can be seen in Figure 2-17, the inner portion of Basin E shows the predominant presence of the human marker, though only during wet weather.

Figure 2-17. Human bacteroides hits for all dry and wet weather events with positive results. (There were no positive human hits for the 5th dry weather event.)

2.2.2.3 Wet Weather Ribotyping Results

The most significant factor in the wet weather ribotyping findings is that, like the dry weather, birds are shown to be the major contributor of bacterial contamination in the back basins, and human impacts are minimal (Table 2-10). Wet weather results for Basins D, E and F combined were found to be 74% bird, 11% canine, 3% rodent, 2% feline, 3% sewage, 2% human and 6% unknown (Figure 2-18).

In Basin D, the overall contribution is 66% bird, 12% canine, 4% rodent and 2% sewage. Basin D for wet weather had the highest number of unknown isolates at 16%. Basin E for wet weather had the highest contribution of bird sources at 79%. The remainder was 12% canine, 3% rodent, 2% sewage and 2% human. Basin F was 73% bird, 6% feline, 9% canine and 2% rodent. Basin F for wet weather had the highest contribution to human sources in the study with 2% of the isolates found to be human and 6% sewage. Both Basins E and F had only 2% their isolates attributable to unknown sources (Figure 2-19).

Oxford Basin had the lowest percentage of bird isolates at 57%, with 3% feline, 22% canine (the highest in the study), 10% rodent, 8% unknown and interestingly no human sources. Boone Olive had 65% of its isolates attributed to bird, 2% feline, 17% canine, 7% rodent, 3% sewage and 6% unknown.

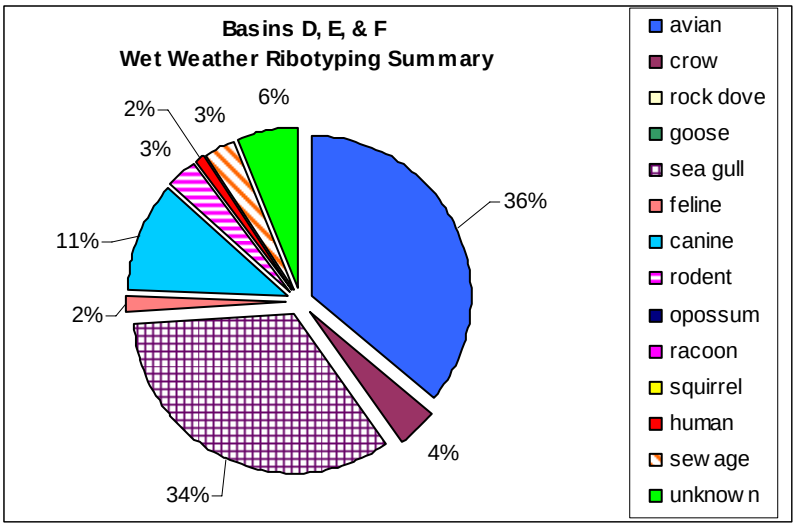


Figure 2-18. Wet weather ribotyping results for Basins D, E and F combined.

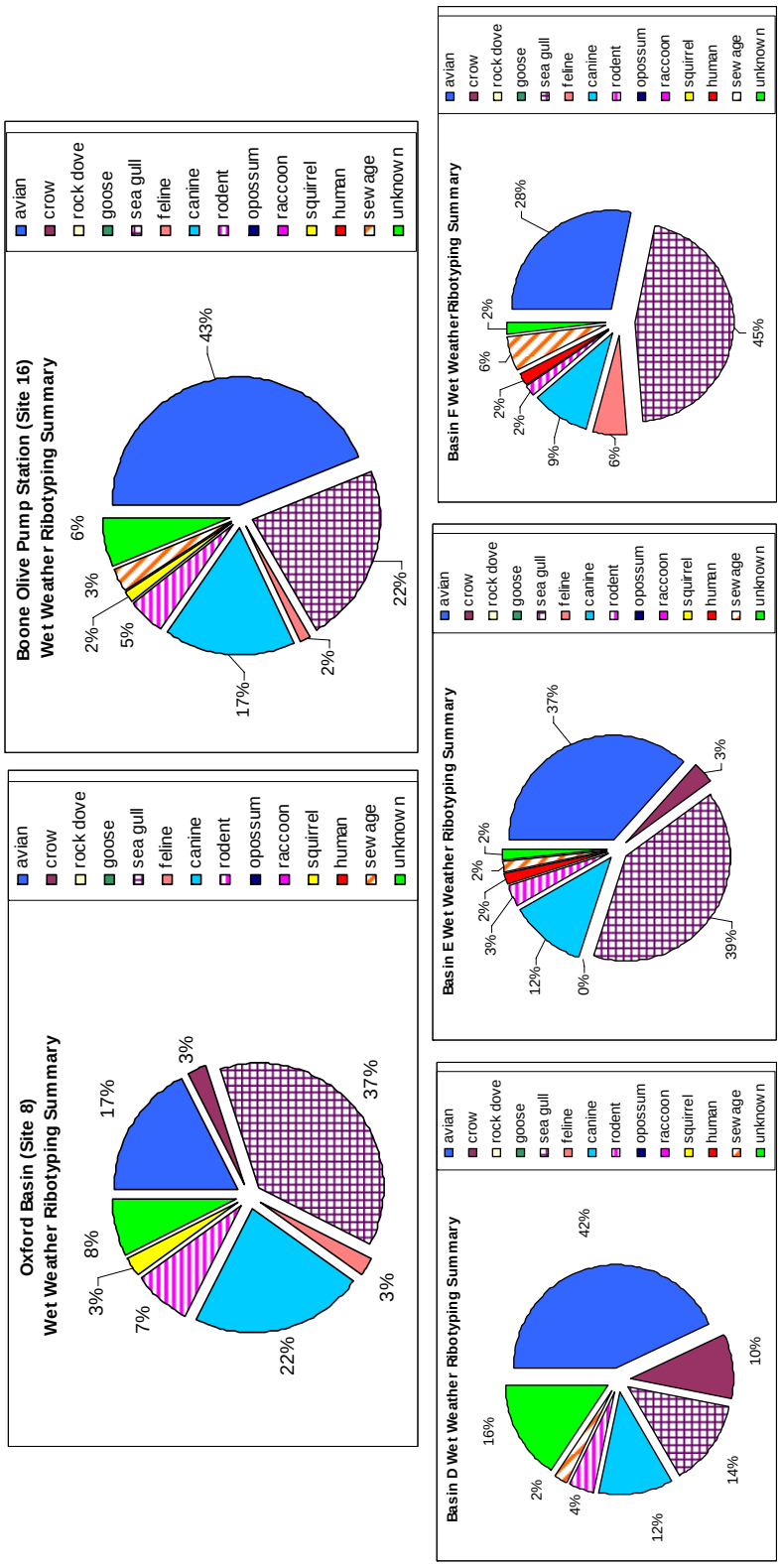


Figure 2-19. Ribotyping pie-charts for wet weather

2.2.2.4 Wet Weather Visual Observations and Spot Samples

The visual observations and spot samples taken during the wet weather events indicate that when a storm occurs, the activity in the marina ceases: there are fewer birds, visitors, maintenance activities, and boaters observed in the back basins of the Harbor.

Visual observations conducted during wet weather sampling indicated that there were no swimmers in the water. Two toddlers were observed in diapers, and no toddlers were observed without diapers. There were 16 people walking dogs during the storm events. None of the pets were playing in the water. On two occasions pet waste was not disposed of properly, including one at Site J and the other at Site 8. Two incidences of pet waste were also observed at Site J.

Bird surveys identified 61 ducks, 18 gulls, 4 pigeons, 1 pelican, 49 shorebirds, and 130 other birds. The predominant observed activity was swimming. Greater than 1000 instances of bird waste were documented during the two surveys. Sites 14, 8, and H had the majority of the ducks, shorebirds, and other birds, as well as the most observed bird waste. No dead or injured birds were observed. There were no rodents or marine mammals observed during wet weather; however, the presence of one marine animal was documented. These observations of potentially direct sources of bacterial contamination to MdRH are summarized below in Table 2-19.

Boating activities were clearly reduced during wet weather as compared with dry weather. Only one instance of boat washing was observed. There were no observed illegal discharges or dumping from boats, nor were there any observed sewage odors or pump-out station problems. Similarly, the lower usage rate of the Harbor resulted in less of a waste disposal burden. Trash removal was not observed during wet weather, although 13 trashcans/dumpsters were found uncovered and 2 were overflowing. Garbage found in the water consisted of food waste (11 observations) and non-food waste (12 observations). Trash was observed less frequently on the ground than in the water, with a total of 8 observations of food and non-food waste. There were no other observations of potentially problematic public behavior.

The majority of the observed runoff during wet weather was found near parking areas (7 instances). Runoff near restaurants and other unspecified runoff were each documented 4 times. Only two observations were made of runoff entering the Harbor. Storm drains were most commonly observed to have ponded water (22 observations), followed by 17 documented trickle flows and 12 instances of high flow. Vegetation growing on or near the storm drains was predominantly sparse. Storm drain flows were described as having an oily sheen 38 times, suds 9 times, garbage 32 times, and leaves 7 times. Other notable characteristics included 3 observations each of gasoline and sewage odors, and 1 musty smell. There were no unusual pipes observed; however, one storm drain appeared to be plugged. Observations of potential contamination from anthropogenic sources are provided in Table 2-20.

Table 2-19. Visual observations of people, pets, and wildlife during wet weather.

Wet Weather Visual Observations	
BATHERS/CHILDREN	**# of observations**
Swimmers (3+ yrs)	NONE
Toddlers in diapers	2
Toddlers without diapers	NONE
PETS	
Dog walkers	16
Pets in the water	NONE
Pet wastes disposed of improperly	2
Pet waste piles	2
BIRDS	
Ducks	61
Gulls	18
Pigeons	4
Pelicans	1
Shorebirds	49
Other birds	130
Bird waste piles	>1000
Birds flying	4
Birds swimming	13
Birds feeding in water	3
Birds shore feeding	1
Birds picking through litter	2
Dead or injured birds	NONE
Other bird behavior	1
OTHER ANIMALS	
Rodents	NONE
Marine mammals	NONE
Marine animals	1
Animals picking through litter	NONE
Other animal behavior	1
Behavior of marine mammals	NONE

Table 2-20. Visual observations of anthropogenic activities during wet weather.

Wet Weather Visual Observations	
BOATS	**# of observations**
Hosing down of boats	1
Illegal discharge	NONE
Sewage odor	NONE
Sewage pumpout station problems	NONE
Illegal dumping from boats	NONE
TRASH	
Trash removal observed	NONE
Debris from trash removal observed	NONE
Trashcans/dumpsters uncovered	13
Trashcans/dumpsters overflowing	2
FOOD WASTE	
Food waste on ground	1
Food waste in water	11
Non-food waste on ground	7
Non-food waste in water	12
Other problem behaviors, i.e. public urination, car washing, etc.	NONE
RUNOFF	
Runoff near restrooms	NONE
Runoff near parking areas	7
Runoff near restaurants	4
Runoff entering harbor	2
Broken sprinklers	0
Other runoff	4
Number of samples taken	3
STORM DRAINS	
Ponded water	22
Trickle flow	17
High flow	12
Sparse vegetation	19
Extensive vegetation	10
Algae in storm drain water	10
Oily sheen	38
Suds	9
Garbage	32
Leaves	7
Musty odor	1
Gasoline odor	3
Sewage odor	3
Unusual pipes	NONE
Plugged storm drain	1

Table 2-21 presents the spot samples from the wet weather surveys. One spot sample was collected in the receiving water after a boater was observed washing down his boat. Because this was a receiving water sample, the enterococci results that exceeded the single sample standard may have been caused not by the boat washing, but from other sources impacting the receiving waters. Two spot samples were taken of runoff; one of overland flow at Mother's Beach and the other of parking lot runoff before it entered the storm drain. Results for fecal coliform and enterococci exceeded the single sample standards for both spot samples collected. The parking lot runoff near Site 3 in Basin D had fecal coliform results of 8,000 MPN/100mL and enterococci results of 2,909 MPN/100mL. Birds have been observed in this parking lot and on the light poles, in addition to dog waste. These sources may contribute to the higher bacterial numbers that were found. The small drainage area that likely contributed to the runoff on Mother's Beach is a small asphalt path, a picnic area, a small parking lot, and a grassy area that is a part of the hotel. Results from this spot sample were 500 MPN/100mL for fecal coliforms and 602 MPN/100mL for enterococci.

Table 2-21. Description of spot samples collected during wet weather.

Spot Samples			
Date, Set	**Fecal Coliforms**	**Enterococci**	**Description**
11/9/2005, Set 1	**500**	**602**	Runoff over beach between Sites 5 and D.
11/9/2005, Set 2	130	**717**	Near Site 2; Receiving water from boat wash down.
2/19/2006, Set 4	**8,000**	**2,909**	At Site 3; Parking lot runoff before entering storm drain.
2/19/2006, Set 4	**5,000**	**23,593**	Storm drain effluent at Site 9
2/19/2006, Set 4	**2,800**	**581**	Storm drain effluent at Site 11

Mothers' Beach Runoff

In addition to the spot samples, Sites 9 and 11 were sampled directly from the storm drain effluent rather than the receiving water during the fourth set of the second storm event (as referenced in Section 1.2.2.1). The sample taken from the Site 9 storm drain effluent had a relatively high enterococci result of 23,593 MPN/100mL.

2.3 Discussion

A detailed literature review conducted by Weston Solutions indicated that circulation in MdRH, particularly the back basins, is very limited. Statistical and qualitative analysis further supports this conclusion. Results of the spatial and temporal surveys illustrated in the interpolation maps presented in Figures 2-5 – 2-8 (fecal coliform and enterococci results for both dry and wet weather sample events) display the trend analysis showing that the highest concentration of bacteria occur in Oxford Flood Control Basin and the Boone-Olive Pump Plant during the dry weather monitoring events; and Oxford Flood Control Basin, Boone-Olive Pump Plant, and Basin E during the wet weather monitoring events. Thus the evidence maintains that the sources of bacteria found within the back basins originate from sources within the basins themselves rather than from sources elsewhere in the Harbor.

Because the sources of bacteria originating within and impacting Mothers' Beach and the back basins of Marina del Rey are unknown, the two primary objectives of the non-point source investigation study were to determine the host origin of bacteria and to assess the relative loads from these sources. The spatial and temporal surveys were specifically designed to achieve these goals, with five 24-hour dry weather surveys and two 12-hour wet weather surveys conducted over the course of a year. The following discussion describes the findings in each basin for indicator bacteria, Q-PCR, ribotyping, visual observations, questionnaire responses, and spot sampling.

Basin D/Mothers' Beach
The primary source of contamination in Basin D/Mothers' Beach is direct avian sources. However, Basin D generally had very low levels of bacterial contamination throughout the study period. During dry weather, exceedances of the single sample standard were found at Sites 3, 4, and 5 for fecal coliform, and Sites 2 through 5 for enterococci. However, more than 75% of the samples at all sites in Basin D fell below water quality limits and low geometric mean values indicate that the majority of the samples collected during dry weather had minimal densities of indicator bacteria. Along with Basin F, Basin D had the lowest bacterial concentrations during wet weather. Only Sites 2 and 4 exceeded the fecal coliform single sample standard and only Site 2 had upper quartile densities above this limit. There were no sites with fecal coliform geometric means above the 30-day geometric mean WQO. Enterococci densities were relatively higher than fecal coliform in Basin D during wet weather. All sites exceeded the enterococci single sample standard, and Sites 1 through 3 also had densities above the 30-day geometric mean WQO. In Basin D, the highest bacterial value was found at Site 2, which is located in close proximity to a storm drain outfall in the northern portion of the basin. Bacterial densities measured in the vicinity of Mothers' Beach were typically low during both dry and wet weather.

Over the course of the study, Q-PCR analysis produced two wet and two dry weather results that were positive for the presence of human bacteroides in Basin D. Only one of these was at Mothers' Beach, while all others were in the boat docking areas. These results equate to less than 1% human contamination throughout the basin. This conclusion was corroborated by the ribotyping results, which indicated only 4% of the isolates submitted were found to be of human origin during dry weather and 2% during wet weather. These data, coupled with observations

supporting a lack of human contributions, confirm that sources of human origin are not contributing measurable loads of bacteria to the receiving waters in Basin D.

Other sources of bacteria in Basin D were elucidated using spot sampling and visual observations. Among all back basins, the second highest sum of densities from the various spot samples was found in Basin D (Table 2-22).

Table 2-22. Spot sample results for Basin D.

Spot Sample Type	Fecal Coliform	Enterococci
Basin D		
Dumpster Wash Down	**500,000**	2,559
Restaurant Runoff	**80,000**	3,130
Bathroom Wash Down	2,300	**27,230**
Irrigation	36,200	**19,321**
Unknown (ponded water)	8,000	2,909
Total	**626,500**	**55,149**

Dumpster wash down practices contributed the greatest amount of fecal coliform. Visual observations of the area where this sample was collected indicated that the ground surrounding the dumpsters was stained with apparent bird feces. Visual observations also documented several instances where trash containers were either uncovered or overflowing at locations in Basin D. Loose or uncovered trash attracts scavenging wildlife such as birds and rodents. Ribotyping results indicated that 72% of the isolates originated from birds and 10% from rodents during dry weather. Similarly, 66% were from birds during wet weather and 4% were from rodents. Collectively, birds and rodents accounted for 82% of the bacteria during dry weather and 70% during wet weather. Focus in Basin D should be placed on maintenance of clean, covered, and dry trash areas. The use of wet-washing techniques to clean these areas is an obvious contributor to the bacteria in Basin D and enforcement should be increased to prevent this practice.

Fecal coliform was also high in runoff from restaurants. The washing of areas where food is prepared and consumed, and allowing the runoff to enter storm drains or the receiving water is certain to generate significant bacterial loads. Furthermore, using hoses to clean these areas provides a source of fresh water that not only attracts birds and rodents, but also provides a damp environment for bacteria to grow. Restaurants surrounding MdRH benefit from the beauty of the surrounding environment, but they also have a unique and critical responsibility to implement BMPs, such as dry-cleaning methods, that are protective of water quality. Cooperation should be sought when working with restaurants to develop alternate practices; however, enforcement actions should be taken when necessary.

Enterococci was found in large amounts in water from bathroom wash down. It was also observed that the Palawan Way restrooms do not have floor drainage. Therefore, whenever this facility is cleaned, the runoff runs along the sidewalk, down the ramp and onto Mothers' Beach. Because bacteria can survive and even re-grow in sediment, where it can then become re-suspended in the water column, it is critical that direct sources of bacteria-laden water do not

enter Mothers' Beach. These restrooms should either be retrofitted with drains connected to the sanitary sewer, or cleaning practices should be altered to prevent runoff onto the beach.

Significant contributions of enterococci came from irrigation runoff as well. Though individual samples of irrigation runoff were not high relative to the other types of spot samples, the frequency with which irrigation was observed in this basin is certain to have a cumulative effect. Irrigation runoff can carry bacteria from pet waste to the receiving waters, as confirmed by the ribotyping results. During dry weather, a total of 9% of the isolates originated from domestic animals (2% from felines and 7% from canines). During wet weather, 12% of the isolates were from dogs. Irrigation schedules should be adjusted to limit over-watering, and care should be taken to ensure that sprinkler heads are properly oriented to target vegetation and pervious surfaces only. Of course, pet owners should be encouraged to clean up after their pets, with enforcement as necessary.

Basin E

The results from this study and those of the model discussed in Section 7 strongly indicate the majority of contamination to Basin E originates from the Boone-Olive Pump Plant and Oxford Basin. Basin E had noticeably higher bacteria levels than either Basin D or F, especially during wet weather. Dry weather sampling resulted in multiple exceedances of the single sample standards for both indicator bacteria. Geometric mean values during dry weather were low for fecal coliform, whereas Sites 6 and 7 had geometric means for enterococci that were greater than the 30-day WQO, indicating that higher densities were consistently found at these sites. Sampling during wet weather created a much different picture of bacterial densities in Basin E. The majority of the samples collected were greater than the single sample standards for both indicators. This was also evidenced by the elevated geometric means at all sites (except Site 11) for fecal coliform and the entire basin for enterococci. It was clear from these results that large inputs of bacteria cause elevated densities throughout Basin E, and densities are exceptionally high during wet weather in the western portion of the basin near the discharge point from Oxford Basin.

Basin E had the highest overall sums of fecal coliform and enterococci densities among the basins (Table 2-23). In fact, the three highest spot sample results found during the study were collected within the drainage area of Basin E.

Table 2-23. Spot sample results for Basin E.

Spot Sample Type	Fecal Coliform	Enterococci
Basin E		
Parking Lot Wash Down	**3,800,000**	**38,154**
Possible ICID	**1,767,000**	7,919
Restaurant Runoff	28,000	**98,039**
Irrigation	900	3,873
Total	**5,595,900**	**147,985**

The primary activity contributing to high fecal coliform contamination was wash down of the parking lots, and this activity also generated the second highest enterococci summed density. During two different sampling events, spot samples were collected from the wash down of a condominium parking garage located across the street from Site 9. One sample was collected from a sump pump discharging wash down water from the underground portion of the parking garage onto Palawan Way, and the other was collected from wash down water running off of an upper level of the parking garage. Collectively, these samples resulted in fecal coliform densities of 3.8 million MPN/100mL. Although results of Q-PCR analysis during dry weather indicated a positive result for the presence of human bacteroides at Site 9, results of ribotyping analysis showed that human sources to Basin E overall were minimal. In fact, none of the isolates were of human origin during dry weather, and only 4% of the isolates were accounted for by human sources during wet weather. It is possible that this source is being significantly diluted when it enters the receiving water. However, previous reports of sewage overflows have been linked to this building. The combination of a possible sewage overflow along with a maintenance practice that allows the runoff water from washing the parking garage to enter the street and in turn, the Harbor, is a likely contributor to the bacterial contamination in Basin E.

Another major contributor to fecal coliform in Basin E was the possible illicit connection/illegal discharge (IC/ID) that was found during visual observations. A small drain on the northern wall of Basin E was seen flowing and was therefore sampled during the third, fourth, and fifth dry weather events for fecal indicator bacteria enumeration, and Q-PCR analysis was completed during the fourth dry weather event because of a sewage odor. Due to very high indicator bacteria results and a positive result for human bacteroides, this possible source was brought to the Stakeholder's attention and an investigation into the possible illicit sewer connection was initiated. Restaurant runoff contributed the greatest amount of enterococci that was found during spot sampling of Basin E.

Other evidence of human bacterial contribution to Basin E included the presence of human bacteroides during wet weather at Sites 6, 7, 9, and 18. Because of their proximity to the effluent from Boone-Olive and Oxford Basin, it is likely that results from these sites reflect the input of highly contaminated water from the discharge area Basin E during wet weather.

Because the questionnaire was not exclusively limited to the back basins, many of the comments pertained to activity outside the realm of this study. However, Basin E was identified in 26 of the surveys specifically as an area with discharges, odor, trash, floatables, and dog walkers. These observations are supported by the visual observations performed during the dry and wet weather studies, as well as verification by ribotyping. Dog walking was popular in Basin E, with a total of 15% of isolates from canine sources during dry weather and 12% during wet weather. As in Basin F, uncovered trash containers likely attracted birds and rodents, with respective dry weather contributions of 65% and 7%. Wet weather contributions from birds equaled 79% and rodents were found to comprise 3% of the isolates. As previously described, BMPs should be applied to waste disposal in Basin E.

Basin F

Basin F had considerably lower densities of indicator bacteria than Basin E or Oxford Basin throughout the study period. Densities in Basin F were somewhat comparable to those found in Basin D during dry and wet weather. Although single sample exceedances were found at Site K for fecal coliform and enterococci, low geometric mean values indicate that the majority of the samples collected during dry weather were below WQOs. During wet weather, neither Site 12 nor 13 had densities above the 30-day geometric mean for fecal coliform, but both sites exceeded single sample standards for enterococci. Only Site 12 had densities above the single sample standard for fecal coliform and the 30-day geometric mean standard for enterococci. Furthermore, the two sites in Basin F did not have any positive human bacteroides results.

Basin F had the least amount of indicator bacteria found in spot samples among the basins (Table 2-24). The greatest contribution of both fecal coliform and enterococci was from restaurant runoff, with air conditioning condensate contributing high values as well. As previously discussed, restaurants should be encouraged/required to utilize BMPs when cleaning their facilities. While air conditioning condensate is not expected to have high bacterial densities, runoff from this unit may be contributing to contamination by providing a moist area where bacteria can grow. The implementation of french drains or other means of directing this water to pervious areas where it does not runoff as surface flow is advised.

Table 2-24. Spot sample results for Basin F.

Spot Sample Type	Fecal Coliform	Enterococci
Basin F		
Restaurant Runoff	**30,000**	**99,661**
AC Runoff	**12,339**	**3,076**
Boat Wash Down	5,000	420
Total	**47,339**	**103,157**

Boat wash down was also noted as a contributor of bacteria to Basin F. Although the densities in the spot sample were relatively low when compared with the other sample types, the frequency of occurrence of boat washing should be taken into account when considering loading. Because there are approximately 2,000 boat slips in the back basins, this could represent a considerable source of bacteria to the receiving waters.

As with the other basins, ribotyping results in Basin F indicated that the predominant contributor was from avian sources, with 57% during dry weather and 73% during wet weather. Also notable was the contribution from rodents during dry weather, representing 17% of the isolates. These sources point to potential causes, and therefore likely solutions, to the contamination. Of the entire study area, Sites 12 and 13 in Basin F were most commonly seen with uncovered disposal areas, with a total of 19 individual observations. Although these sites had relatively low levels of indicator bacteria throughout the dry weather surveys, covering the trashcans/dumpsters is an easy and effective BMP that could be implemented at these sites to reduce potential bacterial contribution during wet weather or via attraction of scavenging wildlife. Visual observations documented that garbage was primarily observed in the water rather than on the ground, indicating that trash inevitably reaches the water regardless of where it is discarded.

Canine waste was also problematic in Basin F, with respective dry and wet weather contributions of 11% and 9%. Dog walking is extremely popular around the Harbor, as evidenced by 137 observations of this activity throughout the entire back basins. Although none of the pets were in the water, dog waste was either found on the ground or neglect of proper pet waste disposal was observed on a total of 40 occasions. These observations suggest that almost one in every three dog owners do not pick up after their pets when walking around the Harbor. Pet waste disposal was found to be most problematic at Site 13 in Basin F. Greater efforts should be directed toward a public education campaign regarding pet waste disposal in this area.

Oxford Basin

Among the basins, Oxford Basin had the highest bacterial densities during both dry and wet weather, as evidenced by exceedances of the single sample standards for both indicators and elevated geometric means. Although most of the sites were elevated during dry weather, Site 15 consistently had the highest values for both indicators, with geometric means of 8,195 MPN/100mL for fecal coliform and 686 MPN/100mL for enterococci. During wet weather, all of the sites were exceptionally elevated, with geometric means at Sites 8 and 14 were nearly an order of magnitude grater than those from any other basin.

Oxford Basin had two positive results for human bacteroides during the two surveys; one at Site 14 during the second event and one at Site 15 during the first event. Receiving water densities were certainly high enough throughout the study to support the Q-PCR results; however, ribotyping only detected only 2% of the isolates during dry weather and none during wet weather from human origin.

In Oxford Basin, parking lot wash down was the primary activity causing this basin to have the third highest summed densities from spot sampling (Table 2-25). Building wash down was also observed, but the contribution from this spot sample was significantly less. Because wash down activities appear to be problematic throughout all of the back basins, it is recommended that a targeted educational campaign be initiated for commercial/dense residential BMPs related to appropriate cleaning practices.

Table 2-25. Spot sample results for Oxford Basin.

Spot Sample Type	Fecal Coliform	Enterococci
Oxford Basin		
Parking Lot Wash Down	170,000	16,785
Building Wash Down	16,000	74
Total	**186,000**	**16,859**

While conducting library sampling, field technicians discovered two duck ponds located inside the fence around Oxford Basin. In the winter, 10 to 20 ducks would gather there, in addition to snowy egrets and other birds, to enjoy the constant source of fresh, flowing water provided by the pond. The water would slowly overflow the concrete walls of the pond, which were covered in bird feces. The water source to the pond had undetectable amounts of bacteria. It appears that, depending on the number of birds present, there is the potential for the fresh water to become contaminated by fecal indicator bacteria. During the December sampling, the concrete pond walls had been cleaned and the fecal indicator results decreased. The receiving water

results were still generally higher than the effluent and the duck ponds are therefore not the main source of contamination in Oxford Basin. This conclusion was reinforced by the fact that midway through the survey, the duck ponds were drained and the water source was therefore eliminated. Oxford Basin continued to have high fecal coliform and enterococci results.

Throughout the study, observed wildlife primarily consisted of birds. Bird enumeration surveys conducted during dry weather sampling revealed large populations of gulls, ducks, shorebirds, and other birds. Of these, 60% of the ducks were observed in Oxford Basin. Shorebirds, with a total of 165 observations, were seen mostly in Oxford Basin at sites 14, 15, and 8. Other unidentified birds (154 total) were seen at these sites as well as Sites 7 and 18, which are located adjacent to the outlet of Oxford Basin into Basin E. Field samplers counted greater than 1880 instances of bird waste. Overwhelmingly, these observations were made at Sites 14 and 15. Site 14 alone had greater than 1000 collective counts, while Site 15 had an additional 800+ counts. Bacterial densities at these sites were consistently high through the study period, indicating that bird waste could be a potentially large source of bacteria to the receiving water at these sites. Ribotyping results affirm this conclusion, with 71% and 57% of isolates originating from avian sources during dry and wet weather, respectively.

Dog walking was also frequently observed. As with the other basins, pet waste disposal practices were problematic in Oxford Basin and resulted in the greatest contribution of isolates from canine sources found during the study. During wet weather, 22% of the isolates originated from dogs, compared with 11% during dry weather.

Boone-Olive Pump Station

All of the samples collected at the Boone-Olive Pump Station (Site 16) throughout the study period exceeded single sample standards, with the exception of several results for fecal coliform during dry weather. Site 16 had positive results for the presence of human bacteroides during dry weather but not during wet weather. Results of ribotyping analysis suggested that the human contribution of isolates was only 2% during dry weather and 3% during wet weather. Furthermore, ribotyping indicated that the primary source of bacteria to the Boone-Olive Pump Station was from birds, with a 65% contribution of isolates of avian origin during both dry and wet weather. Secondly, the largest contribution was from canine sources (13% during dry weather and 19% during wet weather), followed by rodents (11% during dry weather and 7% during wet weather).

Failures within the sewerage infrastructure surrounding Marina del Rey Harbor (MdRH) represent potential sources of bacterial contamination. Structural damage, such as cracks or lining failures, can allow sewage to infiltrate the soil, groundwater, and eventually the marina waters. Furthermore, operation and maintenance problems including grease buildup or root migration into pipes may cause sewage to backup and spill, thereby contaminating storm drains and receiving waters.

In order to assess the potential contamination from the sewerage infrastructure to the back basins of MdRH, a closed-circuit television (CCTV) camera investigation was conducted to identify cracks, lining failures, tree roots, sedimentation, and other problems involving the structural integrity of the sewer lines around Mother's Beach, portions of Basins D and E, and Oxford Basin. This Section will discuss the investigation area, methods, and results of the CCTV investigation.

3.1 Methods

3.1.1 Investigation Area

Figure 3-1 presents a map provided by LADPW of the sewer infrastructure surrounding MdRH and the dates when infrastructure lining occurred. The sewer conveyances are typically made of vitrified clay pipe. The majority of the infrastructure in this area has been lined using cure-in-place resin-impregnated liner. Lining is scheduled to be completed by April, 2007.

The area within the investigation footprint was based upon multiple factors. Sections of the infrastructure were considered high priority if they were: unlined, near a sample site that had a positive human hit during the first two dry weather and wet weather events, or had not been lined prior to 2000. The sewer conveyances surrounding Mothers' Beach and Oxford Basin were considered to have the high priority. As presented in Figure 3-1, the sanitary sewer line that runs directly under Oxford Basin is owned and maintained by the City of Los Angeles Sewer Maintenance District. The City of Los Angeles conducted an independent CCTV investigation of those segments with ProPipe Professional Pipe Services.

Figure 3-2 presents the sanitary sewer lines that were investigated as part of this study by LADPW. In accordance with the LADPW Sewer Maintenance District requirements, Empire Pipe Cleaning and Equipment, Inc. was chosen to conduct the CCTV investigations.

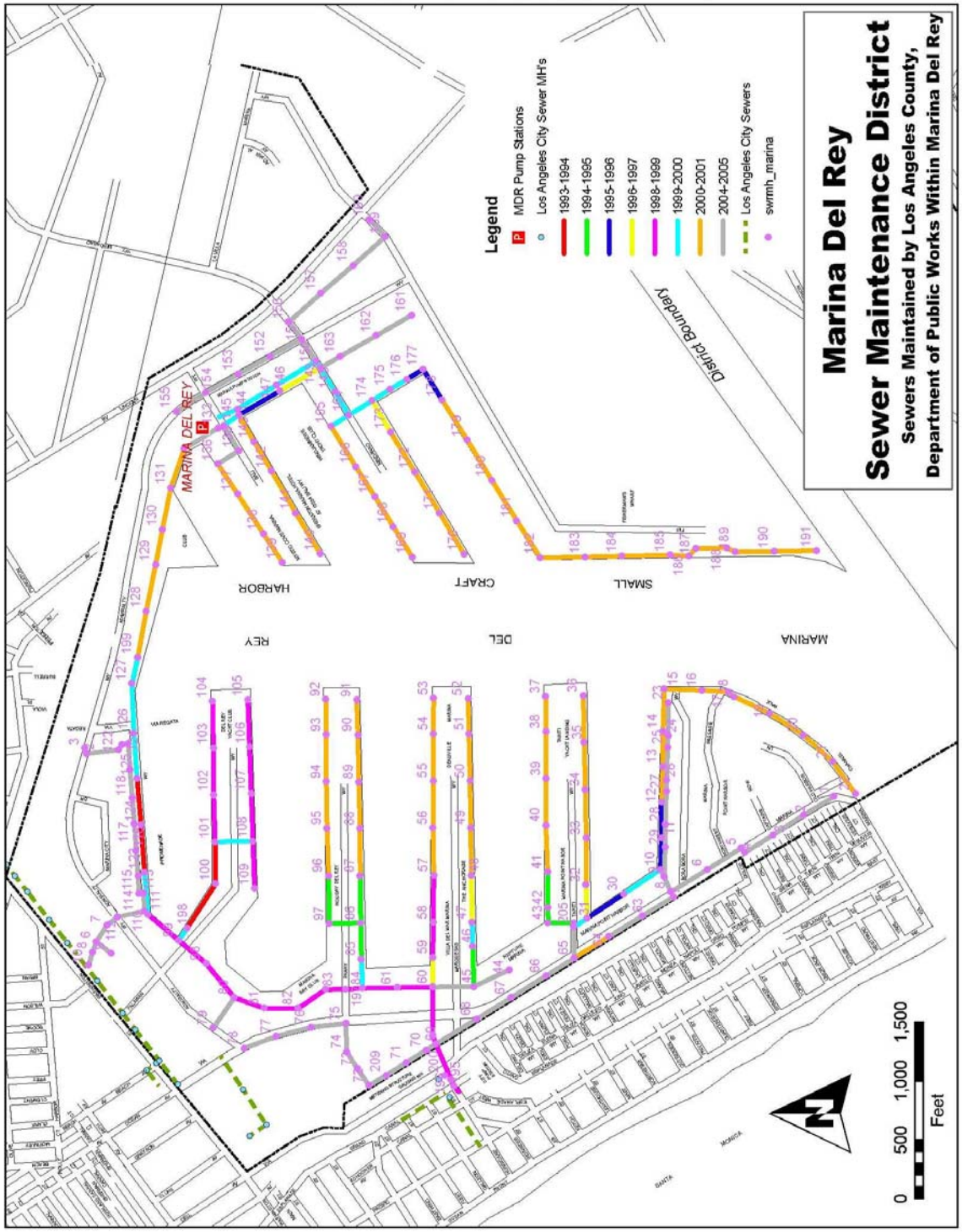


Figure 3-1. Sewer infrastructure surrounding Marina del Rey Harbor.

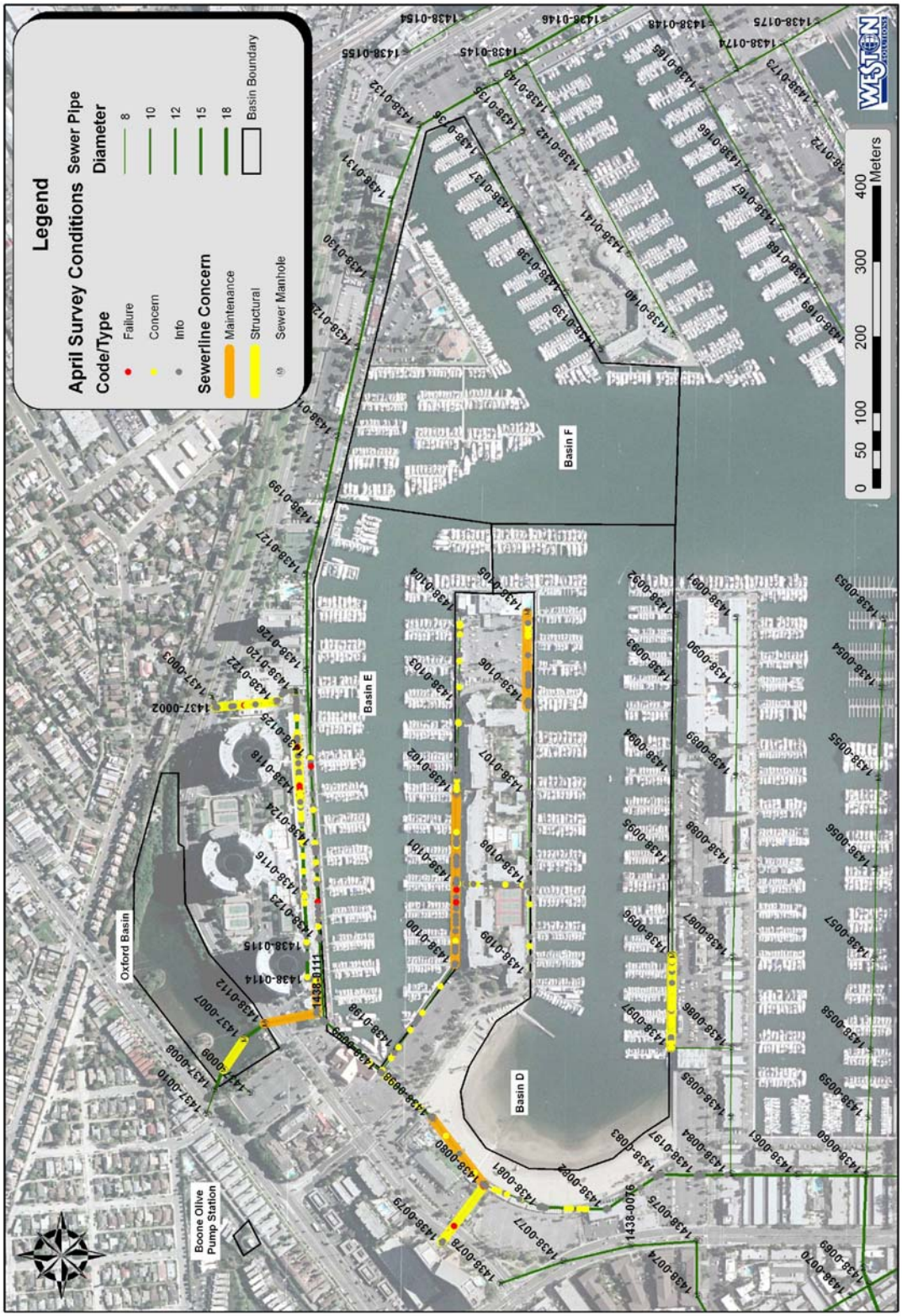


Figure 3-2. Sanitary sewer lines.

3.1.2 Data Analysis

As required by the LADPW Sewer Maintenance District, Empire Pipe Cleaning and Equipment, Inc. utilized the WinCam Version 7 software during the CCTV investigation. This software provides a final report of each segment, or run, and includes all comments, defects, and points of interest identified during the investigation. Any concerns or failures are weighted on a five point scale, with a grade of 5 indicating the greatest structural or operations and maintenance (O&M) problems.

Each segment of sewer pipe is given a four digit rating for structural integrity, O&M integrity, and an overall rating which takes into account both types of possible defects. The first digit of each rating identifies the worst grade given to the segment. The second digit identifies the number of defects with that grade in the pipe. The third digit identifies the next worst grade given to the segment. The fourth digit identifies the number of defects with that grade in the pipe. If the number of defects exceeds nine, the fourth digit then becomes a letter. Figure 3-3 is an example of the WinCam rating system.

Grade	Structural	O&M	Overall
5	10	0	10
4	4	0	4
3	3	3	6
2	0	14	14
1	0	4	4
Overall	17	21	38
Number of Defects	4	9	13
Pipe Rating	5241	3127	5241

Figure 3-3. Sample CCTV pipe rating.

In the example in Figure 3-3, the structural pipe rating is "5241." This means there were two major structural defects, such as cracking with soil visible and one defect with a grade of "4" representing multiple fractures. The O&M pipe rating is "3127." This indicated there was one instance of medium sized roots in the pipe and seven instances of attached grease on the side of the pipe. The overall pipe rating follows the same equation. Because the two highest grades of defects were both structural, the overall rating is the same as the structural pipe rating.

The conclusions made from this investigation are directly based on the ratings used by the CCTV operators. The structural and O&M defects with a weight of a 4 or 5 are discussed in the results section. In addition, using this data recorded with the WinCam software, a GIS program has been created to provide an interactive tool to identify the defects in the lines investigated. This information will be provided on a CD with the final report. While the City of Los Angeles

conducted a separate investigation that did not utilize the same software and weighing scale, these results are also discussed and major defects are identified.

3.2 Results

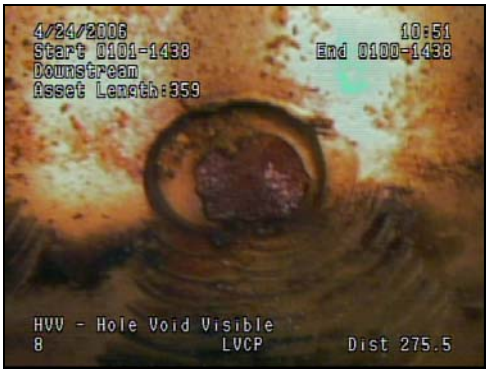
The majority of the selected sewer lines identified in Figure 3-2 were investigated between April 21 and April 25, 2006. The segments leading from the northwest corner of Basin E to the City of Los Angeles line were investigated on May 23, 2005. All lines were pre-cleaned a maximum of three days prior to the investigation by LADPW Sewer Maintenance District. The City of Los Angeles sanitary sewer line was investigated on April 27, 2006.

Table 3-1 and Figure 3-2 present the sewer lines with the greatest structural defects. These are indicated with a grade of "4" or "5" in the WinCam system. Two of the segments had a defect constituting a grade of "5" and three with a defect constituting a grade of "4".

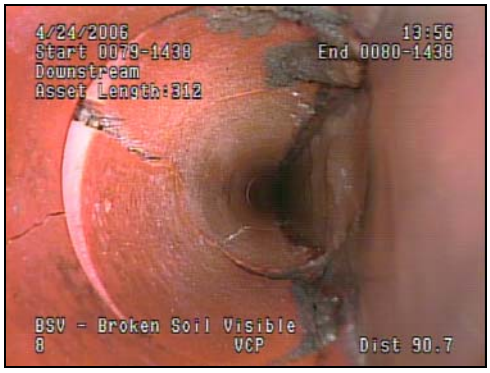
Table 3-1. Description of major structural defects in sewerage infrastructure.

Site Description	Segment (Manhole # to Manhole #)	Structural Pipe Rating	Lined or Unlined	Structural Rating Comments
South side of Basin E	1438-101 to 1438-100	5431	Lined	Three holes in the lining. At a connection with a lateral, there is a crack with a void visible. There are several other cracks and fractures at lateral connections.
Northwest of Mother's Beach	1438-0079 to 1438-0080	5241	Unlined	Two major cracks in the pipe with soil visible. One 90 ft from Manhole# 79. The other a few feet from the downstream manhole (#80). More fractures near the downstream manhole.
North of Basin E	1437-0002 to 1437-0012	4132	Unlined	Multiple fractures and cracks.
Southwest of Oxford Basin	1437-007 to 1437-006	4100	Unlined	One multiple fracture.
North of Basin E	1437-0002 to 1437-0012	4100	Unlined	One multiple fracture.

The segment with the greatest defect rating was a lined pipe on the southern wall of Basin E. There were three concentric holes in the lining that appeared to be mis-measured lateral holes. While these three holes were on the side of the pipe, above the sewage water level that day, the potential exists for sewage to leak through the holes. Because the pipe is lined, the structural integrity of the clay pipe behind the lining is not verified and therefore the magnitude of this defect is unknown. This section of pipe also had a crack with a void visible at a lateral connection.



The segment of sewer line with the greatest potential effect on water quality is the segment running from Admiralty Way in front of the Marriott to the bike path on Mothers' Beach between the picnic area and the Best Western Hotel. This unlined segment had two major cracks with soil visible. The largest crack identified in the investigation is a few feet from the edge of Mothers' Beach and was below the sewer water line in the pipe.



Three other sewer line segments were identified with grade "4" cracks and fractures, including two segments on the north side of Basin E and one to the southwest of Oxford Basin. The actual impact of each of these lines with structural defects on the receiving waters of MdRH was not assessed. It is likely that some sewage, particularly in the line closest to the Harbor, is seeping into the soil. The rate of transport, however, has not been determined.

Table 3-2 presents the sewer lines with the greatest O&M defects. These are indicated with a grade of "4" or "5" in the WinCam software. O&M defects include blockages by grease or roots which can cause a backup in the pipe and lead to a spill. Other defects include water level changes and a sag in the pipe, which may indicate that the ground underneath that pipe has moved slightly and could lead to structural damage.

Table 3-2. Description of operational and maintenance (O&M) defects in the sanitary sewer.

Site Description	Segment (Manhole # to Manhole #)	Structural Pipe Rating	Lined or Unlined	Structural Rating Comments
South side of Basin E	102 – 101	4731	Lined	Camera underwater. Abandoned survey due to large amount of grease attached.
		4122		Completed previous survey. Grade of "4" for amount of grease in portion of pipe.
South side of Basin E	101-100	413E	Lined	At a lateral connection, infiltration of groundwater. A water level sag and grease and other deposits attached.
South side of Basin D	96 - 97	413B	Lined	Abandoned survey 15 feet early due to large grease deposit. Multiple occurrences of grease and other deposits. Water level sag also identified.
North side of Basin D	105 – 106	4131	Unlined	Abandoned survey 50 feet early due to roots growing through the joints.
North side of Basin E	113 – 111	4131	Unlined	Camera underwater. Rocks in the pipe. Grease and other deposits attached.
Line from Basin E running toward Oxford Basin	111-11	4131	Unlined	Camera underwater. Unidentified deposits.
Northwest side of Mothers' Beach	98 - 80	412E	Lined	Abandoned survey due to grease deposits. Survey was continued from the downstream manhole.

There were no grade "5" O&M defects identified. Seven segments of line had a grade "4" O&M defect, the majority of which were caused by large amounts of grease attached to the sides of the pipe or water level sags. Below is a photograph of the grease attached to the line between manholes 102 and 101. Whatever the cause, when large deposits of grease are present, defects are difficult to identify and the surveys are usually abandoned and attempted from the downstream manhole.

The City of Los Angeles sewer conveyance running under Oxford Basin is primarily unlined vitrified clay pipe with portions of cast iron pipe. There are mineral deposits throughout the length of the pipe; occasionally these are severe. Additionally, structural defects, consisting primarily of cracks leading to infiltration at lateral connections occur within the segment between Manhole 67 and Manhole 76.

A summary of the results for all CCTV investigations completed for this task is presented in Appendix H.

3.3 Discussion

The CCTV investigation of the sanitary sewer lines surrounding the back basins of MdRH identified structural and O&M defects. The structural defects are a current concern due to the potential for leaks and associated bacterial contamination, while the maintenance defects remain a concern for possible future spills, but are generally not an immediate source of bacterial contamination to the receiving waters.

The most problematic segment within the Marina del Rey basin is the segment leading from the Marriot to the main line. This segment runs underneath a bike path at Mothers' Beach and is viewed as the most likely candidate for contributing bacteria to the soil, and potentially the groundwater. One of the major fractures within this segment occurs only a few feet from Mothers' Beach approximately eight feet below ground. Thus, bacteria from fractures or breaches within this segment may be infiltrating the receiving waters of the Harbor. While bacterial contamination from this segment was not confirmed during this survey, it is recommended that the repair of this line be the City's top priority with regard to this project.

The segment of sewer line to the south of Basin E is also recommended for maintenance. Although the sewer water level was below the holes in the lining when the investigations were conducted, the potential exists for sewer water to leach out through these holes. In addition, the cracks and fractures within the lateral connections pose an immediate risk for bacterial contamination of the soil.

There are two sanitary sewer lines to the north of Basin E. The one closest to the basin wall is lined, while the other is not. Two segments on this line, and one segment on the line running southwest of Oxford Basin were identified as potential areas of concern. Fractures and cracking of the pipe was observed in the line closest to the basin wall, while one fracture was identified on the line running southwest of Oxford Basin. Although bacterial contamination of the receiving waters resulting from these pipe fractures is undetermined, maintenance is recommended.

The majority of the high ratings for O&M were due to grease and water level sags and likely originates from several restaurants and apartments in the area. Maintenance and cleaning of these lines is done regularly and is recommended to continue. The sags in the sewer pipe may not be an immediate source of bacterial contamination, but may be a concern in the future.

The City of Los Angeles sanitary sewer lines that run under Oxford Basin have several minor to moderate structural defects. The cracks and fractures occur on the southwest side of Oxford Basin and continue under the parking lot and beneath the Marina International Hotel. While the majority of the cracks lead to infiltration rather than leaks, maintenance on these lines is also recommended.

As the largest artificial small-craft harbor in the United States, Marina del Rey Harbor (MdRH) is home to more than 6,000 wet berthed slips for private and commercial vessels. Dry storage accommodates an additional 3,000 boats, while launch facilities accommodate approximately 240 trailered boats. Marina del Rey is a no-discharge harbor, meaning that all vessel waste is to be retained on board and disposed of using a designated pump-out station or mobile pump-out service. Of the three 24-hour public pump-out stations located within the harbor, two are free and the third charges only a nominal fee for its use. Despite the no-discharge regulation and availability of pump-out stations, fecal contamination problems persist in the back basins of Marina del Rey. Because of this, an investigation was conducted to determine the extent to which leaking boat holding tanks and/or illicit sewage discharge from boats may be impacting receiving water quality in these basins. The monitoring study was developed in conjunction with members of the stakeholder group who are knowledgeable about boating activities and the potential for accidental or illicit discharge in the area, and was designed to incorporate the results of the Questionnaire discussed in Section 2. The resulting monitoring study was implemented to assess the potential contribution of bacterial contamination from boating activities through the collection of samples adjacent to the approximately 2,000 recreational and commercial boat slips in Basins D, E, and F.

The objectives of this study were to:

1. Assess the extent to which illicit sewage discharge from recreational and commercial boats in Basins D, E, and F is occurring, using indicator bacteria (fecal coliform and enterococci) and Q-PCR analysis.

2. Determine the extent to which any detected illicit sewage discharge is impacting the receiving waters in the back basins of Marina del Rey, as well as the receiving waters at Mothers' Beach.

4.1 Methods

4.1.1 Sample Locations

A total of 23 sampling locations were evenly distributed throughout Basins D, E, and F along a series of visual transects running parallel to the long axis of each basin channel (Figure 4-1). These transects were aligned perpendicular to the ends of the docks within each basin channel, approximately five feet from the moored boats. Through conversations with the stakeholders, it was apparent that concern over discharges from non-seaworthy houseboats was a priority. Therefore, sites were selected in close proximity to houseboats where possible, while still maintaining a comprehensive distribution of sampling locations. Nine sampling sites (numbered 1 through 9 in Figure 4-1) were located in four transects along Basin D, including one site located in the center of the basin channel near the opening to the Main Channel. Ten sites (numbered 10 through 19) along four transects were located in Basin E, including one in the center of the basin channel near the opening to the Main Channel (#18 in Figure 4-1) and one site

on the east side of the basin entrance (#11 in Figure 4-1). An additional sampling point (#23 in Figure 4-1) was placed in the northeast corner of Basin E after stakeholders indicated concern over specific large commercial vessels berthed in the area. Basin F had three sites, including two on either side of the basin entrance and one further east in the center of the channel. This basin had fewer sites than the others due to a low historical occurrence of bacterial contamination.

Figure 4-1. Sampling locations for the illicit boat discharge investigation.
The green lines indicate groupings of site samples composited for PCR analysis.

4.1.2 Sample Frequency

Sampling events investigating illicit boat discharges occurred on April 20, 2005; May 18, 2006; and June 18, 2006. These dates were selected to coincide with the dry weather sampling events in order to maximize the efficacy of visual observation and receiving water sample collection efforts. Each of the boat surveys was conducted at night when illicit discharges were most likely to occur. Two sets of samples were collected during each nighttime survey. For the first two events, one set of samples was collected during the hours of 8:00 pm – 11:00 pm and a second set of samples was collected from 12:00 am – 4:00 am. The timing was shifted slightly for the third event such that the first set of samples was collected from 12:00 am – 3:00 am and the second set was collected during the hours of 4:00 am – 7:00 am.

4.1.3 Sample Handling and Processing

During each survey, sample locations were identified in the field using Figure 4-1 and field logs. The same field technician collected surface water samples during each event while motoring an inflatable craft around the perimeter of the boat slips. One sample was taken per site from the front of the inflatable boat, approximately six inches below the surface of the water. An aseptic technique was employed at each sampling location in a manner similar to standard beach sample collection procedures. Because the purpose of these samples was to determine whether illegal discharges were occurring, the sampling technician was as discreet as possible when taking the samples.

Samples were collected and analyzed for the presence of fecal coliform and enterococci bacteria to identify areas containing high fecal indicator bacteria densities. In addition, samples were also collected and analyzed for bacteroides using the Q-PCR technique in order to determine if detected fecal indicator bacteria could be traced to human sources. Ribotyping was not conducted during the boat discharge investigations. Samples for PCR analysis were composited from sets of two or three adjacent samples. Generally, samples collected opposite of one another across a basin channel were grouped (see Figure 4-1). In the laboratory, fecal coliforms were enumerated using multiple tube fermentation based on Standard Methods 9221E while enterococci bacteria were enumerated using a chromogenic technique (IDEXX Enterolert), based on Standard Methods 9223. Composited samples for Q-PCR analysis were evaluated for presence/absence of human bacteroides.

For all samples, the sampling technician wore sterile, disposable gloves and collected bacterial samples using sterile, plastic containers. The bottle was submerged open-end down below the water's surface and then turned face-up and allowed to fill. The bottle was closed and placed in a plastic bag, sealed, and placed on ice. Each sample was labeled and identified with the project title, appropriate identification number, and the date and time of sample collection. All samples were kept on ice in the dark from the time of sample collection until delivery to the Weston Solutions, Inc. Microbiology Laboratory in Carlsbad, California. The samples and corresponding chains of custody were delivered within the maximum holding time of six hours.

4.1.4 Data Analysis

Mothers' Beach and the back basins of MdRH were listed on California's 2002 303(d) list as impaired water bodies due to high bacterial concentrations. The total and/or fecal coliform water quality standards contained in the Water Quality Control Plan for Ocean Waters of California were exceeded based upon monitoring data and based upon one or more beach closures during the period assessed. In the assessment that led to the listing of MdRH, beaches were listed due to bacteria if, for the entire data set: 1) the fecal coliform standard of 400 organisms per 100mL was exceeded in more than 15% of samples and/or 2) the total coliform standard of 10,000 MPN/100mL was exceeded in more than 20% of samples. Mothers' Beach was listed due to beach closures.

Fecal indicator bacteria concentrations within MdRH are compared with standards set in the Water Quality Control Plan (Basin Plan, RWQCB, 1994) for the Los Angeles Region and also with Title 40 of the Code of Federal Regulations (Part 131; Water Quality Standards) (USEPA, 2000a). The number of exceedances in the receiving water from storm water or urban runoff were determined based upon these comparisons. Table 4-1 lists the constituents monitored during this project and their associated water quality objectives.

Table 4-1. Major water quality constituents and applicable criteria.

Constituent	Criteria	Source
Fecal coliform	200 MPN/100ml and 400 MPN/100ml (a)	MdR Bacteria TMDL (2005)
Enterococci	35 MPN/100mL and 104 MPN/100mL (a)	MdR Bacteria TMDL (2005)
Bacteroides (c)	Presence/Absence	N/A

(a) 30-Day Geometric Mean and Single Sample, respectively.
(b) No current water quality criteria exist for the enumeration of bacteroides species. Samples will be analyzed for general bacteroides, present in all warm-blooded animals. Upon the detection of the general marker, the sample DNA will be further analyzed to determine if it is human in source.

Q-PCR analysis, which identifies general and human bacteroides, does not have a water quality objective, but assists in the determination of the host origin of the bacteria found.

4.2 Results

Results of the indicator bacteria analyses from samples collected around the boats at all 23 sites are summarized in Table 4-2. Low densities of indicator bacteria were detected throughout the study at the majority of the sites. In most cases, the densities were below or just above the method detection limits. This was particularly true of the first two sampling efforts, during which time only two single sample exceedances were found per event. On April 20, 2005, a fecal coliform density of 800 MPN/100mL was found at site B14 and an enterococci density of 287 MPN/100mL was measured at site B4. During the May 18, 2006 event, fecal coliform was detected at 500 MPN/100mL in the sample from B11 and site B1 had an enterococci density of 292 MPN/100mL. The June 18, 2006 sampling event had notably more single-sample exceedances. While the only fecal coliform density to exceed was a value of 700 MPN/100mL from site B12, there were 6 enterococci results above the single-sample standard. Of these, sites B2 and B10 each had exceedances during both sampling sets.

As shown in Table 4-2, enterococci densities measured during the three sampling events resulted in two exceedances of the geometric mean standard of 35 MPN/100mL. These included a density of 37 MPN/100mL at site B2 and 62 MPN/100mL at site B4. There were no exceedances of the geometric mean standard for fecal coliform.

Table 4-2. Summary of bacterial densities from the illicit discharge investigation.

Station ID		Fecal Coliform (MPN/100mL)			Enterococci (MPN/100mL)		
		Minimum Density	Maximum Density	Geometric Mean	Minimum Density	Maximum Density	Geometric Mean
Basin D	B1	<20	20	14	<10	**292**	34
	B2	<20	140	17	<10	**798**	**37**
	B3	<20	130	31	<10	84	17
	B4	<20	40	20	<10	**857**	**62**
	B5	<20	40	14	<10	10	<10
	B6	<20	40	20	<10	63	14
	B7	<20	40	16	<10	10	<10
	B8	<20	40	20	<10	10	<10
	B9	<20	40	20	<10	10	<10
Basin E	B10	<20	170	41	<10	**213**	19
	B11	20	**500**	65	<10	94	24
	B12	<20	**700**	111	<10	52	11
	B13	<20	170	25	<10	41	11
	B14	<20	**800**	81	<10	74	16
	B15	<20	40	16	<10	20	<10
	B16	20	130	42	<10	10	<10
	B17	<20	40	16	<10	20	<10
	B18	<20	40	18	<10	20	<10
	B19	<20	80	20	<10	20	<10
Basin F	B20	<20	20	13	<10	<10	<10
	B21	<20	70	24	<10	10	<10
	B22	<20	40	18	<10	10	<10
	B23	<20	20	13	<10	10	<10
Spot Samples							
	D1300	<20	<20	10	<10	<10	<10
	D1500	20	20	20	10	10	10
	D3500	60	60	60	<10	<10	<10
	17	20	20	20	<10	<10	<10

Values in red indicate exceedances of the single sample standard (maximum density) or geometric mean.

Results of Q-PCR analysis throughout the investigation indicated only one positive result for bacteroides of human origin. This occurred in the composited sample for sites B10, B11, and B12 that was collected during the second set on May 18, 2006. Because the composite sample showed a positive result for HF183, archived filters of the individual samples were reevaluated. Results of the individual site evaluation indicated that site B10 tested positive for human presence, whereas B11 and B12 tested negative. Interestingly, the corresponding results of indicator bacteria analysis showed very low levels of both fecal coliform (20 MPN/100mL) and enterococci (<10 MPN/100mL). Because the results of the Q-PCR analysis and indicator bacteria are contradictory for this single event, further testing of this site would be required in order to assess the likelihood of discharges at this location.

4.3 Discussion

Overall, sixteen (or 70%), of the sites had low or undetectable concentrations of indicator bacteria throughout the study period. At least one indicator bacteria exceeded single sample standards at the other 7 sites. Of these, three sites (B11, B12, and B14) each had one exceedance for fecal coliform, but enterococci was only detected at low densities throughout the study period. Conversely, sites B1 and B10 each exceeded for enterococci twice, while the fecal coliform densities were all below water quality criteria.

The most notable results were from sites B2 and B4. At site B2, fecal coliform densities were generally low or undetected, whereas the geometric mean for enterococci exceeded based on two high densities of 798 MPN/100mL and 491 MPN/100mL that were detected during the June 18, 2006 sampling event. These high densities persisting throughout the night indicate a potential discharge event, although they were not coupled with equally high fecal coliform densities. This could be due to the greater survival of enterococci over fecal coliform in marine waters; however, there is not enough evidence to confirm that a discharge occurred. Similarly, fecal coliform densities were all low at site B4, whereas two high enterococci results and three mid-range densities resulted in an exceedance of the geometric mean standard for enterococci. Interestingly, all of the higher densities were measured during the second sampling set of each event, suggesting a potential discharge pattern occurring in the very early morning hours. Again, fecal coliform densities in these samples did not provide clear support for this hypothesis, so further sampling would be required in order to further elucidate this pattern.

In general, the lack of elevated levels of indicator bacteria from the majority of the samples collected indicates illegal discharge of sewage from boats in Basins D, E, and F was not occurring during the time of sampling. The results also suggest illegal sewage dumping from boats is not a likely chronic source of bacterial contamination in the receiving waters of the back basins. However, the illegal discharge of sewage holding tanks from boats is inherently episodic and the results of the study do not rule out the potential for isolated events. Follow-up investigations, including additional sampling for indicator bacteria, the Q-PCR technique, and information gathering from local knowledgeable sources are recommended for sites B2 and B4 based on elevated geometric means for enterococci, and at site B10 to re-evaluate the positive human result of Q-PCR analysis.

Mother's Beach is a shallow swimming beach with low wave energy located at the far end of Basin D in Marina del Rey Harbor (MdRH). Due to the lack of surf, the presence of on-duty lifeguards, and the large expanse of flat sandy beach, Mothers' Beach is popular among parents with small children. The numerous restaurants, hotels, children's playgrounds, picnic shelters, and recreational equipment rental opportunities add to the appeal of this area as a favorite destination for family activities. However, Mothers' Beach was listed on the state's 2002 303(d) list as impaired due to bacteria due to exceedances of the total and fecal coliform water quality standards contained in the Water Quality Control Plan for Ocean Waters of California.

The total maximum daily load (TMDL) resulting from this 303(d) listing required the County of Los Angeles to conduct a non-point source study to determine relative bacterial loading from a multitude of possible contamination sources. One of the potential sources investigated as part of this study was the sediment in the tidally influenced area of Mothers' Beach. There is a growing body of evidence suggesting that beach sediments can act as a reservoir for indicator bacteria, which can be released into the water column when the sediments are disturbed through natural mechanisms such as wind action or through anthropogenic activities such as swimming. To assess the extent to which intertidal sediments on the beach potentially impact bacterial densities in the receiving waters, beach face transects were sampled to create a profile of bacterial densities in the intertidal sediments from the high to low tide marks. The primary goals of this investigation were as follows:

1. Determine whether the sediments at Mothers' Beach act as a reservoir for bacteria.
2. Determine whether there are spatial or temporal trends in bacterial densities within the sediment.

5.1 Methods

Due to the mounting interest and awareness of bacterial presence in sediment, many efforts similar to the present investigation have been undertaken with the intent of understanding persistence and re-growth in sediment, and the corresponding impacts on water quality. Specifically, several studies have been conducted at Mothers' Beach and multiple other locations in Southern California. Field and laboratory methods for determining bacterial concentrations in sediment are not currently standard and each investigator presents a unique approach. Despite the increasing base of knowledge that has resulted from these studies, there is a lack of conclusive data correlating densities of bacteria in sediment to those in measured water. Because a generally accepted dilution ratio of sediment/water bacteria densities does not exist, data are presented as actual values in the sediments (as analyzed in the supernatant) and assumptions were not made regarding potential densities in receiving water.

5.1.1 Sample Locations

For this study, seven transects were positioned along the beach face (Figure 5-1). Each transect ran perpendicular to the waterline from a tidal height of 0 to +6 feet above Mean Lower Low Water (MLLW). Transects were established during a low tide (below 0' MLLW) and surveying equipment was used to identify sampling points corresponding to a series of tidal height positions. For transects 1 through 6, points were flagged at the 0, 1.5, 3, 4.5, and 6 foot marks above MLLW tide lines. A seventh transect containing three sampling points at the 0, 3, and 6 foot tide marks above MLLW tide lines was located near the bathroom/kayak washdown area. Samples along each transect were enumerated as follows: 0ft tide = sampling point A; 6ft tide = sampling point E. For example, the 1.5 ft MLLW point on transect two was sample 2B. Similarly, points along transect 7 were 7A, 7C, and 7E.

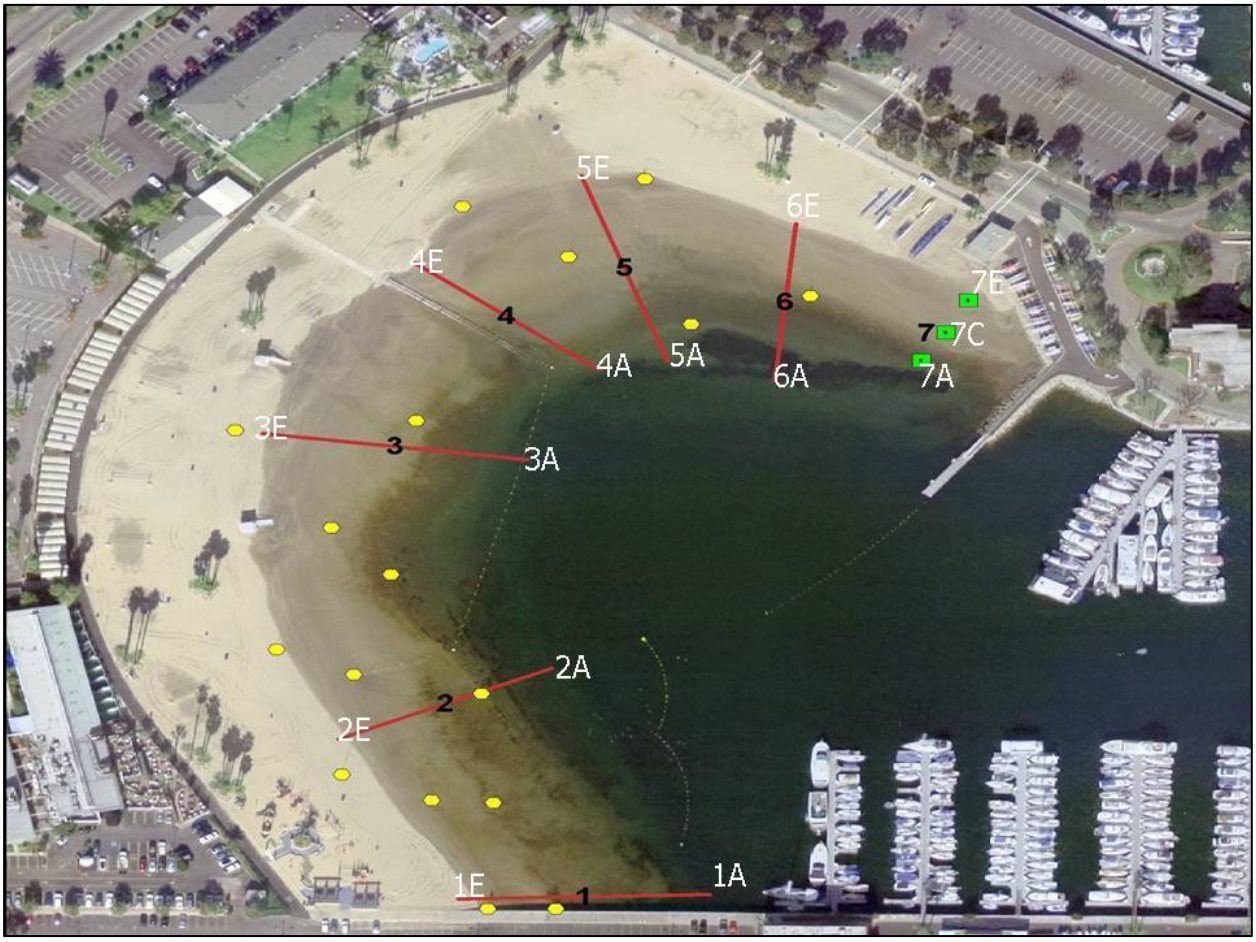


Figure 5-1. Sediment Transects for Mother's Beach Sediment Study

5.1.2 Sample Frequency

Two surveys were conducted to assess the effects of seasonality on the occurrence of bacteria in the sediment at Mothers' Beach. The January 27, 2006 sampling event was scheduled to evaluate winter conditions after several storms impacted the area. Although several large rain events occurred in the area prior to sampling, there were at least five antecedent dry days before sampling was conducted. Thus, the event was considered "winter-dry". The second event was conducted as a "summer" or "summer-dry" event, on June 15, 2006.

5.1.3 Sample Handling and Processing

During each survey, observation forms were filled out to record the number of birds on the beach, any fecal matter present, locations of groundwater springs, and other information that could be used to identify potential bacterial sources. Sample collection was performed during a low tide (less than 0' above MLLW). At each of the transect sampling points, one surficial sediment sample consisting of approximately 50g of sediment was collected by scooping the top 2cm of beach sand into sterile 100mL plastic bottles. Sterile sampling technique was employed and gloves were changed between each sample. Immediately upon collection, samples were placed on ice in the dark and were delivered to the laboratory within the 24-hour holding time for sediment. Samples were analyzed for fecal coliform and enterococci bacteria at the Weston Solutions, Inc. Microbiology Laboratory in Carlsbad, California.

All sediment bacterial densities are presented as Most Probable Number (MPN) of bacteria per gram dry weight using the following procedure. The weight of the sample bottle was subtracted from the total weight of the sample bottle plus the sediment in the sample to determine the sediment wet weight. A total of 50-75mL of sterile dilution water (phosphate buffered saline) was then added to the weighed sample, shaken, and allowed to settle for two minutes. The bacteria suspended in the overlying water was then extracted using a sterile pipette and analyzed for fecal coliform using multiple tube fermentation based on Standard Methods 9221E, and enterococci using a chromogenic technique (IDEXX Enterolert) based on Standard Methods 9223. The results of the initial assessment were in units of MPN/100mL of sample, however, because only 50-75mL of water was used in the initial dilutions, the result was multiplied by this factor to correct for the amount of water used. The MPN result was then divided by the weight of sediment tested to yield results in bacteria per gram wet weight.

To determine the moisture content of the sample, a representative section of sediment was added to a pre-weighed porcelain dish and weighed. The weight of the dish was then subtracted from the total weight to determine the wet weight of the sediment. The sediment and dish were dried in an oven overnight at 80º C and re-weighed. The weight of the dish was then subtracted to determine the dry weight of the sediment. The dry weight was divided by the wet weight to determine the percentage of dry sediment to the overall sediment. The initial bacterial

concentration per gram wet weight was then multiplied by this percentage to produce the final result in bacteria MPN per gram of dry sediment.

5.1.4 Data Analysis

The bacteria results dataset was standardized with log transformations. The data were then grouped for each date and indicator based on transects (i.e., Transect 1 included all five points representing the tidal heights) and tidal zones (i.e., Zone A included all seven transects). Analysis of variance (ANOVA) was performed to determine if there were statistical differences between transects or between tidal height zones for each indicator bacteria using SAS statistical software. When statistically significant differences were found, a Tukey's multiple range test was implemented to determine which groups were different from other groups.

There are no water quality objectives or other environmental standards related to bacteria in beach sediments that apply to the data collected under this investigation.

5.2 Results

The results of the Mothers' Beach transect assessment indicated both spatial and temporal patterns of bacterial densities along the beach face. Generally, bacteria densities in sediment were higher in the lower intertidal zone during the winter, and elevated bacteria was found along Transect 7 during both the winter and summer sampling events. Figure 5-2 and Figure 5-3 show the results of bacterial analyses for each season and indicator.

Statistical analysis show that during the winter-dry sampling event on January 26, 2006, bacteria in sediment samples collected in the lower intertidal zone were significantly greater than those in the upper intertidal zone. Whereas fecal coliform and enterococci densities were found at or near the detection limit at all of the sampling points along transects 1 through 6 above 1.5 ft MLLW, higher densities of both indicator bacteria were found along tidal Zone A at 0 ft MLLW. In Zone A, fecal coliform was found at a density of 31 MPN/g dry wt. at Transect 1 and 30 MPN/g dry wt. at Transect 4, while an enterococci density of 131 MPN/g dry wt. was found at Transect 5. Several lower-range but detectable densities were also found for both indicator bacteria in Zone A. These values resulted in a geometric mean for fecal coliform (but not enterococci) in Zone A that was statistically significantly different from the other tidal height zones. Another notable result from the winter-dry sampling event was the detection of enterococci at a density of 189 MPN/g dry wt. at Transect 7 in tidal Zone E (6 ft MLLW). This was the highest result detected during the entire investigation.

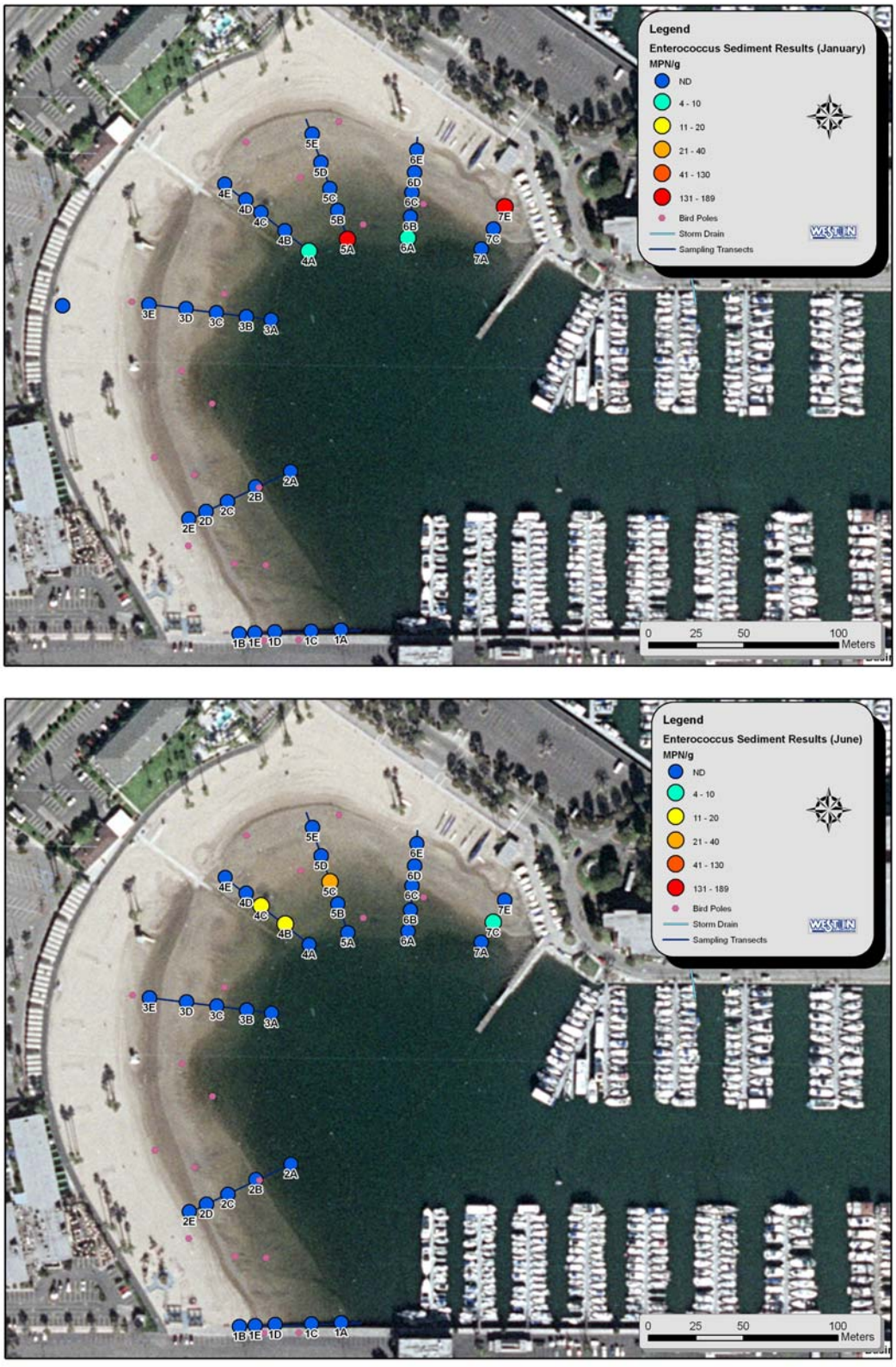


Figure 5-2. Sediment Results for Enterococci for January and June

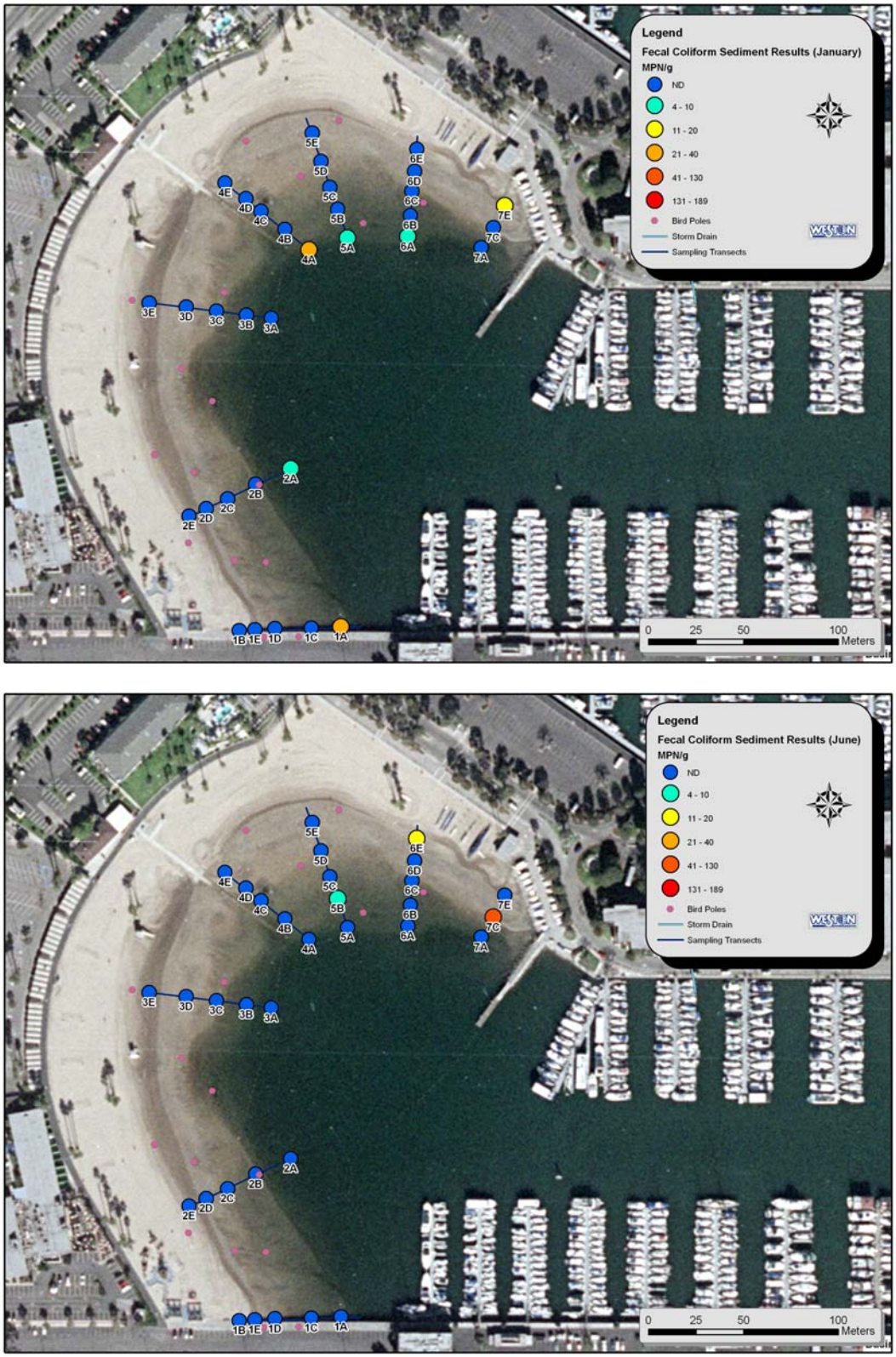


Figure 5-3. Sediment Results for Fecal Coliform for January and June

Results of the January 27, 2006 sampling event are provided in Table 5-1. The geometric means were calculated for individual transects and tidal zones. While the 30-day geometric mean water quality criteria is not directly applicable due to the expanded timeframe of the data collected, it is used here as a point of reference.

Table 5-1. Results of indicator bacteria analysis in sediment collected on January 27, 2006 at Mothers' Beach.

Tidal Zone	Transect							GEOMEAN
	1	2	3	4	5	6	7	
Fecal Coliform								
E	3	<1	<1	<1	<1	<1	12	1.0
D	<1	<1	<1	<2	<1	<1	ND	0.6
C	<1	<1	<1	<1	<3	<1	<1	0.6
B	<2	<2	<1	1	<1	<1	ND	0.7
A	31	8	<1	30	5	10	2	**6.2***
GEOMEAN	1.5	1.0	0.5	1.5	1.0	0.9	2.3	
Enterococci								
E	<1	<1	1	<1	1	<1	189	1.4
D	<1	<1	<1	<1	<1	<1	ND	0.5
C	<1	<1	<1	<1	<2	<1	<1	0.6
B	<1	<1	<1	1	<1	3	ND	0.8
A	1	<1	2	6	131	4	<1	2.9
GEOMEAN	0.6	0.5	0.8	0.9	2.0	1.1	3.6	

* indicates value is statistically significant; ND = No data
All results are presented in MPN/g dry wt.

Similar to the winter-dry sampling event, the majority of the samples collected on June 15, 2006 resulted in indicator bacteria densities equal to or less than the detection limit. In contrast to winter results, all of the samples collected in tidal Zone A were very low. However, summer-dry sampling along Transect 7 resulted in an elevated density similar to that found during the winter. Fecal coliform was detected at a density of 122 MPN/g dry wt. in tidal Zone C (3 ft MLLW). Although the elevated indicator bacteria were different between the seasons (high enterococci during winter versus high fecal coliform during summer), these results suggest a persistent presence of bacteria in the sediment along Transect 7. Other notable results, though sporadic, included several mid-range densities along transects 4 and 6, and a density of 40 MPN/g dry wt. along Transect 5 in tidal Zone C. There were no statistically significant geometric means among transects or tidal zones during the summer sampling event. All results from June 15, 2006 are presented in Table 5-2. The geometric means were calculated for individual transects and tidal zones. While the 30-day geometric mean water quality criteria is not directly applicable due to the expanded timeframe of the data collected, it is used here as a point of reference. Appendix D contains the full lab reports from the study.

Table 5-2. Results of indicator bacteria analysis in sediment collected on June 15, 2006 at Mothers' Beach.

Tidal Zone	Transect							GEOMEAN
	1	2	3	4	5	6	7	
Fecal Coliform								
E	<1	<1	<1	<1	1	17	1	1.0
D	<1	<1	<1	<1	<1	<1	ND	0.5
C	<1	<1	<1	<1	1	<1	122	1.2
B	<1	<1	<1	<1	5	<1	ND	0.7
A	<1	2	<1	<1	<1	<1	<1	0.6
GEOMEAN	0.5	0.7	0.5	0.5	1.0	1.0	3.9	
Enterococci								
E	<1	2	1	<1	1	<1	<1	0.7
D	<1	<1	1	2	2	<1	ND	0.9
C	<1	<1	<1	12	40	3	7	2.8
B	<1	<1	1	18	2	1	ND	1.4
A	1	<1	1	1	1	3	1	1.1
GEOMEAN	0.6	0.7	0.9	2.9	2.8	1.2	1.5	

ND = No data
All results are presented in MPN/g dry wt.

5.3 Discussion

Numerous studies have indicated that beach sediments often contain higher densities of fecal indicator bacteria than the overlying water column (An et al., 2002; Grant et al., 2001; Obiri-Danso and Jones, 2000; Solo-Gabriele et al., 2000; Howell et al., 1996). In addition, studies on the survival of bacteria show that sediments containing a large amount of organic matter provide a favorable environment for growth. Fecal bacteria have been shown to survive and, to a certain extent, even to grow in both freshwater and marine sediments (Grant et al., 2001; Solo-Gabriele et al., 2000; Davies et al., 1995; Hood and Ness, 1982). During summer months, bacteria may be re-suspended in the water column by swimmers, possibly resulting in exceedances of water quality standards. One study conducted in Southern California found a seasonal pattern of fecal coliform storage in sediments during low-flow conditions and subsequent re-suspension of bacteria to the water column when the sediments were disturbed (Steets and Holden, 2003). A similar study conducted in Florida suggested that *E. coli* bacteria multiplied in tidal riverbank soils after their initial deposition during storms and were re-suspended and carried to the river mouth during ebbing tides (Solo-Gabriele et al., 2000).

The aim of this investigation was to create a profile of bacterial densities across the beach face and thereby determine whether re-suspension of bacteria in the sediment could be a significant source of contamination to the receiving water at Mothers' Beach. Results indicate that these sediments are generally uncontaminated based on two sampling events that occurred in 2006, one each during the winter and summer. The majority of the beach face had densities of fecal coliform and enterococci that were at or near the detection limit. It is therefore not likely that sediment re-suspension contributes large amounts of bacteria to the water. However, two patterns of bacterial presence in the sediment emerged that show spatial and temporal relationships with potential bacterial sources.

During the January 27, 2006 sampling event, the geometric mean for bacterial densities in the lower intertidal zone (Zone A) was significantly higher than the other tidal heights. Although storms had previously occurred, there was no rain for at least three days prior to sampling, thereby reducing the possibility of contamination due to urban runoff. Furthermore, a source of storm water runoff would likely have impacted the upper intertidal zone as well as the lower intertidal. Data for receiving water densities collected on that day independently of this study (by the City of Los Angeles) showed very low indicator bacteria levels, with total coliform at a density of 210 MPN/100mL and enterococci at less than 10 MPN/100mL. This information indicates that the contamination was not originating within MdRH waters. Visual observations recorded as part of the sampling effort indicated the presence of numerous shorebirds along the waterline that could have contributed to the increased densities in this area. This observation is not surprising because bird populations are more prevalent during the winter months than the summer months in Southern California due to

migrational patterns. Interestingly, the pattern of increased bacterial densities in the lower intertidal zone was not observed during the summer. This reasoning would indicate that birds were the likely source of the increased densities observed during the winter sampling event.

The other trend that was observed between the two sampling events was elevated densities of indicator bacteria along Transect 7, which was located adjacent to the restroom/kayak wash down area. During the winter, enterococci was elevated at a density of 189 MPN/100mL, whereas sampling on June 15, 2006 resulted in the detection of fecal coliform at 122 MPN/100mL. Although the pattern is not consistent among the indicators, it is clear that a source exists in this area and that bacteria are persistent throughout the year. Wash down practices could be resulting in runoff to the beach and the leaching of bacteria into the sand. This could be amplified by the large amount of birds that were observed during the winter months. It is recommended that bathroom wash down practices be corrected and closely monitored to prevent the runoff from reaching the beach. In addition, it is recommended that the removal of bird waste be performed two or more times weekly to reduce bacterial loading into the receiving water.

On August 7, 2003 the California Regional Water Quality Control Board (RWQCB), Los Angles Region adopted an amendment to the Water Quality Control Plan to incorporate the Marina del Rey Harbor (MdRH) Mothers' Beach and Back Basins Bacterial Indicator TMDL. This amendment states:

> "… the MdR responsible jurisdictions and responsible agencies are required to conduct a study to determine the relative bacterial loading from sources including but not limited to storm drains, boats, birds, and other non-point sources. Once this study is completed in three years, the Regional Board will adjust the WLAs, if appropriate, based on the study, during the scheduled review of this TMDL."

The first objective of the monitoring plan for the non-point study required in the TMDL states:

> "determine the relative loadings of indicator bacteria to the water bodies listed in the TMDL from sources including but not limited to storm drains, boats, birds, and other non-point sources."

The MdRH Mothers' Beach and Back Basins Bacterial Indicator TMDL established allowable number of exceedance days for summer dry weather, winter dry weather, and winter wet weather periods at 12 monitoring locations. These locations are spatially distributed within the MdRH Mothers' Beach, Basin E, and Basin F. Per the study objective, estimates of the loading for fecal coliform and enterococci were made based on the waters quality sampling and other information identified below.

Wet and dry weather runoff enters MdRH through storm drains at three locations: (1) Oxford Flood Control Basin, (2) Boone-Olive Pump Plant, and (3) local runoff. In addition, avian waste may also contribute considerable loading of bacteria to both the water surface and the local drainages. Marina activities such as waste disposal from boats, boat deck and slip washing also have the potential for bacterial loading. However, the TMDL concluded that these marina activities were not a significant source. This conclusion was confirmed with the illicit boat discharge investigation discussed later in this report. The estimates of bacterial loading from each of these sources are presented in this Section.

6.1 Oxford Flood Control Basin Loading

Flows between the Oxford Basin and Basin E are largely influenced by the tidal cycle. A water mass balance approach was used to estimate the net into Basin E. Oxford Basin discharges to Basin E through a tide gate via a sluiceway that is continually submerged. The sluiceway has a constant cross-sectional area of 101 ft^2. At the start of the study, a velocity meter was installed within this sluiceway and measurements were taken from September 22, 2005 to June 12, 2006.

Periods of wet weather versus dry weather were determined using the same approach as the MdRH Bacterial Indicator TMDL. Wet weather was defined as those days with 0.1 inch of rain or more, and the three days following the rain event. Rainfall data was obtained from County of Los Angeles Department of Public Works (LADPW) Station 370 at Ballona Creek for the study period. Wet and dry weather periods were identified based on the precipitation record. For each wet and dry period, the mean net flow into Basin E was determined based on the velocity measurements and the known cross section of the submerged sluiceway.

Fecal coliform and enterococci bacterial indicator samples were collected for six to eight sets during five dry weather events and four sets during two wet weather events. Station 8 is located in the Oxford Basin at the outflow into Basin E. The cumulative geometric mean was calculated for both dry and wet weather sampling periods for both bacterial indicators. The geometric mean represents the best estimate of bacterial concentrations due to the log-normal distribution and measured variability. The cumulative geometric means and the measured flows were used to calculate bacterial indicator loads for all wet and dry periods of the study.

Loadings were derived on an annual basis for comparative purposes. The summer period from June 13, 2005 to September 21, 2005 prior to the study was assumed to represent a dry weather period. The mean dry weather flow from the study period was used to estimate loadings for the non-study period. Annual loads were computed by summing the total study period dry weather loads, wet weather flows, and non-study dry weather loads. Wet weather loads were two to three orders of magnitude greater than dry weather loads for both bacterial indicators (Table 6-1).

Table 6-1. Annual bacterial indicator loads from Oxford Flood Control Basin.

Period	Fecal coliform (MPN/yr)	Enterococci (MPN/yr)
Wet Weather	7.42×10^{14}	8.56×10^{13}
Dry Weather	6.79×10^{11}	4.49×10^{11}
Total Annual	7.43×10^{14}	8.60×10^{13}

6.2 Boone-Olive Pump Plant Loading

Storm drain runoff within Ballona Creek watershed is also discharged into Basin E from the Boone-Olive Pump Plant. This facility periodically pumps runoff that has accumulated in a detention basin near Venice Boulevard. The times of the pumping and the volume of water discharged are recorded.

Periods of wet weather versus dry weather were determined using the same approach as the MdRH Bacterial Indicator TMDL. Wet weather was defined as those days with 0.1 inch of rain or more, and the three days following the rain event. Rainfall data was obtained from LADPW Station 370 at Ballona Creek for the study period. Wet and dry weather periods were identified based on the precipitation record. For each wet and dry period, the volume of water pumped into Basin E was identified from the pump facility record.

Fecal coliform and enterococci bacterial indicator samples were collected for 6 sets during five dry weather events and 4 sets during two wet weather events. Station 16 is located in the open detention basin that holds runoff until discharged into Basin E via pumping from the Boon-Olive Pump Plant. The cumulative geometric mean was calculated for both dry and wet weather sampling periods for both bacterial indicators. The geometric mean represents the best estimate of bacterial concentrations due to the log-normal distribution and measured variability. The cumulative geometric means and the measured pump volumes were used to calculate bacterial indicator loads for all wet and dry periods of the study.

Detention basin at Boone - Olive

Loadings were derived on an annual basis for comparative purposes. The summer period from June 13, 2005 to September 21, 2005 prior to the study was assumed to represent a dry weather period. The mean dry weather flow from the study period was used to estimate loadings for the non-study period. Annual loads were computed by summing the total study period dry weather loads, wet weather flows, and non-study dry weather loads. Wet weather loads were an order of magnitude greater than dry weather loads for both bacterial indicators (Table 6-2).

Table 6-2. Annual bacterial indicator loads from Boone-Olive Pump Plant.

Period	Fecal coliform (MPN/yr)	Enterococci (MPN/yr)
Wet Weather	2.66×10^{13}	2.18×10^{13}
Dry Weather	1.10×10^{12}	5.61×10^{11}
Total Annual	2.77×10^{13}	2.23×10^{13}

6.3 Local Drainage Loading

Several storm drains also discharge runoff from the nearshore local drainage areas. These areas drain runoff to each of the basin areas identified in the MdRH Bacterial Indicator TMDL. Direct measurement of the bacterial indicator loading of these diffuse discharges is not logistically feasible since most drain below the water level of the MdRH receiving waters. A modeling approach can be used to estimate the bacterial indicator loads based on the types of land uses in the local drainage areas.

On June 8, 2006 the California Regional Water Quality Control Board (RWQCB), Los Angles Region proposed an amendment to the Water Quality Control Plan to incorporate the Ballona Creek and Estuary Bacterial Indicator TMDL. To support the implementation of this TMDL, the Southern California Coastal Water Research Project (SCCWRP) has developed a watershed water quality model. The Hydrologic Simulation Program – FORTRAN (HSPF) (Bicknell *et al* 1997) was selected for watershed loading analyses of bacterial indicators. HSPF was selected since it could be linked directly with the watershed and stream-modeling framework of the Ballona Creek TMDL. The Ballona Creek watershed is immediately adjacent to MdRH and is expected to have similar watershed characteristics as the local drainage into MdRH.

To calibrate the HSPF model, fecal coliform indicator overland flow wash-off parameters were defined for each land use category. These calibrated parameters were provided to Weston Solutions, Inc. for use in this study (Drew Ackerman -SCCWRP, personal communication). No model parameters for enterococci are currently available. The model simulates overland flow wash-off as a function of pollutant land storage, runoff volume, and the susceptibility of the pollutant to wash-off. HSPF defines this mechanism as:

SOQO = SQO * (1-exp(-SURO*WAFAC)

where,

SOQO = Flux of the pollutant from the land surface (quantity/acre/interval)
SQO = Storage of the pollutant on the land surface (quantity/acre)

SOQLIM = Upper limit for pollutant land storage (quantity/acre)
SURO = Surface water volume runoff (inch/interval)
WSQOP = Rate of surface runoff that results in 90% wash-off in one hour (inch/hour)
WSFAC = Susceptibility of the pollutant to wash-off (1/inch) = 2.30/WSQOP

The local drainage areas were delineated by inspection of the LADPW storm drain map and did not include the drainage areas of Oxford Control Basin or Boone-Olive Pump Plant. The local drainage areas were also differentiated between the specific basins identified in the TMDL, namely Mothers' Beach, Basin E, and Basin F. These local drainage area delineations were intersected with a GIS land use layer (Southern California Aerial land Use Consortium 2001 Land Use Classification developed by Aerial Information Systems, Inc.). The result of the intersection was a list of the areas for each land use within each drainage basin (Table 6-3).

Table 6-3. Land use areas for the local drainages of MdRH's back basins.

Waterbody	Local Drainage Basin Land Use	Area (acres)
Basin E	Beach Parks	0.62
	Developed Local Parks and Recreation	0.64
	Fire Stations	0.08
	High-Rise Apartments and Condominiums	1.46
	Hotels and Motels	1.90
	Marina Water Facilities	4.31
	Medium-Rise Apartments and Condominiums	1.31
	Modern Strip Development	1.67
	Other Open Space and Recreation	0.19
Basin F	Hotels and Motels	0.56
	Low- and Medium-Rise Major Office Use	0.32
	Marina Water Facilities	4.88
	Modern Strip Development	1.23
	Other Open Space and Recreation	5.08
Mothers' Beach	Beach Parks	0.62
	Hotels and Motels	1.49
	Low-Rise Apartments, Condominiums, and Townhouses	0.39
	Marina Water Facilities	7.11
	Medium-Rise Apartments and Condominiums	3.60
	Modern Strip Development	1.46
	Other Open Space and Recreation	0.19
Total		39.13

The loading from each land use was derived using the calibrated HSPF parameters and the mechanistic wash-off equation above. Several assumptions were made for the loading estimate. First, only the wash-off mechanism of the HSPF model was used in steady state. The dynamic nature of build-up and wash-off driven by rainfall was not modeled. Second, the upper limit of land storage (SQOLIM) for fecal coliform was used to estimate the maximum loading possible. Third, only the impervious surface wash-off loading was modeled based on the attributes in the

GIS land use layer. Pervious surfaces were assumed to infiltrate before reaching the storm drain. Finally, only the runoff associated with wet periods was used based in the LADPW Ballona Creek rain gauge. Small precipitation events during dry periods were assumed to not produce run-off (i.e., daily rainfall < 0.1 inch). The total volume of rainfall during wet days was 11.04 in/yr. Annual fecal coliform loadings were found to be in the same range for all three drainage basins (Table 6-4 and Figure 6-1).

Table 6-4. Annual fecal coliform loadings from local drainages of MdRH's back basins.

Waterbody	Local Drainage Basin Area (acres)	Fecal Coliform Loading (MPN/yr)
Basin E	12.20	1.21×10^{10}
Basin F	12.08	6.79×10^{9}
Mothers' Beach	14.86	1.30×10^{10}
Total	39.13	2.23×10^{10}

Figure 6-1. Annual fecal coliform loadings from local drainages of MdRH's back basins.

6.4 Estimation of Avian Loads

The U.S. Environmental Protection Agency documents literature that shows significant bacterial indicator contribution to bodies of water from bird populations (USEPA, 2001). Four variables are needed to estimate bacterial indicator loads from bird sources: (1) the average number of birds at a particular location, (2) the amount of excretion per bird, (3) the concentration of bacterial indicators in excretion for a specific bird type, and (4) an approximate percentage of the load reaching the waterbodies. It is difficult to obtain site-specific information for each of these variables. As such, avian loading of fecal coliform was estimated based on identified assumptions.

The frequency of avian excretions, the amount of excretion per bird and concentration of bacterial indicators in droppings of the different bird types were estimated by reviewing available literature (Table 6-5, Table 6-6, and Table 6-7).

Table 6-5. Frequency of avian excretions found in the literature.

Bird Type	Excretion Rate (excretions/hr)	Literature Reference
Duck	6.8	Ryder, 1970
Gull	3.1	Portnoy, 1990
Gull	4.4	Good, 1998
Knot	25.2	U.S. FWS, 2003

Table 6-6. Amount of avian excretions found in the literature.

Bird Type	Weight per Excretion (grams)	Literature Reference
Duck	0.26 (dry weight)	Ryder, 1970
Gull	0.53 (dry weight)	Portnoy, 1990
Gull	0.23 (dry weight)	Nixon and Oviatt, 1973
Gull	0.20 (dry weight)	Marion et al. 1994
Gull	0.48 (wet weight)	Alderisio and DeLuca, 1999

Table 6-7. Avian excretion bacterial indicator concentrations found in the literature.

Bird Type	Excretion Concentration (CFU/g)	Indicator	Literature Reference
Duck	3.3×10^7	Fecal coliform	Geldreich, 1978
Gull	3.7×10^8	Fecal coliform	Alderisio and DeLuca, 1999
Gull	5.2×10^8	Fecal coliform	Levesque et al., 1993
Gull	2.1×10^8	Fecal coliform	Levesque et al., 2000
Gull	5.2×10^8	Fecal coliform	Gould and Fletcher, 1978
Gull	6.2×10^8	Fecal coliform	Gould and Fletcher, 1978
Gull	3.0×10^8	Fecal coliform	Gould and Fletcher, 1978

The number and types of birds in the in the MdRH back basins were estimated by taking sequential 30-minute digital pictures of eight areas in the local drainage over 33 days. Since over 8000 images were collected, a sub-sample was visually reviewed and counts of birds and types were tallied. The area viewed in each camera angle was visually estimated. Total bird counts over the area of local drainage were extrapolated based on the areas visible on the images with their respective bird counts. The estimate of avian loading was made only for the local drainage area and not for the entire watershed. The assumption was made that 100% of avian loading from the local drainage are delivered to the waterbodies. The contribution of bird loading within the greater watershed are included in the storm drain loading estimates from Oxford Flood Control Basin and Boone-Olive Pump Plant, but were not differentiated.

Several assumptions were made in the avian loading estimates. First, the knot excretion weight was assumed to be one-quarter of a gull excretion weight based on the relative bird sizes. Second, the length of time a bird stayed on the ground in the camera areas was assumed to be 15-minutes (i.e., one-half the time frame between collected digital pictures). Third, fecal coliform excretion concentrations of knots were assumed to be the same as gulls. Fourth, the bird counts in the winter are twice what were observed in the summer (Kathy Keane, Keane Biological consulting, personal communication, 4 Aug 2006). Based on these assumptions, the avian loads were estimated (Table 6-8).

Table 6-8. Estimated annual avian loading from local drainages of MdRH's back basins.

Waterbody	Local Drainage Basin Area (acres)	Fecal Coliform Loading (MPN/yr)
Basin E	12.20	1.66×10^{12}
Basin F	12.08	1.66×10^{12}
Mothers' Beach	14.86	2.04×10^{12}
Total	39.13	5.37×10^{12}

6.5 Boat Waste Loads

Three reports were reviewed to gain insight on possible bacterial indicator loads from boats harbored in the marina. These reviews are summarized below. Based on this review, boat wastes are not considered to be a significant loading source of bacterial indicators. This conclusion was also confirmed with the illicit boat discharge investigation and ribotyping data, which showed no widespread bacterial indicator contamination from human sources.

Total Maximum Daily Load to Reduce Bacterial Indicator Densities at Marina del Rey Harbor Mothers' Beach and Back Basins (LARWQCB, 2003)
The Regional Board staff does not consider waste disposal from boats to be a significant source of bacterial loading, since, the lowest exceedance probabilities generally occur during summer dry-weather when the use of private and commercial boats would be highest. In addition, only the back basins of MdRH are listed as impaired for coliform. If boats were a major source of bacterial loading then one would expect other areas of the Marina to be impaired.

Marina Beach Water Quality Improvement Project- (LADBH, 2004a)
MdRH has an intense operational and maintenance program. The report describes investigations on sewage disposal practices from boats, parking lot sweeping, boat wash down practices, bird exclusion structure at Marina Beach, and beach operations and sand management practices. The report concludes:

- Boat waste discharges were not shown to be a problem in the marina.
- Boat wash down practices may be a source of bacterial indicator loading.

Marina del Rey Vessel Discharge Report (LADBH, 2004b)
This report discusses the background on the management of vessel related activities in MdRH, an inventory of current available pump-out services and the demand for their use, a survey of the number of liveaboards in MdRH and the provision for new pump-out services as a part of the redevelopment of the Marina. The findings of this report are as follows:

- MdRH consists of eight boat basins, providing wet storage for approximately 5,000 small craft. The boats are permanently berthed within 18 anchorages. At least seven percent of the existing boat population within MdRH is presumed to be liveaboards.
- Presently there are five boat pump-out stations located throughout the marina. Three are accessible to the general public and two are dedicated to marina tenants and charter boat fleets. In addition, two workboats with on-board pumps service boats while in their slips. DBH anticipates at least 6-7 additional pump-out stations will be installed over the next seven years.

- Pump-out stations are used sparingly – only reaching 20% of their full capacity to service boats.
- The County of Los Angeles Sheriff's Department estimates the violators of discharge rules is very low.
- The US Coast Guard has never observed any incidents of illegal boat waste discharge nor received any complaints.
- Fishing is performed on boats nearshore, at deep sea, and off Chace Park pier. A facility for fish cleaning is provided at Chace Park. Fish cleaning not performed at this facility is presumed to be done out to sea. No observations of fish waste have been made, and significant bird population following an incoming boat provokes immediate investigation by the Harbor Master. It is not presumed fish cleaning in the Harbor is a contribution to bacterial waste.

6.6 Other Non-point Sources of Bacterial Indicator Loading

During the dry weather monitoring numerous spot samples were collected from observed runoff in the local watershed of the MdRH back basins. These samples identified small, intermittent surface water flows with very high concentrations of bacterial indicators. These flows were most often the results of various maintenance activities. Due to the nature of the flows, bacterial indicator loads from these sources cannot be quantified. However, these sources have the possibility to discharge in quantities that may increase the resulting bacterial indicators concentrations in the receiving waters of the MdRH back basins. Five primary sources with high bacterial indicator concentrations from these maintenance activities were observed: (1) Parking lot washdown, (2) Restaurant wash down, (3) Boat wash down, (4) Irrigation, and (5) Illicit Discharges/Illegal Discharges. Best management practices (BMPs) can be established that could reduce the loading caused by these maintenance activities and improve the water quality of the receiving waters.

6.6.1 Parking Lot Wash Down

Parking lot runoff accounts for a significant percentage of non-point source pollution in commercial areas, depending on the proportion of building size to parking lot size. The fine-grain particulates that accumulate on parking lots can are often associated with bacteria.

Sweeping is a viable method of reducing the particulates and associated bacteria from paved area runoff. Equipment types commonly used for street sweeping include abrasive brush and vacuum device sweepers. Reduction of these pollutants can be improved by using more effective sweeping equipment and increasing the frequency of the sweeping in targeted areas. For example, vacuum-assisted and regenerative air sweepers are generally more efficient than mechanical sweepers at removing finer sediments and bacteria.

Although vacuum sweepers are more effective at removing fine particulates than brush sweepers, they are still generally considered to be inefficient. A helical brush sweeper that incorporates a

steel brush with vacuum has been shown to be more effective at removing bacteria associated with fine solids.

6.6.2 Restaurant Wash Down

Restaurants contribute to pollution through improper cleaning practices that allow food particles, oil, grease, trash and cleaning products to flow into the street, gutter or storm drain. Bacterial indicators are often associated with these waste products. Several BMPs for restaurants can help control the discharge of pollutants from restaurant maintenance activities. Suggestions are listed in the recommendations section of this report.

The opportunities for and advantages of pollution prevention practices vary from restaurant, location, and activity. Therefore, it is important to develop pollution prevention programs tailored specifically to an activity or site. Pollution prevention assessments on a site-by-site basis reduce some wastes and possibly eliminate the generation of other wastes. Such assessments are often necessary for successful pollution prevention programs.

6.6.3 Boat Wash Down

Wastes generated during hull preparation (washing, scraping, sanding and blasting) contain residues that can become associated with bacteria**.** Wash water and paint residues from boat hulls need to be captured and not be allowed to enter the aquatic environment. Best Management Practices (BMPs) have been designed to help prevent water contamination that can result from maintenance, repair, and other activities associated with boats. These BMPs should be applied at locations around the marina, the boatyard, and haul-out areas and are discussed in the recommendations section of this report.

6.6.4 Irrigation

Water that flows into drainage systems and eventually into the receiving waters during dry weather is commonly referred to as nuisance flow. The most common source of nuisance flow is landscape irrigation. Upon entering the storm drain system, nuisance flow may contain high levels of bacterial indicators with concentrations that may be higher than in storm water. Nuisance flows are of particular concern to beach users because they occur during the peak tourist season, when beach activity is at its highest. Non-point source runoff from landscaping can be reduced by employing efficient landscape watering techniques. Several BMPs can reduce or eliminate all nuisance flow caused by inefficient irrigation practices and are discussed in the recommendations section.

6.6.5 Illicit Connection/Illegal Discharges

Significant loadings of pollutants can enter surface waters and tributaries via illegal discharges into storm drains. The public unknowingly assumes that storm drains discharge into sanitary sewers, and materials are dumped into storm drains under the assumption that treatment will occur at the sewage treatment plant. Public education programs, such as storm drain stenciling, can be effective tools to reduce pollutant loadings.

Illicit discharges may also be a problem. Improper connections to storm drainage systems convey contamination to receiving waters. Sources of microbial contamination transported through this route include sanitary wastewater and septic tank effluent. Sanitary surveys are also a useful method to help managers identify the presence and entry point(s) of illicit discharges or other sources of pollutants to storm sewer systems. Procedures for identifying potential illicit discharges include reviewing existing drainage area maps, surveying building storm drain connections, and inspecting sewer lines (USEPA, 2003).

Visible flow during dry weather periods is a sign of possible cross connection that should be investigated. Tracers are often used to investigate illicit connections (Pitt et al., 1993). Tracers for bacterial indicator contamination include BOD, suspended solids, specific conductivity, ammonia, surfactants, and/or fluorescence (e.g., optical brighteners from laundry detergents). Smoke testing is another investigative method for illicit connections. Zinc chloride smoke injected into sewer lines emerges from all breaks in the sewer line, vents in connected buildings, and outfalls (USEPA, 2003).

6.7 Relative Loadings

The first objective of the study is to determine the relative loadings of indicator bacteria to the waterbodies listed in the TMDL from storm drains, boats, and birds. The waterbodies from the MdRH back basins identified in the TMDL are Mothers' Beach, Basin E, and Basin F. Storm drain loading occurs at three locations: (1) Oxford Flood Control Basin, (2) Boone-Olive Pump Plant, and (3) local runoff. Marina activities were identified in the TMDL to not be a significant source. This conclusion was confirmed with the illicit boat discharge investigation. Avian loadings were estimated based on bird count observations and published literature values on excretion. Other non-point sources were observed during the dry weather spot sampling, but the loads could not be quantified due to lack of data. The annual loadings estimated for each of these sources were compared (Table 6-9 and Table 6-10), as well as the loads between wet and dry periods (Table 6-11 and Figure 6-2).

Table 6-9. Relative fecal coliform loadings to the MdRH back basins.

Loading Source	Annual Fecal Coliform Loading (MPN/yr)		
	Basin E	Basin F	Mothers' Beach
Oxford Flood Control Basin	7.43×10^{14}	0	0
Boone-Olive Pump Plant	2.77×10^{13}	0	0
Local Storm Drains	1.21×10^{10}	6.79×10^{9}	1.30×10^{10}
Avian Waste	1.66×10^{12}	1.66×10^{12}	2.04×10^{12}
Boat Waste	unknown	unknown	unknown
Other Non-point Sources	unknown	unknown	unknown

Table 6-10. Relative enterococci loadings to the MdRH back basins.

Loading Source	Annual Enterococci Loading (MPN/yr)		
	Basin E	Basin F	Mothers' Beach
Oxford Flood Control Basin	8.60×10^{13}	0	0
Boone-Olive Pump Plant	2.23×10^{13}	0	0
Local Storm Drains	unknown	unknown	unknown
Avian Waste	unknown	unknown	unknown
Boat Waste	unknown	unknown	unknown
Other Non-point Sources	unknown	unknown	unknown

Table 6-11. Relative wet and dry period bacterial indicator loads to the MdRH back basins.

Period	Flow (cubic feet/yr)	Fecal Coliform* Loading (MPN/yr)	Enterococci Loading (MPN/yr)
Wet (46days)	6.53×10^{6}	7.69×10^{14}	1.07×10^{14}
Dry (319 days)	2.64×10^{8}	7.15×10^{12}	1.01×10^{12}
Total Annual	2.70×10^{8}	7.76×10^{14}	1.08×10^{14}

* includes estimated avian loads

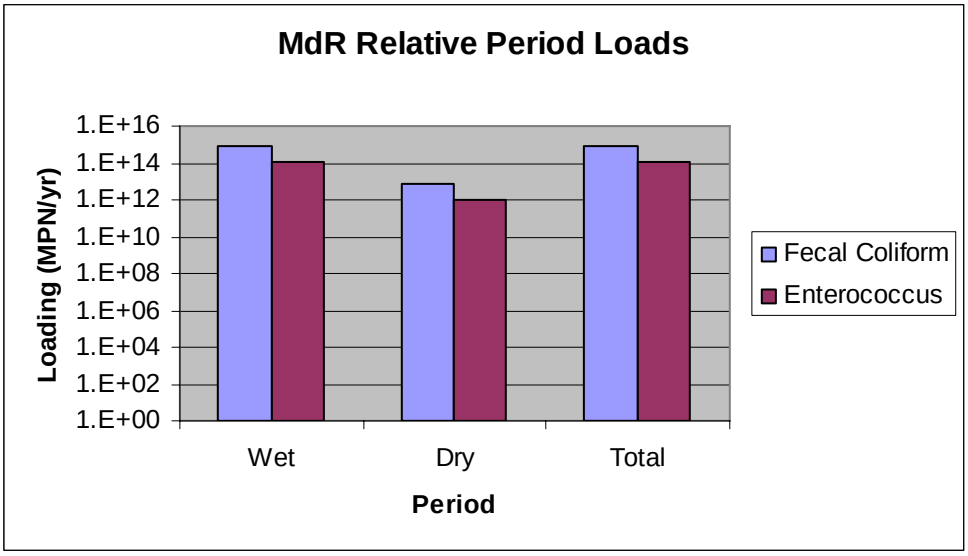


Figure 6-2. Relative wet and dry period bacterial indicator loads to the MdRH back basins.

The relative comparison of the bacterial indicator load data supports several conclusions. First, the Oxford Flood Control Basin contributes the majority of the loads to the MdRH back basins. Second, the contribution from avian waste is relatively small compared to loads discharged from the major storm drains. Third, annual wet weather loadings are significantly higher than dry weather loadings. Since the relative flow is for dry weather days as compared to wet weather days, the greater loadings from wet weather events are attributed to the higher concentrations measured during wet weather.

Several additional special studies were conducted to better understand the upper Marina del Rey Harbor Basin system. First, the upstream watershed was sampled to help establish dry weather bacteria concentrations. These estimates were then used as an input to a hydrologic mass balance model that estimates the bacteria concentrations in Oxford Basin and Basin E. Because of the complex dynamics of bacterial populations, the model is focused on the relative difference of bacterial loads in different scenarios using simple assumptions.

Also, to further understand the complex dynamics in Basin E and Oxford Basin, an intensive field sampling effort was conducted. In addition, several possible Best Management Practices are discussed and the model is then used to estimate the effect of a few selected BMPs on bacteria concentrations.

7.1 Upstream Bacteria Contribution

To determine the contribution of dry weather bacteria loading, storm drains were sampled and analyzed for fecal coliform and enterococci. Four locations were chosen that were upstream of tidal influence. Figure 7-1 shows the geometric mean of the results from the sampling that was conducted three times during the summer. Data for the sites is found in Appendix D. These results are used as an estimate of dry weather bacteria loads into Oxford Basin.

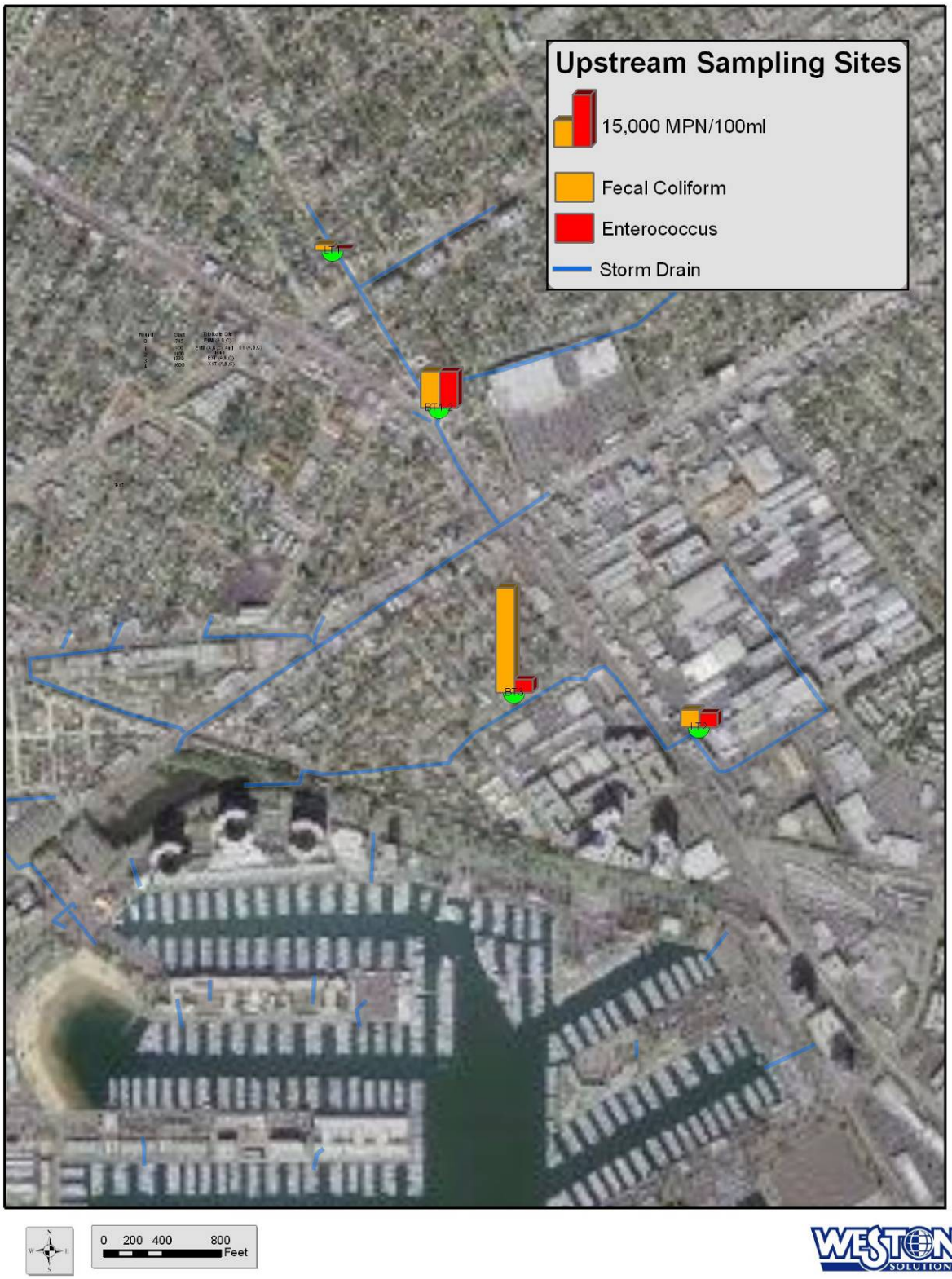


Figure 7-1. Geometric mean of upstream sampling.

7.2 Oxford Basin Hydrologic Model

In order to better understand the water balance and bacteria loading in Oxford Basin and Basin E, a hydrologic model was developed using Excel®. The model is intended to be used as a tool to help understand the movement of bacteria over a few days under various conditions. Accurate bathymetry of Oxford Basin was acquired in order to develop a relationship between water level and Oxford Basin water volume. Flow into and out of Oxford Basin could then be estimated by changes in water stage using this storage curve relationship (Figure 7-2).

Because of the complexities of modeling bacteria in a tidal system, the model is limited in scope. It is assumed that bacterial die-off rate may vary at different locations but are constant over time. The model is not intended to be used to design or site a particular BMP, but rather offer insight to relative effect of different management actions. The modeled scenarios are based on fecal coliform concentrations during dry weather periods. A limited discussion of wet weather modeling is also presented.

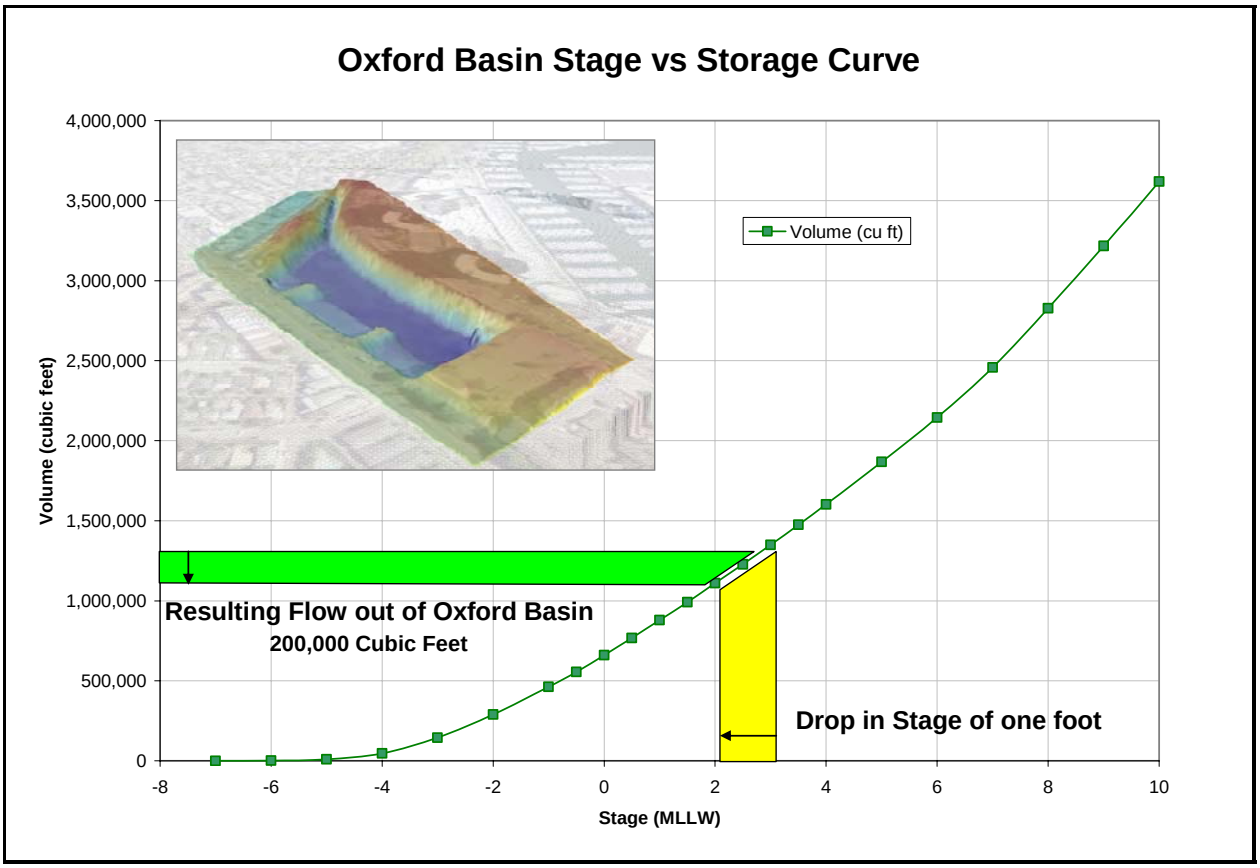


Figure 7-2. Oxford Basin Storage Curve.

The model was created in Excel® to track bacteria concentrations and water volumes in 19 cells as shown in Figure 7-3. Water movement between cells is calculated by knowing the amount of water that would have to move through the various cells to adjust the volumes to equate to the changing tide level.

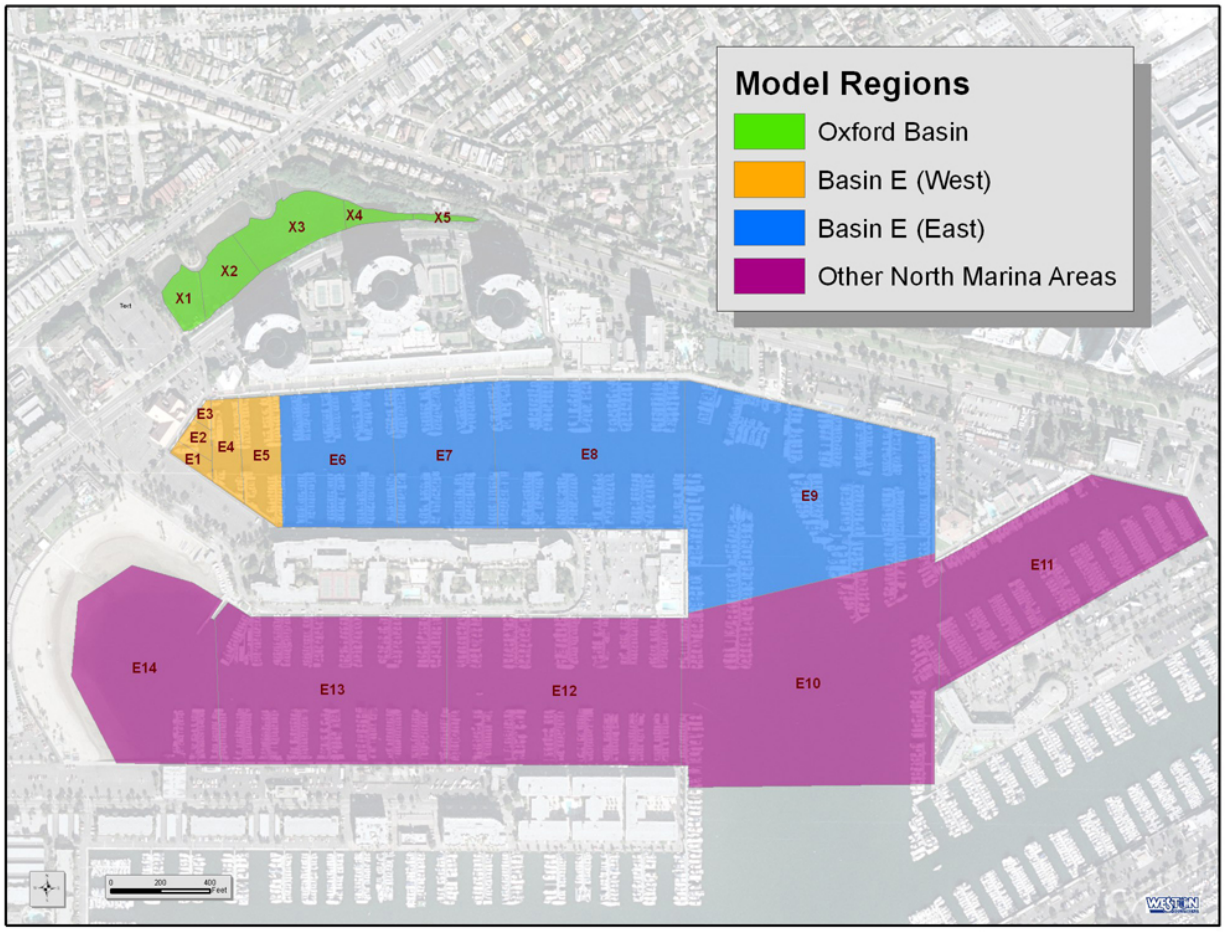


Figure 7-3. Model Cells

Bacteria concentrations are calculated by assuming complete mixing within each cell and by keeping track of the volumes and concentrations moving in and out of the cells (Figure 7-4). The model keeps track of volumes and concentrations on a five minute interval.

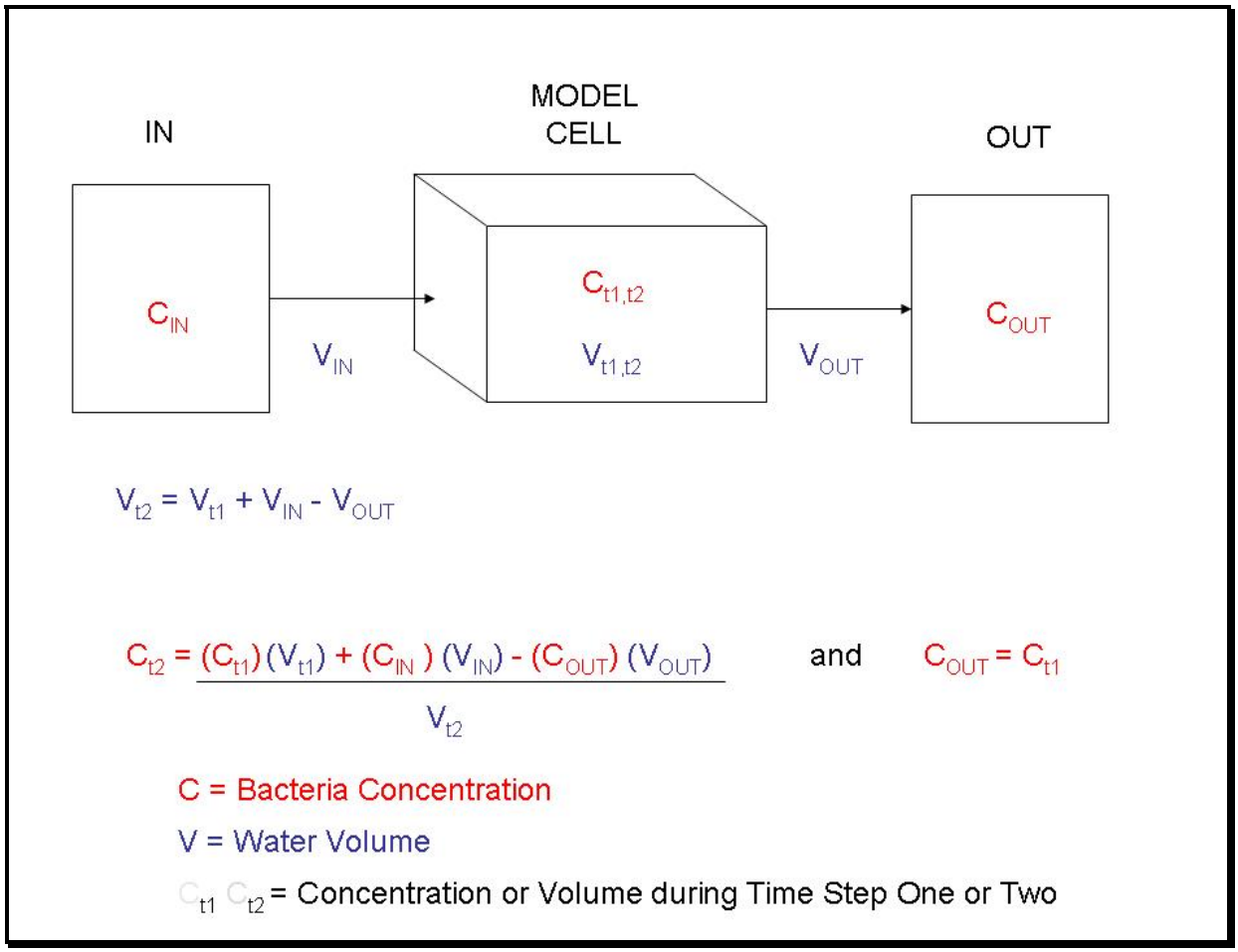


Figure 7-4. Equation used in model to track bacteria concentrations.

Parameters that can be adjusted in the model include the following:

- Flow and bacteria concentrations into Oxford Basin
- Flow and bacteria concentrations from the Boone-Olive Pump Plant into Basin E
- Tide gate opening and closing between Oxford Basin and Basin E
- First order local bacteria die off and growth rates

The setup of the model includes entering the tide level over the period of interest and setting the initial bacteria concentrations. The tide gate can be setup to open and close according to a set of rules based on water level differences between Oxford Basin and Basin E.

The fecal coliform growth and die-off rates were calibrated by adjusting the rates to best match the bacteria concentrations measured during five separate 24-hour sampling events. The calibrated rates were estimated using the "Solver" extension in Excel® to find a solution that had the lowest root mean square error. Calibrated die-off rates were restricted to -6% per hour to 8% per hour. An in-situ typical die-off rate found in controlled experiments was around 1% per hour (Easton, 1999). Experiments in Santa Monica Bay found die-off rates to range from 1-5% per

hour (Noble, 1999). Future enhancements to the model could allow for variable die-off rates based on temperature, nutrients, and UV light exposure.

Figure 7-5 shows the comparison of the mean decay or growth rates calibrated from the first five dry weather sampling events to the rates measured during the May 25th special sampling event. This visual verification does not include regions of the Marina not sampled on May 25th (E10-E14). The differences in the rates in Oxford Basin (X1-X5) appear to be small. Some areas in the western portion of Basin E (E2-E5) did not match as well. The figure shows high bacteria die-off rates in Oxford Basin (X1-X5). The effect of UV light in the shallow water of Oxford Basin may explain the high estimated die off rates in Oxford Basin. Further sampling and modeling of the sediment interaction and nutrient concentrations Oxford Basin may yield further information on the sources and sinks of fecal coliform.

In general, bacteria growth and decay rates are highly variable and difficult to model. Although the model did not predict all of the variability of the estimated growth and decay rates, the model can still serve as a useful tool in evaluating relative bacterial concentrations between different scenarios. As such, the mean bacterial die-off rates calibrated from the five sampling events were used for modeling different management scenarios.

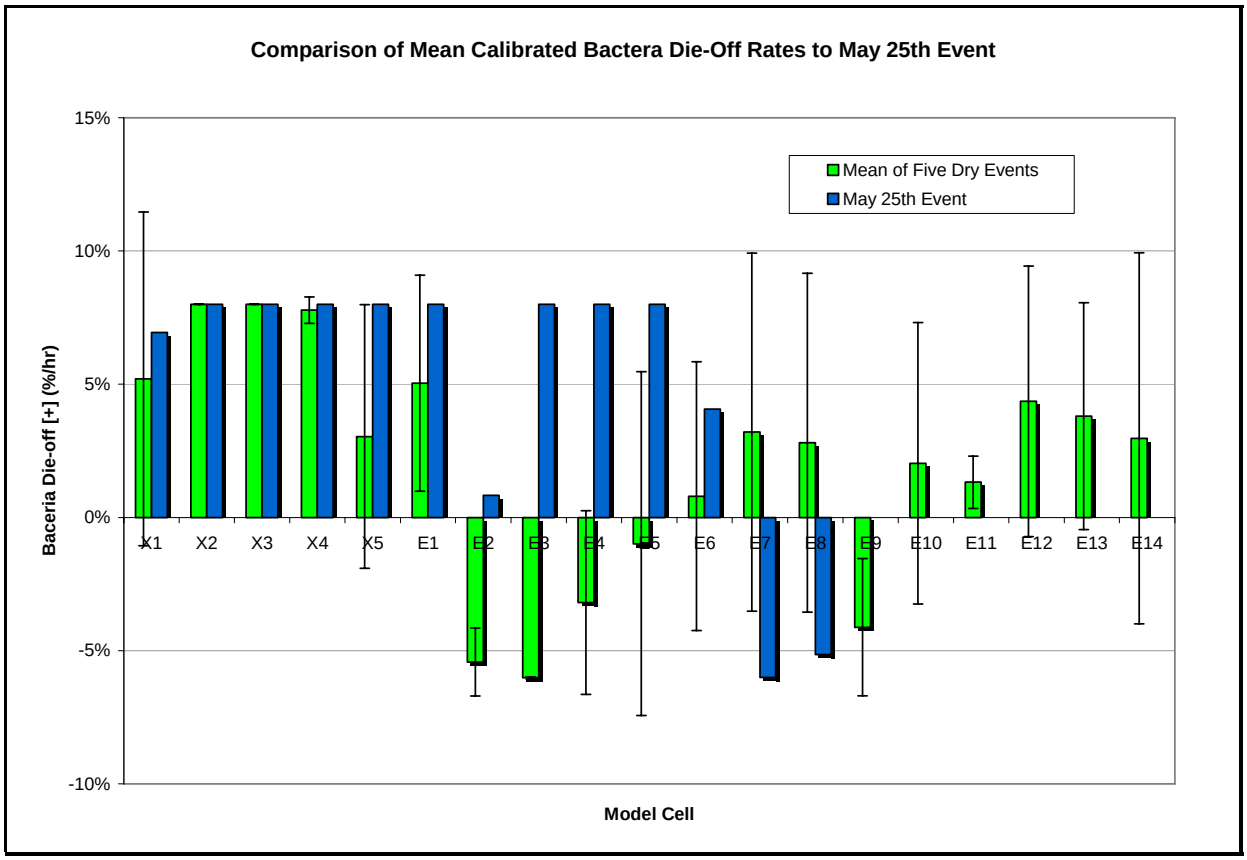


Figure 7-5. Comparison of calibrated die-off rates.

Performance of the model calibration and verification was evaluated using several statistical metrics. Precision can be expressed using 3 different statistics: (1) root mean square error, (2) relative error, and (3) median absolute deviation:

The root mean square error (RMSE) presents an estimate of the variation in the same units as the measurement (e.g., MPN/100mL):

$$RMSE = (\Sigma (P_i - O_i)^2/n)^{1/2}, \text{ where } P_i = \text{predictions and } O_i = \text{observations}$$

The mean calibration and verification RMSEs for bacteria concentrations in each model cell location is shown in Figure 7-6. The chart shows that the mean error of the calibrated model was less than 30 MPN/100mL and the individual site error was less than 500 MPN/100mL. The model verification shows a similar range of error.

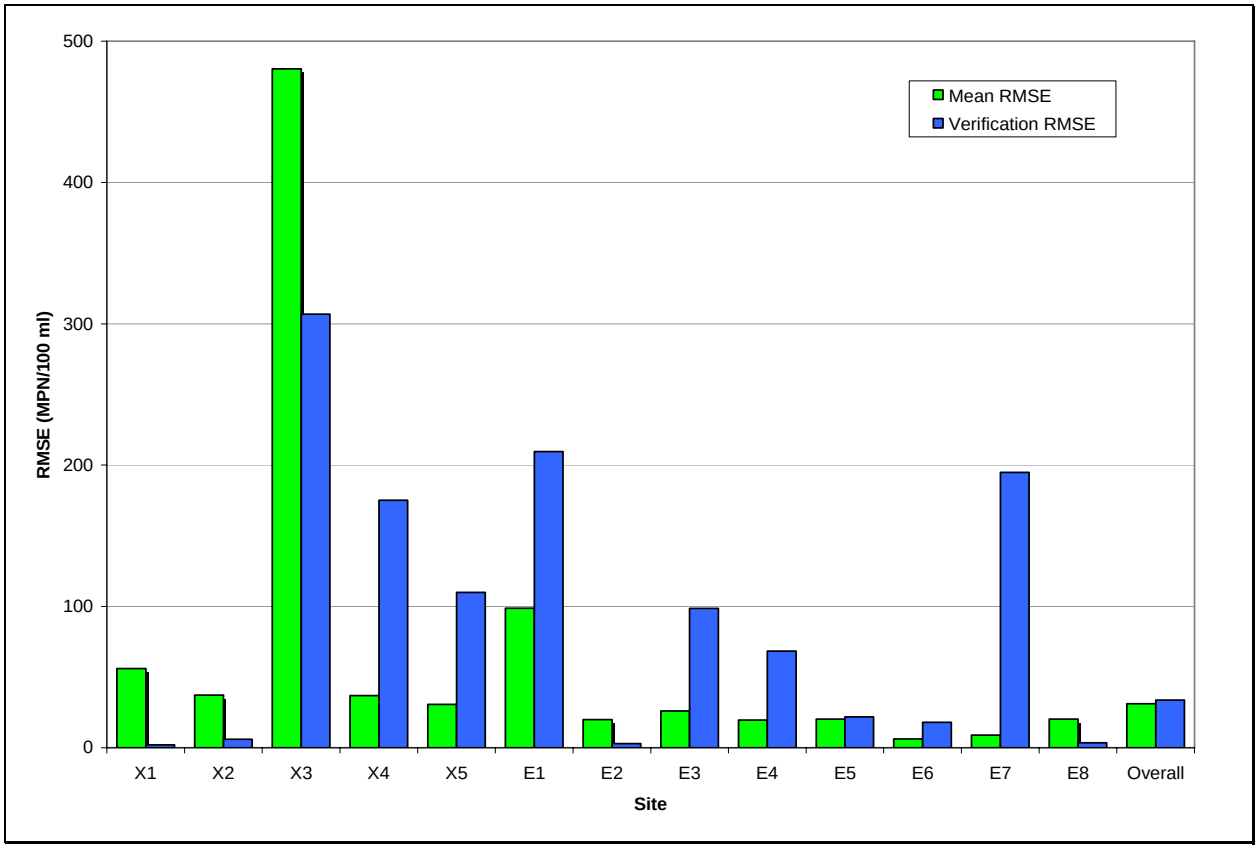


Figure 7-6. Root mean square error model performance at model cells.

Another precision statistic, the relative error (% Error), compares the predicted concentrations to the observed concentrations and presents the variation as a percentage of the measurement mean:

$$\% \text{ Error} = \text{standard deviation}/(\text{mean} * n^{1/2})$$

The overall relative error for all fecal coliform concentrations compared to calibrated values was -1.2%. Model verification showed an overall relative error of -9%. These very values show that overall model predictions match observed conditions quite well.

The median absolute deviation (MAD) describes the dispersion of comparison between the predicted and observed fecal coliform concentrations:

$$MAD = \text{Median of } \{|X_i - X_M|\},$$

where X_M = median of the difference between predicted and observed.

The overall MAD for all fecal coliform concentrations compared to calibrated values was 6.4 MPN/100mL. Then MAD for model verification was 10 MPN/100mL. These very low numbers demonstrates that more than half of the predictions are within just a few measurement units of the observed fecal coliform concentrations.

Modeling bias was inferred by the statistic of median scaled residual (MSR). This statistic provides a relative estimate of whether predictions produce values consistently higher or lower than observed conditions:

$$MSR = 100*(P_i - O_i)/(\text{mean } O) \text{ , where } P_i = \text{predictions and } O_i = \text{observations}$$

The overall MSR for all fecal coliform concentrations compared to calibrated values was 21 MPN/100mL. Model verification showed an overall MSR of -5 MPN/100mL. The very low MSR numbers show that the model predictions do not likely exhibit any bias.

The results from the model can be displayed in a chart of continuously changing bacteria levels (Figure 7-7). Although bacteria concentrations are modeled in 19 different cells, the results are aggregated to four areas in this figure for easier readability. The fecal coliform concentrations over time in the four areas are shown as colored lines. The tide levels in the Marina and Oxford Basin are also displayed (top of graph in blue) as the tidal current have a great affect on water movement and bacterial concentrations. The fecal coliform concentrations increase in Basin E when the Boone-Olive Pump is operating. Fecal coliform from Basin E will enter Oxford Basin on incoming tides when the tide gate is open.

Another use of the model is the ability to compute the amount of water exchanged between Oxford Basin and Basin E. During a typical tidal cycle, the volume of water in Basin E will increase and decrease by 20-30% of the original volume (Figure 7-8). In contrast, there is very little exchange of water in Oxford Basin until the tide drops below about 1 foot MLLW and the tide gate opens. When the tide gate is open, more than 80% of the water leaves Oxford Basin during a dropping tide and returns on a rising tide.

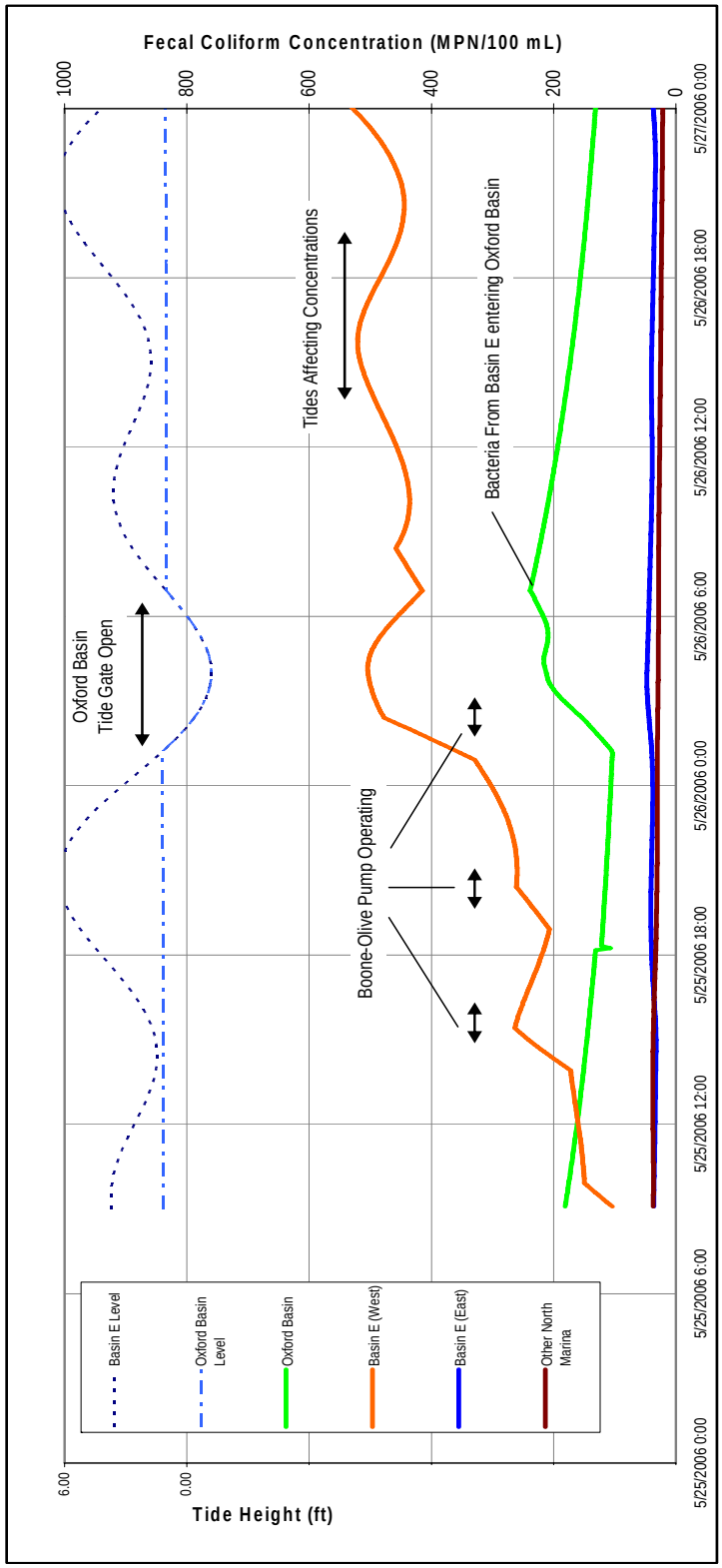


Figure 7-7. Chart of model results for bacteria concentrations.

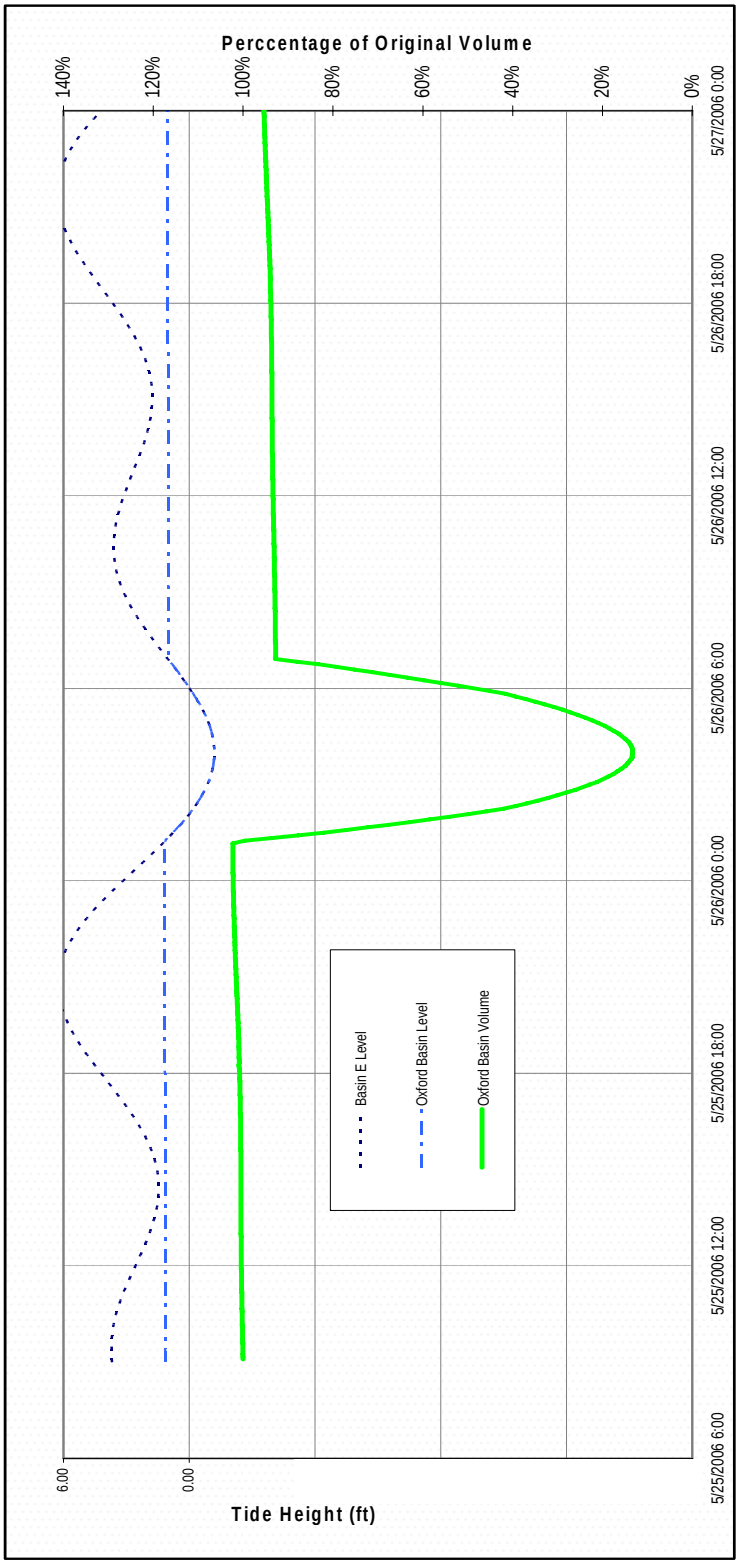


Figure 7-8. Chart of model results water volume exchange.

7.3 Intensive Field Sampling

On May 25, 2006, intensive sampling was done to measure the migration of bacteria during various tidal phases (Figure 7-9). This event included sampling at the surface and at mid-depth levels for bacterial concentration, temperature, dissolved oxygen, pH, and salinity. Various locations in Basin E and Oxford Basin were sampled at four times during the day: 9:00 am; 11:00 am; 2:00 pm; and 5:00 pm. Figure 7-10 through Figure 7-13 present the interpolations (Inverse Distance Weighted) of the bacteria sampling results.

At 9:00 am, sampling began at a slack high tide. Surface bacteria concentrations were moderately high in the western portion of Basin E and the eastern portion of Oxford Basin. The Boone-Olive Pump Plant was operating from 8:30 am to 10:00 am. By the time of the next sampling at 11:30 am, bacteria levels had generally dropped. However, high bacteria concentrations now extended into more of Oxford Basin. At 2:00 pm, high counts of bacteria were found at several locations in Basin E. The highest concentrations were observed near the outflow of the Boone-Olive Pump Plant. Although no record of pumping matches this period, it seems possible that the pump was operating at this time. By 5:00 pm, bacteria concentrations fall to their lowest point during the day. Mid-depth sampling results were low for both fecal coliform and enterococci throughout the sampling period. The salinity measurements have indicated that the fresher water, being less dense, stays near the surface. The higher fecal coliform concentrations appeared to stay in the less saline water.

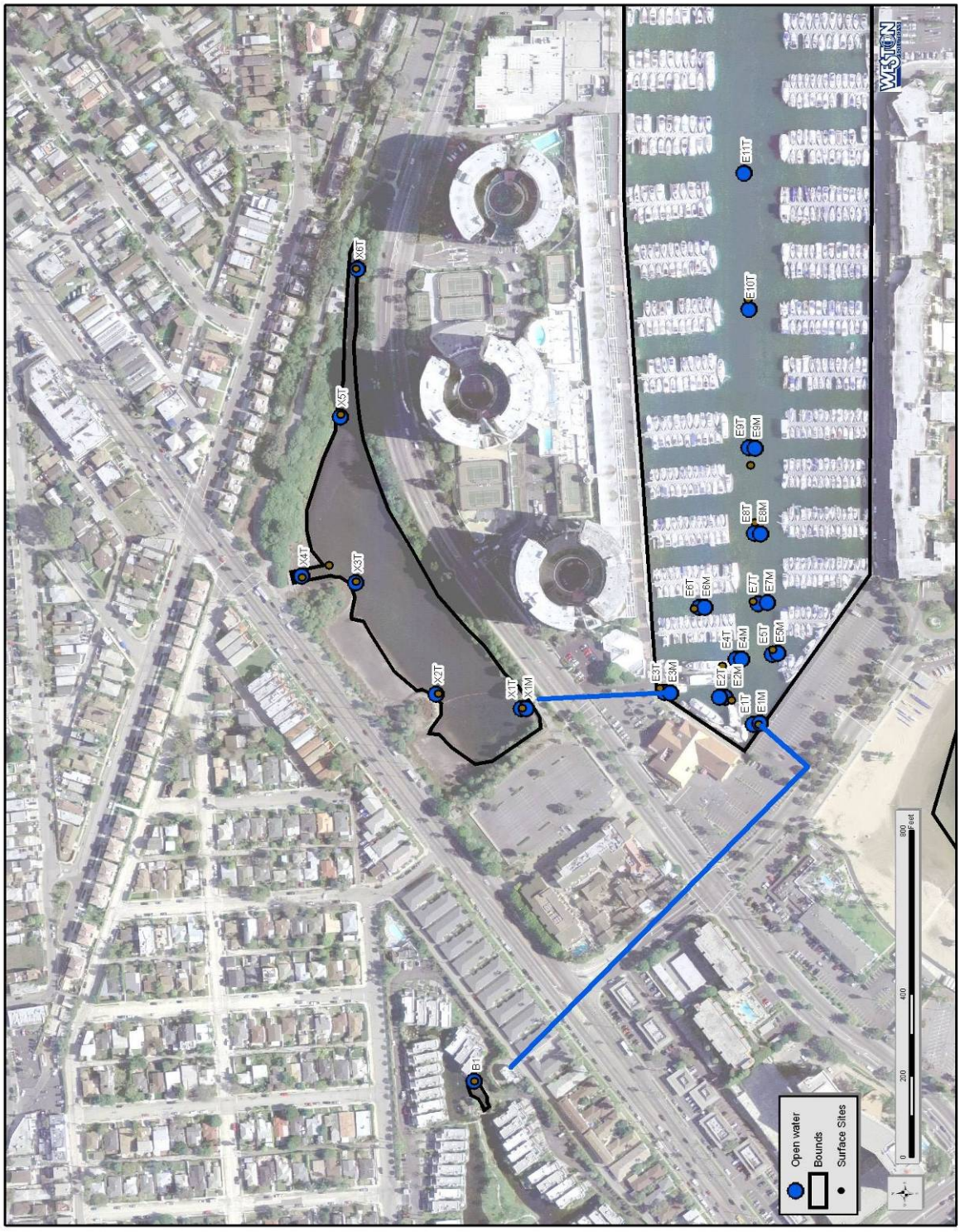
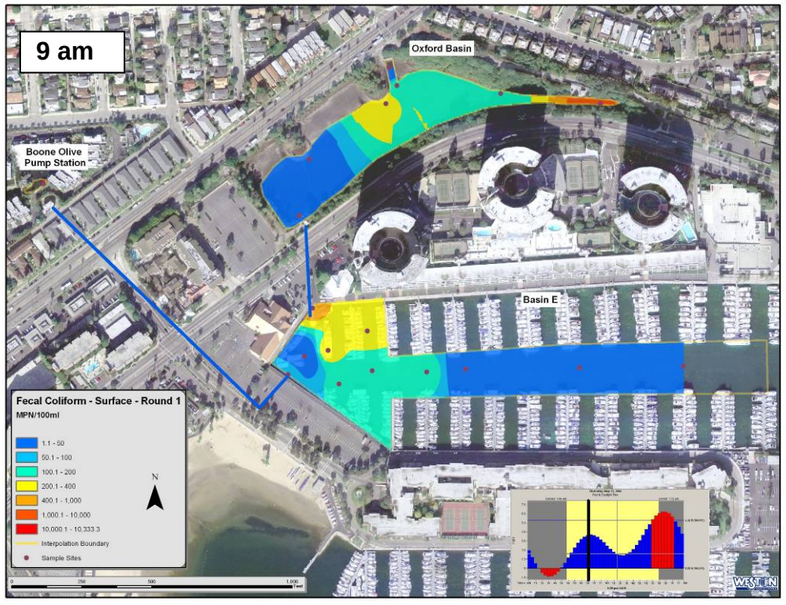
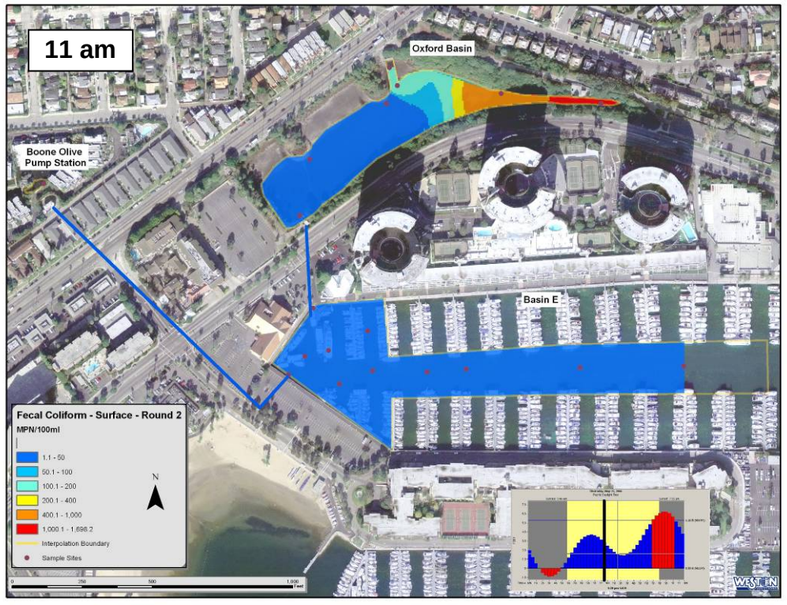
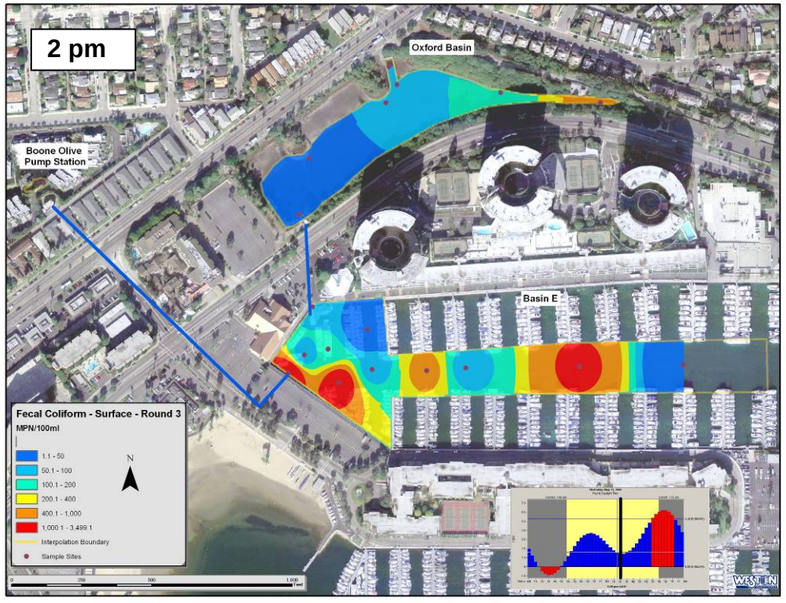


Figure 7-9. Sampling locations.







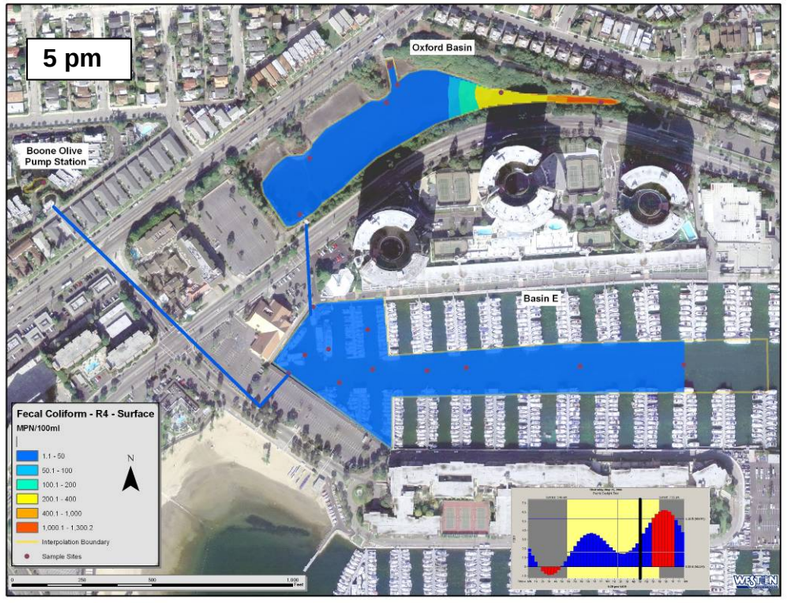
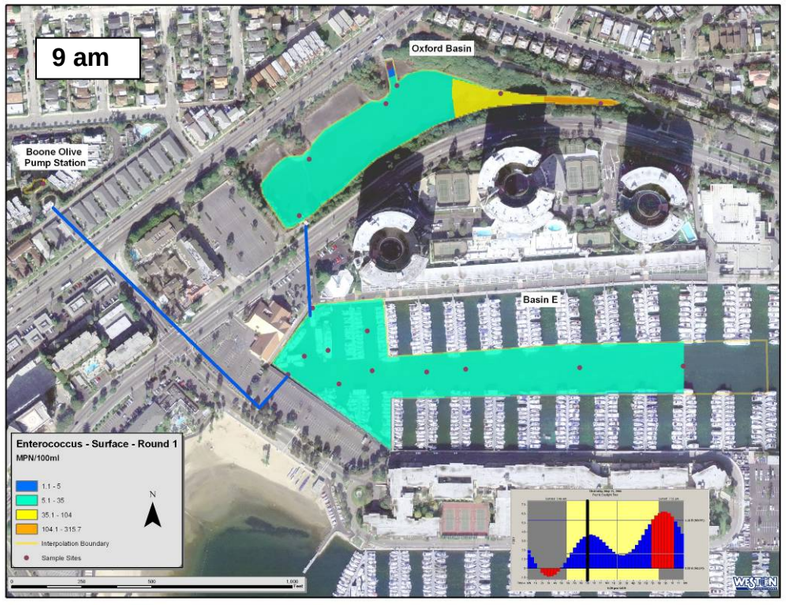
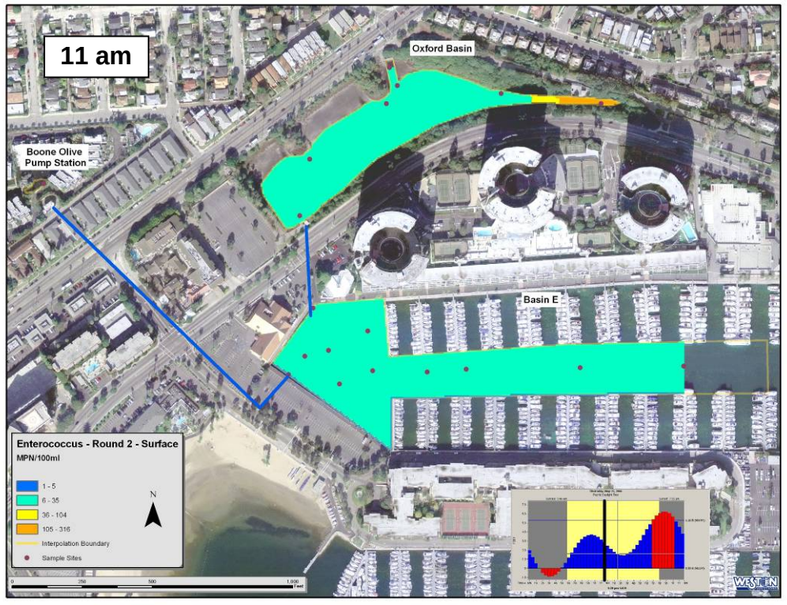
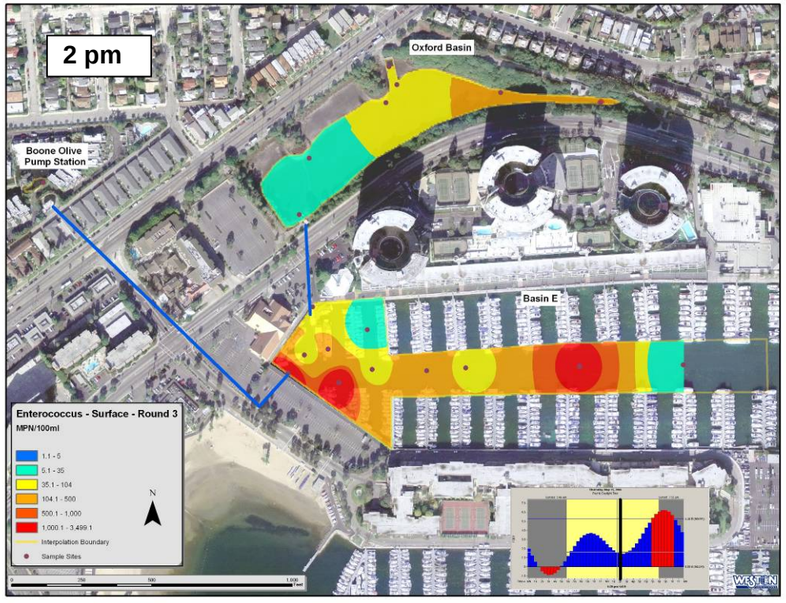


Figure 7-10. Fecal Coliform surface concentration interpolations for May 25th event.







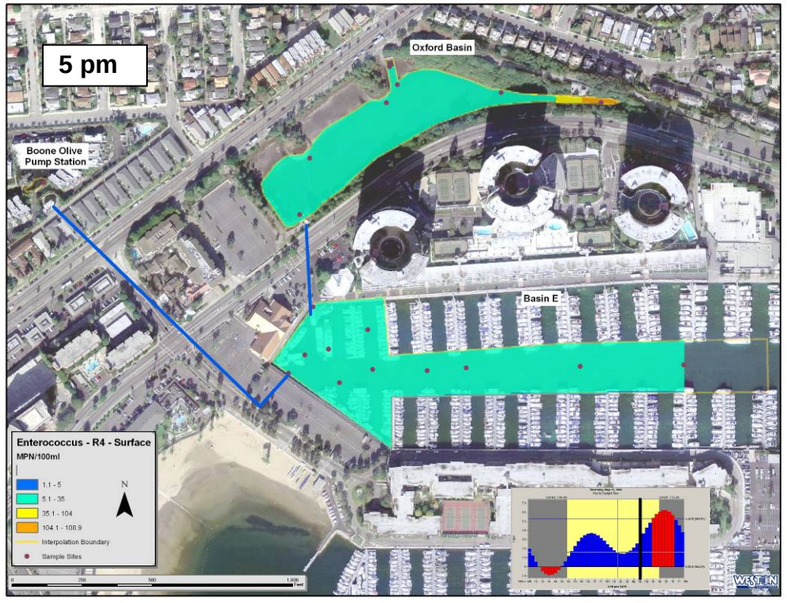
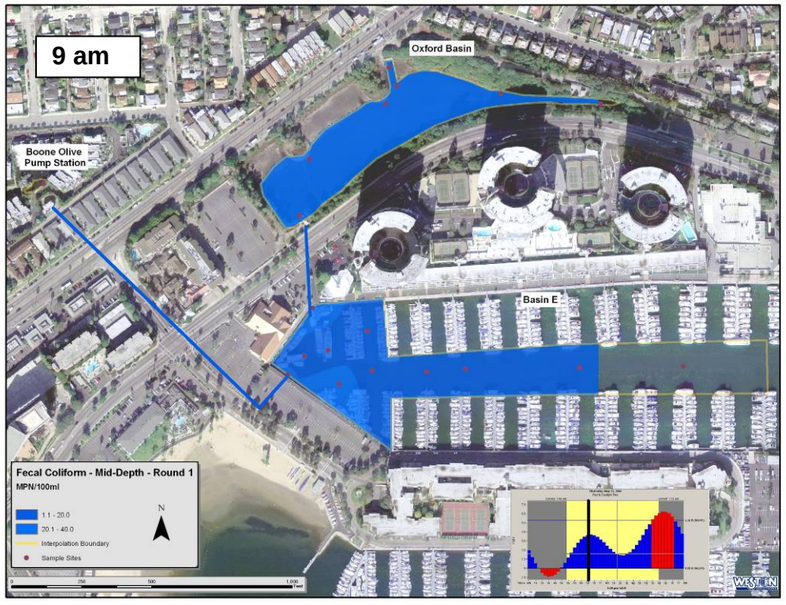
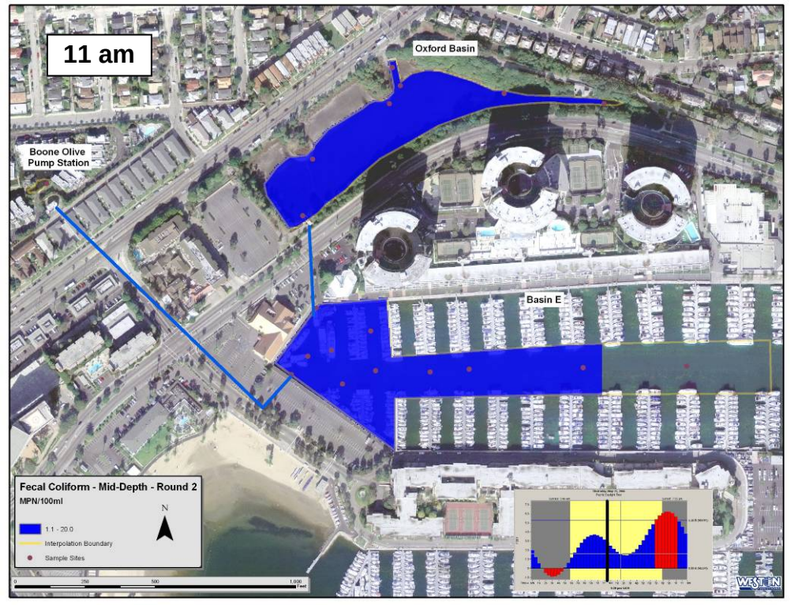
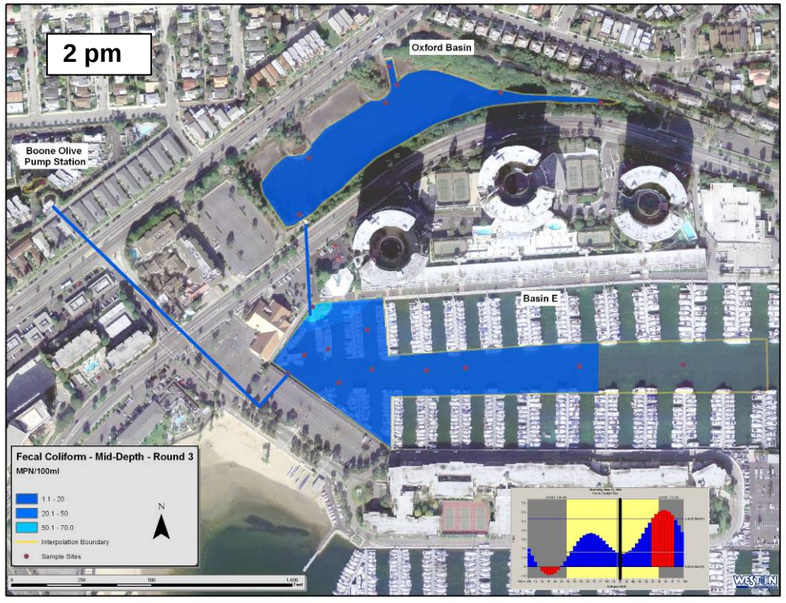


Figure 7-11. Enterococci surface concentration interpolations for May 25th event.







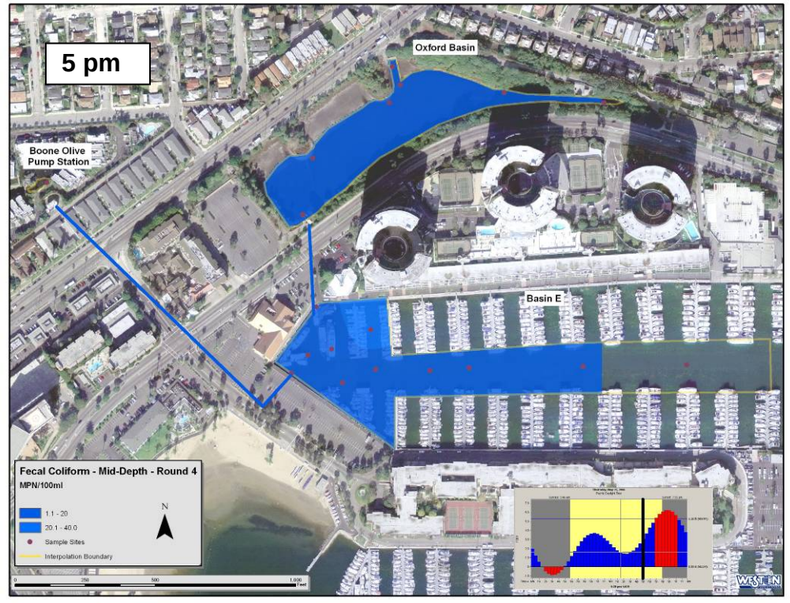
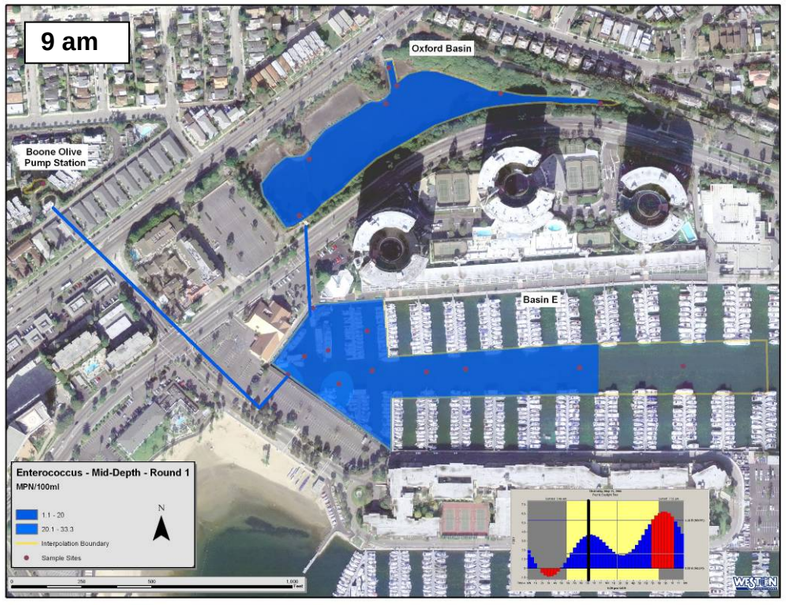
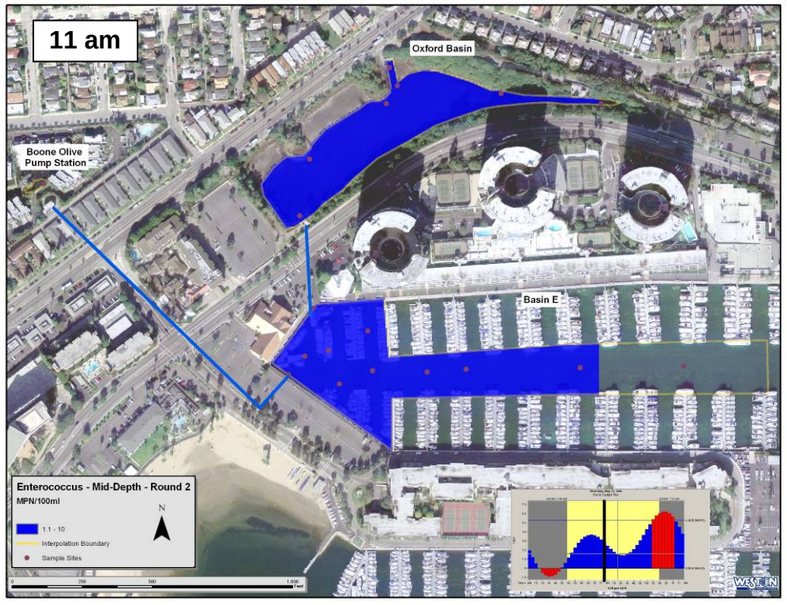
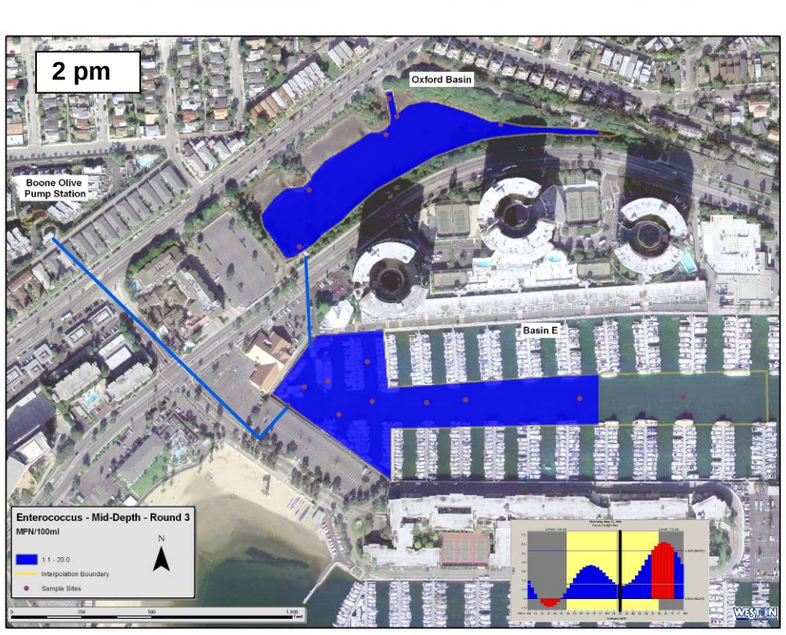


Figure 7-12. Fecal mid-depth concentration interpolations for May 25th event.







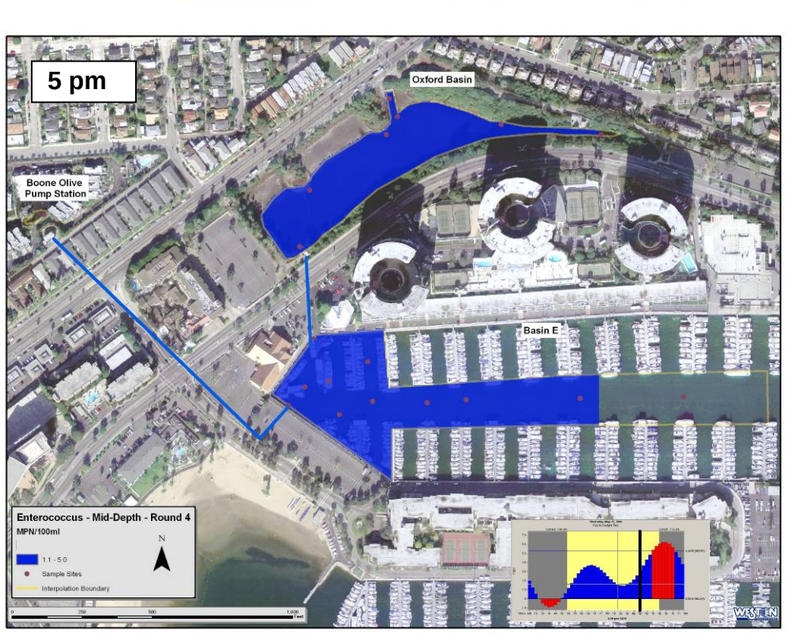


Figure 7-13. Enterococci mid-depth concentration interpolations for May 25th event.

Of the other water quality parameters that were measured, salinity provided the most information to explain water mixing. Figure 7-14 shows the salinity differences during the four sampling rounds on May 25th. The blue bars are from Oxford Basin while the green bars are from Basin E. The values are generally arranged from west to east. Mid-depth samples are a shown as a darker color than surface collected samples.

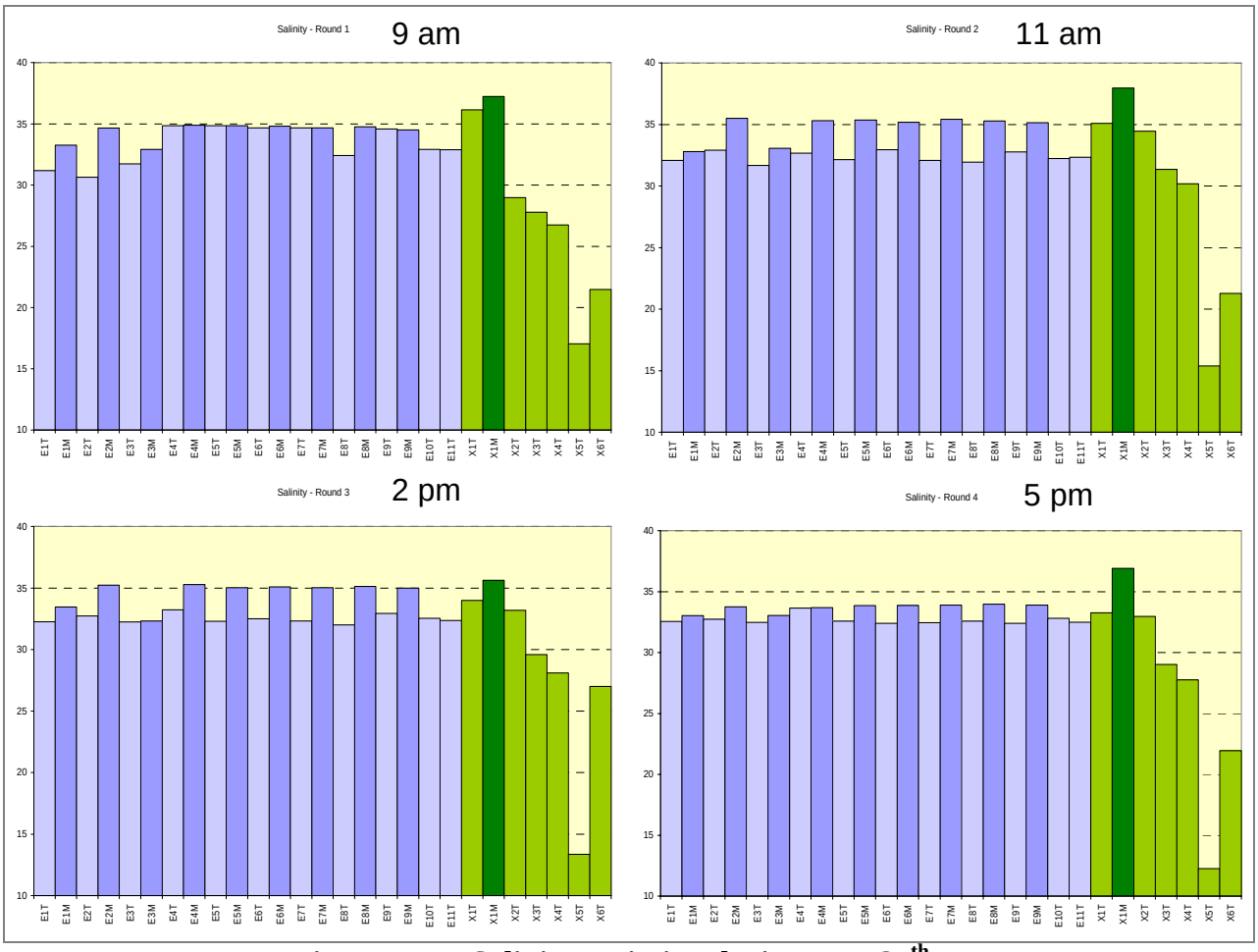


Figure 7-14. Salinity variation during May 25th.

Figure 7-15 and Figure 7-16 illustrate the interpolations (Inverse Distance Weighted) of salinity for both surface and mid-depth levels. By 9 am, the Boone-Olive Pump Station had been pumping for an hour and a depression in salinity values was seen for the western Basin E sampling locations. By 11 am, the less saline water had extended across Basin E. However, salinity remained relatively unchanged at mid-depth. This condition continued though 2 pm, when high levels over fecal coliform were observed. By 5 pm, some mixing between the shallow and deep water appeared to be occurring although the overall salinity level changed little.

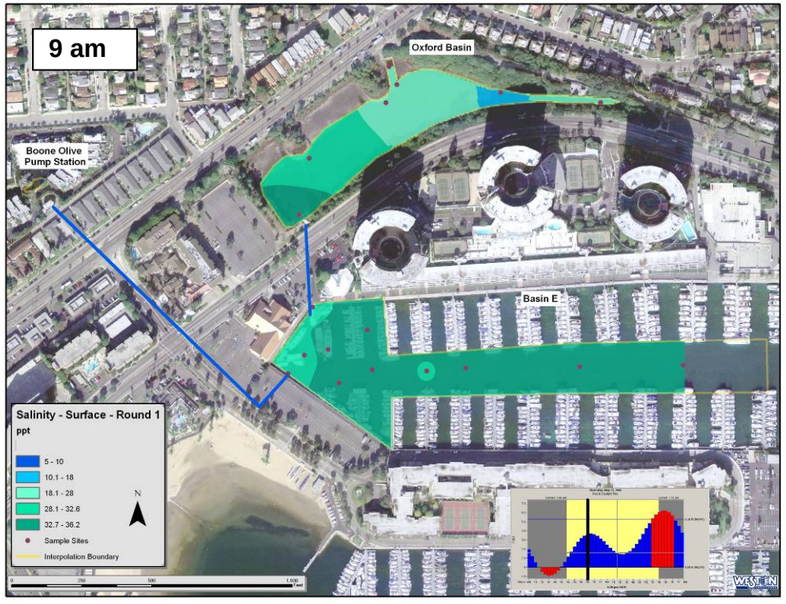
A salinity gradient appeared to persist in the eastern portion of Oxford Basin. Fresh water input may be keeping the salinity low. The previous bacteria interpolations suggest that this brackish water stagnates here and harbors bacteria.

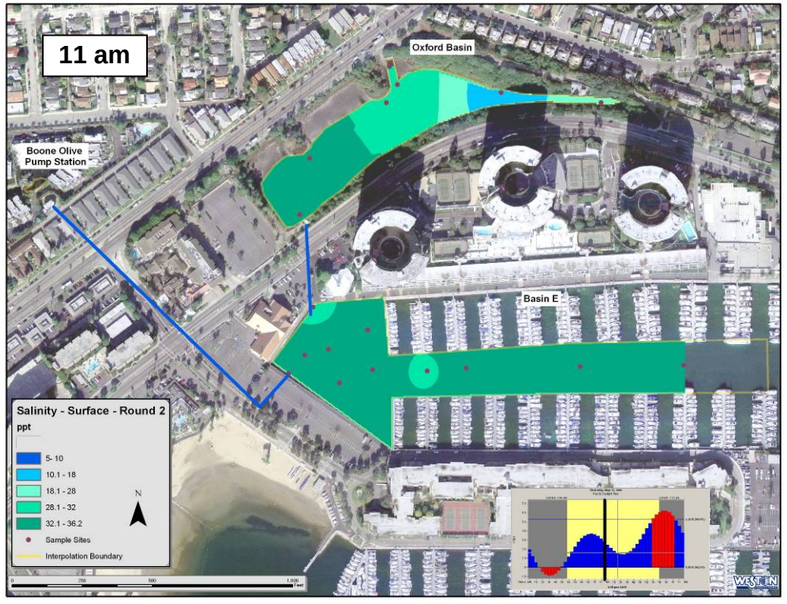
To further characterize the conditions of the basin, Figure 7-17 through Figure 7-22 present the Interpolations (Inverse Distance Weighted) of the temperature, pH, and dissolved oxygen.

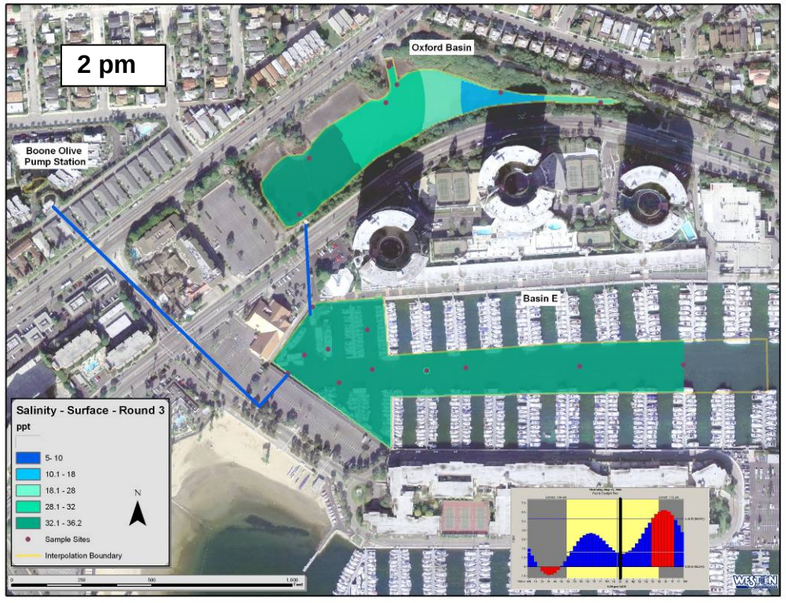
The temperature increased throughout the day but was a few degrees higher in Oxford Basin. The east channel of Oxford Basin remained cool, perhaps because of shade trees. At mid-depth, some of the warmer temperatures measured were near the Boone Olive Pump Plant Outfall and the Oxford Basin Outfall.

Before 5 pm, the pH surface measurements were below 8 in the western portion of Basin E and above 8 elsewhere. By 5 pm, all pH measurements were above 8. Mid-depth measurements were similar to surface measurements.

Accurate dissolved oxygen measurements began at 11 am. Dissolved oxygen in Basin E was generally less than 6 mg/L while Oxford Basin was higher than 8 mg/l.







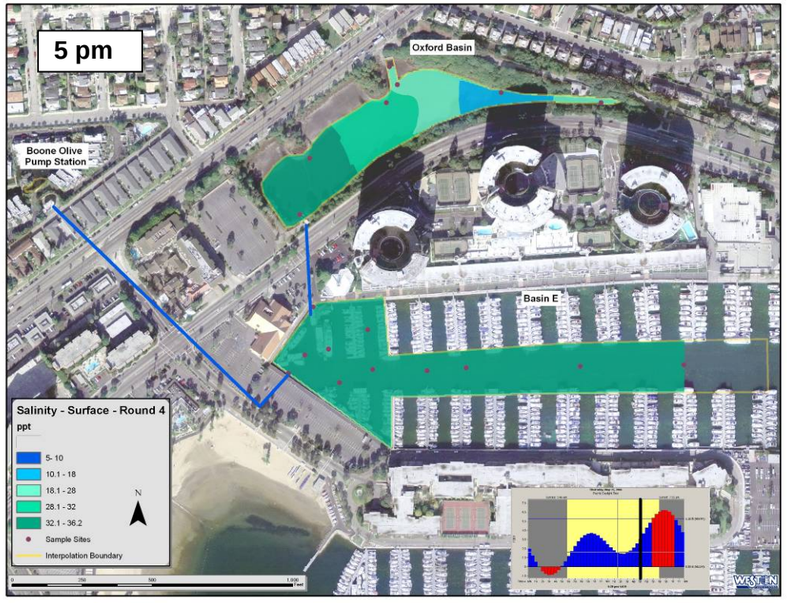
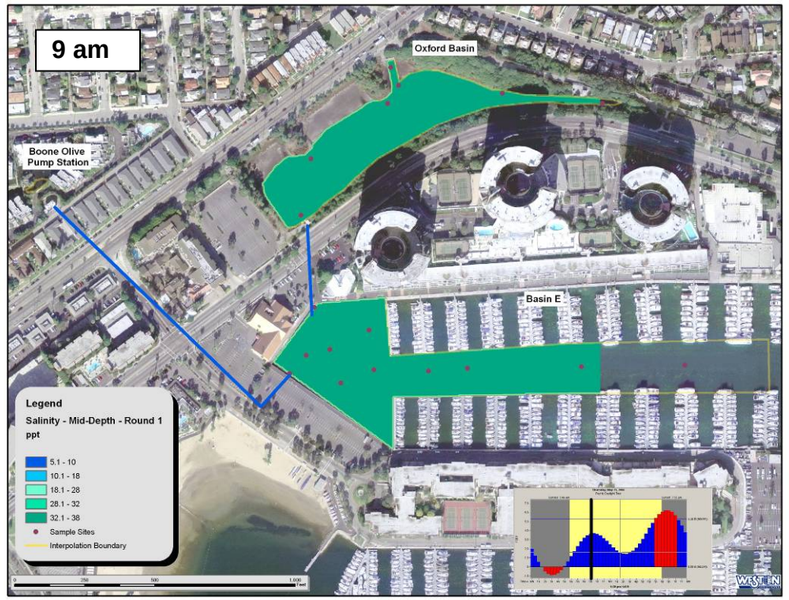
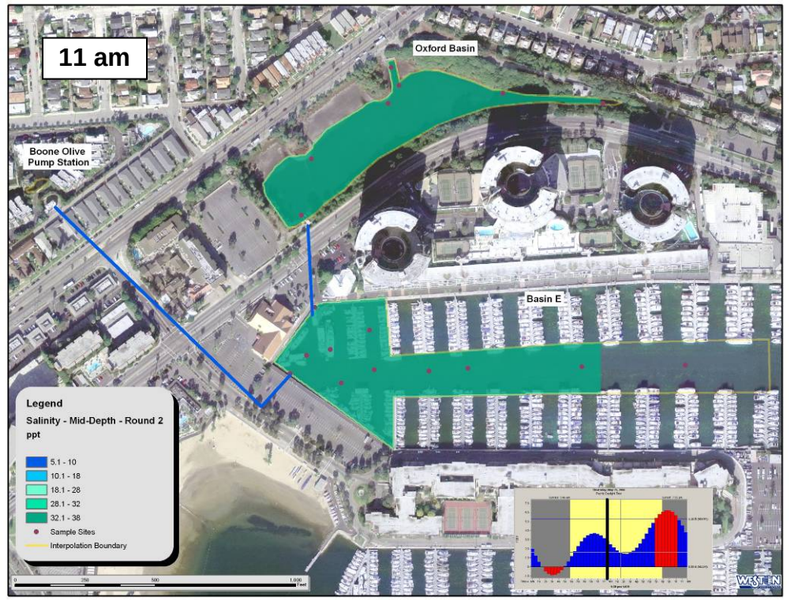
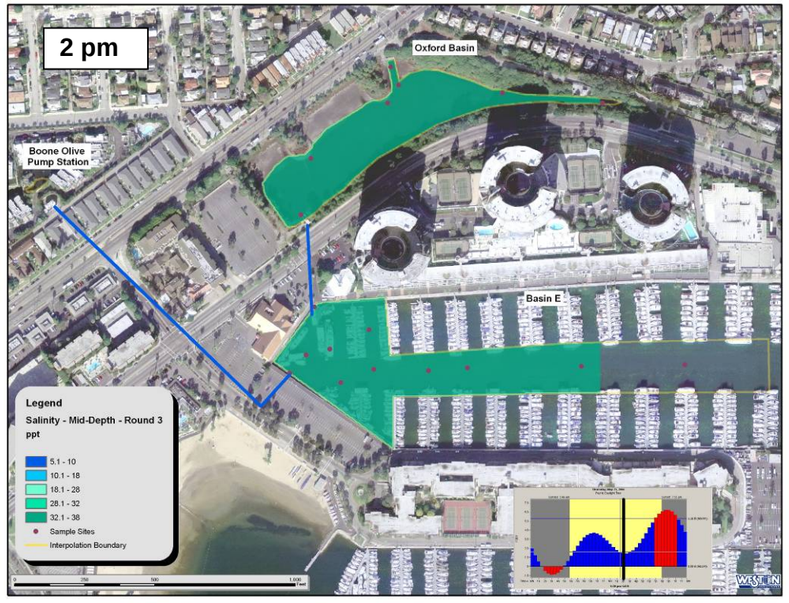


Figure 7-15. Salinity surface concentration interpolations for May 25th event.







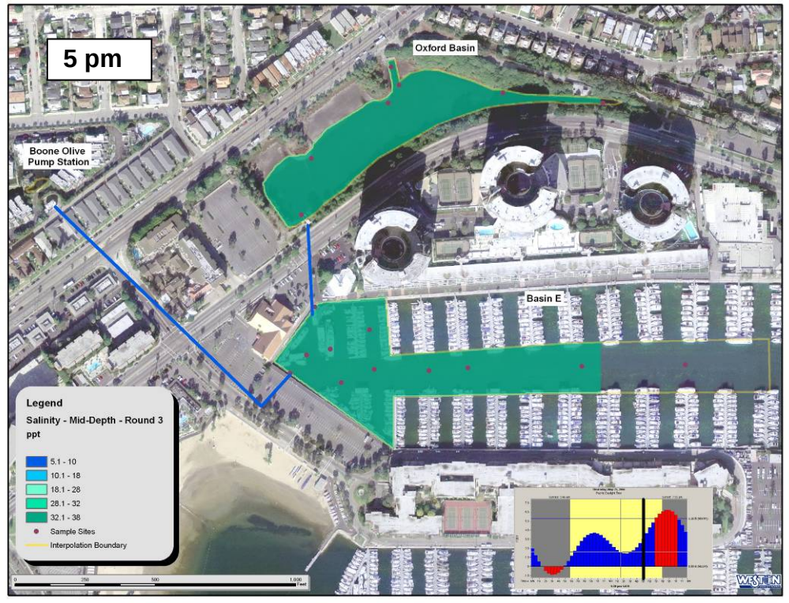
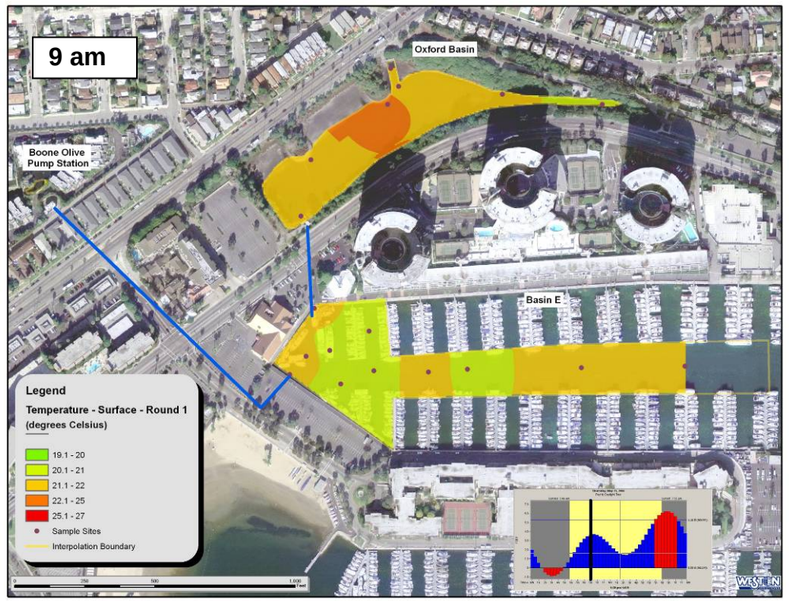
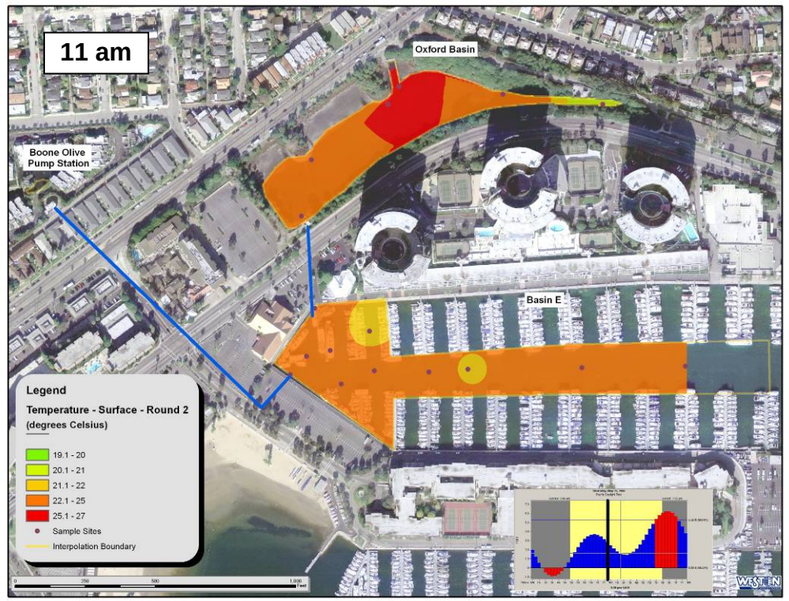
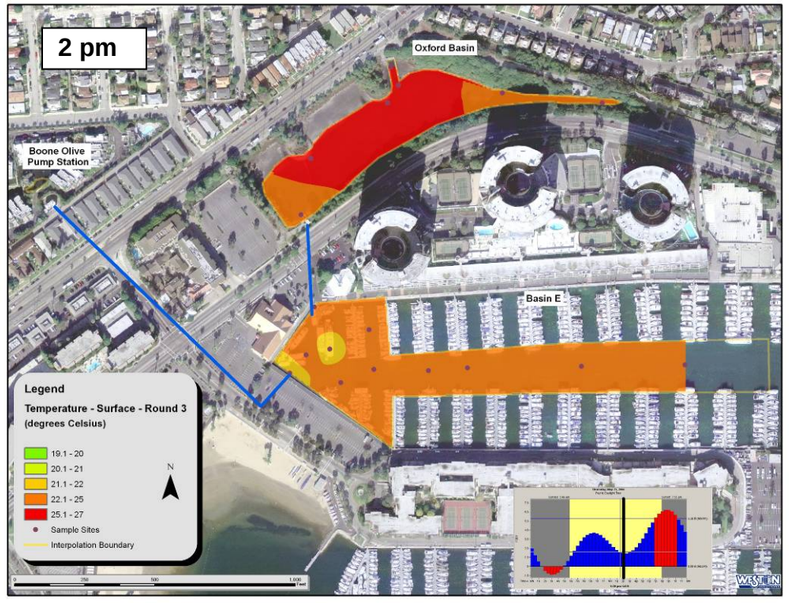


Figure 7-16. Salinity mid-depth concentration interpolations for May 25th event.







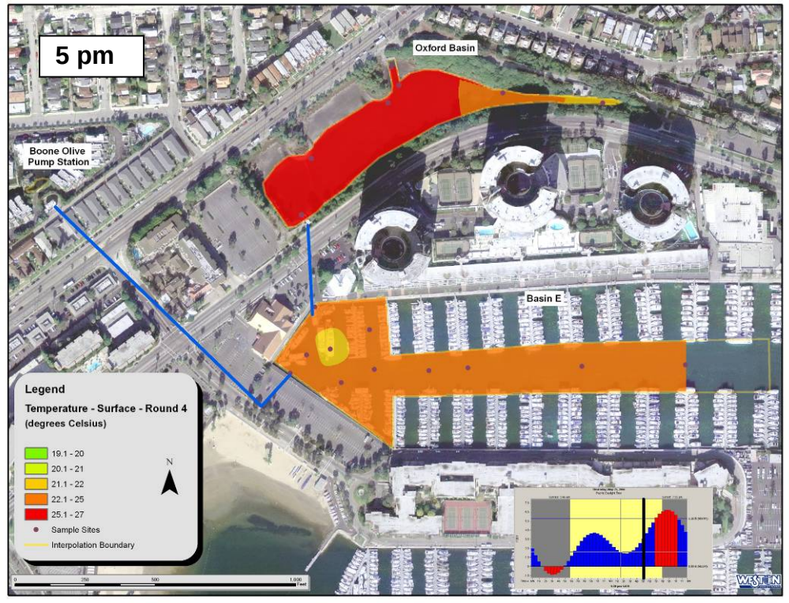
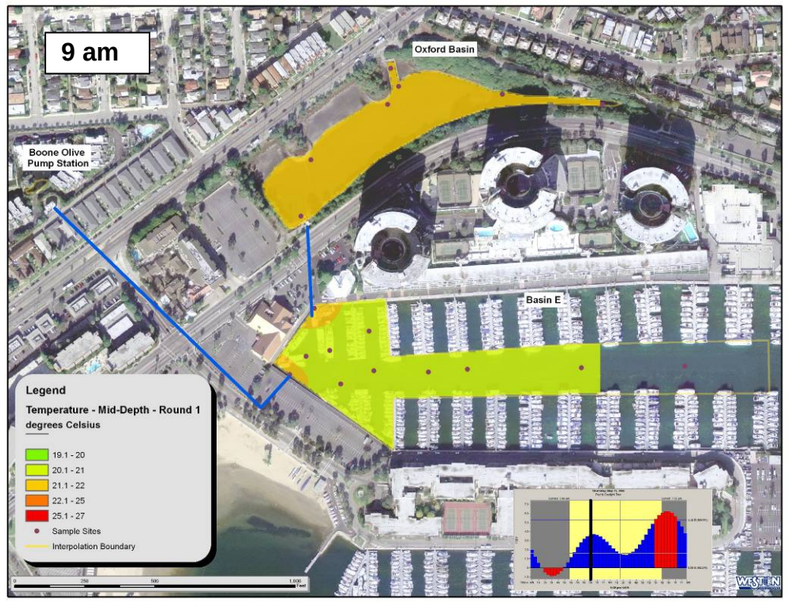
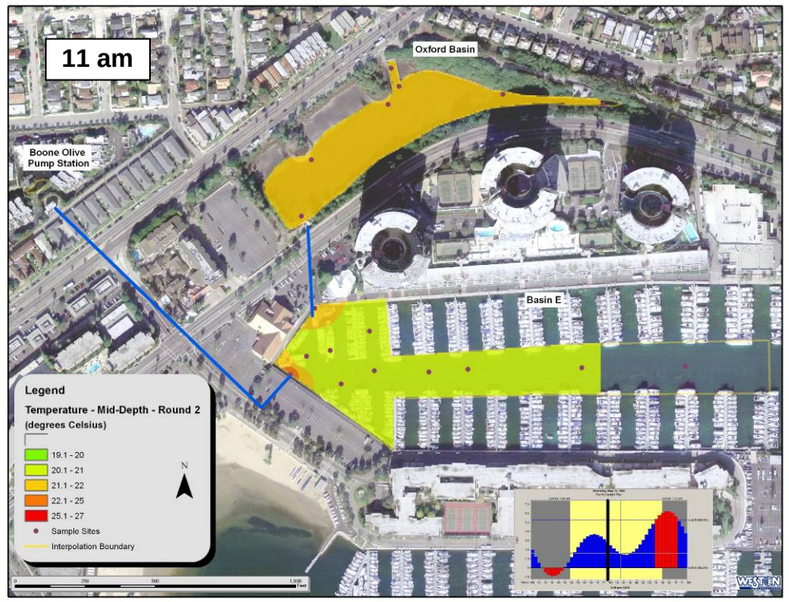
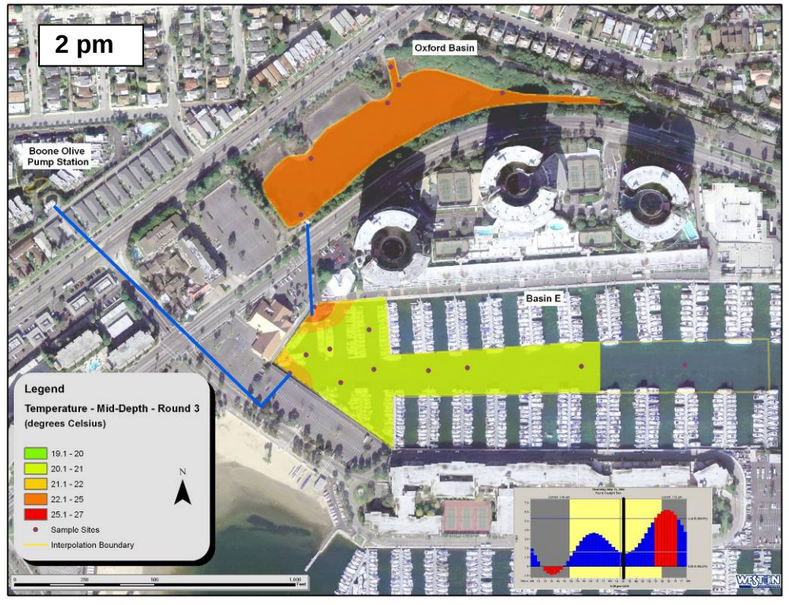


Figure 7-17. Temperature surface concentration interpolations for May 25th event.







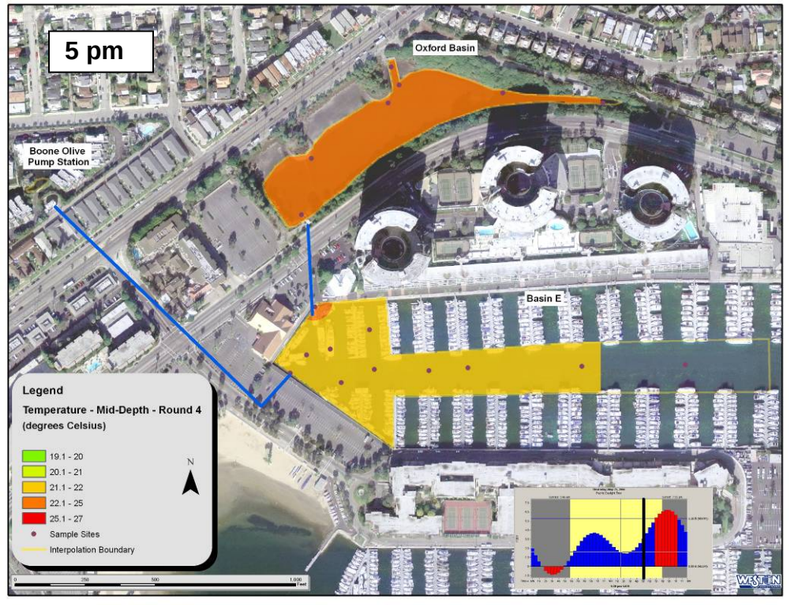
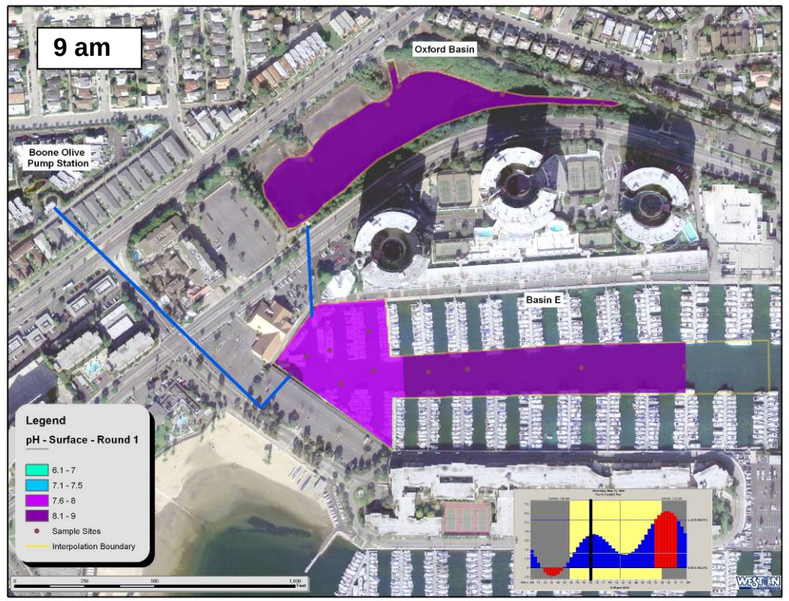
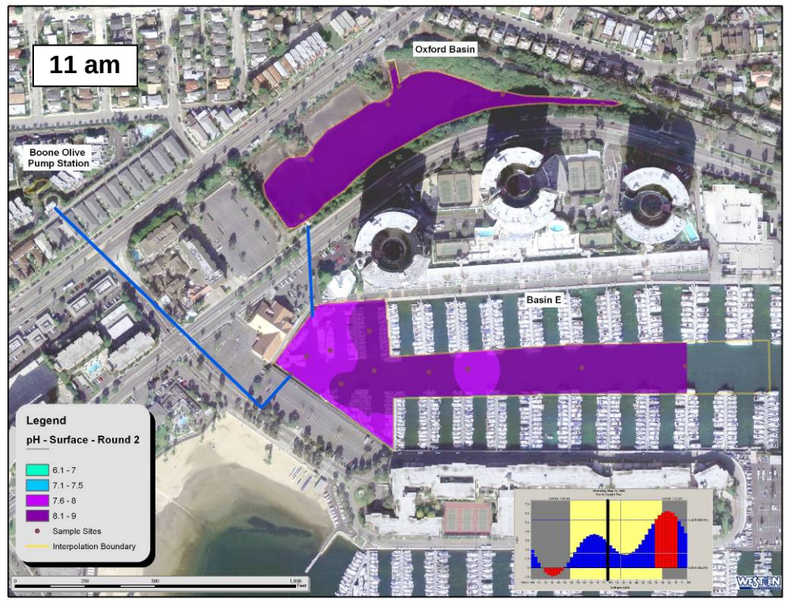
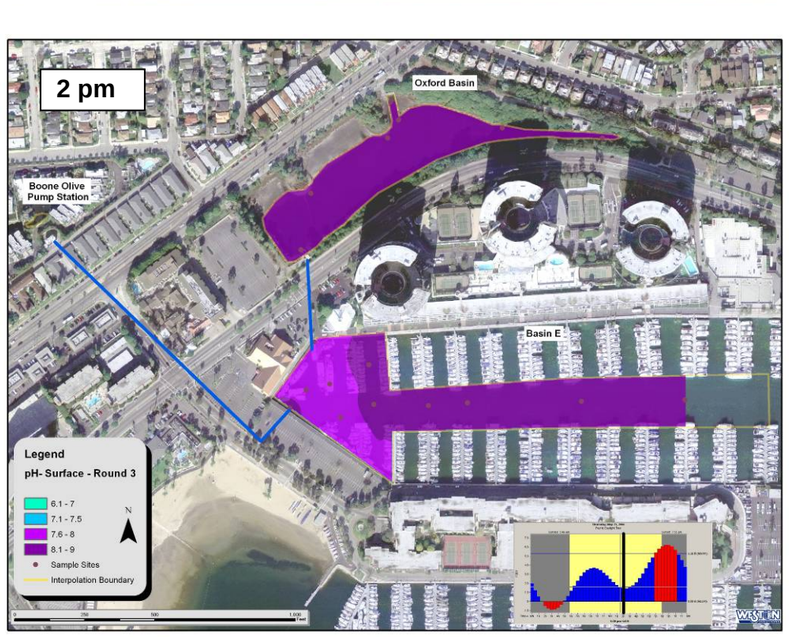


Figure 7-18. Temperature mid-depth concentration interpolations for May 25th event.







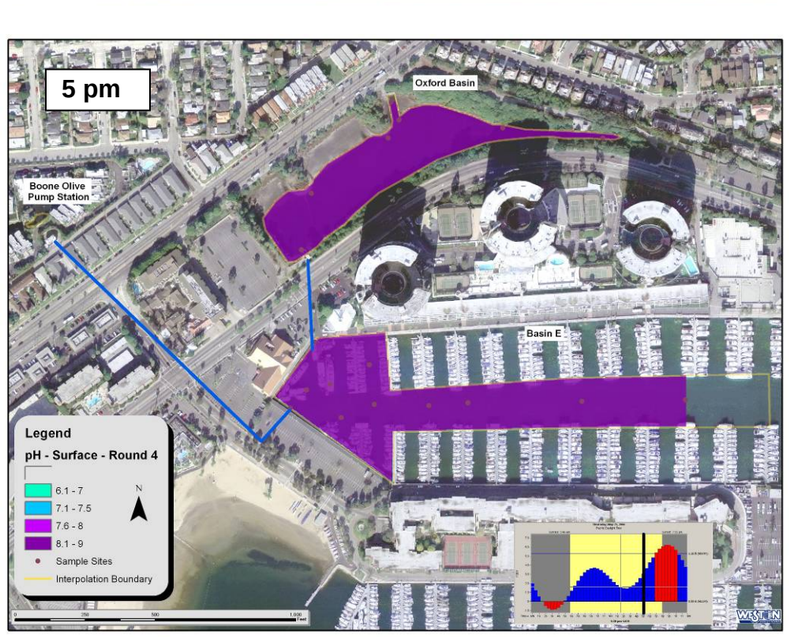
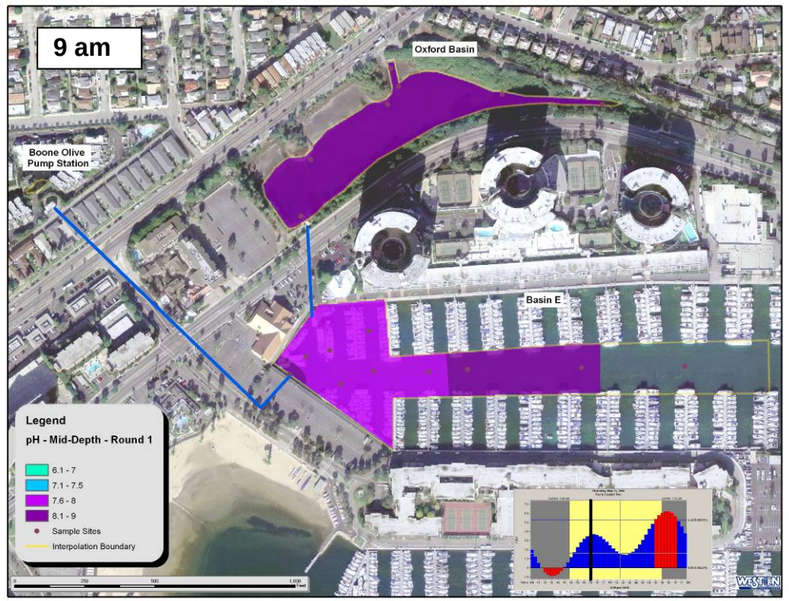
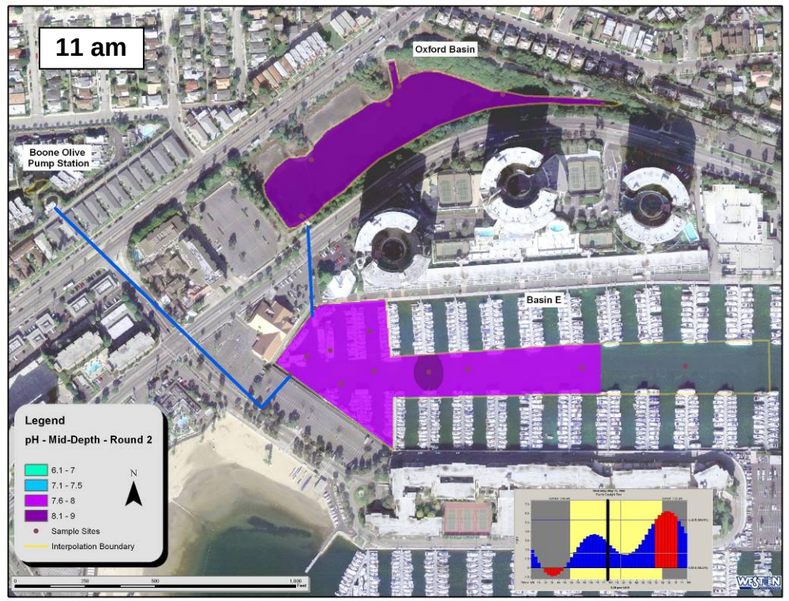
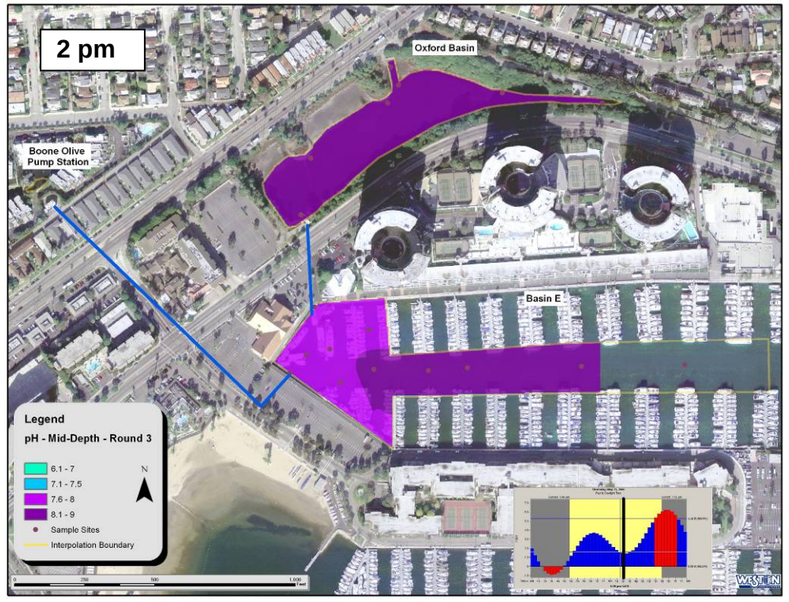


Figure 7-19. pH surface concentration interpolations for May 25th event.







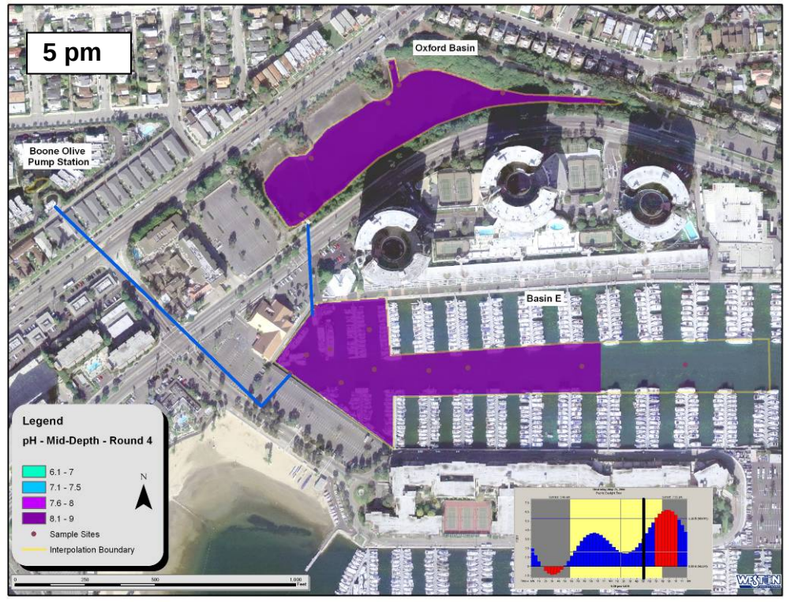
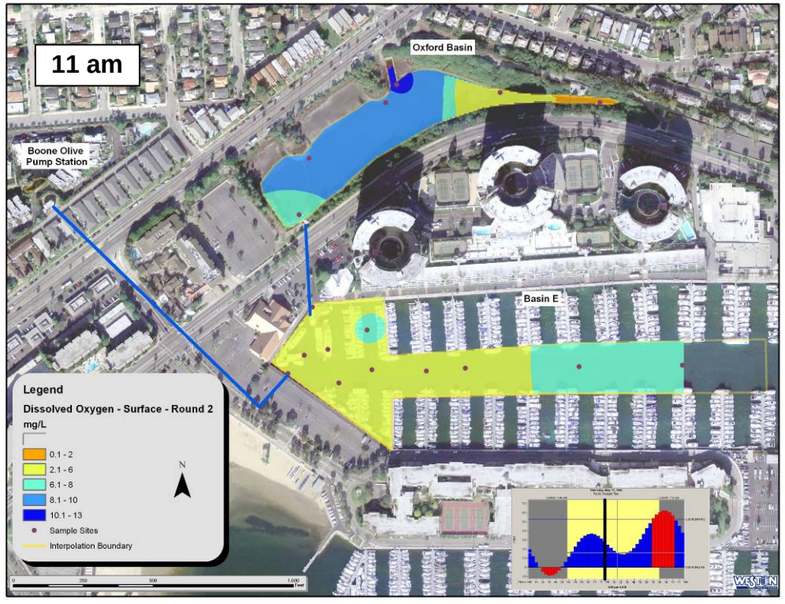
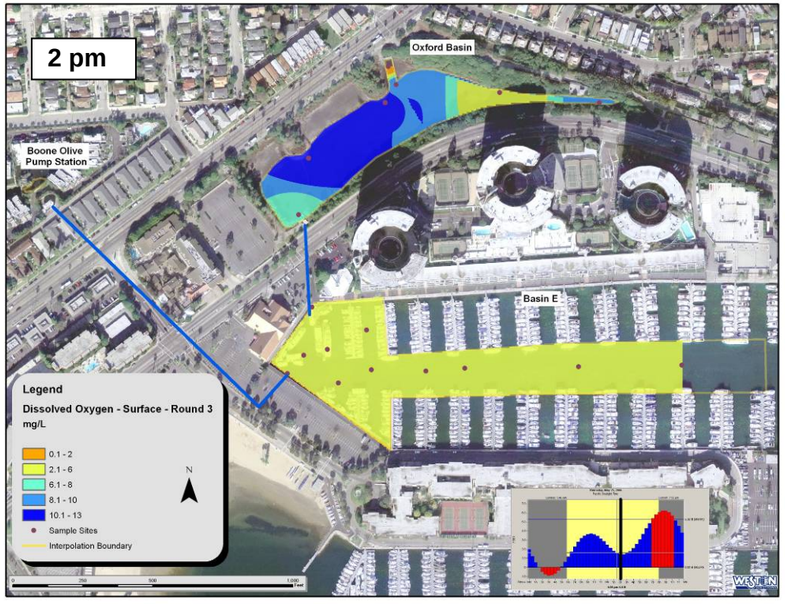


Figure 7-20. pH mid-depth concentration interpolations for May 25th event.





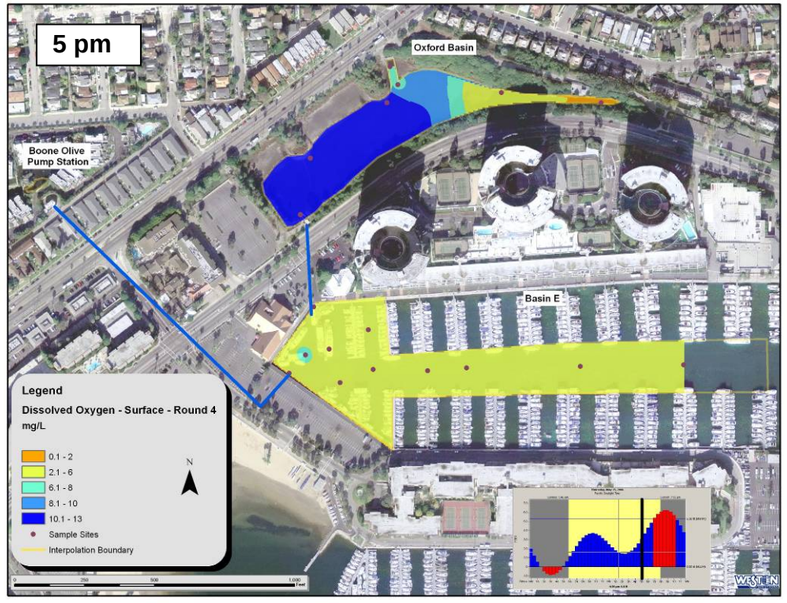
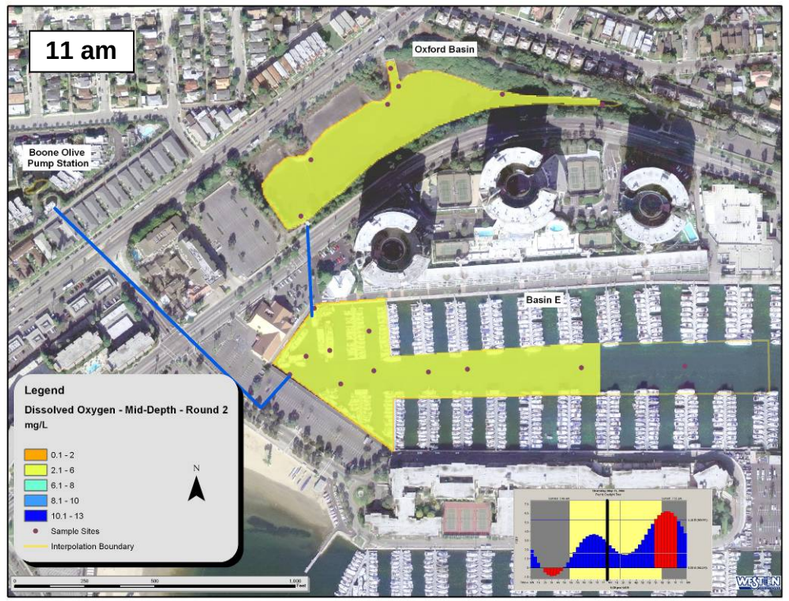
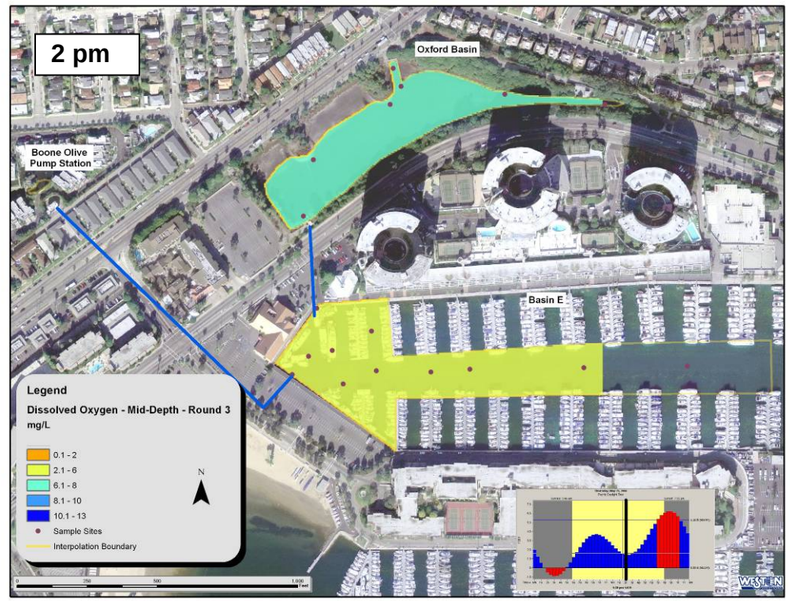


Figure 7-21. Dissolved oxygen surface concentration interpolations for May 25th event.





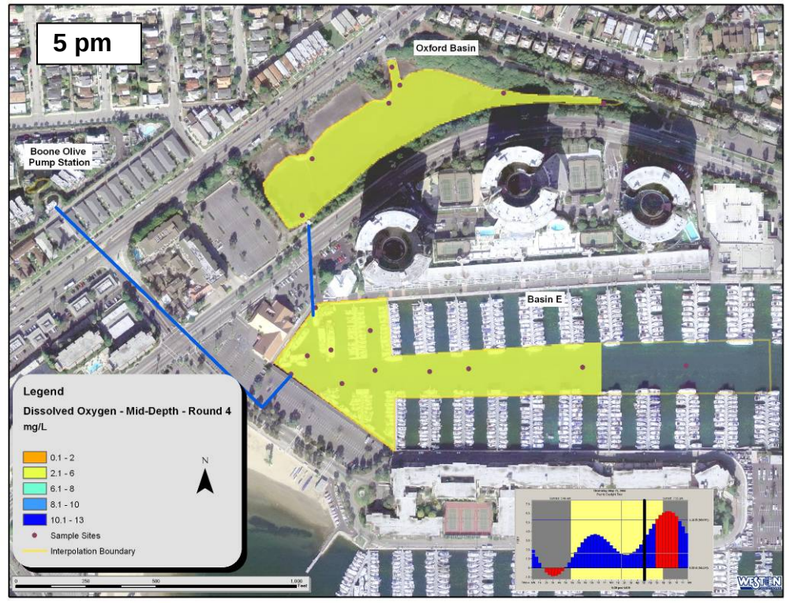


Figure 7-22. Dissolved oxygen mid-depth concentration interpolations for May 25th event.

7.4 Discussion of Bacteria BMPs

The common practice for managing storm water has been the use of structural and nonstructural BMPs. BMPs can achieve significant environmental improvements, such as reduction of flow volume and removal of pollutants. Removal of pathogens (i.e., bacterial indicators) through the use of BMPs can also be associated with reduced flow and removed solids. There are three major options for treating storm water and urban runoff: (1) active treatment systems (i.e., disinfection), (2) storm water treatment BMPs, and (3) diversion to a sanitary sewer system.

7.4.1 Active Treatment Systems

Active treatment technologies are feasible for storm water that can be collected and confined. Active treatment systems are highly effective (almost 100 percent) in reducing bacterial indicators and associated pathogens. There are three types of active treatment systems used for storm water:

7.4.1.1 Chlorination

Disinfection by chlorine (gas or liquid) has proven to be effective and is widely used for wastewater disinfection. Chlorine is readily available in several forms, inexpensive, and effective against bacteria, though not fully effective against viruses or protozoa. The easiest way to increase chlorine effectiveness is to increase the dosage within the system. However, the increased dosage results in the additional generation of toxic byproducts, as well as a high residual concentration of chlorine in the receiving waters. These chlorination residuals discharged to natural waters may be harmful to aquatic life. The chlorination system also requires the handling and storage of chlorine, which is a dangerous material.

7.4.1.2 UV Light

Irradiation from mercury arcs emitting UV light is an efficient disinfecting agent. At the germicidal wavelengths, UV light disinfects water by altering the genetic material in microbial cells, preventing reproduction. UV irradiation has become an acceptable alternative to chlorination for wastewaters undergoing a secondary or tertiary treatment. Recently, it has been used for low-quality effluents such as storm water as an alternative to chlorination for disinfection. Using UV irradiation for disinfection eliminates many problems arising from chlorination, such as the need for chemicals and dechlorination facilities. Eliminating large contact tanks and facility buildings significantly lowers capital and operating costs. UV light irradiation affects a wide range of microorganisms and does not generate known harmful secondary chemical byproducts. However, to inactivate the target microorganisms efficiently, UV light must penetrate the water. Therefore, the water to be disinfected must be as clear as possible

7.4.1.3 Ozonation

These treatment systems are highly effective and reliable, and exhibit very few drawbacks. It is the strongest and fastest-acting oxidant of all the disinfecting agents used for water sanitation.

Ozone inactivates a wider range of microorganisms than chlorine, has a relatively high disinfection-kill power, and releases limited byproducts. In addition to being a strong disinfectant, ozone reacts with organic impurities destroying them in the process. The presence of water impurities is a major limiting factor of ozonation for storm water. Reactions with impurities consume the ozone, which is then no longer available as a disinfecting agent. As a result, storm water with high levels of impurities requires a high dosage of ozone for disinfection to be successful. The equipment and operating costs associated with ozonation are relatively high. Due to its high instability, ozone must be produced onsite and used within a short period of time. Skilled operators and constant attention are required.

The long contact time required for disinfection in conventional wastewater treatment is extremely costly for the treatment of storm water due to the relatively high flow rates and intermittent volumes. However, storm water disinfection can be achieved at shorter contact times. High-rate disinfection is accomplished by: (1) increased mixing intensity, (2) use of higher concentrations of disinfectant, (3) use of chemicals or irradiation with higher oxidizing rates or microorganism-kill potential.

Effective use the disinfection technology on storm water requires use of a treatment train, where initially excess suspended solids are removed prior to the disinfection process. Disinfection of storm water requires some form of filtration, clarification, or sedimentation prior to introduction of disinfecting chemicals (USEPA, 1973). High levels of particulate matter in storm water can provide a "shielding effect" in which particles present in the medium protect the microbes either from disinfecting agent.

7.4.2 Storm Water Treatment BMPs

Structural BMPs are designed to function without human intervention at the time a storm event occurs. Often, controlling pathogens or bacterial indicators are a secondary goal for the BMPs. Most are implemented to control flow volume, sediment or other pollutants. Nonstructural BMPs are institutional or educational practices with the goal of changing behaviors to reduce the amount of pollutants entering the storm drainage system.

7.4.2.1 Vegetated Swales and Strips

These BMPs are most suitable along roads and at parking lots. They are inexpensive, but vulnerable to filling with sedimentation. They have a low to moderate efficiency in reducing bacteria.

7.4.2.2 Sand Filters Inlets and Basins

These BMPs are suitable for urbanized settings, especially for retrofitting storm drain facilities. They require pretreatment to remove sediment trash. They are moderately efficient in reducing bacteria.

7.4.2.3 Media Filters

These BMPs are suitable for urbanized settings. The BMP requires pre-treatment to remove sediment and trash. They are moderately efficient in reducing bacteria.

7.4.2.4 Infiltration Trenches and Strips

These BMPs are highly efficient in reducing bacteria. The space requirements vary based on the amount of runoff to be treated. These BMPs require pre-treatment to remove sediments.

7.4.2.5 Infiltration Basins

This BMP can be highly efficient in reducing bacteria, but requires a very large infiltration area and permeable soils.

7.4.2.6 Wet Ponds and Dry Ponds

These BMPs have a low to moderate efficiency in reducing bacteria levels. They require large areas, engineered flow facilities, and year-round or prolonged flows.

7.4.2.7 Constructed Wetlands

This BMP is commonly used to reduce bacteria levels and can be very efficient. However, the wetland requires sufficient water to support specific wetland plants.

7.4.3 Diversion to a Sanitary Sewer

Diversion of storm water and urban runoff to sanitary sewers is a commonly used treatment option. Diversion is a highly reliable and effective method that can involve low capital expenditures where piping and the treatment facilities are already constructed. A low flow diversion structure consists of a pre-treatment chamber that collects water from the storm drain system by gravity or pump. The initial chamber collects trash and other floating materials through the use of bars, screens, or filters. Water is then conveyed to a sump well where it is pumped to the sanitary sewer with a backflow valve. The low-flow diversion can be constructed underground in roadways.

The advantages of diversions are:

- Simple and effective
- Highly reliable
- Relatively lower capital costs
- Effective at varying flows

The disadvantages are:

- Requires pre-treatment to remove trash and to prevent entry of pollutants that could disrupt biological wastewater treatment process. The implications of wastewater treatment plant disruption can be significant, including possible shut-down of the entire City sewer system or discharge of untreated sewage to the ocean
- Possible ecological effects from stream diversions which could disrupt movement of fish, and/or reduce water supporting downstream riparian habitat

Typical fecal coliform bacteria removal rates for treatment BMPs vary widely (Table 7-1). The removal effectiveness rate varies greatly with the type of BMP, concentration of inflows, and

maintenance practices. The negative removal efficiencies represent studies that found BMPs that had higher fecal coliform concentrations at the effluent than at the influent. Perhaps representing bacterial growth. Limited research has been conducted on efficiency of structural and non-structural BMPs on controlling pathogen or bacterial indicator loads to receiving waters. Most of the efficiency information has been compiled by Winer (2000) and ASCE (2002) in U.S. EPA-funded projects. These data show that while BMPs can achieve a reduction in bacterial indicator loads, these BMPs also can serve as environments that increase bacteria from wildlife populations or resuspension from bottom sediments.

Table 7-1. Storm water BMP fecal coliform removal efficiency studies.

BMP Type	Removal Efficiency	Location	Reference
Wetlands	-134%	Fremont, CA	ASCE, 2002
	-117%	Sea Pines Plantation, SC	Kadlec and Knight, 1996
	-82%	Fremont, CA	ASCE, 2002
	55%	Glenwood, WA	Winer, 2000 (Study 80)
	78%	Lake Beardall, FL	Winer, 2000 (Study 91)
	97%	Kingston, MA	Winer, 2000 (Study 79)
Wet Ponds	-6%	Piedmont, NC	Winer, 2000 (Study 12)
	46%	Woodhollow, TX	ASCE, 2002
	56%	East Barrhaven, Ontario	Winer, 2000 (Study 19)
	64%	Fremont, CA	ASCE, 2002
	64%	Harding Park, Ontario	Winer, 2000 (Study 16)
	70%	Monroe Street, WI	Winer, 2000 (Study 91)
	73%	Davis, NC	Winer, 2000 (Study 11)
	86%	Unqua, NY	Winer, 2000 (Study 34)
	90%	Heritage Park, Ontario	Winer, 2000 (Study 43)
	97%	Uplands, Ontario	Winer, 2000 (Study 21)
	98%	St. Elmo, TX	Winer, 2000 (Study 26)
	98%	Tampa, FL	Kurz, 1998
	99%	Kennedy-Burnett, Ontario	Winer, 2000 (Study 20)
Dry Pond	78%	Maple Run, TX	ASCE, 2002
Sand Filter	-85%	Austin, TX	Winer, 2000 (Study 109)
	36%	Austin, TX	Winer, 2000 (Study 107)
	37%	Austin, TX	Winer, 2000 (Study 105)
	37%	Austin, TX	Winer, 2000 (Study 108)
	66%	Madeira Beach, FL	Kurz, 1998
	81%	Austin, TX	Winer, 2000 (Study 110)
	83%	Austin, TX	Winer, 2000 (Study 106)

7.5 BMPs Simulated in the Model

The model was used to evaluate the effectiveness of some BMPs. The time period of a full tidal cycle beginning on May 25th was chosen to run the model. By beginning and ending the model run at the same tidal level, there should be no net movement of water and load differences should not be greatly affected by the tide. The calibrated die-off or growth rates from the five dry weather sampling events data was used in the model simulations. The initial concentrations at the various locations were assigned from the geometric mean of all recent sampling events.

The following management scenarios were considered for evaluating dry weather fecal coliform loads:

A. Baseline conditions as they existed on May 25th.
B. Keep Boone-Olive concentrations at 20% of baseline.
C. Divert all Boone-Olive flow.
D. Keep Oxford tide gate closed; keep level at 1.2 MLLW.
E. Keep Oxford tide gate open; allow level to vary with the tide.
F. Simulate a BMP in Oxford Basin by doubling the die-off rate.
G. Divert dry weather flows from entering Oxford Basin.
H. Divert both Oxford and Boone Olive flows (C & G)
I. Create BMP for Oxford Basin with a removal efficiency of 75%
J. Reduce Oxford Basin fecal coliform inflow concentrations by 50%

The results from these scenarios are shown in Figure 7-23. All results are shown as a difference from the loads estimated in the baseline scenario "A". Reducing or eliminating the loads from the Boone Olive Pump Plant greatly decreased the loads in the western portion of Basin E as well as moderately reduced the loads in other areas. Closing Oxford Basin off completely as in option "D", reduced the loads in Oxford Basin due to the die-off rate but had little effect on other areas. By allowing a free exchange of water into Oxford Basin, as in scenario E, loads in Oxford Basin increased by allowing high loads in Basin E to enter. Scenarios F and G had a dramatic effect on decreasing the bacterial loads in Oxford Basin. However, other areas were not greatly affected. A sand filter BMP would be similar to the diversion mentioned in Scenario G but less effective. Scenario H involves diverting dry weather flows into Oxford Basin, as well diverting the Boone Olive Pump flow away from Basin E. This scenario provided the greatest reduction to north Marina del Rey. Scenario "I" simulates an Oxford Basin BMP with a removal efficiency of 75%. This removal efficiency is similar to the median value of the wet and dry ponds mentioned in the previous section. There was very little difference between the baseline and the simulated BMP load reduction outside of Oxford Basin. Scenario "J" reduced inflow fecal coliform concentrations into Oxford Basin by 50%. This reduction is similar to what might be expected from a sand filter BMP.

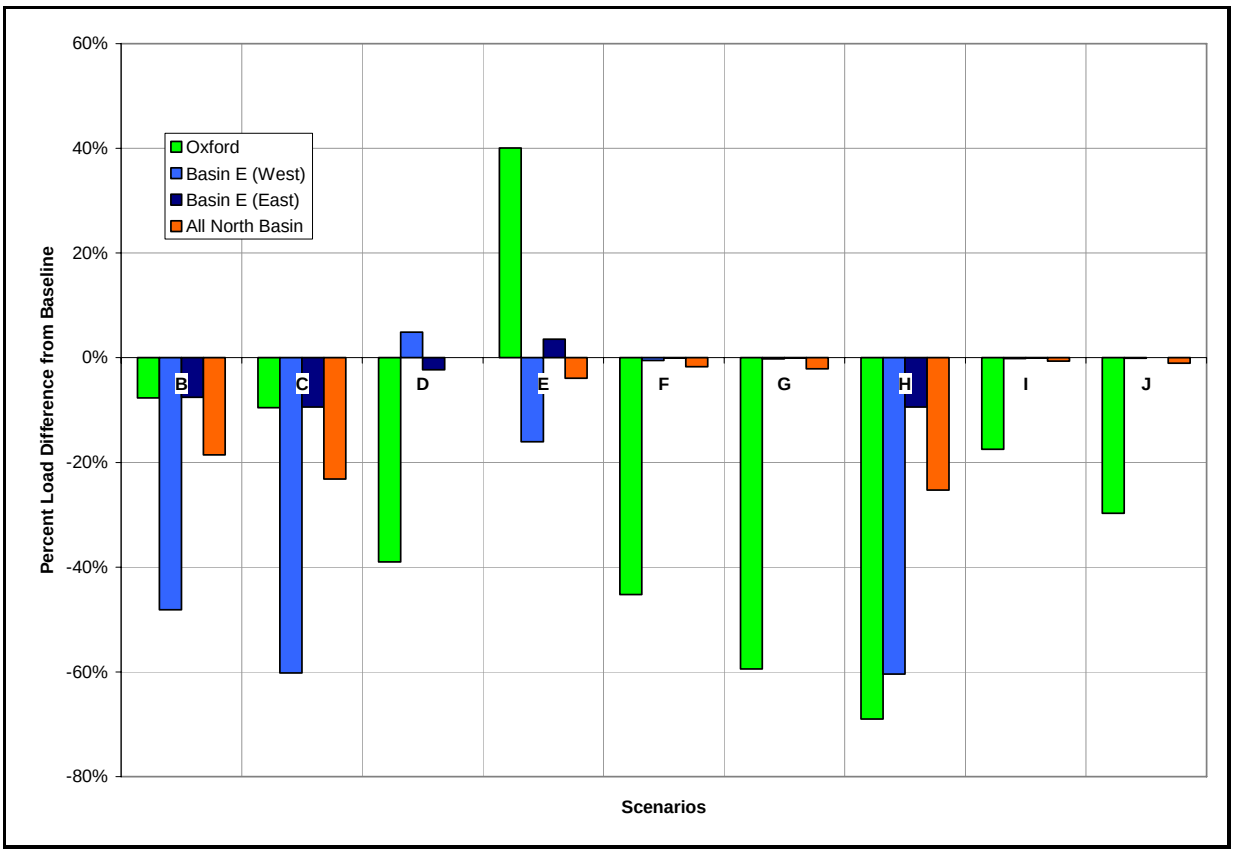


Figure 7-23. Difference in loads under different scenarios.

The scenarios discussed above can be summarized by equating them to specific BMPs for Marina del Rey. Table 7-2 shows estimated removal rates in Basin E for seven different BMPs. The diversion of Boone Olive inflows appears to have the highest percent load removal. The wet and dry pond reductions are based on the assumption that a BMP of this type could be placed in or near Oxford Basin that could achieve a 75% removal efficiency. The removal efficiency is based on the average effectiveness of wet and dry ponds found in previous studies. Other BMPs that focus on Oxford Basin appear to be less effective although scenario modeling over a longer time period and other tidal conditions may show better removal. BMPs such as UV treatment can be effective at treating inflows into Oxford Basin but because the load of bacteria from these inflows is estimated to be relatively small, these BMPs have a low overall effectiveness for reducing loads to Basin E.

Table 7-2. Estimated fecal coliform load removal from various BMPs.

Treatment	Load Removal from Basin E
Diversion of Boone Olive inflows	60%
Dry Pond in Oxford Basin	48%
Wet Pond in Oxford Basin	48%
Sand Filter for Oxford Basin inflows	1%
Diversion of Oxford Basin inflows	1%
UV treatment of Oxford Basin inflows	1%
Ozone treatment of Oxford Basin inflows	1%

Another BMP that has been discussed is constantly pump water out of Oxford Basin to the Marina or directly to the ocean. The effect of this is assumed to be similar to diverting inflows into Oxford Basin. More research is necessary to determine the feasibility and effectiveness of this expensive option.

7.6 Wet Weather Applications of the Model

The previous discussions of the model have focused on dry weather conditions. The model was also be used to simulate wet weather conditions by changing the inputs into Oxford Basin and Basin E to match runoff conditions during a storm. A watershed model for the Oxford Basin was created by the Los Angeles Department of Public Works for a weighted average TMDL design storm. The design storm provides peak flows of 30 cubic feet per second into the northern Oxford Basin storm drain and 4 cubic feet per second into the eastern storm drain. Also, from observations of pump records, the Boone-Olive Pump Plant operates continuously at the rate of 0.75 cubic feet per second for a couple of hours after the storm. This study did not collect samples of fecal coliform concentrations in storm drains during storm events. For the wet weather model simulations discussed below, the fecal coliform concentrations from the storm drains were assumed to be similar to the concentrations measured during dry weather.

With only two storm events monitored, a rigorous wet weather calibration of the model was not possible. However, if we assume that bacteria die-off rates are similar over the short term during a storm event, the model can be a useful tool to make relative statements about bacteria concentrations during different wet weather conditions.

Figure 7-24 and Figure 7-25 show a comparison of fecal coliform concentrations during a dry weather period and during a design storm. The storm concentrations in Oxford Basin are an order of magnitude higher than during dry weather. The concentrations in western Basin E show a less dramatic increase. The model predicts only small increases in concentrations from a storm elsewhere in the Marina.

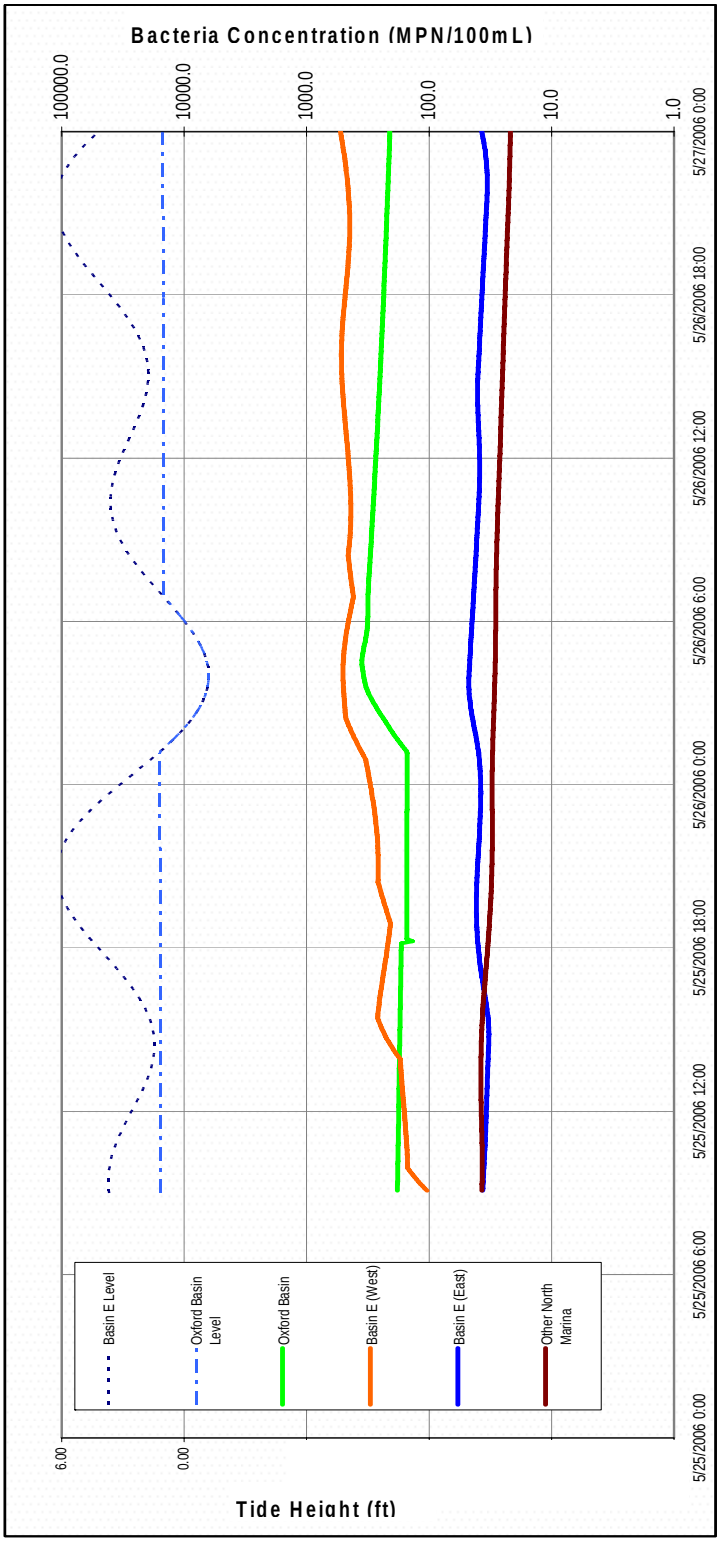


Figure 7-24. Model Simulation with no storm input.

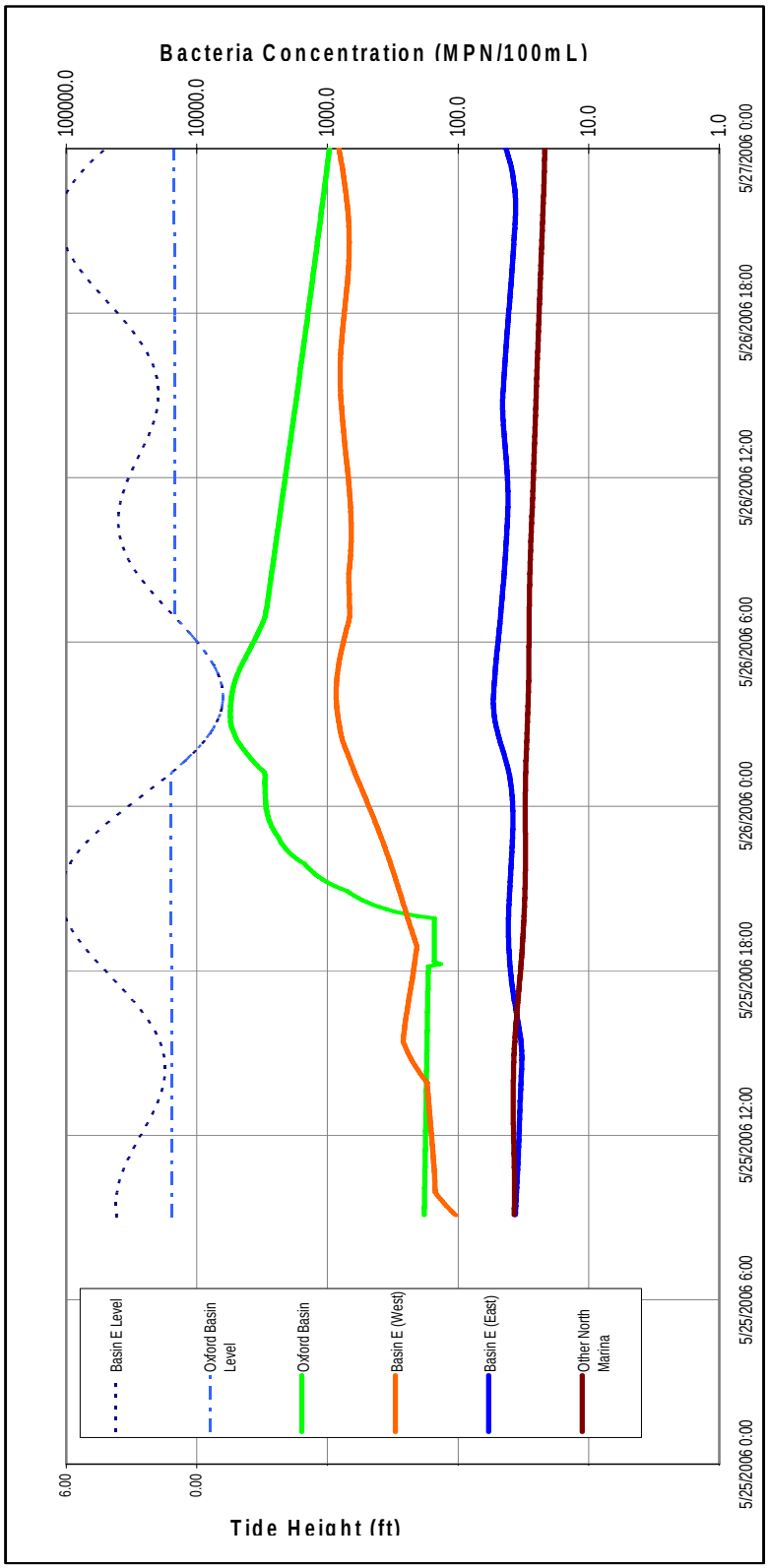


Figure 7-25. Model simulation with TMDL Design Storm

7.7 Conclusions

The model results suggest the biggest impact to reducing fecal coliform loads may be to address the Boone-Olive Pump Plant source. The high bacteria concentrations from this source has a direct impact to the water quality in Basin E, as well a providing a continuous source of bacteria to Oxford Basin on flooding tides. The model also shows limited water movement out of Basin E to the front Marina basins. The east end of Oxford Basin is especially isolated from tidal flushing.

The complex interactions of biology and the environment make bacteria concentrations very difficult to simulate to a dynamic system. However, the model is one tool to better understand the Marina del Rey environment. The model has the potential to be modified to investigate results over a longer time period, simulate more complex bacterial die-off assumptions, run other management scenarios in greater depth, and look at other water quality constituents such as enterococci, ammonia, and salinity.

The purpose of this year-long study was to identify the host sources of bacteria contributing to the contamination of Mothers' Beach and the back basins of Marina del Rey Harbor (MdRH), and to determine the relative loading from those sources. This section provides a brief summary of the findings from each of the 6 investigative tasks conducted throughout the year-long study.

Task 1 – Spatial and temporal survey consisting of dry and wet weather sampling events. Utilize a weight-of-evidence approach to understand the sources of contamination to the back basins and Mothers' Beach. This includes visual observations and spot samples, a public questionnaire, extensive sampling for fecal indicator bacteria and a 'toolbox' approach to bacterial source tracking using two methodologies proven successful in previous studies.

Task 2 –Investigate the potential for contamination by human sewage from structural defects or operational and maintenance problems in the sewerage infrastructure surrounding MdRH.

Task 3 – Investigate possible contributions of bacteria from illicit discharge of sewage from boats within MdRH.

Task 4 – Investigate the extent to which sediment at Mothers' Beach act as a reservoir and source of bacteria to MdRH receiving waters.

Task 5 – Estimate loading of indicator bacteria from sources including but not limited to major drainages, boats, birds, and other non-point sources.

Task 6 – Perform additional studies as needed to further elucidate sources and quantify loading of bacteria to Mothers' Beach and the back basins of MdRH.

The major findings from each of these tasks are presented below.

8.1 Task 1 – Spatial and Temporal Surveys

Task 1 was designed to assess the numerous potential sources of bacteria to Mothers' Beach and the back basins of MdRH using a weight-of-evidence approach. This included the collection of samples during five 24-hour dry weather surveys and two 12-hour wet weather surveys for bacterial evaluation using three analytical methods: indicator bacteria enumeration, Q-PCR, and ribotyping. In addition, visual observations were conducted in conjunction with sampling, a questionnaire was distributed to those knowledgeable about potential bacterial sources, and spot samples were collected when runoff was observed.

One of the key findings in this study is that due to low tidal flushing, each of the three back basins maintains its own local sources of bacteria. Basin D is primarily contaminated due to

direct avian sources. Basin F was the least contaminated basin showing little fecal indicator bacteria. The trace amounts of bacteria found in this basin were attributed to avian, pet, rodent and some human sources. Basin E had the most complex contamination issues with direct and indirect contamination from birds and irrigation, etc., in addition to the major effects caused by the effluent from Oxford Basin and the Boone Olive Pump Plant. A more detailed analysis by basin is provided below and recommendations for the eradication of these individual sources are provided in Section 9.

8.1.1 Basin D

As stated above, the primary source of contamination in Basin D and Mothers' Beach is direct avian sources. Ribotyping results indicated that birds accounted for 72% and 66% of the bacteria during the dry and wet weather periods respectively. Despite this, Basin D generally had low levels of bacterial contamination throughout the study period. During dry weather, more than 75% of the samples at all sites in Basin D fell below water quality limits. After Basin F, Basin D had the lowest bacterial concentrations during wet weather. There were no sites with fecal coliform geometric means greater than the 30-day water quality objective (WQO). Enterococci densities were relatively higher than fecal coliform in Basin D during wet weather and reversed for dry weather. The greatest value was found at Site 2, which is located in close proximity to a storm drain outfall in the northern portion of the basin. Bacterial densities measured in the vicinity of Mothers' Beach were typically low during both dry and wet weather.

Over the course of the study, Q-PCR analysis produced two wet and two dry weather results that were positive for the presence of human bacteroides in Basin D. Only one of these was at Mothers' Beach, while all others were in the boat docking areas. These results equate to less than 1% human contamination throughout the basin. This conclusion was corroborated by the ribotyping results, which indicated that only 4% of the isolates submitted were found to be of human origin during dry weather and 2% during wet weather. These data, coupled with observations supporting a lack of human contributions, confirm that sources of human origin are not contributing measurable loads of bacteria to the receiving waters in Basin D.

Other sources of bacteria in Basin D were elucidated using spot sampling and visual observations. Results of spot sampling produced the second highest densities among all of the back basins. Dumpster wash down practices contributed the greatest amount of fecal coliform. Visual observations of the area where this sample was collected indicated that the ground surrounding the dumpsters was stained with apparent bird feces. Visual observations also documented several instances where trash containers were either uncovered or overflowing at locations in Basin D. Loose or uncovered trash attracts scavenging wildlife such as birds and rodents. Ribotyping results indicated that birds and rodents collectively accounted for 82% of the bacteria during dry weather and 70% during wet weather in Basin D.

Fecal coliform was also high in runoff from restaurants. The washing of areas where food is prepared and consumed, and allowing the runoff to enter storm drains or the receiving water can generate significant bacterial loads. Furthermore, using hoses to clean these areas provides a source of fresh water that not only attracts birds and rodents, but also provides a damp

environment for bacteria to grow. Cooperation should be sought with restaurants to develop alternative practices.

Enterococci was found in large amounts in water from bathroom wash down. It was also observed that the Palawan Way restrooms do not have floor drainage. Therefore, whenever this facility is cleaned, the runoff runs along the sidewalk, down the ramp and onto Mothers' Beach. Because bacteria can survive and even re-grow in sediment where it can then become re-suspended in the water column, it is critical that direct sources of bacteria-laden water do not enter Mothers' Beach. These restrooms should either be retrofitted with drains connected to the sanitary sewer, or cleaning practices should be altered to prevent runoff onto the beach.

Contributions of enterococci came from irrigation runoff as well. Though individual samples of irrigation runoff were not high relative to the other types of spot samples, the frequency with which irrigation was observed in this basin is expected to have a cumulative effect. Irrigation runoff can carry bacteria from avian, pet and other waste to the receiving waters, as confirmed by the ribotyping results (i.e., dogs contributed 7% and 12% of the isolates during dry and wet weather, respectively).

8.1.2 Basin E

As shown in the studies and the model in Section 7, Basin E is affected dramatically by the effluent from the Boone Olive Pump Plant and Oxford Basin. Basin E had noticeably higher bacteria levels than either Basin D or F, especially during wet weather. Dry weather sampling resulted in multiple exceedances of the single sample standards for both indicator bacteria, but geometric mean values were generally low. In contrast, almost all of the sites had elevated geometric means for both fecal coliform and enterococci during wet weather. It was clear from these results that large inputs of bacteria during wet weather cause elevated densities throughout Basin E; these densities are exceptionally high in the western portion of the basin near the discharge point from Oxford Basin where the highest number of positive results for human bacteroides was also found.

Basin E had the highest overall spot sampling results for fecal coliform and enterococci densities among the basins. In fact, the three highest spot sample results found during the study were collected within the drainage area of Basin E. The primary activity contributing to high fecal coliform contamination was wash down of the parking lots. During two different sampling events, spot samples were collected from the wash down of a condominium parking garage located across the street from Site 9. Collectively, these samples resulted in fecal coliform densities of 3.8 million MPN/100mL. Although results of Q-PCR analysis during dry weather indicated a positive result for the presence of human bacteroides at Site 9, results of ribotyping analysis showed that human sources to Basin E overall were minimal. In fact, none of the isolates were of human origin during dry weather, and only 4% of the isolates were accounted for by human sources during wet weather. It is possible that this source is being significantly diluted when it enters the receiving water. However, previous reports of sewage overflows have been linked to this building. The combination of a possible sewage overflow along with a maintenance practice that allows the runoff water from washing the parking garage to enter the street and in turn, the Harbor, is a likely contributor of bacterial contamination in Basin E.

Other evidence of human bacterial contribution to Basin E included the presence of human bacteroides during wet weather at several sites in close proximity to Oxford Basin. It is likely that results from these sites reflect the input of highly contaminated water from the discharge area of Oxford Basin or Boone Olive into Basin E during wet weather. Another major contributor to fecal coliform in Basin E was the possible ICID that was found during visual observations. Due to very high indicator bacteria results and a positive result for human bacteroides, this possible source was brought to the stakeholder's attention and an investigation into the possible illicit sewer connection was initiated. Restaurant runoff contributed the greatest amount of enterococci that was found during spot sampling of Basin E.

Because the questionnaire was not exclusively limited to the back basins, many of the comments pertained to activity outside the realm of this study. However, Basin E was identified in 26 of the surveys specifically as an area with discharges, odor, trash, floatables, and dog walkers. These observations are supported by the visual observations performed during the dry and wet weather studies, as well as verification by ribotyping. Dog waste disposal practices were problematic in Basin E, with a total of 15% of isolates from canine sources during dry weather and 12% during wet weather. As in Basin F, uncovered trash containers likely attracted birds and rodents, with respective dry weather contributions of 65% and 7%. Wet weather contributions from birds equaled 79% and rodents were found to comprise 3% of the isolates.

8.1.3 Basin F

Basin F had considerably lower densities of indicator bacteria than Basin E throughout the study period. Densities in Basin F were somewhat comparable to those found in Basin D during dry and wet weather. Low geometric mean values indicated that the majority of the samples collected during dry weather were below WQOs, while wet weather densities were slightly higher.

Basin F had the least amount of indicator bacteria found in spot samples among the basins. The greatest contribution of both fecal coliform and enterococci was from restaurant runoff, with air conditioning condensate contributing high values as well. While air conditioning condensate is not expected to have high bacterial densities, runoff from this unit may be contributing to contamination by providing a moist area where bacteria can grow.

Boat wash down was also noted as a contributor of bacteria to Basin F. Although the densities in the spot samples were relatively low, the frequency of boat washing practices should be taken into account when considering loading. Because there are approximately 2,000 boat slips in the back basins, this could represent a considerable source of avian bacteria to the receiving waters.

As with the other basins, ribotyping results in Basin F indicated that the predominant contributor was from avian sources, with 57% during dry weather and 73% during wet weather. Also notable was the contribution from rodents during dry weather, representing 17% of the isolates. These sources point to potential causes, and therefore likely solutions to the contamination. Of the entire study area, Sites 12 and 13 in Basin F were most commonly seen with uncovered disposal areas. Although these sites had relatively low levels of indicator bacteria throughout the

dry weather surveys, covering the trashcans/dumpsters is an easy and effective BMP that could be implemented at these sites to reduce potential bacterial contribution during wet weather or via attraction of scavenging wildlife. Visual observations documented that garbage was primarily observed in the water rather than on the ground, indicating that trash inevitably reaches the water regardless of where it is discarded.

Canine waste was also problematic in Basin F, with respective dry and wet weather contributions of 11% and 9%. Dog walking is extremely popular around the Harbor, as evidenced by 137 observations of this activity throughout the entire back basins. Although none of the pets were in the water, dog waste was either found on the ground or neglect of proper pet waste disposal was observed on a total of 40 occasions throughout the entire study area. These observations suggest that almost one in every three dog owners do not pick up after their pets when walking around the Harbor. Pet waste disposal was found to be most problematic at Site 13 in Basin F. Greater efforts should be directed toward a public education campaign regarding pet waste disposal in this area.

Basin F had the highest percentage of human influences of the back basins with 2% human during dry weather and 8% human influences during wet weather. While this may be a larger percentage than in the other basins, it should be noted that bacterial densities in this basin are so low, that this percentage represents a very small number actual of bacteria from human fecal sources. The fact that no human bacteroides samples were found to be positive in this basin throughout the study confirms that the actual number of human fecal bacteria is very low. And while any human contamination should not go without concern, these factors should be considered when prioritizing BMPs throughout the back basins.

8.1.4 Oxford Basin

Oxford Basin had the highest bacterial densities during both dry and wet weather, as evidenced by exceedances of the single sample standards for both indicators and elevated geometric means. All of the sites were exceptionally elevated during wet weather, with geometric means at two sites nearly an order of magnitude greater than those from any other basin.

Despite the large concentrations of bacteria discussed above, Oxford Basin had two positive results for human bacteroides; one during each of the two wet weather surveys. Q-PCR results were corroborated by the ribotyping data, which detected only 2% of the isolates during dry weather and none during wet weather from human origin.

In Oxford Basin, parking lot wash down was a primary activity causing this basin to have the third highest densities from spot sampling. Building wash down was also observed, but the contribution from this spot sample was significantly lower. Because wash down activities appear to be problematic throughout all of the back basins, it is recommended that a targeted educational campaign be initiated for commercial/dense residential BMPs related to appropriate cleaning practices.

Throughout the study, observed wildlife primarily consisted of birds. Bird enumeration surveys conducted during dry weather sampling revealed large populations of gulls, ducks, shorebirds,

and other birds. Of these, 60% of the ducks were observed in Oxford Basin. Shorebirds were also most commonly observed at several sites in Oxford Basin, and other unidentified birds were seen at these sites as well as two sites located adjacent to the outlet of Oxford Basin into Basin E. Field samplers counted greater than 1,880 instances of bird waste. Overwhelmingly, these observations were made at the inlets of Sites 14 and 15 in Oxford Basin. Site 14 alone had greater than 1,000 collective counts, while Site 15 had an additional 800+ counts. Bacterial densities at these sites were consistently high through the study period, indicating that bird waste could be a potentially large source of bacteria to the receiving water at these sites. Ribotyping results affirm this conclusion, with 71% and 57% of isolates originating from avian sources during dry and wet weather, respectively.

Dog walking was also frequently observed. As with the other basins, pet waste disposal practices were problematic in Oxford Basin and resulted in the greatest contribution of isolates from canine sources found during the study. During wet weather, 22% of the isolates originated from dogs, compared with 11% during dry weather.

8.1.5 Boone-Olive Pump Station

All of the samples collected at the Boone-Olive Pump Station (Site 16) throughout the study period exceeded single sample standards, with the exception of several results for fecal coliform during dry weather. Site 16 had positive results for the presence of human bacteroides during dry weather but not during wet weather. Results of ribotyping analysis suggested that the human contribution of isolates was only 2% during dry weather and 3% during wet weather. Furthermore, ribotyping indicated that the primary source of bacteria to the Boone-Olive Pump Station was from birds, with a 65% contribution of isolates of avian origin during both dry and wet weather. Secondly, the largest contribution was from canine sources (13% during dry weather and 19% during wet weather), followed by rodents (11% during dry weather and 7% during wet weather).

8.1.6 Spot Sampling Overview

As shown in Table 8-1, among the types of spot samples collected in all basins, parking lot wash down generated the greatest amount of fecal coliform and significantly high densities of enterococci. Restaurant runoff generated the greatest amount of enterococci and contributed high densities of fecal coliform as well. Other significant activities included the possible ICID at Site 9, dumpster wash down, bathroom wash down, and irrigation. Relative to these activities, air conditioning condensate and building wash down were less significant. Lastly, boat wash down contributed relatively little bacteria. However, it should be noted that although this source was smaller than the other activities, boat wash down is frequently observed in MdRH and cumulative impacts cannot be discounted.

Table 8-1. Spot sample bacterial densities in Marina del Rey Harbor.

Spot Sample Type	Fecal Coliform	Enterococci
Parking Lot Wash Down	**3,970,000**	**54,939**
Restaurant Runoff	**138,000**	**200,830**
Possible ICID	**1,767,000**	7,919
Dumpster Wash Down	**500,000**	2,559
Restroom Wash Down	2,300	**27,230**
Irrigation	37,100	**23,194**
AC Runoff	12,339	3,076
Ponded Water	8,000	2,909
Building Wash Down	16,000	74
Boat Wash Down	5,000	420

Values in red are the two highest sums of bacterial densities among spot sample types. Similarly, orange values are the third and fourth highest summed densities. These values reflect only the top 23 spot sample results, as reported in Section 2.

8.2 Task 2 – Inspection of Sewerage Infrastructure

The CCTV investigation of the sanitary sewer lines surrounding the back basins of Marina del Rey Harbor identified structural and O&M defects. The structural defects are a current concern due to the potential for leaks and associated bacterial contamination, while the maintenance defects remain a concern for possible future spills and leaks, but are generally not an immediate source of bacterial contamination to the receiving waters.

The most problematic segment within the Marina del Rey Harbor basin is the segment leading from the Marriot to the main line. This segment runs underneath a bike path at Mothers' Beach and is viewed as the most likely candidate for contributing bacteria to the soil, and potentially the groundwater and receiving water. One of the major fractures within this segment occurs only a few feet from Mothers' Beach approximately eight feet below ground. Thus, bacteria from fractures or breaches within this segment may be infiltrating the receiving waters of the Harbor. While bacterial contamination from this segment was not confirmed during this survey, it is recommended in Section 9 that the repair of this line be a top priority with regard to this project.

The segment of sewer line to the south of Basin E is also recommended for maintenance. Although the sewer water level was below the holes in the lining when the investigations were conducted, the potential exists for sewer water to leach out through these holes. In addition, the cracks and fractures within the lateral connections pose an immediate risk for bacterial contamination of the soil.

There are two sanitary sewer lines to the north of Basin E. The one closest to the basin wall is lined, while the other is not. Two segments on this line and one segment on the line running southwest of Oxford Basin were identified as potential areas of concern. Fractures and cracking of the pipe were observed in the line closest to the basin wall, while one fracture was identified on the line running southwest of Oxford Basin. Although bacterial contamination of the

receiving waters resulting from these pipe fractures is undetermined, maintenance is recommended.

The majority of the high ratings for O&M were due to grease and water level sags and likely originates due to runoff from several restaurants and apartments in the area. Maintenance and cleaning of these lines is done regularly and is recommended to continue. The sags in the sewer pipe may not be an immediate source of bacterial contamination, but may be a concern in the future.

The City of Los Angeles sanitary sewer lines that run under Oxford Basin have several minor to moderate structural defects. The cracks and fractures occur on the southwest side of Oxford Basin and continue under the parking lot and beneath the Marina International Hotel. While the majority of the cracks lead to infiltration rather than leaks, maintenance on these lines is also recommended.

8.3 Task 3 – Illicit Boat Discharge Investigation

Overall, sixteen (or 70%), of the sites had low or undetectable concentrations of indicator bacteria throughout the study period. At all other sites, at least one indicator bacteria exceeded the single sample standards. Of these, three sites (B11, B12, and B14) each had one exceedance for fecal coliform, but enterococci was only detected at low densities throughout the study period. Conversely, sites B1 and B10 each exceeded for enterococci twice, while the fecal coliform densities were all below water quality criteria.

Figure 8-1. Sampling locations for the illicit boat discharge investigation.
The green lines indicate groupings of site samples composited for PCR analysis.

The most notable results were from sites B2 and B4. At site B2, fecal coliform densities were generally low or undetected, whereas the geometric mean for enterococci exceeded based on two high densities of 798 MPN/100mL and 491 MPN/100mL that were detected during the June 18, 2006 sampling event. These high densities persisting throughout the night indicate a potential discharge event, although they were not coupled with equally high fecal coliform densities. This could be due to the greater survival of enterococci over fecal coliform in marine waters; however, there is not enough evidence to confirm that a discharge occurred. Similarly, fecal coliform densities were all low at site B4, whereas two high enterococci results and three mid-range densities resulted in an exceedance of the geometric mean standard for enterococci. Interestingly, all of the higher densities were measured during the second sampling set of each event, suggesting a potential discharge pattern occurring in the very early morning hours. Again, fecal coliform densities in these samples did not provide clear support for this hypothesis, so further sampling would be required in order to further elucidate this pattern.

Results of Q-PCR/bacteroides analysis throughout the investigation indicated only one positive result for bacteroides of human origin. This occurred in sample B10, collected during the second set on May 18, 2006. Interestingly, the corresponding results of indicator bacteria analysis showed very low levels of both fecal coliform (20 MPN/100mL) and enterococci (<10 MPN/100mL). Because the results of the Q-PCR analysis and indicator bacteria are contradictory for this single event, further testing of this site would be required in order to assess the likelihood of discharges at this location.

In general, the lack of elevated levels of indicator bacteria and positive results for bacteroides from the majority of the samples collected indicates illegal discharge of sewage from boats in Basins D, E, and F was not occurring during the time of sampling. The results also suggest illegal sewage dumping from boats is not a likely chronic source of bacterial contamination in the receiving waters of the back basins. However, the illegal discharge of sewage holding tanks from boats is inherently episodic and the results of the study do not rule out the potential for isolated events. Follow-up investigations, including additional sampling for indicator bacteria, the Q-PCR technique, and information gathering from local knowledgeable sources are recommended for sites B2 and B4 based on elevated geometric means for enterococci, and at site B10 to re-evaluate the positive human result of Q-PCR analysis.

8.4 Task 4 – Sediment Investigation

Numerous studies have indicated that beach sediments often contain higher densities of fecal indicator bacteria than the overlying water column (An et al., 2002; Grant et al., 2001; Obiri-Danso and Jones, 2000; Solo-Gabriele et al., 2000; Howell et al., 1996). In addition, studies on the survival of bacteria show that sediments containing a large amount of organic matter provide a favorable environment for growth. Fecal bacteria have been shown to survive and, to a certain extent, even to grow in both freshwater and marine sediments (Grant et al., 2001; Solo-Gabriele et al., 2000; Davies et al., 1995; Hood and Ness, 1982). During summer months, bacteria may be re-suspended in the water column by swimmers, possibly resulting in exceedances of water quality standards. One study conducted in Southern California found a seasonal pattern of fecal coliform storage in sediments during low-flow conditions and subsequent re-suspension of

bacteria to the water column when the sediments were disturbed (Steets and Holden, 2003). A similar study conducted in Florida suggested that *E. coli* bacteria multiplied in tidal riverbank soils after their initial deposition during storms and were re-suspended and carried to the river mouth during ebbing tides (Solo-Gabriele et al., 2000).

The aim of this investigation was to create a profile of bacterial densities across the beach face and thereby determine whether re-suspension of bacteria in the sediment could be a significant source of contamination to the receiving water at Mothers' Beach. Results indicate that these sediments are generally uncontaminated based on two sampling events that occurred in 2006, one each during the winter and summer. The majority of the beach face had densities of fecal coliform and enterococci that were at or near the detection limit. It is therefore not likely that sediment re-suspension contributes large amounts of bacteria to the water. However, two patterns of bacterial presence in the sediment emerged that show spatial and temporal relationships with potential bacterial sources.

During the January 27, 2006 sampling event, the geometric mean for bacterial densities in the lower intertidal zone (Zone A) was significantly higher than the other tidal heights. Although storms had previously occurred, there was no rain for at five three days prior to sampling, thereby reducing the possibility of contamination due to urban runoff. Furthermore, a source of storm water runoff would likely have impacted the upper intertidal zone as well as the lower intertidal. Data for receiving water densities collected on that day independently of this study (by the City of Los Angeles) showed very low indicator bacteria levels, with total coliform at a density of 210 MPN/100mL and enterococci at less than 10 MPN/100mL. This information indicates that the contamination was not originating within the marina waters. Visual observations recorded as part of the sampling effort indicated the presence of numerous shorebirds along the waterline that could have contributed to the increased densities in this area. This observation is not surprising because bird populations are more prevalent during the winter months than the summer months in Southern California due to migrational patterns. Interestingly, the pattern of increased bacterial densities in the lower intertidal zone was not observed during the summer. This reasoning would indicate that birds were the likely source of the increased densities observed during the winter sampling event.

The other trend that was observed between the two sampling events was elevated densities of indicator bacteria along Transect 7, which was located adjacent to the restroom/kayak wash down area. During the winter, enterococci was elevated at a density of 189 MPN/100mL, whereas sampling on June 15, 2006 resulted in the detection of fecal coliform at 122 MPN/100mL. Although the pattern is not consistent among the indicators, it is clear that a source exists in this area and that bacteria are persistent throughout the year. Wash down practices could be resulting in runoff to the beach and the leaching of bacteria into the sand. This could be amplified by the large amount of birds that were observed during the winter months. It is recommended that bathroom wash down practices be corrected and closely monitored to prevent the runoff from reaching the beach. In addition, it is recommended that the removal of bird waste be performed two or more times weekly to reduce bacterial loading into the receiving water.

8.5 Task 5 – Bacterial Indicator Loading

The first objective of the study was to determine the relative loadings of indicator bacteria to the waterbodies listed in the TMDL from storm drains, boats, and birds. The waterbodies from the MdRH back basins identified in the TMDL are Basin D/Mothers' Beach, Basin E, and Basin F. Storm drain loading occurs at three locations: (1) Oxford Flood Control Basin, (2) Boone-Olive Pump Plant, and (3) local runoff. Marina activities were identified in the TMDL to not be a significant source. This conclusion was confirmed with the illicit boat discharge investigation. Avian loadings were estimated based on bird count observations and published literature values on excretion. Other non-point sources were observed during the dry weather spot sampling, but the loads could not be quantified due to lack of data. The annual loadings estimated for each of these sources were compared (Table 8-2 and Table 8-3), as well as the loads between wet and dry periods (Table 8-4 and Figure 8-2).

Table 8-2. Relative fecal coliform loadings to the MdRH back basins.

Loading Source	Annual Fecal Coliform Loading (MPN/yr)		
	Basin E	Basin F	Mothers' Beach
Oxford Flood Control Basin	7.43×10^{14}	0	0
Boone-Olive Pump Plant	2.77×10^{13}	0	0
Local Storm Drains	1.21×10^{10}	6.79×10^{9}	1.30×10^{10}
Avian Waste	1.66×10^{12}	1.66×10^{12}	2.04×10^{12}
Boat Waste	unknown	unknown	unknown
Other Non-point Sources	unknown	unknown	unknown

Table 8-3. Relative enterococci loadings to the MdRH back basins.

Loading Source	Annual Enterococci Loading (MPN/yr)		
	Basin E	Basin F	Mothers' Beach
Oxford Flood Control Basin	8.60×10^{13}	0	0
Boone-Olive Pump Plant	2.23×10^{13}	0	0
Local Storm Drains	unknown	unknown	unknown
Avian Waste	unknown	unknown	unknown
Boat Waste	unknown	unknown	unknown
Other Non-point Sources	unknown	unknown	unknown

Table 8-4. Relative wet and dry period bacterial indicator loads to the MdRH back basins.

Period	Flow (cubic feet/yr)	Fecal Coliform* Loading (MPN/yr)	Enterococci Loading (MPN/yr)
Wet (46days)	6.53×10^{6}	7.69×10^{14}	1.07×10^{14}
Dry (319 days)	2.64×10^{8}	7.15×10^{12}	1.01×10^{12}
Total Annual	2.70×10^{8}	7.76×10^{14}	1.08×10^{14}

* includes estimated avian loads

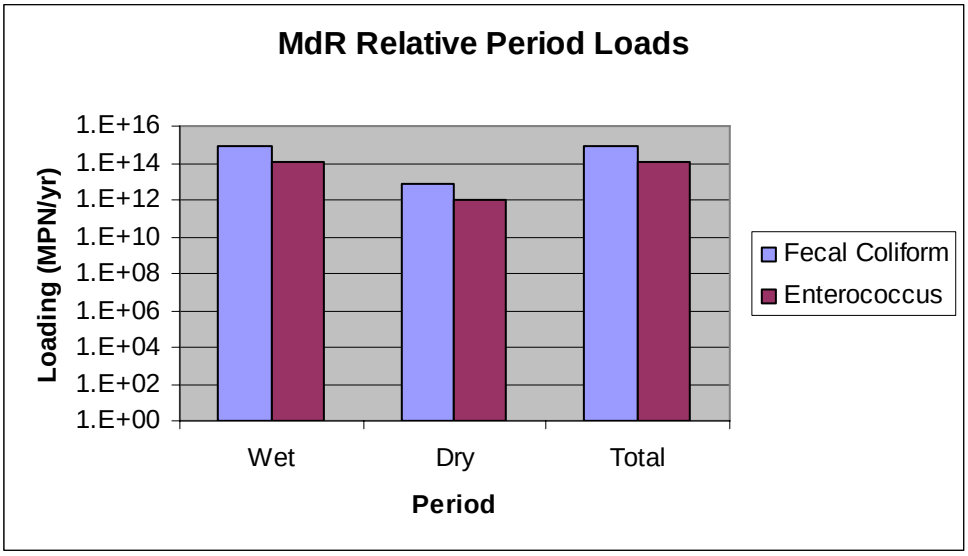


Figure 8-2. Relative wet and dry period bacterial indicator loads to the MdRH back basins.

The relative comparison of the bacterial indicator load data supports several conclusions. First, the Oxford Flood Control Basin contributes the majority of the loads to the MdRH back basins. Second, the contribution from avian waste is relatively small compared to loads discharged from the major storm drains. Third, annual wet weather loadings are significantly higher than dry weather loadings. Since the relative flow is for dry weather days as compared to wet weather days, the greater loadings from wet weather events are attributed to the higher concentrations measured during wet weather.

8.6 Task 6 – Additional Studies

The model results suggest greatest impact to fecal coliform loads may be to address the Boone-Olive Pump Plant source. The high bacteria concentrations from this source can have a direct impact to the water quality in Basin E as well as providing a continuous source of bacteria to Oxford Basin on flooding tides. The model also shows the limited water movement out of Basin E. The east end of Oxford Basin is especially isolated from tidal flushing.

During the course of this year-long study, Weston met with LADPW and the project stakeholders on a monthly basis to discuss study findings. At each of these meetings, visual observations and bacterial concentrations from spot samples were discussed in an effort to address practices contributing to contamination in the Harbor. Suggested actions were taken immediately where possible by the stakeholders. Examples of this include draining and cleaning of a duck pond behind Oxford Basin, and improvement of several operation and maintenance practices contributing to overall contamination throughout the back basins. In addition to steps already taken, recommendations for Marina del Rey Harbor Mothers' Beach and Back Basins bacterial source reduction have been addressed in this section on a three-tiered level. It is anticipated that Tier I source control and pollution prevention BMPs would be non-structural and could be implemented within a year since many of these measures require little time or capital investment.

Tier II activities beginning in year one would be ongoing and include continued lining of sewerage infrastructure and BMP feasibility analysis for Tier III implementation. Effectiveness monitoring should also be conducted as part of this adaptive approach. An iterative and phased approach is necessary for Tier I and Tier II BMPs to meet the maximum achievable reductions possible. The BMPs in these tiers will result in lower impacts to the community and be more cost effective, but will require more time to achieve the maximum reduction potential. While it is expected that Tiers I and II would greatly reduce bacterial concentrations in the Harbor, Tier III treatments would be required to fully meet TMDL requirements.

Tier III would involve the more costly treatment BMPs needed to fully achieve the maximum load reductions possible, especially in Basin E. Tier III BMP projects would begin around year two following necessary land acquisition, easement, design, and permitting activities depending on the feasibility assessment and chosen BMPs from Tier II. These phased treatment projects would be targeted for the Boone Olive Pump Plant and Oxford Basin and include the BMPs discussed in Section 7 of this report. Effectiveness monitoring would be conducted after these phased treatment systems are installed to evaluate the need for system modification or evaluation of alternative technologies that may become available in the near future that are cost effective.

The bacteria TMDL for Marina del Rey Harbor, Mother's Beach and Back Basins includes bacterial reduction requirements for areas in Basins D (Mothers' Beach), E and F. The results of this study have shown that while the animal host of primary concern throughout the back basins is avian, the mechanisms for transport for these bacteria to each of the back basins are independent of each other. While all three back basins have been shown to have bird populations, Basin D/Mothers' Beach is the most affected. It is expected that direct removal of fecal sources from birds in this area will eradicate the main cause of exceedances at this beach. Historically, Basin F has had few exceedances. This study showed little bacterial contamination in this area in the way of indicator bacteria or general bacteroides (meaning little fecal contamination). Avian, rodent and dog sources appear to be of primary concern in this area and recommendations include ways to eradicate all three of these animal host fecal sources. Lastly, while Basin E has shown to be affected by direct avian sources as well, data shows that the

primary mechanism for transport of this bacteria is from the effluent of both the Boone Olive Pump Plant and Oxford Basin.

Recommendations for Basins D and F are primarily Tier I and Tier II, while Basin E bacterial reductions are expected to require more intensive, Tier III structural changes. The following areas in Table 9-1 are specified in the TMDL for reductions of exceedances days and are the target of the recommendations in this study.

Table 9-1. TMDL exceedance day reduction requirements for dry and wet weather.

Monitoring Location		Estimated no. of winter dry-weather exceedance days in critical year	Allowable no. of winter dry-weather exceedance days (daily sampling)	Estimated final winter dry-weather exceedance-day reduction	Estimated no. of wet-weather exceedance days in critical year (90th percentile)	Allowable no. of wet-weather exceedance days (daily sampling)	Estimated final wet-weather exceedance-day reduction
Basin D/Mothers' Beach	Mothers' Beach, at Lifeguard Tower	13	3	10	33	17	16
	Mothers' Beach, at Playground Area	20	3	17	45	17	28
	Mothers' Beach, between Lifeguard Tower and Boat Dock	20	3	17	48	17	31
	Mothers' Beach, near first slips outside swim area	4	3	1	23	17	6
	Mothers' Beach, 20 meters off of the wheel chair ramp	0	0	0	15	15	0
	Mothers' Beach, end of wheel chair ramp	4	3	1	30	17	13
Basin F	Basin F, innermost end	8	3	5	8	8	0
Basin E	Basin E, near center of basin	20	3	17	60	17	43
	Basin E, in front of Tidegate from Oxford Basin	40	3	37	68	17	51

The following table depicts sources of loading into the back basins of Marina del Rey Harbor and Mother's Beach. Recommendations for eradicating these sources are discussed below.

Table 9-2. Potential sources of indicator bacteria to MdRH by site.

Site Name	Birds and Other Wildlife	Boone Olive Pump Plant	Oxford Basin Effluent	Illicit Boat Discharge	Irrigation Runoff	Stormdrains	Intertidal Sediments	Sewerage Infrastrucutre	Restaurant Washdown	Restroom Wash down	Parking Lot Washdown	Dog/Pet Waste	Other
Basin D/Mothers' Beach	Y	N	N	I	Y	Y	I	Y	Y	Y	Y	Y	Y
Basin E	Y	Y	Y	I	Y	Y	N	Y	Y	N	Y	Y	Y
Basin F	Y	N	N	I	Y	Y	N	N	N	N	Y	Y	Y

Red 'Y' indicates a significant source. Blue 'I' indicates a minor or potential source.
Green 'N' indicates not a concern.

9.1 Birds and Other Wildlife

The most important result of the Marina del Rey Source Identification Study is that the majority of the enteric bacteria in the back basins originates from birds and that contributions of bacteria from human origin are insignificant. Therefore, one of the most effective management solutions is to implement BMPs to deter birds from landing in the low-circulation areas of the back basins and to remove waste, especially at Mothers' Beach.

Recommendation:
Tier I: For Mothers' Beach, the bird exclusion poles should be extended to the low tide zone and across the beach. The bird exclusion area works well, however the birds simply land in the areas where the poles are limited or do not exist.

Recommendation:
Tier I: Previous studies, such as those in Mission Bay, have shown the manual removal of bird waste at beaches to significantly reduce the number of beach exceedances where they are found in large numbers. It is recommended that bird waste removal occur at Mothers' Beach at least twice weekly.

Recommendation:
Tier I: Reduction of food and trash availability to birds and wildlife by keeping trash bins covered, accomplished through public education and signage. Signs discouraging people from feeding these animals has proven successful as well.

Recommendation:
Tier I: During dry weather especially, ribotyping analysis has attributed up to 17% (Basin F) of the bacterial contamination in some areas of the back basins to rodents and small wild mammals. Rodent trapping within stormdrains and in areas where they nest and forage would be a safe and effective method of removal. This task would also involve frequent checking and emptying of the traps as carcasses can contribute significant bacteria to the receiving waters. Live trapping is another option, with frequent removal just as necessary. Due to their obvious contributions to other types of pollution, rodenticides and poisons would not be recommended.

Recommendation:
Tier I-II: Bird exclusion devices on decks, docks and boats such as bird spikes, ledge modification and wire legs. This would be a Tier I-II recommendation based on the need for research into the best devices, and potential investment in enough of these devices to be effective.

9.2 Boat Discharge

Three reports were reviewed to gain insight into possible bacterial indicator loads from boats harbored in the marina. Based on this review, boat wastes are not considered to be a significant loading source of bacterial indicators. This conclusion was also confirmed with the illicit boat discharge investigation and ribotyping data, which showed no widespread bacterial indicator contamination from human sources. However, some of the responses from the public questionnaire regarding this issue were as follows:

Recommendation:
Tier I: The pump-out stations included a need for greater ease of use and for better maintenance of those available. We recommend further investigation and follow-up of these issues.

Recommendation:
Tier II: Responses also suggested adding a boat pump-out station to the back basins. Many people were unaware of the locations of the pump-out stations in the Harbor or complained of the distance from the back basins.

9.3 Irrigation

Water that flows into drainage systems and eventually into the receiving waters during dry weather is commonly referred to as nuisance flow. The most common source of nuisance flow is landscape irrigation. Upon entering the stormdrain system, nuisance flow may contain high levels of bacterial indicators with concentrations that may be higher than in storm water. Nuisance flows are of particular concern to beach users because they occur during the peak tourist season, when beach activity is at its highest. Non-point source runoff from landscaping can be reduced by employing efficient landscape watering techniques. The following Tier II BMPs can reduce or eliminate all nuisance flow caused by inefficient irrigation practices through public education and incentives throughout the watershed:

- Soaker hoses and trickle or drip irrigation systems are an alternative to sprinkler systems. These types of systems deliver water at lower rates, which can increase the volume infiltrated, conserve water, and avoid runoff that can be associated with improperly operated sprinkler systems.
- If automatic sprinkler systems are to be used, water conservation devices should be installed. These devices include rain shut-off devices, flow meters and/or soil moisture sensors for more precise control.
- Low volume irrigation systems should be installed in long narrow strips, small irregular-shaped areas and landscape beds to avoid applying water on hard surfaces such as patios, decks, sidewalks, parking areas, and roadways.
- Prepare landscape water conservation guidelines that promote efficient irrigation water use. Topics include the importance of hydro-zoning plant material, maintaining proper operation of system components, and how to determine irrigation run times from plant water requirements and zone precipitation rates.

9.4 Sediments

The findings of this study reveal little contribution of bacteria to the receiving waters of Mother's Beach through beach sediments. There are relatively few management actions related to intertidal sediments that can be implemented to reduce loading of indicator bacteria on the beach. As discussed previously, simply removing the bird fecal matter from the beach face has proved in other studies to be an effective means of reducing indicator bacterial densities in the receiving waters. Therefore recommendations would be the same as above with regard to removal of bird waste and/or expansion of the bird exclusion area throughout the entire beach. In addition, as discussed, maintenance practice for comfort station runoff in the beach areas should include keeping all water within the facility.

9.5 Restaurant, Restroom, and Boat and Parking Lot Wash Down

As discussed in Section 2, among the types of spot samples collected in all basins, parking lot wash down generated the greatest amount of fecal coliform and significantly high densities of enterococci. Restaurant runoff generated the greatest amount of enterococci and contributed high densities of fecal coliform as well. Other significant activities included the possible ICID, dumpster wash down, bathroom wash down, and irrigation. Relative to these activities, air conditioning condensate and building wash down were less significant. Lastly, boat wash down contributed relatively little bacteria. However, it should be noted that although this source was smaller than the other activities, boat wash down is frequently observed in the marina and cumulative impacts cannot be discounted. Because wash down activities overall appear to be problematic throughout all of the back basins, it is recommended that a targeted educational campaign be initiated for commercial/dense residential BMPs related to appropriate cleaning practices. Following are several steps that can be taken involving both structural and non-structural BMPs.

Table 9-3. Spot sample bacterial densities in Marina del Rey Harbor.

Spot Sample Type	Fecal Coliform (MPN/100mL)	Enterococci (MPN/100mL)
Parking Lot Wash Down	3,970,000	54,939
Restaurant Runoff	138,000	200,830
Possible ICID	1,767,000	7,919
Dumpster Wash Down	500,000	2,559
Restroom Wash Down	2,300	27,230
Irrigation	37,100	23,194
AC Runoff	12,339	3,076
Ponded Water	8,000	2,909
Building Wash Down	16,000	74
Boat Wash Down	5,000	420

Recommendation:
Tier I Restroom Wash Down: Restroom wash down has been observed at the comfort stations at Mothers' Beach and in various areas throughout the back basins. This runoff, while not always making it to the receiving waters, often has very high concentrations of bacteria. It is recommended that maintenance staff be educated on the potential bacterial contributions of this practice to the Harbor, and that practices be changed to keep runoff inside the facility.

Recommendation:
Tier I Restaurant Wash Down: Restaurants contribute to pollution through improper cleaning practices that allow food particles, oil, grease, trash and cleaning products to flow into the street, gutter or stormdrain. Bacterial indicators are often associated with these waste products. Several BMPs for restaurants can help control the discharge of pollutants from restaurant maintenance activities and can be shared and enforced through education and inspections.

- Sweep, mop or vacuum instead of using a hose to clean outdoor areas.
- Always clean equipment including floor mats, grease filters, grills and garbage cans indoors or in a covered outdoor wash area that is plumbed to the sanitary sewer.
- Clean equipment in a mop sink, if possible (never in a food preparation sink). If the restaurant does not have a mop sink, dedicate an indoor cleaning area where there is a drain that is plumbed to the sanitary sewer.
- All mop water from cleaning floors must be disposed of indoors in a mop sink, toilet or other drain that is plumbed to the sanitary sewer.
- Dry sweep pavement areas including "drive-through" areas, parking lots, outdoor eating areas and dumpster or tallow bin areas frequently. If water must be used for cleaning, use a mop & bucket and dispose of wash water in mop sink or floor drain that is plumbed to the sanitary sewer.
- Major cleaning of exterior surfaces must include capturing all wash water and disposing it to the sanitary sewer.
- Wash water should not be allowed to enter the street gutter or stormdrain.
- All wastewater containing oil and grease must be disposed of in a grease trap or interceptor. Do not pour grease or oil into a sink, floor drain, stormdrain or dumpster.
- Use dry methods for spill cleanup. Rags or absorbents such as cat litter can be used to pick up liquids or grease. Sweep up the absorbent, seal in a plastic bag and dispose in the trash.
- Clean outdoor eating areas frequently using dry cleaning methods such as sweeping or vacuuming.
- Never wash down dumpsters or tallow bins with a hose. Check dumpsters regularly for leaks. If a dumpster or tallow bin must be cleaned or repaired, contact the leasing company.

Recommendation:
Tier I-II Street/Parking Lot Runoff: Runoff from parking garage cleaning has been observed during this study and has shown to contain high concentrations of bacteria. It is recommended that maintenance staff be educated and that this water be vacuum-pumped properly to avoid potential contamination of the receiving waters. Additionally, street sweeping removes

particulates associated with bacterial survival and growth. Increasing the removal of trash and contributing particulates can be achieved through greater frequency of sweeping and improved equipment. Cleaning solution should never be emptied into the stormdrains.

Recommendation:
Tier I Boat Wash Down: Wastes generated during hull preparation (washing, scraping, sanding and blasting) contain residues that can become associated with bacteria**.** Wash water and paint residues from boat hulls need to be captured and not allowed to enter the aquatic environment. Best Management Practices (BMPs) have been designed to help prevent water contamination that can result from maintenance, repair, and other activities associated with boats. In addition, because birds often congregate on boats, bacteria is often found in the rinseate. The following BMPs should be applied at locations around the marina, the boatyard, and haul-out areas:

- Since bacteria are associated with fine particles, ground tarps should be used at all times in the boatyard to control the release of dust, sandings, chemical spills, and other residues. These tarps should be swept or vacuumed daily.
- Non-vacuum grinding should be prohibited in the boatyard. Sand blasting or power spraying of any abrasive grit or substance should also be prohibited.
- Covers on dumpsters should remain closed except during the process of actual trash disposal in order to minimize rainwater entry and access to birds and other wildlife. Damaged or missing dumpster lids should be repaired as soon as possible.
- Signs should be posted prohibiting discharge of sewage from vessel toilet facilities while in the marina/boatyard facility. Information on nearby pump-out facilities should be identified for non-resident boaters using Marina facilities.
- Signs should be posted stating that no liquid or solid waste shall be dumped in stormdrains or on the ground.

9.6 Dog/Pet Waste

Recommendation:
Tier I: Visual observations have shown particularly dog waste to be a persistent problem, and ribotyping data have shown pet waste to contribute as much as 24% of the bacterial contamination to areas within the Harbor. Signs should be posted requiring Marina or boatyard users who bring their pets on site to clean up and dispose of their pet's waste. It should be noted that both the Boone Olive Pump Plant and Oxford Basin show high levels of pet contamination. Education throughout the watershed regarding pet waste should be considered to eradicate indirect loading of this bacteria to the basins.

Recommendation:
Tier I-II: It is recommended that pet waste baggie dispensers with attached, lidded trash be placed in appropriate, highly visible areas around the Harbor docks and streets and on Mothers' Beach. Previous studies have shown that the trash cans and baggies can be effective in reducing the number of dog waste piles and associated bacteria.

9.7 Sewerage Infrastructure

The CCTV investigation of the sanitary sewer lines surrounding the back basins of Marina del Rey identified structural and operational and maintenance (O&M) defects. The structural defects are a current concern due to the potential for leaks and associated bacterial contamination, while the maintenance defects remain a concern for possible future spills, but are generally not an immediate source of bacterial contamination to the receiving waters.

Recommendation:
Tier I-II: The majority of the high ratings for O&M were due to large amounts of grease attached to the pipe walls or water level sags that likely result from several restaurants and apartments in the area. Maintenance and cleaning of these lines is done regularly and is recommended to continue. The sags in the sewer pipe may not be an immediate source of bacterial contamination, but may be a concern in the future.

Recommendation:
Tier I-II: The City of Los Angeles sanitary sewer lines that run under Oxford Basin have several minor to moderate structural defects. The conveyance system is primarily unlined vitrified clay pipe with portions of cast iron pipe. There are mineral deposits throughout the length of the pipe; occasionally these are severe. Cracks and fractures occur on the southwest side of Oxford Basin and continue under the parking lot and beneath the Marina International Hotel. While the majority of the cracks lead to infiltration at lateral connections rather than leaks, maintenance on these lines is also recommended.

Recommendation:
Tier II: The segment of sewer line with the greatest potential effect on water quality within the Marina del Rey Harbor basin is the segment leading from Admiralty Way, in front of the Marriott, to the main line. This unlined segment runs underneath a bike path at Mothers' Beach and is viewed as the most likely candidate for contributing bacteria to the soil, and potentially the groundwater. This segment had two major cracks with soil visible. The largest crack identified in the investigation occurred only a few feet from Mothers' Beach, approximately eight feet below ground, and was below the sewer water line in the pipe. Bacteria from fractures or breaches within this segment of pipe may be infiltrating the receiving waters of the Harbor. While bacterial contamination from this segment of pipe was not confirmed during this survey, it is recommended that the repair of this line be the County's top priority with regard to this project.

Recommendation:
Tier II: The segment of sewer line to the south of Basin E is also recommended for maintenance. It scored the greatest defect rating due to the identification of three concentric holes in the lining that appeared to be mis-measured lateral holes. Although the sewer water level was below the holes in the lining when the investigations were conducted, the potential exists for sewer water to leach out through these holes. Because the pipe is lined, the structural integrity of the clay pipe behind the lining is not verified and therefore the magnitude of this defect is unknown. This section of pipe also had a crack with a void visible at a lateral connection. When combined, the

defects in this segment likely pose an immediate risk for bacterial contamination of the soil. Repairing this line is highly recommended.

Recommendation:
Tier II: Three other sewer line segments were identified with grade "4" cracks and fractures, including two segments on the north side of Basin E and one to the southwest of Oxford Basin. To the north of Basin E, the segment of sewer conveyance system closest to the basin wall is lined, while the other is not. Fractures and cracking of the pipe was observed in the line closest to the basin wall, while one fracture was identified on the line running southwest of Oxford Basin. Although the actual impact of each of these lines with structural defects on the receiving waters of MdRH was not assessed, it is likely that some sewage is seeping into the soil. The rate of transport, however, has not been quantified. Although bacterial contamination of the receiving waters resulting from these pipe fractures is undetermined, maintenance is recommended.

9.8 Oxford Basin and Boone-Olive Pump Plant

A model was designed to better understand the influences of the Boone Olive Pump Plant and Oxford Basin on the back basins of MdRH. The modeling was used to simulate several BMPs and other management measures. Based on the modeling results, several recommendations for further work should be considered.

Recommendation:
Tier II: Conduct a feasibility analysis of structural BMPs suggested in the model for Oxford Basin and Boone Olive Pump Plant. Even though some of these BMPs may be very effective at removing bacterial pollution, their implementation may not be feasible due to capitol costs or available land for installation. Since the modeling exercise did not address watershed characteristics, other source control BMPs should be considered in a feasibility analysis. These include several storm water treatment BMPs (vegetated swales and strips, sand filters, media filters, infiltration trenches and strips, infiltration basins, wet ponds and dry ponds, constructed wetlands). The feasibility analysis should also consider diversion of dry weather runoff or storm water runoff from different points in the watershed (i.e. upstream of Boone Olive and or Oxford Basin). Diversion of this runoff may be to sanitary sewers, areas of available land for treatment BMPs, or other surface waters with high dilution capacity.

Recommendation:
Tier III: According to the modeling results, diversion of the Boone Olive Pump Plant effluent will likely show immediate improvement of bacterial indicator concentrations in both Basin E and Oxford Basin. A feasibility analysis should be conducted to find an acceptable location to divert this effluent. This may be a sanitary sewer connection if wastewater treatment capacity is available. Diversion of the effluent can also be made to areas with high infiltration capacity or to areas of the marina or nearby surface waters with higher circulation for improved dilution. Options to remove Boone Olive Pump Plant effluent discharge from Basin E should be studied for feasibility of diversion including availability of capital and O&M costs.

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APPENDIX A

Ribotyping Library Sample Collection Procedures and Data Sheets

MARINA DEL REY SOURCE IDENTIFICATION SURVEY

Ribotyping Library Sample Collection Procedures

Overview

Samples of fecal material will be collected from host sources living within the watershed. These sources include shorebirds, humans (individuals or sewer), dogs, and cats, among others. From each host species, the end goal is to collect 50 samples from 50 distinct individuals over the course of the study. No more than 3 samples will be collected per species at a given location per day. Two isolates will then be obtained in the laboratory from each sample, for a total of 100 isolates per species.

Supplies

- Gloves
- Sterilizing gel
- Spray bottle of 70% ethanol
- Cooler
- Ice
- Conical tubes
- Sterile spatulas
- Ziploc bags
- Paper towels
- Permanent pen
- Field log and/or data sheets
- Chain of Custody (COC) forms
- Animal identification key/book
- Binoculars
- GPS

Sample Identification

Because the purpose of building the ribotyping library is to identify DNA "fingerprints" for known fecal bacteria host sources, accurate identification of the species from which samples are collected is integral to the success of the study. It is therefore important that the sampler correctly identifies the animal from which the sample originates, down to the species level when possible. If it is not possible to determine the species, the genus will be used. Common names will be used for labeling purposes, however, there must be adequate documentation of corresponding scientific names in the study log. Species can be determined using an identification key or book.

Sample Collection

When necessary, the sampler can use binoculars to observe a population from a distance. The sampler should first identify the host species, and then begin scanning the group for individuals engaged in the "requisite activity". When an individual has been found, approach that area to find the fresh sample. Once the sampler has gained familiarity with the types of waste specific to each species, it is not absolutely necessary to catch an animal in the act, rather, the sampler can approach a population and begin looking on the substrate (grass, sand, etc.) for recently deposited samples. Fresh samples will be moist and will have the appropriate coloration. Do not collect old samples.

The sampler will be required to confirm (on the datasheet and/or field log) whether the sample was positively identified to be taken from a specific host species. The purpose of this step is to assess the degree of certainty, from the sampler's perspective, that the sample was taken from the species for which it was identified. If the sampler witnesses the requisite activity, there is a high degree of certainty that the identification is correct. However, with some of the upstream watershed species, it is sometimes difficult to collect a sample immediately after it was deposited (i.e. coyote). Therefore, the sampler should indicate the degree of uncertainty on the field documentation.

Sterile Techniques

Prior to collecting each sample, clean hands with sterilizing gel then apply new gloves. Gloves should be changed between species, or when the sampler must handle field supplies other than those used directly for sampling (i.e. coolers, ice, etc.) Open sample container just before collecting, holding the lid in your other hand (do not set the lid down on contaminated surfaces). Avoid touching the inside of the sampling container or lid.

If a spatula will be used to scoop the sample, ensure that it is adequately sterilized using the spray ethanol. Use either the spatula or the container lid to scoop up the sample, collecting as little of the ground substrate as possible. For smaller birds, it will be difficult to obtain enough sample without collecting the associated sand. But when the deposit size is larger (as with dogs, etc.), collect from the center, avoiding those portions that have been in contact with the ground or the ambient air and sunlight. Collect as much of the sample as possible, up to a maximum of approximately 5 grams (many avian samples will be smaller than this). Close the container immediately, making sure the lid is firmly in place.

Sample Labeling and Preservation

Using a permanent marker, write the following information directly onto the conical tube:

- Date
- Time
- Location
- Sampler's initials
- Sample ID. The ID will be recorded with the source's common name abbreviation, followed by the next chronological sample number (up to 50). For example, if three Western Gull samples were collected during week one, these would be labeled W.G.01, W.G.02, and W.G.03. Starting week two, the next Western Gull sample would be labeled W.G.04. The sampler is responsible for checking the log to determine the number of the last sample that was taken.

Confirm that the sample is properly labeled on the container and the COC. Immediately place the sample in the cooler on ice in an upright position for transport to the lab.

LIBRARY SAMPLE COLLECTION DATA SHEET FOR MARINA DEL REY SOURCE IDENTIFICATION SURVEY

Sample ID	Date	Time	Location[1]	Latitude	Longitude	Suspected Source	Comments

[1] For samples collected within the survey area, document location according to basin (Basin D, E, F, Oxford Basin, etc.). For samples collected within the watershed, provide a description of the location and the lat/long coordinates.

APPENDIX B

Visual Observation Form

Marina del Rey Harbor Observations-East

Date: _____ **Shift (Time):** _____ **Field Crew:** _____ _____

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Time	Time of Bacteria Sample																			
	Time of Ribotyping Sample																			
	Time of PCR Sample																			
Weather	Cloud Cover (%)																			
	Wind Speed (mph)																			
	Wind Direction (coming from N, SE,W…)																			
	Rain? (N=None; L=Light; H=Heavy)																			
Boat Use	Hosing down of Boats?																			
	Illegal Discharge?																			
	Sewage Odor?																			
	Sewage Pumpout Station Problems?																			
	Illegal Dumping from Boats?																			
Trash	Trash Removal Observed?																			
	Debris from Trash Removal Observed?																			
	Trashcans/Dumpsters Uncovered?																			
	Trashcans/Dumpsters Overflowing?																			
Irrigation	Runoff near Restrooms?																			
	Runoff near Parking Areas?																			
	Runoff near Restaurants																			
	Runoff entering Harbor?																			
	Broken Sprinkler?																			
	Other Runoff?																			
	Sample Taken? (Note Sample ID in Comments)																			
Visitor Behavior	Number of Dog Walkers																			
	Number of Pets in the Water																			
	Pet Wastes disposed of properly? (Y or N)																			
	Number of Pet Waste Piles?																			
	Number of Swimmers (3+ yrs)?																			
	Number of Toddlers in diapers?																			
	Number of Toddlers without diapers																			
	Food Waste? (G = on Ground; T = on Tables; W = in Water)																			
	Non-Food Waste? (G = on Ground; T = on Tables; W = in Water)																			
	Other Problem Behaviors? (public urination, car washing, etc)																			
Bird Behavior	Number of Ducks?																			
	Number of Gulls?																			
	Number of Pigeons?																			
	Number of Pelicans?																			
	Number of Shorebirds?																			
	Number of Other Birds?																			
	Number of Bird Waste Piles?																			
	Were Birds Flying? (indicate bird type (D = Ducks; G = Gulls…)																			
	Were Birds Swimming?																			
	Were Birds Feeding in Water?																			
	Were Birds Shore Feeding?																			
	Were Birds picking through litter?																			
	Were Birds Dead or Injured?																			
	Other Bird Behavior?																			
Animals	Number of Rodents?																			
	Number of Marine Animals?																			
	Animal picking through litter?																			
	Other Animal Behavior?																			
Storm Drain Outlets	Type of Flow? (P = Ponded; T = Trickle; H = High Flow)																			
	Vegetation near storm drain outlet? (S = Sparse; E = Extensive)																			
	Algae in storm drain water?																			
	Floatables? (O = Oily Sheen; S = Suds; G = Garbage)																			
	Other Floatables?																			
	Odor? (Sewage, Rotten Eggs, Musty, Gasoline, Fishy)																			
	Any unusual pipes or overland flow?																			
Comments	**Comments** (include Photo ID, and Notes)																			

Marina del Rey Harbor Observations-East

Date: _____ **Shift (Time):** _____ **Field Crew:** _____ _____

		Sites																			
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	Spot	Spot	**Comments** (Site, Time, Photo ID, and Note)
Time	Time of Bacteria Sample																				
	Time of Ribotyping Sample																				
	Time of PCR Sample																				
Weather	Cloud Cover (%)																				
	Wind Speed (mph)																				
	Wind Direction (coming from N, SE,W…)																				
	Rain? (N=None; L=Light; H=Heavy)																				
Boat Use	Hosing down of Boats?																				
	Illegal Discharge?																				
	Sewage Odor?																				
	Sewage Pumpout Station Problems?																				
	Illegal Dumping from Boats?																				
Trash	Trash Removal Observed?																				
	Debris from Trash Removal Observed?																				
	Trashcans/Dumpsters Uncovered?																				
	Trashcans/Dumpsters Overflowing?																				
Irrigation	Runoff near Restrooms?																				
	Runoff near Parking Areas?																				
	Runoff near Restaurants																				
	Runoff entering Harbor?																				
	Broken Sprinkler?																				
	Other Runoff?																				
	Sample Taken? (Note Sample ID in Comments)																				
Visitor Behavior	Number of Dog Walkers																				
	Number of Pets in the Water																				
	Pet Wastes disposed of properly? (Y or N)																				
	Number of Pet Waste Piles?																				
	Number of Swimmers (3+ yrs)?																				
	Number of Toddlers in diapers?																				
	Number of Toddlers without diapers																				
	Food Waste? (G = on Ground; T = on Tables; W = in Water)																				
	Non-Food Waste? (G = on Ground; T = on Tables; W = in Water)																				
	Other Problem Behaviors? (public urination, car washing, etc)																				
Bird Behavior	Number of Ducks?																				
	Number of Gulls?																				
	Number of Pigeons?																				
	Number of Pelicans?																				
	Number of Shorebirds?																				
	Number of Other Birds?																				
	Number of Bird Waste Piles?																				
	Were Birds Flying? (indicate bird type (D = Ducks; G = Gulls…)																				
	Were Birds Swimming?																				
	Were Birds Feeding in Water?																				
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	Were Birds picking through litter?																				
	Were Birds Dead or Injured?																				
	Other Bird Behavior?																				
Animals	Number of Rodents?																				
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	Vegetation near storm drain outlet? (S = Sparse; E = Extensive)																				
	Algae in storm drain water?																				
	Floatables? (O = Oily Sheen; S = Suds; G = Garbage)																				
	Other Floatables?																				
	Odor? (Sewage, Rotten Eggs, Musty, Gasoline, Fishy)																				
	Any unusual pipes or overland flow?																				
Comments	**Comments** (include Photo ID, and Notes)																				

APPENDIX C

Bacterial Source Questionnaire

Questionnaire for Pollution Tracking in Marina del Rey

We are conducting an assessment for the Los Angeles Department of Public Works to identify non-point sources of bacterial pollution around Marina del Rey Harbor, and we would like your input. We hope the results from this questionnaire will aid in the design of management plans that will prevent impairment of water quality due to bacteria.

Your answers are important to help protect the aquatic environment by determining pollution sources at Marina del Rey Harbor. Your survey results will be anonymous, so please answer as honestly as possible.

Please return your survey in the envelope to the following address.

Return Address:

Weston Solutions, Inc.

Attn.: Suzan Given

2433 Impala Dr.

Carlsbad, CA 92008

If you prefer to complete the survey on line, you may use the following website:
http://www.surveymonkey.com/s.asp?u=628031291300

Thank you!

Boater Practices

Please indicate your knowledge of boater practices at Marina del Rey Harbor in this section.

1. How often have you seen boats get hosed off in a typical week?

Never <2 times 3-5 times 6-10 times >11 times

Please specify location(s) (Examples: Basin __, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.

2. How often have you noticed any discharge from boats in a week?

Never <2 times 3-5 times 6-10 times >11 times

Please specify location(s) (Examples: Basin __, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.

3. Please add any additional information pertaining to your observations/knowledge of boater practices around Marina del Rey Harbor here.

_____

_____

Pump-Out Station Practices

Please indicate your observations of practices at the pump-out stations at Marina del Rey Harbor in this section.

4. How often have you noticed use of pump-out station/equipment in a week?

Never <2 times 3-5 times 6-10 times >11 times

Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park, etc.) or provide any further comments or observations.

5. How often have you noticed malfunction of pump-out station equipment in a week?

Never <2 times 3-5 times 6-10 times >11 times

Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park, etc.) or provide any further comments or observations.

6. How often have you noticed sewage/runoff originating from the pump-out station in a week?

Never <2 times 3-5 times 6-10 times >11 times

Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park, etc.) or provide any further comments or observations.

7. How often is the ground hosed off near pump-out stations?

Never <2 times 3-5 times 6-10 times >11 times

Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park, etc.) or provide any further comments or observations.

8. Please add any additional information pertaining to your observations/knowledge of pump-out station practices around Marina del Rey Harbor here.

_____

_____

General Harbor Maintenance Practices

Please indicate your observations of irrigation, restroom, and trash maintenance activities at Marina del Rey in this section.

---

9. How often have you observed over-irrigation (water from irrigation pooling in the landscaped areas)?

Never Less than twice a month 1-2 times per week Daily

Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.

10. Is the irrigation system properly maintained (no broken or free-flowing sprinkler heads, etc.)?

Yes No

Please indicate location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) where you have noticed problems or provide any further comments or observations.

11. How often have you seen water entering/running off restroom areas?

Never Less than twice a month 1-2 times per week Daily

Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.

12. Please indicate your observations of trashcans/dumpsters at Marina del Rey Harbor:

Covered Partially covered Uncovered

Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.

13. Please indicate your observations of the trashcans/dumpsters at Marina del Rey Harbor:

Emptied regularly Overflowing

Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.

14. Have you observed irrigation water hitting dumpster areas?

Yes No

If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.

15. Does runoff from the parking lot/landscaped areas enter the Harbor?

Yes No

If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.

16. How often are trash bins emptied?

Less than once a week Once per week Twice per week Daily

Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations

17. Please add any additional information pertaining to your observations/knowledge of general Harbor maintenance practices around Marina del Rey Harbor here.

_____

_____

Marina del Rey Harbor Wildlife

Please indicate your observations of wildlife around the Marina del Rey Harbor in this section.

---

18. Please provide your best estimations on the types, numbers, and activities of the birds present at Marina del Rey Harbor. You may fill in the table for different bird types for their approximate abundance, behaviors, locations, and time of observation.

Bird Type (Examples: Ducks, Gulls, Pigeons, Pelicans, Shorebirds, etc.)	**Abundance** (Examples: <10, 11-50, 51-100, >100)	**Behavior** (Examples: Nesting, Flying, Feeding in water, Feeding at shore, Injured, Dead, Burrowing, Picking through trash, Swimming, Solitary, In a flock, etc.)	**Locations** (Examples: Basin __, Dock Number, Fisherman's Village, Public Launch Ramp, Burton Chace Park, etc.)	**Time Observed** (Examples: Jan-Mar, Apr-Jun, July-Sept, Oct-Dec)

19. How often have you noticed birds congregating around trash dumpsters?

Never Less than twice a month 1-2 times per week Daily

Please specify location(s) (Examples: Basin __, Dock Number, Fisherman's Village, Public Launch Ramp, Burton Chace Park, etc.) or provide any further comments or observations.

20. How often have you observed birds bathing in standing water on landscaped areas?

Never Less than twice a month 1-2 times per week Daily

Please specify location(s) (Examples: Basin __, Dock Number, Fisherman's Village, Public Launch Ramp, Burton Chace Park, etc.) or provide any further comments or observations.

21. Please list other animals present other than birds. Please indicate abundance and behavior observed.

_____

_____

22. Please add any additional information pertaining to your observations/knowledge of wildlife around Marina del Rey Harbor here.

_____

_____

Visitor Behavior around Marina del Rey Harbor

Please indicate your observations of typical visitor behavior around Marina del Rey Harbor.

---

23. How often have you observed visitors feeding the birds?

Never Less than twice a month 1-2 times per week Daily

Please specify location(s) (Examples: Burton Chace Park, North or South Jetty, Mother's Beach, Admiralty Park, Parking Lot, etc.) or provide any further comments or observations.

24. How many people do you observe walking dogs at the Harbor per day?

None 1-5 6-10 11-15 Over 15

Please specify location(s) (Examples: Burton Chace Park, North or South Jetty, Mother's Beach, Admiralty Park, Parking Lot, etc.) or provide any further comments or observations.

25. Out of the individuals you observe walking dogs, what percentage would you estimate properly dispose of pet waste (pick it up with a plastic bag or pooper scooper, and throw away into the trash)?

0 25 50 75 100

Please specify location(s) (Examples: Burton Chace Park, North or South Jetty, Mother's Beach, Admiralty Park, Parking Lot, etc.) or provide any further comments or observations.

26. Please comment on your observations of pet waste (give locations where you have seen pet waste, how often it is present).

_____

_____

27. Please indicate where you have observed people swimming, numbers of individuals there, and number of toddlers naked/without diapers observed swimming there.

Area (Examples: Mother's Beach, etc.)	**Number of swimmers** (Examples: <5, 6-9, 10-20, 21-50, >50)	**Number of toddlers naked/without diapers** (Examples: None, 1-2, 3-5, >6)

28. Please indicate any areas at Marina del Rey Harbor other than Mother's Beach where you have observed swimming.

_____

_____

29. Please describe your observations of visitor's most common food disposal habits:

Food waste on ground Food waste in water Food waste in trash

Please specify location(s) (Examples: Burton Chace Park, North or South Jetty, Mother's Beach, Admiralty Park, Parking Lot, etc.) or provide any further comments or observations.

30. Have you observed any homeless encampments around Marina del Rey Harbor?

Yes No Don't know

Please specify location (Examples: Burton Chace Park, North or South Jetty, Mother's Beach, Admiralty Park, Parking Lot, etc.) or provide any further comments or observations.

31. Please add any additional information pertaining to your observations/knowledge of visitor behavior around Marina del Rey Harbor here.

_____

_____

Storm Drains/Runoff

Please indicate your observations of storm drains around Marina del Rey Harbor in this section.

---

32. What are the typical flow characteristics you have noticed from storm drains?

None Ponded Trickle Steady High

Please specify location (Examples: Basin __, Dock Number, Fisherman's Village, Burton Chace Park, etc.) or provide any further comments or observations.

33. What kinds of floatables have you observed near storm drain outlets?

None Oil Garbage Suds Scum

Please specify location (Examples: Basin __, Dock Number, Fisherman's Village, Burton Chace Park, etc.) or provide any further comments or observations.

34. What kind of odor have you observed near storm drain outlets?

None Chemical Rotten eggs Earthy Fishy

Please specify location (Examples: Basin __, Dock Number, Fisherman's Village, Burton Chace Park, etc.) or provide any further comments or observations.

35. Please add any more information pertaining to your observations/knowledge of storm drains around Marina del Rey Harbor here.

_____

_____

Sewage Infrastructure

Please indicate your knowledge around Marina del Rey Harbor pertaining to the sewage infrastructure.

---

36. Do you know of any leaking sewage pipelines around Marina del Rey Harbor?

Yes No Don't know

Please specify location (Examples: Condo Name, Apartment Complex, Restaurant Name, Parking Lot, Dock Number, etc.) or provide any further comments or observations.

37. Do local restaurants properly dispose of oil and grease?

Yes No Don't know

If possible, please provide any additional information, such as location of restaurant, time of disposal, etc.

38. Do you know if sewage line leaks or sewage spills impact the water at Marina del Rey Harbor?

Yes No Don't know

If you answered yes, please provide any further comments or observations here (location, time of occurrence, etc.).

39. Please add any additional information pertaining to your observations/knowledge of the sewage infrastructure around Marina del Rey Harbor here.

_____

_____

Thank you for completing this survey! Your input is an integral part of our assessment and we appreciate your time. Please return the completed surveys to the address on the front page.

APPENDIX D

Bacteria Lab Reports and Corresponding Chains of Custody

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Illicit Boat Discharge Invest.
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 21, 2006
Date Test Started: April 21, 2006
Date Test Ended: April 22, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
B1 Set 1	042106 B1 Set 1	4/20/2006	2120	20	<10
B2 Set 1	042106 B2 Set 1	4/20/2006	2130	<20	<10
B3 Set 1	042106 B3 Set 1	4/20/2006	2115	40	<10
B4 Set 1	042106 B4 Set 1	4/20/2006	2110	<20	<10
B5 Set 1	042106 B5 Set 1	4/20/2006	2045	<20	<10
B6 Set 1	042106 B6 Set 1	4/20/2006	2100	<20	<10
B7 Set 1	042106 B7 Set 1	4/20/2006	2035	<20	<10
B8 Set 1	042106 B8 Set 1	4/20/2006	2025	<20	10
B9 Set 1	042106 B9 Set 1	4/20/2006	2020	20	<10
B10 Set 1	042106 B10 Set 1	4/20/2006	2145	20	<10
B11 Set 1	042106 B11 Set 1	4/20/2006	2150	40	<10
B12 Set 1	042106 B12 Set 1	4/20/2006	2155	<20	<10
B13 Set 1	042106 B13 Set 1	4/20/2006	2230	<20	10
B14 Set 1	042106 B14 Set 1	4/20/2006	2240	<20	10
B15 Set 1	042106 B15 Set 1	4/20/2006	2220	<20	<10
B16 Set 1	042106 B16 Set 1	4/20/2006	2215	20	10
B17 Set 1	042106 B17 Set 1	4/20/2006	2150	20	<10
B18 Set 1	042106 B18 Set 1	4/20/2006	2145	20	<10
B19 Set 1	042106 B19 Set 1	4/20/2006	2140	20	<10
B20 Set 1	042106 B20 Set 1	4/20/2006	2325	<20	<10
B21 Set 1	042106 B21 Set 1	4/20/2006	2320	<20	<10
B22 Set 1	042106 B22 Set 1	4/20/2006	2315	20	<10
B23 Set 1	042106 B23 Set 1	4/20/2006	2310	<20	<10
*17 Sojourn**	*042106 17 Sojourn*	4/20/2006	2000	20	<10

**** For spot samples***

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Illicit Boat Discharge Invest.
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 21, 2006
Date Test Started: April 21, 2006
Date Test Ended: April 22, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
B1 Set 2	042106 B1 Set 2	4/21/2006	0045	<20	41
B2 Set 2	042106 B2 Set 2	4/21/2006	0050	20	52
B3 Set 2	042106 B3 Set 2	4/21/2006	0100	80	84
B4 Set 2	042106 B4 Set 2	4/21/2006	0105	20	287
B5 Set 2	042106 B5 Set 2	4/21/2006	0115	<20	<10
B6 Set 2	042106 B6 Set 2	4/21/2006	0120	20	<10
B7 Set 2	042106 B7 Set 2	4/21/2006	0130	<20	<10
B8 Set 2	042106 B8 Set 2	4/21/2006	0135	40	10
B9 Set 2	042106 B9 Set 2	4/21/2006	0140	<20	10
B10 Set 2	042106 B10 Set 2	4/21/2006	0200	<20	<10
B11 Set 2	042106 B11 Set 2	4/21/2006	0205	20	<10
B12 Set 2	042106 B12 Set 2	4/21/2006	0210	20	<10
B13 Set 2	042106 B13 Set 2	4/21/2006	0225	<20	<10
B14 Set 2	042106 B14 Set 2	4/21/2006	0230	800	74
B15 Set 2	042106 B15 Set 2	4/21/2006	0245	<20	<10
B16 Set 2	042106 B16 Set 2	4/21/2006	0250	40	<10
B17 Set 2	042106 B17 Set 2	4/21/2006	0300	20	<10
B18 Set 2	042106 B18 Set 2	4/21/2006	0305	<20	<10
B19 Set 2	042106 B19 Set 2	4/21/2006	0310	<20	<10
B20 Set 2	042106 B20 Set 2	4/21/2006	0450	<20	<10
B21 Set 2	042106 B21 Set 2	4/21/2006	0500	20	<10
B22 Set 2	042106 B22 Set 2	4/21/2006	0510	<20	10
B23 Set 2	042106 B23 Set 2	4/21/2006	0340	<20	<10

** For spot samples*

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Illicit Boat Discharge Invest.
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 21, 2006
Date Test Started: April 21, 2006
Date Test Ended: April 22, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
D1300*	***042106 D1300***	**4/21/2006**	0610	<20	<10
D1500*	***042106 D1500***	**4/21/2006**	0620	20	10
D3500*	***042106 D3500***	**4/21/2006**	0635	60	<10

**** For spot samples***

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

QA/QC Officer (Rosabel Dias) — Date: 08/28/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/28/06

WESTON SOLUTIONS

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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12687

DATE 4.21.6 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MDR ~~Dry Weather~~ Boat Study

PROJECT MANAGER: Larissa Lamaud

COMPANY: Weston

ADDRESS: See Above

PHONE/FAX: " "

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal coliform	ANALYSIS/TEST REQUESTED: Enterco	ANALYSIS/TEST REQUESTED: Temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B20 SET 2	4.21.6	0450	H_2O	DO	1x1000	X	X				ICE/ST	2°C	042106 B20 SET 2
B21 SET 2		0500											042106 B21 SET 2
B22 SET 2		0510											042106 B22 SET 2
D1300		0610											042106 D1300
D1500		0620											042106 D1500
D3500		0635											042106 D3500
temp blank		0105						X					

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Damon

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston Solutions				
Firm	Firm	Firm	Firm	Firm	Firm
4.21.6/1005	4/21/06 1005				
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT - Bact set 2

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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12680

DATE 4.21.6 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterco	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B1 set 2	4.21.6	~~0045~~ ~~1245~~ TX	H2O	DO	1x100mL	X	X	ICE	2° C	042106 B1 SET2
B2 set 2		~~0050~~ ~~1250~~ TX								042106 B2 SET2
B3 set 2		0100								042106 B3 SET2
B4 set 2		0105								042106 B4 SET2
B5 set 2		0115								042106 B5 SET2
B6 set 2		0120								042106 B6 SET2
B7 set 2		0130								042106 B7 SET2
B8 set 2		0135								042106 B8 SET2
B9 set 2		0140								042106 B9 SET2
B10 set 2		0200								042106 B10 SET2
B11 set 2		0205								042106 B11 SET2
B12 set 2		0210								042106 B12 SET2
B13 set 2		0225								042106 B13 SET2
B14 set 2		0230								042106 B14 SET2
B15 set 2		0245								042106 B15 SET2

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damian Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: D. Owen	Signature: Crystal McKinney	Signature: Crystal McKinney	Signature:	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm:	Firm:
Date/Time: 4.21.6 / 0400	Date/Time: 4/21/06 0400	Date/Time: 4/21/06 0555	Date/Time: 4/21/06 0555	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT - Bact set 2

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12681

DATE 4-21-06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Arnand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterco	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B16 set 2	4.21.6	0250	H_2O	DO	1x100mL	X	X	ICE	2°C	042106 B16 SET 2
B17 set 2	↓	0300	↓	↓	↓	↓	↓	↓	↓	042106 B17 SET 2
B18 set 2	↓	0305	↓	↓	↓	↓	↓	↓	↓	042106 B18 SET 2
B19 set 2	↓	0310	↓	↓	↓	↓	↓	↓	↓	042106 B19 SET 2
~~B20 set 2~~										
B21 set 2										
~~B22 set 2~~										
B23 set 2	4.21.6	0340	↓	DO	↓	↓	↓	↓	↓	042106 B23 SET 2

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Quen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: D Quen	Signature: Crystal McClain	Signature: Crystal McClain	Signature:	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: WESTON	Firm:	Firm:
Date/Time: 4.21.6/0400	Date/Time: 4/21/06 0400	Date/Time: 4/21/06 0555	Date/Time: 4/21/06 0555	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT - Bact Set 1

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CHAIN OF CUSTODY

12677

DATE 4.20.6 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Entero				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B1 Set 1	4.20.6	2120	H_2O	DO	1x100mL	X	X				ICE	6°C	042106 B1 SET1
B2 Set 1		2130											042106 B2 SET1
B3 Set 1		2115											042106 B3 SET1
B4 Set 1		2110											042106 B4 SET1
B5 Set 1		2045											042106 B5 SET1
B6 Set 1		2100											042106 B6 SET1
B7 Set 1		2035											042106 B7 SET1
B8 Set 1		2025											042106 B8 SET1
B9 Set 1		2020											042106 B9 SET1
B10 Set 1		2145											042106 B10 SET1
B11 Set 1		2150											042106 B11 SET1
B12 Set 1		2155											042106 B12 SET1
B13 Set 1		2230											042106 B13 SET1
B14 Set 1		2240											042106 B14 SET1
B15 Set 1		2220											042106 B15 SET1

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Crum

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston	WESTON	WESTON	Weston		
Firm	Firm	Firm	Firm	Firm	Firm
4.21.6/0010	42106 0010	42106 0155	042106 0155		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT – Bact Set 1

☒ 2433 Impala Drive • Carlsbad, CA 92008 • (760) 931-8081, FAX 931-1580
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CHAIN OF CUSTODY

12679

DATE ~~3~~ 4.20.6 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterco	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
B16 Set 1	4.20.6	2215	H_2O	DO	1x100mL	x	x				ICE	6°C	042106 B16 SET 1
B17 Set 1		2150											042106 B17 SET 1
B18 Set 1		2145											042106 B18 SET 1
B19 Set 1		2140											042106 B19 SET 1
B20 Set 1		2325											042106 B20 SET 1
B21 Set 1		2320											042106 B21 SET 1
B22 Set 1		2315											042106 B22 SET 1
B23 Set 1		2310											042106 B23 SET 1
Temp blank		2345						x					
17 Sojourn		2000				x	x						042106 17 SOJOURN

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature WESTON	Signature WESTON	Signature WESTON	Signature	Signature
Firm Weston	Firm 4.20.6 0010	Firm 4.21.06 0155	Firm 4/21/06 0155	Firm	Firm
Date/Time 4.20.6/0010	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Illicit Boat Discharge Invest.
Client Sample ID: See below-46 samples
Weston Sample ID: See below

Date Received: May 18, 2006
Date Test Started: May 18, 2006
Date Test Ended: May 19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
B1 Set 1	051806 B1 Set 1	5/17/2006	2235	20	<10
B2 Set 1	051806 B2 Set 1	5/17/2006	2240	140	<10
B3 Set 1	051806 B3 Set 1	5/17/2006	2215	130	<10
B4 Set 1	051806 B4 Set 1	5/17/2006	2220	20	20
B5 Set 1	051806 B5 Set 1	5/17/2006	2205	40	<10
B6 Set 1	051806 B6 Set 1	5/17/2006	2210	40	<10
B7 Set 1	051806 B7 Set 1	5/17/2006	2150	20	<10
B8 Set 1	051806 B8 Set 1	5/17/2006	2155	40	10
B9 Set 1	051806 B9 Set 1	5/17/2006	2200	40	10
B10 Set 1	051806 B10 Set 1	5/17/2006	2115	170	10
B11 Set 1	051806 B11 Set 1	5/17/2006	2120	500	52
B12 Set 1	051806 B12 Set 1	5/17/2006	2125	220	10
B13 Set 1	051806 B13 Set 1	5/17/2006	2055	170	20
B14 Set 1	051806 B14 Set 1	5/17/2006	2100	170	10
B15 Set 1	051806 B15 Set 1	5/17/2006	2045	40	<10
B16 Set 1	051806 B16 Set 1	5/17/2006	2050	130	<10
B17 Set 1	051806 B17 Set 1	5/17/2006	2025	<20	<10
B18 Set 1	051806 B18 Set 1	5/17/2006	2035	<20	<10
B19 Set 1	051806 B19 Set 1	5/17/2006	2040	40	<10
B20 Set 1	051806 B20 Set 1	5/17/2006	2000	<20	<10
B21 Set 1	051806 B21 Set 1	5/17/2006	2010	70	10
B22 Set 1	051806 B22 Set 1	5/17/2006	2015	<20	<10
B23 Set 1	051806 B23 Set 1	5/17/2006	2020	<20	<10
Field Blank	051806 Field Blank	5/17/2006	2000	*	*

* Due to techinician error, sample was not processed.

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Illicit Boat Discharge Invest.
Client Sample ID: See below-46 samples
Weston Sample ID: See below

Date Received: May 18, 2006
Date Test Started: May 18, 2006
Date Test Ended: May 19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
B1 Set 2	051806 B1 Set 2	5/18/2006	0215	20	292
B2 Set 2	051806 B2 Set 2	5/18/2006	0220	<20	<10
B3 Set 2	051806 B3 Set 2	5/18/2006	0200	<20	52
B4 Set 2	051806 B4 Set 2	5/18/2006	0205	20	75
B5 Set 2	051806 B5 Set 2	5/18/2006	0150	<20	10
B6 Set 2	051806 B6 Set 2	5/18/2006	0155	20	30
B7 Set 2	051806 B7 Set 2	5/18/2006	0135	40	10
B8 Set 2	051806 B8 Set 2	5/18/2006	0140	20	<10
B9 Set 2	051806 B9 Set 2	5/18/2006	0145	40	<10
B10 Set 2	051806 B10 Set 2	5/18/2006	0000	20	<10
B11 Set 2	051806 B11 Set 2	5/18/2006	0005	40	20
B12 Set 2	051806 B12 Set 2	5/18/2006	0010	270	<10
B13 Set 2	051806 B13 Set 2	5/18/2006	0020	70	41
B14 Set 2	051806 B14 Set 2	5/18/2006	0025	80	41
B15 Set 2	051806 B15 Set 2	5/18/2006	0030	<20	10
B16 Set 2	051806 B16 Set 2	5/18/2006	0035	130	10
B17 Set 2	051806 B17 Set 2	5/18/2006	0040	40	<10
B18 Set 2	051806 B18 Set 2	5/18/2006	0045	40	10
B19 Set 2	051806 B19 Set 2	5/18/2006	0050	80	<10
B20 Set 2	051806 B20 Set 2	5/18/2006	0105	20	<10
B21 Set 2	051806 B21 Set 2	5/18/2006	0110	20	10
B22 Set 2	051806 B22 Set 2	5/18/2006	0115	<20	<10
B23 Set 2	051806 B23 Set 2	5/18/2006	0120	<20	<10

* Due to technician error, sample was not processed.

QA/QC Officer (Rosabel Dias) — Date: 08/28/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/28/06

BOAT - Bact Set 1

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CHAIN OF CUSTODY

12635

DATE 5-17-06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey - Boat
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: - See above -
PHONE/FAX: - See above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: Entero	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B1 Set 1	5-17-06	2235	H_2O	DO	1x100mL	X	X	ICE/ST	2°C	~~051706~~ B1 set 1
B2 Set 1		2240								~~051706~~ B2 set 1
B3 Set 1		2215								~~051706~~ B3 set 1
B4 Set 1		2220								~~051706~~ B4 set 1
B5 Set 1		2205								~~051706~~ B5 set 1
B6 Set 1		2210								~~051706~~ B6 set 1
B7 Set 1		2150								~~051706~~ B7 set 1
B8 Set 1		2155								~~051706~~ B8 set 1
B9 Set 1		2200								~~051706~~ B9 set 1
B10 Set 1		2115								~~051706~~ B10 set 1
B11 Set 1		2120								~~051706~~ B11 set 1
B12 Set 1		2125								~~051706~~ B12 set 1
B13 Set 1		2055								~~051706~~ B13 set 1
B14 Set 1		2100								~~051706~~ B14 set 1
B15 Set 1		2045								~~051706~~ B15 set 1

ALL WESTON I.D.'S ARE PRECEDED BY 051806 NOT 051706 TK

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature:	Signature: WESTON	Signature: WESTON	Signature:	Signature:	Signature:
Firm: Weston	Firm: 5.17.06 2300	Firm: 5.18.06 0817	Firm: Weston Solutions, INC. 5/18/06 0117	Firm:	Firm:
Date/Time: 5-17-06/2300	Date/Time:	Date/Time:	Date/Time:	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT - Bact Set 1

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CHAIN OF CUSTODY

12636

DATE 5-17-06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey - Boat
PROJECT MANAGER: L. Almand
COMPANY: WESTON
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterococ	[illegible]			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B16 Set 1	5-17-06	~~2050~~ ~~2045~~	H2O	DO	1x100mL	X	X				ICE/ST	2°C	~~051706~~ B16 Set 1
B17 Set 1		~~2045~~ ~~2050~~											051706 B17 Set 1
B18 Set 1		2035											051706 B18 Set 1
B19 Set 1		2040											051706 B19 Set 1
B20 Set 1		2000											051706 B20 Set 1
B21 Set 1		2010											051706 B21 Set 1
B22 Set 1		2015											051706 B22 Set 1
B23 Set 1		2020											051706 B23 Set 1
Field ~~Trip~~ blank		2000	H2O		1x100mL	X	X	~~X~~					051706 Field Blanks

ALL WESTON SAMPLE I.D.'S ARE PRECEDED BY 051806 NOT 051706. TK

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature [signature]	Signature [signature] WESTON	Signature [signature] WESTON	Signature [signature] Weston Solutions, INC.	Signature	Signature
Firm Weston	Firm 5.17.06 2300	Firm 5.18.06 0117 ~~0115~~	Firm 5/18/06 0117	Firm	Firm
Date/Time 5-17-06/2300	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT - Bact set 2

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12637

DATE 5-18-06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B1 set 2	5-18-06	0215	H_2O	DO	1x100mL	X	X	ICE/ST		051806 B1 set 2
B2 set 2		0220								051806 B2 set 2
B3 set 2		0200								051806 B3 set 2
B4 set 2		0205								051806 B4 set 2
B5 set 2		0150								051806 B5 set 2
B6 set 2		0155								051806 B6 set 2
B7 set 2		0135								051806 B7 set 2
B8 set 2		0140								051806 B8 set 2
B9 set 2		0145								051806 B9 set 2
B10 set 2		0000								051806 B10 set 2
B11 set 2		0005								051806 B11 set 2
B12 set 2		0010								051806 B12 set 2
B13 set 2		0020								051806 B13 set 2
B14 set 2		0025								051806 B14 set 2
B15 set 2		0030								051806 B15 set 2

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Dawn Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: D Owen	Signature: Jeff Apt	Signature: Greg West	Signature: Lynn Smith-Kruck	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm:	Firm:
Date/Time: 5-18-06/0300	Date/Time: 5/18/06 0300	Date/Time: 5.18.06 0545	Date/Time: 5/18/06 0545	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT - Bact set 2

WESTON SOLUTIONS

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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12638

DATE 5-18-06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
B16 set 2	5-18-06	0035	H_2O	DO	1x100mL	X	X				ICE/ST		051806 B16 set2
B17 set 2		0040											051806 B17 set2
B18 set 2		0045											051806 B18 set2
B19 set 2		0050											051806 B19 set2
B20 set 2		0105											051806 B20 set2
B21 set 2		0110											051806 B21 set2
B22 set 2		0115											051806 B22 set2
B23 set 2		0120	↓		↓	↓	↓				↓		051806 B23 set2
Temp blank	↓	0045	H_2O	↓	1x100mL			X				2.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Damon Owen	Signature: [illegible]	Signature: [illegible]	Signature: S. Smith-Knuth	Signature	Signature
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 5-18-06/0300	Date/Time: 5-18-06 0300	Date/Time: 5-18-06 0545	Date/Time: 5/18/06 0545	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Illicit Boat Discharge Invest.
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 18, 2006
Date Test Started: June 18, 2006
Date Test Ended: June 19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
B1 Set 1	061806 B1 Set 1	6/18/2006	0205	<20	134
B2 Set 1	061806 B2 Set 1	6/18/2006	0200	<20	798
B3 Set 1	061806 B3 Set 1	6/18/2006	0155	<20	<10
B4 Set 1	061806 B4 Set 1	6/18/2006	0150	40	30
B5 Set 1	061806 B5 Set 1	6/18/2006	0140	20	<10
B6 Set 1	061806 B6 Set 1	6/18/2006	0145	40	63*
B7 Set 1	061806 B7 Set 1	6/18/2006	0125	20	<10
B8 Set 1	061806 B8 Set 1	6/18/2006	0130	<20	<10
B9 Set 1	061806 B9 Set 1	6/18/2006	0135	20	<10
B10 Set 1	061806 B10 Set 1	6/18/2006	0105	170	158
B11 Set 1	061806 B11 Set 1	6/18/2006	0110	230	94
B12 Set 1	061806 B12 Set 1	6/18/2006	0115	230	52
B13 Set 1	061806 B13 Set 1	6/18/2006	0055	20	<10
B14 Set 1	061806 B14 Set 1	6/18/2006	0100	20	<10
B15 Set 1	061806 B15 Set 1	6/18/2006	0045	20	<10
B16 Set 1	061806 B16 Set 1	6/18/2006	0050	20	<10
B17 Set 1	061806 B17 Set 1	6/18/2006	0030	<20	10
B18 Set 1	061806 B18 Set 1	6/18/2006	0035	20	<10
B19 Set 1	061806 B19 Set 1	6/18/2006	0040	<20	<10
B20 Set 1	061806 B20 Set 1	6/18/2006	0015	20	<10
B21 Set 1	061806 B21 Set 1	6/18/2006	0004	70	<10
B22 Set 1	061806 B22 Set 1	6/18/2006	0009	40	<10
B23 Set 1	061806 B23 Set 1	6/18/2006	0005	20	10

*Duplicate performed on sample B6 Set 1 was out of range.

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Illicit Boat Discharge Invest.
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 18, 2006
Date Test Started: June 18, 2006
Date Test Ended: June 19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
B1 Set 2	061806 B1 Set 2	6/18/2006	0600	<20	41
B2 Set 2	061806 B2 Set 2	6/18/2006	0555	<20	471
B3 Set 2	061806 B3 Set 2	6/18/2006	0550	20	41
B4 Set 2	061806 B4 Set 2	6/18/2006	0545	20	857
B5 Set 2	061806 B5 Set 2	6/18/2006	0535	<20	<10
B6 Set 2	061806 B6 Set 2	6/18/2006	0540	<20	30
B7 Set 2	061806 B7 Set 2	6/18/2006	0520	<20	<10
B8 Set 2	061806 B8 Set 2	6/18/2006	0525	20	<10
B9 Set 2	061806 B9 Set 2	6/18/2006	0530	<20	<10
B10 Set 2	061806 B10 Set 2	6/18/2006	0400	40	213
B11 Set 2	061806 B11 Set 2	6/18/2006	0405	20	75
B12 Set 2	061806 B12 Set 2	6/18/2006	0410	700	31
B13 Set 2	061806 B13 Set 2	6/18/2006	0415	<20	10
B14 Set 2	061806 B14 Set 2	6/18/2006	0420	130	10
B15 Set 2	061806 B15 Set 2	6/18/2006	0425	20	20
B16 Set 2	061806 B16 Set 2	6/18/2006	0430	20	<10
B17 Set 2	061806 B17 Set 2	6/18/2006	0435	<20	20
B18 Set 2	061806 B18 Set 2	6/18/2006	0440	20	20
B19 Set 2	061806 B19 Set 2	6/18/2006	0445	<20	20
B20 Set 2	061806 B20 Set 2	6/18/2006	0455	<20	<10
B21 Set 2	061806 B21 Set 2	6/18/2006	0500	<20	<10
B22 Set 2	061806 B22 Set 2	6/18/2006	0505	40	<10
B23 Set 2	061806 B23 Set 2	6/18/2006	0450	20	<10

QA/QC Officer (Rosabel Dias) — Date: 08/28/06

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/28/06

BOAT Bact - set 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12943

DATE 6-18-06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey Boat Survey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B1 set 2	6-18-06	0600	H2O	DO	1x100mL	X	X	ICE/ST		061806 B1 set 2
B2 set 2		0555								061806 B2 set 2
B3 set 2		0550								061806 B3 set 2
B4 set 2		0545								061806 B4 set 2
B5 set 2		0535								061806 B5 set 2
B6 set 2		0540								061806 B6 set 2
B7 set 2		0520								061806 B7 set 2
B8 set 2		0525								061806 B8 set 2
B9 set 2		0530								061806 B9 set 2
B10 set 2		0400								061806 B10 set 2
B11 set 2		0405								061806 B11 set 2
B12 set 2		0410								061806 B12 set 2
B13 set 2		0415								061806 B13 set 2
B14 set 2		0420								061806 B14 set 2
B15 set 2		0425								061806 B15 set 2

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Dan

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: D	Signature: Weston	Signature: Weston	Signature: Weston	Signature: Weston	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm:
Date/Time: 6-18-06/0620	Date/Time: 6.18.06 0620	Date/Time: 6.18.06 0700	Date/Time: 6/18/06 0700	Date/Time: 6/18/06 0936	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BOAT Bact - set 2

WESTON SOLUTIONS

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☐ 98 Main St., Ste. #428 • Tiburon, CA 94920 • (415) 435-1847, FAX 435-0479
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☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
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CHAIN OF CUSTODY

12944

DATE 6-18-06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey Boat Survey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B16 set 2	6-18-06	0430	H2O	DO	1x100mL	X	X				ICE/ST		061806 B16 set 2
B17 set 2		0435											061806 B17 set 2
B18 set 2		0440											061806 B18 set 2
B19 set 2		0445											061806 B19 set 2
B20 set 2		0455											061806 B20 set 2
B21 set 2		0500											061806 B21 set 2
B22 set 2		0505											061806 B22 set 2
B23 set 2		0450											061806 B23 set 2
Temp blank		0400						X				4.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: D-O	Signature:	Signature:	Signature:	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm:
Date/Time: 6-18-06/0620	Date/Time: 6-18-06 0620	Date/Time: 6-18-06 0700	Date/Time: 6/18/06 0900	Date/Time: 6/18/06 0930	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BEAT - Bact set 1

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12940

DATE 6-18-06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L.Aurand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: Entero	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B1 set 1	6-18-06	0205	H2O	DO	1x100mL	X	X	ICE/ST		061806 B1 set1
B2 set 1		0200								061806 B2 set1
B3 set 1		0155								061806 B3 set1
B4 set 1		0150								061806 B4 set1
B5 set 1		0140								061806 B5 set1
B6 set 1		0145								061806 B6 set1
B7 set 1		0125								061806 B7 set1
B8 set 1		0130								061806 B8 set1
B9 set 1		0135								061806 B9 set1
B10 set 1		0105								061806 B10 set1
B11 set 1		0110								061806 B11 set1
B12 set 1		0115								061806 B12 set1
B13 set 1		~~0055~~ 1235								061806 B13 set1
B14 set 1		0100								061806 B14 set1
B15 set 1		~~0045~~ 1240								061806 B15 set1

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: D E T	Signature: Tom Galojan	Signature: Tom Galojan	Signature: [illegible]	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston Solutions, INC	Firm:	Firm:
Date/Time: 6.18.06/0315	Date/Time: 6/18/06 0315	Date/Time: 6/18/06 0505	Date/Time: 6/18/06 0505	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

BEAT - Bact Set 1

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12941

DATE 6-18-06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: temp	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B16 set 1	6-18-06	1256	H2O	DO	1x100ml	X	X		ICE 1ST		061806 B16set1
B17 set 1		1230									061806 B17set1
B18 set 1		1235									061806 B18 set1
B19 set 1		1240									061806 B19set1
B20 set 1		1215									061806 B20set1
B21 set 1		1204									061806 B21set1
B22 set 1		1201									061806 B22set1
B23 set 1		1225									061806 B23set1
~~Temp blank~~								X			
Temp blank	6-18-06	1204	H2O	DO				X			

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Gan

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature Tom Garbajo	Signature Tom Garbajo	Signature	Signature	Signature
Firm Weston	Firm Weston	Firm Weston	Firm Weston Solutions, INC.	Firm	Firm
Date/Time 6/18/06 0315	Date/Time 6/18/06 0315	Date/Time 6/18/06 0505	Date/Time 6/18/06 0505	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: October 1-2, 2005
Date Test Started: October 1-2, 2005
Date Test Ended: October 2-3, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-160,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 1	100105 1 Set 1	10/1/2005	1615	40	<10
2 Set 1	100105 2 Set 1	10/1/2005	1535	<20	<10
3 Set 1	100105 3 Set 1	10/1/2005	1415	40	<10
4 Set 1	100105 4 Set 1	10/1/2005	1450	<20	<10
5 Set 1	100105 5 Set 1	10/1/2005	1516	<20	10
6 Set 1	100105 6 Set 1	10/1/2005	1705	20	75
7 Set 1	100105 7 Set 1	10/1/2005	1650	20	<10
8 Set 1	100105 8 Set 1	10/1/2005	1712	20	41
9 Set 1	100105 9 Set 1	10/1/2005	1646	20	<10
10 Set 1	100105 10 Set 1	10/1/2005	1630	<20	10
11 Set 1	100105 11 Set 1	10/1/2005	1612	90	175
12 Set 1	100105 12 Set 1	10/1/2005	1430	<20	<10
13 Set 1	100105 13 Set 1	10/1/2005	1449	<20	<10
1 Set 2	100105 1 Set 2	10/1/2005	1933	<20	<10
2 Set 2	100105 2 Set 2	10/1/2005	1915	80	<10
3 Set 2	100105 3 Set 2	10/1/2005	1815	<20	<10
4 Set 2	100105 4 Set 2	10/1/2005	1845	500	145
5 Set 2	100105 5 Set 2	10/1/2005	1900	40	<10
6 Set 2	100105 6 Set 2	10/1/2005	2130	20	<10
7 Set 2	100105 7 Set 2	10/1/2005	2120	<20	31
8 Set 2	100105 8 Set 2	10/1/2005	2102	500	134
9 Set 2	100105 9 Set 2	10/1/2005	2012	<20	10
10 Set 2	100105 10 Set 2	10/1/2005	1950	<20	20
11 Set 2	100105 11 Set 2	10/1/2005	2054	170	10

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: October 1-2, 2005
Date Test Started: October 1-2, 2005
Date Test Ended: October 2-3, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-160,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
12 Set 2	100105 12 Set 2	10/1/2005	1758	<20	<10
13 Set 2	100105 13 Set 2	10/1/2005	1920	<20	<10
1 Set 3	100105 1Set 3	10/1/2005	2320	20	<10
2 Set 3	100105 2 Set 3	10/1/2005	2305	<20	10
3 Set 3	100105 3 Set 3	10/1/2005	2210	<20	20
4 Set 3	100105 4 Set 3	10/1/2005	2230	40	52
5 Set 3	100105 5 Set 3	10/1/2005	2247	40	10
6 Set 3	100205 6 Set 3	10/2/2005	0015	70	253
7 Set 3	100205 7 Set 3	10/2/2005	0030	130	443
8 Set 3	100205 8 Set 3	10/2/2005	0043	300	749
9 Set 3	100205 9 Set 3	10/2/2005	0000	<20	<10
10 Set 3	100105 10 Set 3	10/1/2005	2340	20	63
11 Set 3	100105 11 Set 3	10/1/2005	2336	40	41
12 Set 3	100105 12 Set 3	10/1/2005	2215	<20	<10
13 Set 3	100105 13 Set 3	10/1/2005	2231	<20	20
1 Set 4	100205 1 Set 4	10/2/2005	0302	40	<10
2 Set 4	100205 2 Set 4	10/2/2005	0243	20	<10
3 Set 4	100205 3 Set 4	10/2/2005	0144	170	110
4 Set 4	100205 4 Set 4	10/2/2005	0200	40	41
5 Set 4	100205 5 Set 4	10/2/2005	0222	90	41
6 Set 4	100205 6 Set 4	10/2/2005	0323	300	63
7 Set 4	100205 7 Set 4	10/2/2005	0338	80	233
8 Set 4	100205 8 Set 4	10/2/2005	0306	800	201
9 Set 4	100205 9 Set 4	10/2/2005	0401	20	41

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: October 1-2, 2005
Date Test Started: October 1-2, 2005
Date Test Ended: October 2-3, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-160,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
10 Set 4	100205 10 Set 4	10/2/2005	0341	<20	<10
11 Set 4	100205 11 Set 4	10/2/2005	0242	40	10
12 Set 4	100205 12 Set 4	10/2/2005	0121	<20	<10
13 Set 4	100205 13 Set 4	10/2/2005	0152	<20	10
D1200 Set 4	100205 D1200 Set 4	10/2/2005	0331	2,300	712
1 Set 5	100205 1Set 5	10/2/2005	0625	<20	<10
2 Set 5	100205 2Set 5	10/2/2005	0611	<20	<10
3 Set 5	100205 3 Set 5	10/2/2005	0517	<20	<10
4 Set 5	100205 4 Set 5	10/2/2005	0540	<20	30
5 Set 5	100205 5 Set 5	10/2/2005	0600	<20	20
6 Set 5	100205 6 Set 5	10/2/2005	0710	<20	20
7 Set 5	100205 7Set 5	10/2/2005	700	40	20
8 Set 5	100205 8 Set 5	10/2/2005	0645	1,300	1,106
9 Set 5	100205 9 Set 5	10/2/2005	0659	<20	<10
10 Set 5	100205 10 Set 5	10/2/2005	0643	<20	41
11 Set 5	100205 11 Set 5	10/2/2005	0705	110	97
12 Set 5	100205 12 Set 5	10/2/2005	0550	<20	20
13 Set 5	100205 13 Set 5	10/2/2005	0617	<20	<10
D1300 Set 5	100205 D1300 Set 5	10/2/2005	0503	20	<10
1 Set 6	100205 1 Set 6	10/2/2005	0923	<20	<10
2 Set 6	100205 2 Set 6	10/2/2005	0905	<20	<10
3 Set 6	100205 3 Set 6	10/2/2005	0804	<20	<10
4 Set 6	100205 4 Set 6	10/2/2005	0823	20	10
5 Set 6	100205 5 Set 6	10/2/2005	0848	20	<10

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: October 1-2, 2005
Date Test Started: October 1-2, 2005
Date Test Ended: October 2-3, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-160,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
6 Set 6	100205 6 Set 6	10/2/2005	0917	20	20
7 Set 6	100205 7 Set 6	10/2/2005	0928	40	<10
8 Set 6	100205 8 Set 6	10/2/2005	0857	20	<10
9 Set 6	100205 9 Set 6	10/2/2005	0955	<20	<10
10 Set 6	100205 10 Set 6	10/2/2005	0937	<20	41
11 Set 6	100205 11 Set 6	10/2/2005	1016	300	134
12 Set 6	100205 12 Set 6	10/2/2005	0905	<20	<10
13 Set 6	100205 13 Set 6	10/2/2005	0935	<20	<10
1 Set 7	100205 1 Set 7	10/2/2005	1300	<20	<10
2 Set 7	100205 2 Set 7	10/2/2005	1250	<20	<10
3 Set 7	100205 3 Set 7	10/2/2005	1200	<20	<10
4 Set 7	100205 4 Set 7	10/2/2005	1145	<20	<10
5 Set 7	100205 5 Set 7	10/2/2005	1217	<20	<10
6 Set 7	100205 6 Set 7	10/2/2005	1400	40	373
7 Set 7	100205 7 Set 7	10/2/2005	1410	20	20
8 Set 7	100205 8 Set 7	10/2/2005	1351	80	10
9 Set 7	100205 9 Set 7	10/2/2005	1340	20	10
10 Set 7	100205 10 Set 7	10/2/2005	1310	40	199
11 Set 7	100205 11 Set 7	10/2/2005	1327	170	288
12 Set 7	100205 12 Set 7	10/2/2005	1129	<20	<10
13 Set 7	100205 13 Set 7	10/2/2005	1207	<20	<10
1 Set 8	100205 1 Set 8	10/2/2005	1725	<20	<10
2 Set 8	100205 2 Set 8	10/2/2005	1650	20	<10
3 Set 8	100205 3 Set 8	10/2/2005	1530	<20	<10

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: October 1-2, 2005
Date Test Started: October 1-2, 2005
Date Test Ended: October 2-3, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-160,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
4 Set 8	100205 4 Set 8	10/2/2005	1534	80	<10
5 Set 8	100205 5 Set 8	10/2/2005	1615	40	<10
6 Set 8	100205 6 Set 8	10/2/2005	1709	170	51
7 Set 8	100205 7 Set 8	10/2/2005	1713	20	30
8 Set 8	100205 8 Set 8	10/2/2005	1815	40	20
9 Set 8	100205 9 Set 8	10/2/2005	1820	<20	<10
10 Set 8	100205 10 Set 8	10/2/2005	1740	<20	41
11 Set 8	100205 11 Set 8	10/2/2005	1625	300	697
12 Set 8	100205 12 Set 8	10/2/2005	1508	<20	<10
13 Set 8	100205 13 Set 8	10/2/2005	1541	<20	<10
Micro Blank	100205 Micro Blank	10/2/2005	1824	<20	<10

QA/QC Officer (Rosabel Dias) — 08/29/2006 Date

Microbiology Lab Supervisor (Anthony Trinh) — 8/29/06 Date

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CHAIN OF CUSTODY

№ 11669

DATE Oct 2 05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Dumand
COMPANY: Weston
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	Entero.	Temp Blank			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 Set 8	10/2/05	1508	H2O	SA/ME	1	4	X				ICE/ST		100205 12 Set 8
Temp Blank		1508						X				6.0 °C	~~100205 13 Set 8~~
13 Set 8		1541				X	X						100205 13 Set 8
11 Set 8		1625											100205 11 Set 8
6 Set 8		1709											100205 6 Set 8
7 Set 8		1713											100205 8 Set 8 7 Set 8
8 Set 8		1815											100205 8 Set 8
Micro Blank		1824											100205 Micro Blank

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Sam Adams & Michelle Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Michelle M	Signature: Weston	Signature: Weston	Signature: Weston Solutions	Signature	Signature
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston Solutions	Firm	Firm
Date/Time: 10/2/05 1900	Date/Time: Oct 2, 2005 1900	Date/Time: 10-2-05 2105	Date/Time: 10-2-05 2105	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11641

DATE Oct 2 2005 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col	ANALYSIS/TEST REQUESTED: + Enter	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3 Set 8	Oct 2 05	1530	H_2O	AL	1	X	X	ICE/ ST		100205 3 Set 8
4 Set 8		1534		AL						100205 4 Set 8
5 Set 8		1615		AL						100205 5 Set 8
2 Set 8		1650		AL						100205 2 Set 8
1 Set 8		1725		AL						100205 1 Set 8
10 Set 8		1740		AL						100205 10 Set 8
9 Set 8		1820		AL						100205 9 Set 8

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Andrew Lovell

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: Weston	Firm: Weston Solutions, INC.	Firm	Firm	Firm	Firm
Date/Time: Oct 2, 2005 2105	Date/Time: 10/2/05 2105	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11630

DATE 10/1/05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Larissa Armand
COMPANY: weston
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Total & FC coliform	Fecal coliform	Entero			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
3 set 1	10/1/05	14:15	H_2O	AH	1x100ml		X	X			ST ICE		100105 3 set 1
4 set 1	↓	14:50	↓	↓	↓		X	X			↓		100105 4 set 1
5 set 1		15:16					X	X					100105 5 set 1
2 set 1		15:35					X	X					100105 2 set 1
1 set 1		16:15					X	X					100105 1 set 1
10 set 1		16:30					X	X					100105 10 set 1
9 set 1	↓	16:46	↓	↓	↓		X	X			↓		100105 9 set 1

SPECIAL INSTRUCTIONS/COMMENTS:
SAMPLED BY: AMY HAMILTON
NOTE: ① ONLY FECAL COLIFORM REQUESTED. AH

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Amy Hamilton	Signature: [illegible]	Signature: [illegible]	Signature: [illegible]	Signature	Signature
Firm: Weston	Firm: Weston Solutions INC	Firm: Weston Solutions	Firm: Weston	Firm	Firm
Date/Time: 10/1/05 1750	Date/Time: 10/01/05 1750	Date/Time: 10/1/05 1935	Date/Time: 10/1/05 1935	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11650

DATE Oct 1, 2005 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	temp°			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 Set 1	10-1-05	1430	H_2O	SL	1	X	X				ICE/ST		100105 12 Set 1
13 Set 1	↓	1449	↓	↓	↓	↓	↓						100105 13 Set 1
11 Set 1		1612											100105 11 Set 1
8 Set 1		1712											100105 8 Set 1
7 Set 1		1650											100105 7 Set 1
6 Set 1	↓	1705	↓	~~SL~~									100105 6 Set 1
temp	↓	1430	↓	~~SL~~	↓	↓	↓	X				1.0°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Samantha Leslie & Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Samantha Leslie					
Signature	Signature	Signature	Signature	Signature	Signature
Weston		Weston Solutions	Weston		
Firm	Firm	Firm	Firm	Firm	Firm
10-1-05 1740	Weston Solutions 10-1-05 1740	10/1/05 1935	10/1/05 1935		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11651

DATE Oct 1 '05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions, INC.
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	ANALYSIS/TEST REQUESTED: Enterco				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
~~Odw~~ 12 set 2	Oct 1 '05	~~1758~~ 1750	H2O	CH/SL	1	X	X				ICE/ST		100105 12 Set 2
13 set 2		1920		SL	1								100105 13 Set 2
11 set 2		2054		SL	1								100105 11 Set 2
8 set 2		2102		AW	1								100105 8 Set 2
7 set 2		2120		JP	1								100105 7 Set 2
6 set 2		2130		JP	1								100105 6 Set 2

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Cathy Hartman, Samantha Leskie, Alisa Coffee, Jeanette Pendegraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature Cyntal McCrae	Signature Cyntal McCrae	Signature	Signature	Signature
Firm Weston	Firm Weston	Firm Weston	Firm Weston	Firm	Firm
Date/Time Oct 1 05 2130	Date/Time 10/1/05 2130	Date/Time 10/1/05 2314	Date/Time 10/1/05 2314	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11631

DATE 10/1/05 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Larissa Armand
COMPANY: Weston Solutions, INC.
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: ~~Total~~ coliform	Fecal coliform	Enterco			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3 set 2	10/1/05	1815	H_2O	AH			X	X			Ice		100105 3 set 2
4 set 2		1845					X	X					100105 4 set 2
5 set 2		1900					X	X					100105 5 set 2
2 set 2		1915					X	X					100105 2 set 2
1 set 2		1933					X	X					100105 1 set 2
10 set 2		1950					X	X					100105 10 set 2
9 set 2	↓	2012	↓	↓			X	X			↓		100105 9 set 2

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Amy Hamilton

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Amy Hamilton	Signature: Crystal McClain	Signature: Crystal McClain	Signature: [illegible]	Signature	Signature
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 10/1/05 2040	Date/Time: 10/1/05 2040	Date/Time: 10/1/05 2315	Date/Time: 10/1/05 2315	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11632

DATE 10/2/05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Carissa Armand
COMPANY: Weston
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	Fecal coliforms	Enterco				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
3 set 3	10/1/05	2210	H_2O	AH	Plastic 1 x 100ml	X	X				ST, ice	100205	~~100105~~ 3 Set 3
4 set 3	"	2230	"	"	"	X	X				"	100205	~~100105~~ 4 Set 3
5 set 3	"	2247	"	"	"	X	X				"	100205	~~100105~~ 5 Set 3
2 set 3	"	2305	"	"	"	X	X				"	100205	~~100105~~ 2 Set 3
1 set 3	"	2320	"	"	"	X	X				"	100205	~~100105~~ 1 Set 3
10 set 3	"	2340	"	"	"	X	X				"	100205	~~100105~~ 10 Set 3
9 set 3	10/2/05	0000	"	"	"	X	X				"		100205 9 Set

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by A. Hamilton

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Ann Hamilton	Signature:	Signature	Signature	Signature	Signature
Firm: Weston	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 10/2/05 0305	Date/Time: 10/2/05 0305	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11654

DATE 10-2-05 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterococcus	Temp 0			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 SET 3	10-1	2215	H2O	SL	Plastic 1x1000ml	↓	↓				ice/ST	100205	~~100105~~ 12 Set 3
13 SET 3		2231										100205	~~100105~~ 13 Set 3
11 SET 3	↓	2336										100205	~~100105~~ 11 Set 3
6 SET 3	10/02/05	2415										100205	~~100105~~ 6 Set 3
7 SET 3		2430										100205	~~100105~~ 7 Set 3
8 SET 3	↓	2443	↓	↓								100205	~~100105~~ 8 Set 3
temp Blank	10/1/05	2231	↓	↓	↓	↓	↓	☒				2°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Samantha Leskul

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: Weston	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 10-02-05 1:00 pm	Date/Time: 10-2-05 1100am	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11666

DATE 10-2-05 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey
PROJECT MANAGER: Carissa Aumand
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliforms	ANALYSIS/TEST REQUESTED: Enterococcus				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
13 set 4	10-2-05	0152	H2O	NW	1 100 ml	X	X				ice/ST		100205 13 Set 4
6 set 4		0323			1 100 ml	X	X						100205 6 Set 4
11 set 4		0242			1 100 ml	X	X						100205 11 Set 4
7 set 4		0338			1 100 ml	X	X						100205 7 Set 4
12 set 4		0121			1 100 ml	X	X						100205 12 set 4
8 set 4		0306			1 100 ml	X	X						100205 8 set 4
Temp Control												1°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Philip Lappe + Nikki Woodward

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Nikki Woodward	Signature:	Signature:	Signature:	Signature:	Signature:
Firm: Weston Solutions	Firm: Weston Sol.	Firm: Weston Sol	Firm: Weston Solutions	Firm:	Firm:
Date/Time: 10/2/05 0715	Date/Time: 10.2.05 0715	Date/Time: 10.2.05 0615	Date/Time: 10-2-05 0615	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11633

DATE 10.2.05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Larissa Arnaud
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal coli Form	Entero	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
3 Set 4	10-2	0144	Water	JS	Plastic 1x100mL						Ice / ST		100205 3 Set 4
4 Set 4		0200											100205 4 Set 4
5 Set 4		0222											100205 5 Set 4
2 Set 4		0243											100205 2 Set 4
1 Set 4		0302											100205 1 Set 4
10 Set 4		0341											100205 10 Set 4
9 Set 4		0401											100205 9 Set 4
Temp control		0144						X				1°C	
D1200		0331			X	X	X						100205 D1200

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: J. Schollée + S. Given & Jennifer Schollée + Susie Given

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J Schollée	Signature: L. Carpenter	Signature: L Carpenter	Signature: [signature]	Signature:	Signature:
Firm: Weston Sol	Firm: Weston Sol.	Firm: Weston Sol	Firm: Weston Solutions	Firm:	Firm:
Date/Time: 10-2-05 4:30A	Date/Time: 10-2-05 0450	Date/Time: 10.2.05 0615	Date/Time: 10-2-05 0615	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11655

DATE 10/2/05 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	Enters.	Temp			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
11 Set 5	10/2/05	0105	WATER	NW	1	X	X				Ice/st		100205 11 set 5
7 Set 5		0100	↓	NW	1	X	X						100205 7 set 5
6 Set 5		0110		NW	1	X	X						100205 6 set 5
12 Set 5		0550		NW	1	X	X						100205 12 set 5
13 Set 5		0617		NW	1	X	X						100205 13 set 5
8 Set 5		0645	↓	NW	1	X	X						100205 8 set 5
12 Temp Control								X				2.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Philip Lappe + Nikki Woodward

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Nicole Woodward	Signature: Crystal McClain	Signature: Crystal McClain	Signature: [illegible]	Signature	Signature
Firm: Weston Solutions	Firm: Weston	Firm: Weston	Firm: Weston Solutions, Inc.	Firm	Firm
Date/Time: 10/2/05 0734	Date/Time: 10/2/05 0734	Date/Time: 10/2/05 0950	Date/Time: 10/2/05 0950	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11635

DATE 10/2/05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal coliform	ANALYSIS/TEST REQUESTED: Entero				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
D1300	10-2-05	0503	water	JS	Plastic 12 100mL	X	X						~~100205 D1300~~ 100205D1300
3 Set 5	↓	0517	↓	↓	↓	X	X						~~100205 3 Set 5~~ 100205 3 Set 5
4 Set 5		0540				X	X						100205 4 Set 5
5 Set 5		0600				X	X						100205 5 Set 5
2 Set 5		0611				X	X						100205 2 Set 5
1 Set 5		0625				X	X						100205 1 Set 5
10 Set 5		0643				X	X						100205 10 Set 5
9 Set 5	↓	0659	↓	↓	↓	X	X						100205 9 Set 5

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by S. Given & J. Schollée : Susie Given + Jennifer Schollée

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
J Schollee	Crystal McCain	Crystal McCain	[illegible]		
Signature: Weston Solutions	Signature: Weston	Signature: Weston	Signature: Weston Solutions INC	Signature	Signature
Firm: 10/2/05 7:17A	Firm: 10/2/05 0717	Firm: 10/2/05 0950	Firm: 10/2/05 0950	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11638

DATE 10/02/05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: See above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterococ				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3 Set 6	10-2-05	0804	water	[illegible]	Plastic 1x100mL	X	X				ice/ST		100205 3 Set 6
5 Set 6		0848				X	X						100205 5 Set 6
4 Set 6		0823				X	X						100205 4 Set 6
2 Set 6		0905				X	X						100205 2 Set 6
10 Set 6		0937				X	X						100205 10 Set 6
1 Set 6		0923				X	X						100205 1 Set 6
9 Set 6		0955				X	X						100205 9 Set 6

SPECIAL INSTRUCTIONS/COMMENTS: Jennifer Schollée, Susie Gires, Alison Witheridge, Andrew Lovell
Sampled by J. Schollée, S. Gires, A. Witheridge, A. Lovell

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: Weston Solutions	Firm: Weston Solutions, Inc.	Firm	Firm	Firm	Firm
Date/Time: 10-2-05 12:30P	Date/Time: 10/2/05 1230	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 10962

DATE 10/02/05 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey
PROJECT MANAGER: L. Almond
COMPANY: Westons Solutions
ADDRESS: see above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Received	Entered	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
13 set 6	0935	10/2/05	Water	NW	1 500mL	X	X				ice/ST		100205 13 set 6
12 set 6	0905	↓	↓	↓	↓	X	X						100205 12 set 6
6 set 6	0917					X	X						100205 6 set 6
7 set 6	0928					X	X						100205 7 set 6
8 set 6	0857					X	X						100205 8 set 6
11 set 6	1016	↓	↓	↓	↓	X	X						100205 11 set 6
Temp Control	953	→	→	→	→	→	→	→	→	→		5.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Philip Lappe, Michelle Evans, Niki Woodward

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature Weston Solutions, Inc.	Signature	Signature	Signature	Signature
Firm Westons Solutions	Firm 10/02/05 1310	Firm	Firm	Firm	Firm
Date/Time 10/2/05 1310	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11640

DATE Oct 2 05 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions, INC.
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Regal Cal.	ANALYSIS/TEST REQUESTED: Calveo.	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3 Set 7	Oct 2 05	1200	H2O	~~JH~~ 1200	1	X	X	ICE, ST		100205 3 set 7
4 Set 7		1145		JH 1145						100205 4 set 7
5 Set 7		1217		JH 1217						100205 5 set 7
2 Set 7		1250		AL 1250						100205 2 set 7
1 Set 7		1300		JH 1300						100205 1 set 7
10 Set 7		1310		AL						100205 10 set 7
9 Set 7		1340		JH						100205 9 set 7
6 Set 7		1400		JH						100205 6 set 7
7 Set 7		1410		AL						100205 7 set 7

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Jamie Hultman & Andrew Lovell

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston	Weston	Weston		
Firm	Firm	Firm	Firm	Firm	Firm
Oct 2 05 1428	Oct 2, 2005 1428	Oct 2, 2005 1630	10/2/05 1630		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11659

DATE 10/2/05 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Monna Del Rey
PROJECT MANAGER: L. Armand
COMPANY: Weston Solutions, INC.
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal col.	ANALYSIS/TEST REQUESTED: Entero				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 Set 7	10/2/05	1129	H2O	Same	1						ice, ST		100205 12 set 7
13		1207											100205 13 set 7
11		1327											100205 11 set 7
8		1351											100205 8 set 7
temp blank		1141											

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by S. Adams and M. Evans : Sam Adams and Michelle Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston	Weston	Weston		
Firm 10/2/05 1435	Firm 1435 10/2/05	Firm Oct 2/2005 1630	Firm 10/2/05 1630	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: Nov. 30-Dec. 01, 2005
Date Test Started: Nov. 30-Dec. 01, 2005
Date Test Ended: December 01-02, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 1	113005 1 Set 1	11/30/2005	1342	<20	<10
2 Set 1	113005 2 Set 1	11/30/2005	1330	<20	<10
3 Set 1	113005 3 Set 1	11/30/2005	1342	<20	20
4 Set 1	113005 4 Set 1	11/30/2005	1253	<20	10
5 Set 1	113005 5 Set 1	11/30/2005	1313	170	158
6 Set 1	113005 6 Set 1	11/30/2005	1420	40	135
7 Set 1	113005 7 Set 1	11/30/2005	1431	40	98
8 Set 1	113005 8 Set 1	11/30/2005	1448	230	134
9 Set 1	113005 9 Set 1	11/30/2005	1405	<20	10
10 Set 1	113005 10 Set 1	11/30/2005	1357	<20	<10
11 Set 1	113005 11 Set 1	11/30/2005	1412	20	<10
12 Set 1	113005 12 Set 1	11/30/2005	1217	<20	<10
13 Set 1	113005 13 Set 1	11/30/2005	1250	<20	<10
16 Set 1	113005 16 Set 1	11/30/2005	1510	80	420
19W Set 1	113005 19W Set 1	11/30/2005	1413	1,600,000	13,958
1 Set 2	113005 1 Set 2	11/30/2005	1730	<20	<10
2 Set 2	113005 2 Set 2	11/30/2005	1717	20	<10
3 Set 2	113005 3 Set 2	11/30/2005	1639	80	20
4 Set 2	113005 4 Set 2	11/30/2005	1652	1,300	857
5 Set 2	113005 5 Set 2	11/30/2005	1705	130	52
6 Set 2	113005 6 Set 2	11/30/2005	1840	130	1,126
7 Set 2	113005 7 Set 2	11/30/2005	1852	500	1,872
8 Set 2	113005 8 Set 2	11/30/2005	1830	40	226
9 Set 2	113005 9 Set 2	11/30/2005	1751	<20	20

Spot samples and Sites 8, 16, & 18
Fecal coliform analysis based on dilutions providing results 20-1,600,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: Nov. 30-Dec. 01, 2005
Date Test Started: Nov. 30-Dec. 01, 2005
Date Test Ended: December 01-02, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
10 Set 2	113005 10 Set 2	11/30/2005	1743	20	10
11 Set 2	113005 11 Set 2	11/30/2005	1800	<20	10
12 Set 2	113005 12 Set 2	11/30/2005	1630	<20	<10
13 Set 2	113005 13 Set 2	11/30/2005	1651	<20	41
16 Set 2	113005 16 Set 2	11/30/2005	1815	500	495
1 Set 3	120105 1Set 3	11/30/2005	2050	20	<10
2 Set 3	120105 2 Set 3	11/30/2005	2046	<20	<10
3 Set 3	120105 3 Set 3	11/30/2005	2010	1,100	<10
4 Set 3	120105 4 Set 3	11/30/2005	2020	<20	257
5 Set 3	120105 5 Set 3	11/30/2005	2034	300	10
6 Set 3	120105 6 Set 3	11/30/2005	2210	170	1,086
7 Set 3	120105 7 Set 3	11/30/2005	2235	40	809
8 Set 3	120105 8 Set 3	11/30/2005	2215	130	301
9 Set 3	120105 9 Set 3	11/30/2005	2120	<20	41
10 Set 3	120105 10 Set 3	11/30/2005	2110	<20	20
11 Set 3	120105 11 Set 3	11/30/2005	2135	<20	10
12 Set 3	120105 12 Set 3	11/30/2005	2023	<20	10
13 Set 3	120105 13 Set 3	11/30/2005	2050	<20	<10
16 Set 3	120105 16 Set 3	11/30/2005	2135	2,800	5,475
1 Set 4	120105 1 Set 4	12/1/2005	0145	<20	<10
2 Set 4	120105 2 Set 4	12/1/2005	0130	20	<10
3 Set 4	120105 3 Set 4	12/1/2005	0035	20	10
4 Set 4	120105 4 Set 4	12/1/2005	0100	20	31
5 Set 4	120105 5 Set 4	12/1/2005	0115	80	10

Spot samples and Sites 8, 16, & 18
Fecal coliform analysis based on dilutions providing results 20-1,600,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: Nov. 30-Dec. 01, 2005
Date Test Started: Nov. 30-Dec. 01, 2005
Date Test Ended: December 01-02, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
6 Set 4	120105 6 Set 4	12/1/2005	0330	20	31
7 Set 4	120105 7 Set 4	12/1/2005	0320	20	10
8 Set 4	120105 8 Set 4	12/1/2005	0301	170E	488
9 Set 4	120105 9 Set 4	12/1/2005	0240	<20	10
10 Set 4	120105 10 Set 4	12/1/2005	0205	<20	<10
11 Set 4	120105 11 Set 4	12/1/2005	0242	<20	10
12 Set 4	120105 12 Set 4	12/1/2005	0008	<20	<10
13 Set 4	120105 13 Set 4	12/1/2005	0038	<20	10
16 Set 4	120105 16 Set 4	12/1/2005	0300	230	432
JV Set 4	120105 JV Set 4	12/1/2005	0210	5,000	36,540
JD Set 4	120105 JD Set 4	12/1/2005	0210	17,000	16,695
JV2 Set 4	120105 JV2 Set 4	12/1/2005	0228	3,000	43,517
N1 Set 4	120105 N1 Set 4	12/1/2005	0120	<20	<10
1 Set 5	120105 1 Set 5	12/1/2005	0610	40	<10
2 Set 5	120105 2 Set 5	12/1/2005	0555	<20	1,872
3 Set 5	120105 3 Set 5	12/1/2005	500	<20	31
4 Set 5	120105 4 Set 5	12/1/2005	0515	800	<10
5 Set 5	120105 5 Set 5	12/1/2005	0537	20	<10
6 Set 5	120105 6 Set 5	12/1/2005	0709	130	121
7 Set 5	120105 7 Set 5	12/1/2005	0641	20	75
8 Set 5	120105 8 Set 5	12/1/2005	0624	<20	31
9 Set 5	120105 9 Set 5	12/1/2005	0650	20	41
10 Set 5	120105 10 Set 5	12/1/2005	0632	<20	<10
11 Set 5	120105 11 Set 5	12/1/2005	0600	<20	41

Spot samples and Sites 8, 16, & 18
Fecal coliform analysis based on dilutions providing results 20-1,600,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: Nov. 30-Dec. 01, 2005
Date Test Started: Nov. 30-Dec. 01, 2005
Date Test Ended: December 01-02, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
12 Set 5	120105 12 Set 5	12/1/2005	0414	<20	10
13 Set 5	120105 13 Set 5	12/1/2005	0443	<20	<10
16 Set 5	120105 16 Set 5	12/1/2005	0715	1,400	554
G Set 5	120105 G Set 5	12/1/2005	0645	<20	10
6a Set 5	120105 6a Set 5	12/1/2005	0725	28,000	98,039
21 West Set 5	120105 21 West Set 5	12/1/2005	0535	80	135
22 West Set 5	120105 22 West Set 5	12/1/2005	0600	900	9,075
1 Set 6	120105 1 Set 6	12/1/2005	0955	<20	<10
2 Set 6	120105 2 Set 6	12/1/2005	0935	70	<10
3 Set 6	120105 3 Set 6	12/1/2005	0840	<20	<10
4 Set 6	120105 4 Set 6	12/1/2005	0906	40	<10
5 Set 6	120105 5 Set 6	12/1/2005	0925	<20	31
6 Set 6	120105 6 Set 6	12/1/2005	1043	40	31
7 Set 6	120105 7 Set 6	12/1/2005	1030	1,100	>24196
8 Set 6	120105 8 Set 6	12/1/2005	1002	20	<10
9 Set 6	120105 9 Set 6	12/1/2005	1030	20	31
10 Set 6	120105 10 Set 6	12/1/2005	1015	<20	110
11 Set 6	120105 11 Set 6	12/1/2005	0944	<20	<10
12 Set 6	120105 12 Set 6	12/1/2005	0812	<20	<10
13 Set 6	120105 13 Set 6	12/1/2005	0335	<20	<10
16 Set 6	120105 16 Set 6	12/1/2005	1055	800	1,777

** Spot samples and Sites 8, 16, & 18*
Fecal coliform analysis based on dilutions providing results 20-1,600,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: Nov. 30-Dec. 01, 2005
Date Test Started: Nov. 30-Dec. 01, 2005
Date Test Ended: December 01-02, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
18 Set 6	120105 18 Set 6	12/1/2005	1108	<20	<10
M1A Set 6	120105 M1A Set 6	12/1/2005	1118	<20	<10
23 West Set 6	120105 23 West Set 6	12/1/2005	1030	40	<10

Spot samples and Sites 8, 16, & 18
Fecal coliform analysis based on dilutions providing results 20-1,600,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results 10-241,960 MPN/100ml

QA/QC Officer (Rosabel Dias) — Date: 08/28/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/28/06

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CHAIN OF CUSTODY

№ 11870

DATE 11/30/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Larissa Tumandl
COMPANY: WESTON
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal	enter	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 SET 1	11/30/05	1217	H_2O	CH	1 x 100mL	X	X				ice/ST	10 C	113005 12 Set1
fc 13 SET 1	↓	1250		CH	↓	↓	↓				↓		113005 13 Set 1
11 SET 1	↓	1412		DM	↓	↓	↓				↓		113005 11 Set 1
temp blank	11/30/05	1217	↓	CH	↓			X			↓		
fc 8 SET 1	11/30/05	1448	H_2O	DM	1 x 100mL	X	X				ice/ST	↓	113005 8 Set1

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Dan McCoy and Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
CATHY HARTMAN	[signature]	[signature]	[signature]		
Signature [signature]	Signature	Signature	Signature	Signature	Signature
Firm WESTON	Firm Weston	Firm Weston	Firm Weston	Firm	Firm
Date/Time 11/30/05 1505	Date/Time 11/30/05 ~~1540~~ 1505	Date/Time 11/30/05 1803	Date/Time 11/30/05 1803	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11783

DATE 11/30/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	Fecal coliform	Entero.	Temp. Blank			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
					Plastic	ANALYSIS/TEST REQUESTED						FOR WESTON USE ONLY	
3 Set 1	11/30/05	1342	H_2O	~~JMP~~ JS	1x100mL						Ice IST	10C	113005 3 Set 1
4 Set 1		1253		JMP									113005 4 Set 1
5 Set 1		1313		JS									113005 5 Set 1
2 Set 1		1330		JMP									113005 2 Set 1
E 1 Set 1		1342		↓									113005 1 Set 1
10 Set 1		1357		↓									113005 10 Set 1
9 Set 1		1405		↓									113005 9 Set 1
16 Set 1		1510		JS									113005 16 Set 1
Temp Blank		1215		JMP				X					—
E 6 Set 1		1420		↓									113005 6 Set 1
7 Set 1		1431		↓									113005 7 Set 1
PM ~~19 Set 1 W~~ 19w set 1	↓	1413	↓	JS	↓	↓	↓				↓	↓	113005 19 Set 1 W

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by: Jennifer Schollee + Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft					
Signature J. Pendergraft	Signature	Signature	Signature	Signature	Signature
Firm Weston Solns.	Firm Weston	Firm Weston	Firm Weston	Firm	Firm
Date/Time 11/30/05 1550	Date/Time 11/30/05 15:50	Date/Time 11/30/05 1803	Date/Time 11/30/05 1803	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11808

DATE 11/30/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY
PROJECT MANAGER: LARISSA AUMAND
COMPANY: WESTON SOLUTIONS
ADDRESS: SEE ABOVE
PHONE/FAX: "

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: FECAL	ENTERO	TEMP			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
12 SET 2	11/30/05	16:30	H_2O	DM	1	X	X				5T + ICE	10C	113005 12 Set 2
13 SET 2	11/30/05	16:51	↓	DM	1	X	X				↓	↓	113005 13 Set 2
11 SET 2	11/30/05	18:00		DM	1	X	X						113005 11 Set 2
8 SET 2	11/30/05	18:30		DM	1	X	X						113005 8 Set 2
7 SET 2	11/30/05	18:52		DM	1	X	X						113005 7 set 2
TEMP BLANK	11/30/05	1630	↓	DM	1			X			↓	↓	

SPECIAL INSTRUCTIONS/COMMENTS:
SAMPLED BY CATHY HARTMAN & DAN MCCOY

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [illegible]	Signature: [illegible]	Signature: [illegible]	Signature: [illegible]	Signature	Signature
Firm: WESTON SOLUTIONS	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 11/30/05 1938	Date/Time: 1938 11/30/05	Date/Time: 11/30/05 2140	Date/Time: 11/30/05 2140	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11785

DATE 11/30/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

	SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal coliform	Entero.	Temp Blank			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
E	3 Set 2	11/30/05	1639	H_2O	JS	1x100mL Plastic	X	X				Ice/ST	10 C	113005 3 Set 2
	4 Set 2		1652		JP									113005 4 Set 2
	5 Set 2		1705		JSP									113005 5 Set 2
FC	2 Set 2		1717		JS									113005 2 Set 2
	1 Set 2		1730		JS									113005 1 Set 2
	10 Set 2		1743		JP									113005 10 Set 2
	9 Set 2		1751		JS									113005 9 Set 2
	16 Set 2	1815	~~1813~~ 1815		JP		✓	✓						113005 16 Set 2
	Temp Blank	✓	1730	✓	JS	✓	~~X~~		X			~~X~~ ✓	~~X~~ ✓	—
FC	6 Set 2	11/30/05	1840	H_2O	JS	✓	X	X				✓	✓	113005 6 Set 2

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by: Jennifer Schollee & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	[signature] Weston	[signature] Weston	[signature] Weston		
Signature J. Pendergraft	Signature	Signature	Signature	Signature	Signature
Firm Weston Solns.	Firm 1940 11/30/05	Firm 2140 11/30/05	Firm 2140 11/30/05	Firm	Firm
Date/Time 11/30/05 1940	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11168

DATE 11/30/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY
PROJECT MANAGER: LARISSA AUMAND
COMPANY: WESTON SOLUTIONS
ADDRESS: SEE ABOVE
PHONE/FAX:

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: FECAL COLIF.	ENTERO.	TEMP.			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 SET 3	11/30/05	2023	H_2O	DM	1 100mL	X	X				ICE + ST		120105 12 Set 3
13 SET 3	11/30/05	2050		DM	1 "	X	X						120105 13 Set 3
11 SET 3	11/30/05	2135		DM	1 "	X	X						120105 11 Set 3
8 SET 3	11/30/05	2215		DM	1 "	X	X						120105 8 Set 3
7 SET 3	11/30/05	2235		DM	1 "	X	X						120105 7 Set 3
TEMP. BLANK	11/30/05	2025		DM	1 "			X					

SPECIAL INSTRUCTIONS/COMMENTS:
SAMPLED BY CATHY HARTMAN & DAN McCOY

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature:	Signature:	Signature:	Signature:	Signature:	Signature:
Firm: WESTON SOLUTIONS	Firm: Weston Solutions	Firm:	Firm:	Firm:	Firm:
Date/Time: ~~11/30/05~~ 12/1/05 0130	Date/Time: 12/1/05 0130	Date/Time:	Date/Time:	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11796

DATE 11/30/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solns.
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	Fecal coliform	Entero.	Temp. Blank			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
					Plastic	ANALYSIS/TEST REQUESTED						FOR WESTON USE ONLY	
Temp Blank	11/30/05	2000	H_2O	JP	1x100mL			X			Ice/ST	6°C	
1 Set 3		2050		JMP		X	X						120105 1 Set 3
2 Set 3		2046		JMP									120105 2 Set 3
3 Set 3		2010		JMP									120105 3 Set 3
4 Set 3		2020		JS									120105 4 Set 3
5 Set 3		2034		JS									120105 5 Set 3
9 Set 3		2120		JMP									120105 9 Set 3
10 Set 3		2110		JMP									120105 10 Set 3
16 Set 3		2135		JS									120105 16 Set 3
6 Set 3	↓	2210	↓	JMP	↓	↓	↓				↓		120105 6 Set 3

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by: Jennifer Schallee & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Anthony Trinh				
Signature: J. Pendergraft	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: Weston Solns.	Firm: Weston Solns.	Firm	Firm	Firm	Firm
Date/Time: ~~1115~~	Date/Time: 12/1/05 0120	Date/Time	Date/Time	Date/Time	Date/Time

12/1/05 0120

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11799

DATE 12/1/05 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Armand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
13 set 4	12.1.05	0038	H_2O	[illegible]	1	X	X						120105 13 set 4
12 set 4		0008			1								120105 12 Set 4
11 set 4		0242			1								120105 11 Set 4
8 set 4		0301			1								120105 8 Set 4
7 set 4		0320			1								120105 7 Set 4
temp blank		0327			1			X				6°C	~~120105~~ AT
JD		0210			1	X	X						120105 JD
JV		0210			1								120105 JV
JV2		0228			1								120105 JV2
N1		0120			1								120105 N1
					8								

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by S. Adams & M. Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature: [signature]	Signature: [signature]	Signature	Signature
Firm: Weston 0400 12.1.05	Firm: Weston Solution 12/1/05 0401	Firm: Weston Solution 12/1/05 0614	Firm: Weston Solutions 12/1/05 0644	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1079
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11871

DATE 12/1/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY
PROJECT MANAGER: L. ALMAND
COMPANY: WESTON
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	ANALYSIS/TEST REQUESTED: Entero.	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 SET 4	12/1/05	0145	W	AW	1/100mL	X	X	ICE/ST		120105 1 set 4
2 SET 4		0130								120105 2set 4
3 SET 4		0035								120105 3 set 4
4 SET 4		0100								120105 4 set 4
5 SET 4		0115								120105 5 set 4
9 SET 4		0240								120105 9 set 4
10 SET 4		0205								120105 10 set 4
16 SET 4		0300								120105 16 set 4
6 SET 4		0330								120105 6 set 4

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Alisa Wetheridge

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: Weston	Firm: Weston Solutions	Firm: Weston Solutions	Firm: Weston Solutions	Firm	Firm
Date/Time: 12/1/05 0355	Date/Time: 12/1/05 0359	Date/Time: 12/1/05 0614	Date/Time: 12/1/05 0614	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

☒ 2433 Impala Drive • Carlsbad, CA 92008 • (760) 931-8081, FAX 931-1580
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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11176

DATE 12/1/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Manna del Rey
PROJECT MANAGER: L. Osmond
COMPANY: Weston Solutions
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	tempO			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 set 5	12/1/05	0414	H_2O	SG, ME	1						ICE/ST		120105 12 set 5
13 set 5		0443											120105 13 set 5
~~AA set 5~~		~~0531~~											~~spot sample~~
11 set 5		0600											120105 11 set 5
8 set 5		0624											120105 8 set 5
7 set 5		0641											120105 7 set 5
7 temp blank		0643						X				5.0c	
6 set 5		0709											120105 6 set 5
6A set 5	↓	0725	↓	↓	↓	↓	↓				↓		spot sample ↓ 120105 6A set 5 AT

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Sam Ackms and Michelle Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Michell Mc	Signature: Nicole Woodward	Signature: Nicole Woodward	Signature:	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston Sol.	Firm: Erica Livingston	Firm:	Firm:
Date/Time: 12/1/05 0730	Date/Time: 12/1/05 0730	Date/Time: 12/1/05 0944	Date/Time: Weston Sol'n's 12/1/05 0945	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11609

DATE 12/1/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY
PROJECT MANAGER: L. DUMAND
COMPANY: WESTON
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	ANALYSIS/TEST REQUESTED: Entero				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 Set 5	12/1/05	0610	W	SG	1 100mL	X	X				ICE / ST		120105 1 set 5
2 Set 5		0555											120105 2 set 5
3 Set 5		0500											120105 3 set 5
4 Set 5		0515											120105 4 set 5
5 Set 5		0537											120105 5 set 5
10 Set 5		0632											120105 10 set 5
9 Set 5		0650											120105 9 set 5
16 Set 5		0715		↓									120105 16 set 5
21 West Set 5		0535		AW									120105 21 west set 5
22 West Set 5		0600		AW	↓	↓	↓						120105 22 west set 5
G Set 5	↓	0645	↓	↓	↓	↓	↓				↓		120105 G set 5

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Suzie Givens & Alison Witheridge

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Ryan	Signature: Mcalewood	Signature: Mcalewood	Signature:	Signature:	Signature:
Firm: Weston Solutions, Inc.	Firm: Weston Sol.	Firm: Weston Sol.	Firm: Erica Livingston	Firm:	Firm:
Date/Time: 0745 12/1/05	Date/Time: 12/1/05 0745	Date/Time: 12/1/05 0944	Date/Time: Weston Sol'n's 12/1/05 8945	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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- 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
- 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
- 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11606

DATE 12/1/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Armand

COMPANY: Weston

ADDRESS: See above

PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	Temp blank			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
1 Set 6	12/1/05	0955	H2O	SG	1x100mL	X	X				ICE/ST		120105 1 set 6
2 Set 6		0935		SG									120105 2 Set 6
3 Set 6		0840		SG									120105 3 Set 6
4 Set 6		0906		SG									120105 4 set 6
5 Set 6		0925		SG									120105 5 set 6
10 Set 6		1015		SG									120105 10 set 6
9 Set 6		1030		SG									120105 9 set 6
16 Set 6		1055		SG									120105 16 set 6
18 Set 6		1108		AW									120105 18 set 6
23 WEST Set 6		1030		AW									120105 23 West set 6
Temp blank		0840		SG				X				1.0°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Alison Witheridge & Sunjie Givens

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston Solutions, Inc.	Firm	Firm	Firm	Firm
Date/Time: 12/1/05 1400	Date/Time: 12/1/05 1400	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 98 Main St., Ste. #428 • Tiburon, CA 94920 • (415) 435-1847, FAX 435-0479
☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11610

DATE 12.1.05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Almand
COMPANY: Weston
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	Entero	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
12 set 6	12.1.05	0812	H2O	SA	1x100ml	X	X				ice/ST		120105 12 set 6
13 set 6		0835				X	X						120105 13 Set 6
11 set 6		0944				X	X						120105 11 Set 6
8 set 6		1002				X	X						120105 8 Set 6
7 set 6		1030				X	X						120105 7 Set 6
6 set 6		1043				X	X						120105 6 Set 6
Temp		1047						X				4.0°C	
M1A set 6	↓	1118	↓	↓	↓	X	X				↓		120105 M1A Set 6

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by S. Adams & M. Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston Solutions, Inc.	Firm	Firm	Firm	Firm
Date/Time: 12.1.05 1320	Date/Time: 12/01/05 1820	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 20-21, 2006
Date Test Started: April 20-21, 2006
Date Test Ended: April 21-21, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 1	042006 1 Set 1	4/20/2006	0910	<20	<10
2 Set 1	042006 2 Set 1	4/20/2006	0855	<20	<10
3 Set 1	042006 3 Set 1	4/20/2006	0810	<20	<10
4 Set 1	042006 4 Set 1	4/20/2006	0835	20	<10
5 Set 1	042006 5 Set 1	4/20/2006	0845	300	20
6 Set 1	042006 6 Set 1	4/20/2006	1000	<20	41
7 Set 1	042006 7 Set 1	4/20/2006	1042	20	10
8 Set 1	042006 8 Set 1	4/20/2006	1030	230	97
9 Set 1	042006 9 Set 1	4/20/2006	0945	20	<10
10 Set 1	042006 10 Set 1	4/20/2006	0935	<20	<10
11 Set 1	042006 11 Set 1	4/20/2006	1008	<20	10
12 Set 1	042006 12 Set 1	4/20/2006	0812	<20	<10
13 Set 1	042006 13 Set 1	4/20/2006	0830	<20	<10
14 Set 1	042006 14 Set 1	4/20/2006	0955	1,700	120
15 Set 1	042006 15 Set 1	4/20/2006	0935	16,000	2,755
16 Set 1	042006 16 Set 1	4/20/2006	1040	230	156
18 Set 1	042006 18 Set 1	4/20/2006	1045	<20	30
19 Set 1	042006 19 Set 1	4/20/2006	1032	<20	20
K Set 1	042006 K Set 1	4/20/2006	0922	<20	<10
N Set 1	042006 N Set 1	4/20/2006	0902	<20	20
1 Set 2	042006 1 Set 2	4/20/2006	1425	<20	<10
2 Set 2	042006 2 Set 2	4/20/2006	1320	<20	<10
3 Set 2	042006 3 Set 2	4/20/2006	1240	<20	<10
4 Set 2	042006 4 Set 2	4/20/2006	1300	<20	<10

Spot samples and Sites 8 & 16

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 20-21, 2006
Date Test Started: April 20-21, 2006
Date Test Ended: April 21-21, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
5 Set 2	042006 5 Set 2	4/20/2006	1310	20	<10
6 Set 2	042006 6 Set 2	4/20/2006	1415	40	20
7 Set 2	042006 7 Set 2	4/20/2006	1454	20	<10
8 Set 2	042006 8 Set 2	4/20/2006	1438	20	10
9 Set 2	042006 9 Set 2	4/20/2006	1400	<20	<10
10 Set 2	042006 10 Set 2	4/20/2006	1345	<20	<10
11 Set 2	042006 11 Set 2	4/20/2006	1415	80	<10
12 Set 2	042006 12 Set 2	4/20/2006	1230	<20	<10
13 Set 2	04200613 Set 2	4/20/2006	1242	<20	<10
14 Set 2	042006 14 Set 2	4/20/2006	1403	130	<10
15 Set 2	042006 15 Set 2	4/20/2006	1350	80	41
16 Set 2	04200616 Set 2	4/20/2006	1445	11,000	1,500
18 Set 2	042006 18 Set 2	4/20/2006	1504	<20	<10
19 Set 2	042006 19 Set 2	4/20/2006	1440	20	10
K Set 2	042006 K Set 2	4/20/2006	1332	300	<10
N Set 2	042006 N Set 2	4/20/2006	1315	<20	<10
21 W Set 2	042006 21W Set 2	4/20/2006	1320	<20	<10
I20E Set 2	042006 I20E Set 2	4/20/2006	1515	50,000	1145
I21E Set 2	042006 I21E Set 2	4/20/2006	1525	3,000	97
1 Set 3	042006 1Set 3	4/20/2006	1720	<20	<10
2 Set 3	042006 2 Set 3	4/20/2006	1700	<20	<10
3 Set 3	042006 3 Set 3	4/20/2006	1620	<20	<10
4 Set 3	042006 4 Set 3	4/20/2006	1640	<20	<10
5 Set 3	042006 5 Set 3	4/20/2006	1645	<20	<10

Spot samples and Sites 8 & 16

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 20-21, 2006
Date Test Started: April 20-21, 2006
Date Test Ended: April 21-21, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
6 Set 3	042006 6 Set 3	4/20/2006	1800	<20	<10
7 Set 3	042006 7 Set 3	4/20/2006	1845	20	<10
8 Set 3	042006 8 Set 3	4/20/2006	1825	40	31
9 Set 3	042006 9 Set 3	4/20/2006	1745	<20	<10
10 Set 3	042006 10 Set 3	4/20/2006	1730	<20	20
11 Set 3	042006 11 Set 3	4/20/2006	1805	230	20
12 Set 3	042006 12 Set 3	4/20/2006	1613	<20	<10
13 Set 3	042006 13 Set 3	4/20/2006	1624	<20	<10
14 Set 3	042006 14 Set 3	4/20/2006	1745	<20	10
15 Set 3	042006 15 Set 3	4/20/2006	1736	16,000	173
16 Set 3	042006 16 Set 3	4/20/2006	1825	30,000	1,314
18 Set 3	042006 18 Set 3	4/20/2006	1853	40	<10
19 Set 3	042006 19 Set 3	4/20/2006	1815	<20	<10
K Set 3	042006 K Set 3	4/20/2006	1716	220	10
N Set 3	042006 N Set 3	4/20/2006	1657	<20	<10
1 Set 4	042106 1 Set 4	4/20/2006	2150	<20	<10
2 Set 4	042106 2 Set 4	4/20/2006	2135	<20	<10
3 Set 4	042106 3 Set 4	4/20/2006	2040	<20	<10
4 Set 4	042106 4 Set 4	4/20/2006	2106	<20	<10
5 Set 4	042106 5 Set 4	4/20/2006	2115	70	<10
6 Set 4	042106 6 Set 4	4/20/2006	2235	170	10
7 Set 4	042106 7 Set 4	4/20/2006	2258	<20	<10
8 Set 4	042106 8 Set 4	4/20/2006	2335	40	20
9 Set 4	042106 9 Set 4	4/20/2006	2225	<20	<10

Spot samples and Sites 8 & 16

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 20-21, 2006
Date Test Started: April 20-21, 2006
Date Test Ended: April 21-21, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
10 Set 4	042106 10 Set 4	4/20/2006	2215	<20	<10
11 Set 4	042106 11 Set 4	4/20/2006	2227	80	31
12 Set 4	042106 12 Set 4	4/20/2006	2021	<20	<10
13 Set 4	042106 13 Set 4	4/20/2006	2058	<20	<10
14 Set 4	042106 14 Set 4	4/20/2006	2332	<20	10
15 Set 4	042106 15 Set 4	4/20/2006	2340	170	168
16 Set 4	042106 16 Set 4	4/20/2006	2300	1,300	602
18 Set 4	042106 18 Set 4	4/20/2006	2310	20	20
19 Set 4	042106 19 Set 4	4/20/2006	2320	<20	<10
K Set 4	042106 K Set 4	4/20/2006	2135	<20	<10
N Set 4	042106 N Set 4	4/20/2006	2130	<20	20
1 Set 5	042106 1 Set 5	4/21/2006	0150	20	10
2 Set 5	042106 2 Set 5	4/21/2006	0135	<20	<10
3 Set 5	042106 3 Set 5	4/21/2006	0045	20	<10
4 Set 5	042106 4 Set 5	4/21/2006	0100	20	10
5 Set 5	042106 5 Set 5	4/21/2006	0100	20	10
6 Set 5	042106 6 Set 5	4/21/2006	0235	40	10
7 Set 5	042106 7 Set 5	4/21/2006	0320	20	<10
8 Set 5	042106 8 Set 5	4/21/2006	0335	300	480
9 Set 5	042106 9 Set 5	4/21/2006	0225	40	<10
10 Set 5	042106 10 Set 5	4/21/2006	0200	<20	<10
11 Set 5	042106 11 Set 5	4/21/2006	0240	130	10
12 Set 5	042106 12 Set 5	4/21/2006	0110	20	85

Spot samples and Sites 8 & 16

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 20-21, 2006
Date Test Started: April 20-21, 2006
Date Test Ended: April 21-21, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
13 Set 5	042106 13 Set 5	4/21/2006	0135	<20	30
14 Set 5	042106 14 Set 5	4/21/2006	0315	80	30
15 Set 5	042106 15 Set 5	4/21/2006	0325	230	434
16 Set 5	042106 16 Set 5	4/21/2006	0255	800	1,529
18 Set 5	042106 18 Set 5	4/21/2006	0300	<20	<10
19 Set 5	042106 19 Set 5	4/21/2006	0310	170	134
K Set 5	042106 K Set 5	4/21/2006	0210	300	10
N Set 5	042106 N Set 5	4/21/2006	0155	<20	<10
21 W Set 5	042106 21W Set 5	4/21/2006	0150	20	<10
22 W Set 5	042106 22W Set 5	4/21/2006	0315	3,000	1,012
1 Set 6	042106 1 Set 6	4/21/2006	0555	<20	63
2 Set 6	042106 2 Set 6	4/21/2006	0540	20	<10
3 Set 6	042106 3 Set 6	4/21/2006	0445	20	<10
4 Set 6	042106 4 Set 6	4/21/2006	0505	<20	<10
5 Set 6	042106 5 Set 6	4/21/2006	0515	<20	<10
6 Set 6	042106 6 Set 6	4/21/2006	0630	1,400	327
7 Set 6	042106 7 Set 6	4/21/2006	0645	800	209
8 Set 6	042106 8 Set 6	4/21/2006	0720	70	109
9 Set 6	042106 9 Set 6	4/21/2006	0615	500	<10
10 Set 6	042106 10 Set 6	4/21/2006	0600	<20	10
11 Set 6	042106 11 Set 6	4/21/2006	0610	<20	10
12 Set 6	042106 12 Set 6	4/21/2006	0450	<20	<10

Spot samples and Sites 8 & 16

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Event
Client Sample ID: See below
Weston Sample ID: See below

Date Received: April 20-21, 2006
Date Test Started: April 20-21, 2006
Date Test Ended: April 21-21, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
13 Set 6	042106 13 Set 6	4/21/2006	0510	<20	31
14 Set 6	042106 14 Set 6	4/21/2006	0745	20	145
15 Set 6	042106 15 Set 6	4/21/2006	0740	>16,000	823
16 Set 6	042106 16 Set 6	4/21/2006	0645	1,100	537
18 Set 6	042106 18 Set 6	4/21/2006	0655	2,200	291
19 Set 6	042106 19 Set 6	4/21/2006	0700	210	169
20 Set 6	042106 20 Set 6	4/21/2006	0758	20	<10
K Set 6	042106 K Set 6	4/21/2006	0540	1,300	41
N Set 6	042106 N Set 6	4/21/2006	0535	<20	10
21E Set 6	042106 21E Set 6	4/21/2006	0557	20	<10
22E Set 6	042106 22E Set 6	4/21/2006	0655	<20	<10

Spot samples and Sites 8 & 16

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

QA/QC Officer (Rosabel Dias) — Date: 08/29/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/29/06

EAST Bact - Set 2

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CHAIN OF CUSTODY

12621

DATE 4/20/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	TEMP			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
7 set 2	4/20/06	1454	H2O	SA	1x100mL	X	X				ICE/ST		042006 7 set 2
8 set 2		1438											042006 8 set 2
11 set 2		1415											042006 11 set 2
12 set 2		1230											042006 12 set 2
13 set 2		1242											042006 13 set 2
14 set 2		1403											042006 14 set 2
15 set 2		1350											042006 15 set 2
~~17 set 2~~													
18 set 2		1504		SA									042006 18 set 2
K set 2		1332											042006 K set 2
N set 2		1315											042006 N set 2
Temp blank		1505	H2O	NW	1x100mL	[illegible]	[illegible]	X			ICE/ST	7.0°C	
I20E set 2	4.20.06	1515		SA		X	X						042006 I20E set 2
I21E set 2	4.20.06	1525		SA		X	X						042006 I21E set 2

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Sam Adams & Nikki Woodward

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston	Weston	Weston Solutions		
Firm	Firm	Firm	Firm	Firm	Firm
4/20/06 1545	4/20/06 1545	4/20/06 1545	4/20/06 1820		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST Bact - Set 2

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CHAIN OF CUSTODY

12631

DATE 4/20/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY
PROJECT MANAGER: L. AUMAND
COMPANY: WESTON
ADDRESS: -SEE ABOVE-
PHONE/FAX: -SEE ABOVE-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterco	ANALYSIS/TEST REQUESTED: TEMP	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 2	4/20/06	1425	H_2O	AH	1x100mL	X	X				ICE/ST		042006 1 set2
2 set 2		1320											042006 2 set2
3 set 2		1240											042006 3 set2
4 set 2		1300											042006 4 set2
5 set 2		1310											042006 5 set2
6 set 2		1415											042006 6 set2
9 set 2		1400											042006 9 set2
10 set 2		1345											042006 10 set2
16 set 2		1445											042006 16 set2
19 set 2		1440											042006 19 set2
Temp blank		1230	H_2O		1x100mL			X			ICE/ST		
21W set 2		1320				X	X						042006 21W set2

SPECIAL INSTRUCTIONS/COMMENTS:
SAMPLED BY: Amy Hamilton

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Amy Hamilton	Signature:	Signature:	Signature:	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston Solutions	Firm:	Firm:
Date/Time: 4/20/06 1545	Date/Time: 4/20/06 1545	Date/Time: 4/20/06 1545	Date/Time: 4/20/06 1820	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST Bact - set 1

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CHAIN OF CUSTODY

12630

DATE 4/20/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Arnand
COMPANY: Weston Solutions
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
1 set 1	4/20/06	0910	H2O	AL	1x100mL	X	X				ICE/ST		042006 1 set 1
2 set 1		0855		AL									042006 2 set 1
3 set 1		0810		AL									042006 3 set 1
4 set 1		0835											042006 4 set 1
5 set 1		0845											042006 5 set 1
6 set 1		1000											042006 6 set 1
9 set 1		0945											042006 9 set 1
10 set 1		0935											042006 10 set 1
16 set 1		1040											042006 16 set 1
19 set 1		1032											042006 19 set 1
Temp blank		0800						X				2.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Andrew Lovell

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Amy Hamelik	J Schaller	J Schaller			
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston Solns	Weston Soln	Weston Solutions		
Firm	Firm	Firm	Firm	Firm	Firm
4/20/06 1110	4/20/06 1110	4/20/06 1300	4/20/06 1300		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

East - Bact Set 1

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CHAIN OF CUSTODY

12620

DATE 4.20.06 PAGE 1 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: Weston

ADDRESS: -see above-

PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
7 Set 1	4.20.06	1042	H_2O	SA	1x 100mL	X	X				ICE/ST		042006 7set1
8 Set 1		1030											042006 8 set1
11 Set 1		1008											042006 11 set1
12 Set 1		0812											042006 12set1
13 Set 1		0830											042006 13 set1
14 Set 1		0955											042006 14 set1
15 Set 1		0935											042006 15 set1
N Set 1													
18 Set 1	4.20.06	1045		SA									042006 18 set1
K Set 1		0922											042006 15 set1
N Set 1		0902											042006 N set1
Temp blank		1108						X				3.0°C	~~042AT~~

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Nikki Woodward & Sam Adams

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature Weston Sol'n	Signature Weston Sol'n	Signature Weston Solutions	Signature	Signature
Firm Weston Solutions	Firm 4/20/06 1115	Firm 4/20/06 1300	Firm 4/20/06 1300	Firm	Firm
Date/Time 4/20/06 1115	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST Bact - Set 3

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12622

DATE 4·20·06 PAGE 1 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Amand

COMPANY: Weston Solution

ADDRESS: -See above-

PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Entero	ANALYSIS/TEST REQUESTED: TEMP	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 3	4·20·06	1845	H_2O	[illegible]	1×100mL	X	X				ICE/ST		042006 7 set3
8 set 3		1825											042006 8 set3
11 set 3		1805											042006 11 set3
12 set 3		1613											042006 12 set3
13 set 3		1624											042006 13 set3
14 set 3		1745											042006 14 set3
15 set 3	↓	1736		↓									042006 15 set3
~~17 set 3~~													
18 set 3	4·20·06	1853		[illegible]									042006 18 set3
K set 3		1716											042006 K set3
N set 3		1657	↓		↓	↓	↓				↓		042006 N set3
Temp blank	↓	1853	H_2O	↓	1×100mL			X			ICE/ST	4°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Sam Adams & Nikki Woodward

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	~~RECEIVED~~ BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 4·20·06 2124	Date/Time: 4/20/06 2124	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST Bact set 3

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12632

DATE 4/20/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Entero	ANALYSIS/TEST REQUESTED: TEMP	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 3	4/20/06	1720	H2O	AL	1x100mL	X	X				ICE/ST		042006 1 set 3
2 set 3		1700											042006 2 set 3
3 set 3		1620											042006 3 set 3
4 set 3		1640											042006 4 set 3
5 set 3		1645											042006 5 set 3
6 set 3		1800											042006 6 set 3
9 set 3		1745											042006 9 set 3
10 set 3		1730											042006 10 set 3
16 set 3		1825											042006 16 set 3
19 set 3		1815											042006 19 set 3
Temp Blank		1605	H2O	AL	1x100mL			X			ICE/ST	4°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Andrew Lavell + Amy Hamilton

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Amy Hamilton	Signature: Weston	Signature	Signature	Signature	Signature
Firm: Weston	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 4/20/06 2120	Date/Time: 4/20/06 2120	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST Bact-set 4

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CHAIN OF CUSTODY

12616

DATE 4/20/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterco	Tenp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
7 set 4	4/20/06	2258	H2O	CH ME	1x100mL	X	X				ICE/ST	6°C	042106 7 SET 4
ME 8 set 4		2335											
11 set 4		2227											042106 11 SET 4
12 set 4		2021											042106 12 SET 4
13 set 4		2058											042106 13 SET 13TK 4
ME 14 set 4	—			LC,AW									
ME 15 set 4	—			LCAW									
ME 17 set 4	—			LCAW									
18 set 4		2310											042106 18 SET 4
K set 4		2135											042106 K SET 4
N set 4		2130											042106 N SET 4
temp blank		2021	H2O		1x100mL			X					
* 8 set 4	4/20/06	2335	H2O	CH,ME	1x100mL	X	X				X		042106 8 SET 4

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Cathy Hartman, Michelle Evans
* accidentally crossed out 8 set 4, rewrote on 4/24/06 ME

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Michelle MS	Signature: M. Amand	Signature: M. Amand	Signature:	Signature:	Signature:
Firm: Weston	Firm: WESTON	Firm: WESTON	Firm: WESTON	Firm:	Firm:
Date/Time: 4/20/06 2345	Date/Time: 4-20-06 2345	Date/Time: 4/21/06 0155	Date/Time: 042106 0155	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST Bact - Set 4

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CHAIN OF CUSTODY

12611

DATE 4.20.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston Solutions
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterco	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
1 set 4	4/20/06	2150	H_2O	LC	1x100mL	X	X				ICE/ST	6°C	042106 1 SET 4
2 set 4		2135											042106 2 SET 4
3 set 4		2040											042106 3 SET 4
4 set 4		2106		AW									042106 4 SET 4
5 set 4		2115		LC									042106 5 SET 4
6 set 4		2235											042106 6 SET 4
9 set 4		2225											042106 9 SET 4
10 set 4		2215											042106 10 SET 4
16 set 4		2300											042106 16 SET 4
19 set 4		2320											042106 19 SET 4
temp blank		2040						X					
14 Set 4		2332				X	X						042106 14 SET 4
15 Set 4		2340				X	X						042106 15 SET 4

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Alison Witheridge & Lawrence Campagna

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
WESTON	WESTON	WESTON	WESTON		
Firm	Firm	Firm	Firm	Firm	Firm
4.20.06 2350	42006 2355	42106 0155	042106 0155		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST Bact - Set 5

WESTON SOLUTIONS

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- [ ] 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12618

DATE 4/21/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: WESTON

ADDRESS: -See above-

PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterco	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
7 Set 5	4/21/06	0320	H_2O	CH, MB	1x100mL	X	X				ICE / ST	2°C	042106 7 SET 5
8 Set 5		0335											042106 8 SET 5
11 Set 5		0240											042106 11 SET 5
12 Set 5		0110											042106 12 SET 5
13 Set 5		0135											042106 13 SET 5
~~14 Set 5~~ MB													
~~15 Set 5~~ MB													
~~17 Set 5~~ MB													
18 Set 5		0300											042106 18 SET 5
K Set 5		0210											042106 K SET 5
N Set 5		0155											042106 N SET 5
Temp blank		0110	H_2O		1x100mL			X			ICE / ST		
21 W Set 5		0150											042106 21W SET 5
22 W Set 5		0315											042106 22W SET 5

SPECIAL INSTRUCTIONS/COMMENTS:

Sampled by: Cathy Hartman and Michelle Evans

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston	Weston	Weston		
Firm 4/21/06 0350	Firm 4/21/06 0350	Firm 4/21/06 0555	Firm 4/21/06 0555	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST Bact-Set 5

WESTON SOLUTIONS

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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12633

DATE 4.21.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterco	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
1 set 5	4.21.06	0150	H2O	LC	1x100mL	x	x				ICE/ST	2°C	042106 1 SET 5
2 set 5		0135		LC									042106 2 SET 5
3 set 5		0045		LC									042106 3 SET 5
4 set 5		0100		AW									042106 4 SET 5
5 set 5		0100		LC									042106 5 SET 5
6 set 5		0235		LC									042106 6 SET 5
9 set 5		0225		LC									042106 9 SET 5
10 set 5		0200		LC									042106 10 SET 5
16 set 5		0255		LC									042106 16 SET 5
19 set 5		0310		LC									042106 19 SET 5
Temp blank		0315	H2O	LC	1x100mL			x			ICE/ST		
14 Set 5		0315		LC		x	x						042106 14 SET 5
15 Set 5		0325		LC		x	x						042106 15 SET 5

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Laurence Campagna & Alison Witheridge

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature: [signature]	Signature: [signature]	Signature	Signature
Firm: WESTON	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 4.21.06 0350	Date/Time: 4/21/06 0350	Date/Time: 4/21/06 0555	Date/Time: 4/21/06 0555	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST Bact - Set 6

☒ 2433 Impala Drive • Carlsbad, CA 92008 • (760) 931-8081, FAX 931-1580
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☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12624

DATE 4/21/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterco	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
7 Set 6	4/21/06	0645	H2O	ME/CH	1x100mL	X	X				ICE/ST		042106 7set6
8 Set 6		0720											042106 8 set 6
11 Set 6		0610											042106 11 set 6
12 Set 6		0450											042106 12 set 6
13 Set 6		0510											042106 13 set 6
14 Set 6		0745											042106 14 set 6
15 Set 6		0740											042106 15 set 6
~~17 Set 6~~ (EA)													
18 Set 6		0655											042106 18 set 6
K Set 6		0540											042106 K set 6
N Set 6		0535											042106 N Set 6
Temp blank		0450	H2O		1x100mL			X			ICE/ST	4.0°C	
21E Set 6	X	0557	X	X	X	X	X						042106 21E set6
22E Set 6	X	0655	X	X	X	X	X						042106 22E Set6

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Cathy Hartman & Michelle Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Cathy Hartman	[signature]				
Signature [signature]	Signature WESTON SOLUTIONS	Signature	Signature	Signature	Signature
Firm Weston	Firm 4/21/06 1000	Firm	Firm	Firm	Firm
Date/Time 4/21/06 1400	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

West Bact- set 6

WESTON SOLUTIONS

☒ 2433 Impala Drive • Carlsbad, CA 92008 • (760) 931-8081, FAX 931-1580
☐ 98 Main St., Ste. #428 • Tiburon, CA 94920 • (415) 435-1847, FAX 435-0479
☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12634

DATE_____ PAGE_____ OF_____

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Armand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	Temp			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 6	4.21.06	0555	H2O	LC	1x100mL	X	X				ICE/ST		042106 1 SET6
2 set 6		0540		LC									042106 2 SET6
3 set 6		0445		LC									042106 3 SET6
4 set 6		0505		AW									042106 4 SET6
5 set 6		0515		LC									042106 5 SET6
6 set 6		0630		LC									042106 6 SET6
9 set 6		0615		LC									042106 9 SET6
10 set 6		0600		LC									042106 10 SET6
16 set 6		0645		LC									042106 16 SET6
19 set 6		0700		LC									042106 19 SET6
Temp blank		0750	H2O	LC	1x100mL			X			ICE/ST	4.0°C	042106 20 SET6
$20 set 6		0758		LC	1x100 ml	X	X						

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Lawrence Campagna & Augie Ortiz

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: WESTON SOLUTION	Firm	Firm	Firm	Firm
Date/Time: 4.21.06 1005	Date/Time: 4/21/06 1005	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 17-18, 2006
Date Test Started: May 17-18, 2006
Date Test Ended: May 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 1	051706 1 Set 1	5/17/2006	1320	<20	<10
2 Set 1	051706 2 Set 1	5/17/2006	1310	<20	<10
3 Set 1	051706 3 Set 1	5/17/2006	1200	<20	<10
4 Set 1	051706 4 Set 1	5/17/2006	1222	<20	10
5 Set 1	051706 5 Set 1	5/17/2006	1256	1,300	<10
6 Set 1	051706 6 Set 1	5/17/2006	1415	230	<10
7 Set 1	051706 7 Set 1	5/17/2006	1425	230	<10
8 Set 1	051706 8 Set 1	5/17/2006	1405	80	<10
9 Set 1	051706 9 Set 1	5/17/2006	1350	110	<10
10 Set 1	051706 10 Set 1	5/17/2006	1345	80	<10
11 Set 1	051706 11 Set 1	5/17/2006	1345	300	<10
12 Set 1	051706 12 Set 1	5/17/2006	1206	<20	<10
13 Set 1	051706 13 Set 1	5/17/2006	1233	40	30
14 Set 1	051706 14 Set 1	5/17/2006	1330	20	<10
15 Set 1	051706 15 Set 1	5/17/2006	1315	13,000	670
16 Set 1	051706 16 Set 1	5/17/2006	1446	1,300	4,611
18 Set 1	051706 18 Set 1	5/17/2006	1430	110	<10
19 Set 1	051706 19 Set 1	5/17/2006	1430	20	<10
K Set 1	051706 K Set 1	5/17/2006	1248	>16,000	14,136
N Set 1	051706 N Set 1	5/17/2006	1304	<20	10
12SD Set 1	*051706 12SD Set 1*	5/17/2006	1208	<20	41

Spot samples and Sites 8, 11, 12,14,15,16 & 19
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 17-18, 2006
Date Test Started: May 17-18, 2006
Date Test Ended: May 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 2	051706 1 Set 2	5/17/2006	1712	80	20
2 Set 2	051706 2 Set 2	5/17/2006	1700	20	<10
3 Set 2	051706 3 Set 2	5/17/2006	1615	<20	<10
4 Set 2	051706 4 Set 2	5/17/2006	1625	<20	<10
5 Set 2	051706 5 Set 2	5/17/2006	1652	1,300	313
6 Set 2	051706 6 Set 2	5/17/2006	1805	800	74
7 Set 2	051706 7 Set 2	5/17/2006	1822	3,000	122
8 Set 2	051706 8 Set 2	5/17/2006	1805	<20	<10
9 Set 2	051706 9 Set 2	5/17/2006	1742	500	31
10 Set 2	051706 10 Set 2	5/17/2006	1725	40	<10
11 Set 2	051706 11 Set 2	5/17/2006	1742	1,700	10
12 Set 2	051706 12 Set 2	5/17/2006	1607	20	<10
13 Set 2	051706 13 Set 2	5/17/2006	1615	<20	10
14 Set 2	051706 14 Set 2	5/17/2006	1715	70	<10
15 Set 2	051706 15 Set 2	5/17/2006	1710	13,000	754
16 Set 2	051706 16 Set 2	5/17/2006	1830	8,000	3,255
18 Set 2	051706 18 Set 2	5/17/2006	1815	1,100	52
19 Set 2	051706 19 Set 2	5/17/2006	1810	<20	<10
K Set 2	051706 K Set 2	5/17/2006	1655	16,000	4,106
N Set 2	051706 N Set 2	5/17/2006	1640	20	<10
18SD Set 2	*051706 12SD Set 2*	5/17/2006	1815	900	3,873
21W Set 2	*051706 21W Set 2*	5/17/2006	1605	3,000	437
22W Set 2	*051706 22W Set 2*	5/17/2006	1750	<20	<10

Spot samples and Sites 8, 11, 12,14,15,16 & 19
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 17-18, 2006
Date Test Started: May 17-18, 2006
Date Test Ended: May 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 3	051806 1 Set 3	5/17/2006	2112	230	10
2 Set 3	051806 2 Set 3	5/17/2006	2105	80	<10
3 Set 3	051806 3 Set 3	5/17/2006	2012	40	<10
4 Set 3	051806 4 Set 3	5/17/2006	2035	<20	<10
5 Set 3	051806 5 Set 3	5/17/2006	2050	130	41
6 Set 3	051806 6 Set 3	5/17/2006	2148	500	<10
7 Set 3	051806 7 Set 3	5/17/2006	2222	230	20
8 Set 3	051806 8 Set 3	5/17/2006	2200	*	<10
9 Set 3	051806 9 Set 3	5/17/2006	2140	40	20
10 Set 3	051806 10 Set 3	5/17/2006	2125	80	10
11 Set 3	051806 11 Set 3	5/17/2006	2145	<20	<10
12 Set 3	051806 12 Set 3	5/17/2006	2004	<20	<10
13 Set 3	051806 13 Set 3	5/17/2006	2013	<20	<10
14 Set 3	051806 14 Set 3	5/17/2006	2120	40	10
15 Set 3	051806 15 Set 3	5/17/2006	2110	800	733
16 Set 3	051806 16 Set 3	5/17/2006	2221	800	278
18 Set 3	051806 18 Set 3	5/17/2006	2220	130	10
19 Set 3	051806 19 Set 3	5/17/2006	2200	20	<10
K Set 3	051806 K Set 3	5/17/2006	2036	2,200	30
N Set 3	051806 N Set 3	5/17/2006	2055	70	20

* Sample 8 Set 3 was not analyzed for fecal coliforms due to technician error.

Spot samples and Sites 8, 11, 12,14,15,16 & 19

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 17-18, 2006
Date Test Started: May 17-18, 2006
Date Test Ended: May 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 4	051806 1 Set 4	5/18/2006	0132	80	10
2 Set 4	051806 2 Set 4	5/18/2006	0112	20	10
3 Set 4	051806 3 Set 4	5/18/2006	0025	40	<10
4 Set 4	051806 4 Set 4	5/18/2006	0040	40	10
5 Set 4	051806 5 Set 4	5/18/2006	0100	40	51
6 Set 4	051806 6 Set 4	5/18/2006	0220	230	<10
7 Set 4	051806 7 Set 4	5/18/2006	0313	230	363
8 Set 4	051806 8 Set 4	5/18/2006	0350	<20	<10
9 Set 4	051806 9 Set 4	5/18/2006	0208	40	<10
10 Set 4	051806 10 Set 4	5/18/2006	0149	20	10
11 Set 4	051806 11 Set 4	5/18/2006	0230	170	<10
12 Set 4	051806 12 Set 4	5/18/2006	0000	<20	10
13 Set 4	051806 13 Set 4	5/18/2006	0020	20	41
14 Set 4	051806 14 Set 4	5/18/2006	0200	110	40
15 Set 4	051806 15 Set 4	5/18/2006	0205	1,700	1,377
16 Set 4	051806 16 Set 4	5/18/2006	0249	300	235
18 Set 4	051806 18 Set 4	5/18/2006	0320	1,700	367
19 Set 4	051806 19 Set 4	5/18/2006	0228	40	30
K Set 4	051806 K Set 4	5/18/2006	0110	<20	<10
N Set 4	051806 N Set 4	5/18/2006	0100	<20	10
21W Set 4	*051806 21W Set 4*	5/18/2006	0259	230	543
21E Set 4	*051806 21E Set 4*	5/18/2006	0240	170	72
22E Set 4	*051806 22E Set 4*	5/18/2006	0240	<20	10
CF Set 4	*051806 CF Set 4*	5/18/2006	0055	80,000	3,130
DY Set 4	*051806 DY Set 4*	5/18/2006	0144	8,000	2,909
RZ Set 4	*051806 RZ Set 4*	5/18/2006	0307	230	336

Spot samples and Sites 8, 11, 12,14,15,16 & 19

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 17-18, 2006
Date Test Started: May 17-18, 2006
Date Test Ended: May 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 5	051806 1 Set 5	5/18/2006	0528	<20	<10
2 Set 5	051806 2 Set 5	5/18/2006	0519	<20	<10
3 Set 5	051806 3 Set 5	5/18/2006	0435	<20	<10
4 Set 5	051806 4 Set 5	5/18/2006	0447	40	41
5 Set 5	051806 5 Set 5	5/18/2006	0505	170	20
6 Set 5	051806 6 Set 5	5/18/2006	0603	500	126
7 Set 5	051806 7 Set 5	5/18/2006	0600	2,400	376
8 Set 5	051806 8 Set 5	5/18/2006	0628	<20	20
9 Set 5	051806 9 Set 5	5/18/2006	0617	800	96
10 Set 5	051806 10 Set 5	5/18/2006	0550	<20	20
11 Set 5	051806 11 Set 5	5/18/2006	0538	20	<10
12 Set 5	051806 12 Set 5	5/18/2006	0420	20	<10
13 Set 5	051806 13 Set 5	5/18/2006	0445	20	41
14 Set 5	051806 14 Set 5	5/18/2006	0520	<20	605
15 Set 5	051806 15 Set 5	5/18/2006	0525	2,200	632
16 Set 5	051806 16 Set 5	5/18/2006	0640	800	852
18 Set 5	051806 18 Set 5	5/18/2006	0605	40	41
19 Set 5	051806 19 Set 5	5/18/2006	0627	300	1,085
K Set 5	051806 K Set 5	5/18/2006	0500	<20	10
N Set 5	051806 N Set 5	5/18/2006	0455	<20	<10

Spot samples and Sites 8, 11, 12,14,15,16 & 19
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 17-18, 2006
Date Test Started: May 17-18, 2006
Date Test Ended: May 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 6	051806 1 Set 6	5/18/2006	0907	<20	<10
2 Set 6	051806 2 Set 6	5/18/2006	0904	<20	10
3 Set 6	051806 3 Set 6	5/18/2006	0817	<20	<10
4 Set 6	051806 4 Set 6	5/18/2006	0831	20	<10
5 Set 6	051806 5 Set 6	5/18/2006	0847	20	63
6 Set 6	051806 6 Set 6	5/18/2006	0953	130	31
7 Set 6	051806 7 Set 6	5/18/2006	1045	170E	<10
8 Set 6	051806 8 Set 6	5/18/2006	1125	<20	10
9 Set 6	051806 9 Set 6	5/18/2006	0938	230	10
10 Set 6	051806 10 Set 6	5/18/2006	0927	130	31
11 Set 6	051806 11 Set 6	5/18/2006	1025	20	<10
12 Set 6	051806 12 Set 6	5/18/2006	0800	<20	<10
13 Set 6	051806 13 Set 6	5/18/2006	0840	<20	20
14 Set 6	051806 14 Set 6	5/18/2006	0950	11,000	2,143
15 Set 6	051806 15 Set 6	5/18/2006	1008	2,300	160
16 Set 6	051806 16 Set 6	5/18/2006	1014	2,200	5,172
18 Set 6	051806 18 Set 6	5/18/2006	1055	170	41
19 Set 6	051806 19 Set 6	5/18/2006	1000	300	121
K Set 6	051806 K Set 6	5/18/2006	0927	<20	<10
N Set 6	051806 N Set 6	5/18/2006	0915	<20	10

Spot samples and Sites 8, 11, 12,14,15,16 & 19
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 17-18, 2006
Date Test Started: May 17-18, 2006
Date Test Ended: May 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
21W Set 6	*051806 21W Set 6*	5/18/2006	0923	800	110
20 Set 6	*051806 20 Set 6*	5/18/2006	1028	<20	<10
23E Set 6	*051806 23E Set 6*	5/18/2006	0825	40	20
24E Set 6	*051806 24E Set 6*	5/18/2006	0900	5,000	420
25E Set 6	*051806 25E Set 6*	5/18/2006	0920	20	<10
26E Set 6	*051806 26E Set 6*	5/18/2006	1100	1,700,000	5,731

Spot samples and Sites 8, 11, 12,14,15,16 & 19
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Italicized font= spot samples

QA/QC Officer (Rosabel Dias) — 08/29/2006 Date

Microbiology Lab Supervisor (Anthony Trinh) — 8/29/06 Date

WEST - Bact Set 5

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12760

DATE 5-18-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 Set 5	5/18/06	0528	H_2O	JS	1x100mL	X	X				ICE/ST	5.0 °C	051806 1 SET 5
2 Set 5	↓	0519	↓	JS	↓	↓	↓				↓	↓	051806 2 SET 5
3 Set 5		0435		DM									051806 3 SET 5
4 Set 5		0447		DM									051806 4 SET 5
5 Set 5		0505		DM									051806 5 SET 5
6 Set 5		0603		DM									051806 6 SET 5
9 Set 5		0617		DM									051806 9 SET 5
10 Set 5		0550		DM									051806 10 SET 5
16 Set 5		0640		DM									051806 16 SET 5
19 Set 5		0627		JS		↓	↓					↓	051806 19 SET 5
temp blank	↓	0563	↓	JS	↓			X			↓	5°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Dan McCoy + Jennifer Schollbe

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J. Schollbe	Signature: T. Garbrigan	Signature: T. Garbrigan	Signature:	Signature:	Signature:
Firm: Weston Solu	Firm: Weston	Firm: Weston	Firm: Weston	Firm:	Firm:
Date/Time: 5-18-06 0700	Date/Time: 5/18/06 0700	Date/Time: 5/18/06 0915	Date/Time: 5/15/06 0815 0915 Lab	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact set 5

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12754

DATE 5/18/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 5	5/18/06	0600	H2O	LC/MB	1x100mL	X	X				ICE/ST	5.0°C	051806 7 SET 5
8 set 5		0628											051806 8 SET 5
11 set 5		0538											051806 11 SET 5
12 set 5		0420											051806 12 SET 5
13 set 5		0445											051806 13 SET 5
14 set 5		0520											051806 14 SET 5
15 set 5		0525											051806 15 SET 5
18 set 5		0605											051806 18 SET 5
K set 5		0500											051806 K SET 5
N set 5		0455											051806 N SET 5
Temp blank		0420						X				5°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Lawrence Compagna and Michelle Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Michelle MS	T. Garbujo	T. Garbujo	Stephanie Smith-Hurd		
Signature: Weston	Signature: Weston	Signature: Weston	Signature: WESTON	Signature	Signature
Firm: 5/18/06 0445	Firm: 5/18/06 0650	Firm: 5/18/06 0915	Firm: 5/18/06 0915	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - Bact Set 1

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12756

DATE 5/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: WESTON
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 1	5/17/06	1320	H_2O	NW	1x100ml	X	X				ICE/ST	3°C	051706 1 SET 1
2 set 1		1310		JP									051706 2 SET 1
3 set 1		1200		NW									051706 3 SET 1
4 set 1		1222		JP									051706 4 SET 1
5 set 1		1256		NW									051706 5 SET 1
6 set 1		1415		JP									051706 6 SET 1
9 set 1		1350		JP									051706 9 SET 1
10 set 1		1345		JP									051706 10 SET 1
16 set 1		1446		NW ~~JP~~									051706 16 SET 1
19 set 1		1430		JP									051706 19 SET 1
Temp blank		1200		JP				X				3°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jeanette Pendergraft and Niki Woodward

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	T. Gabrijan	T. Gabrijan			
Signature J. Pendergraft	Signature Weston	Signature Weston	Signature Weston Estabrook	Signature	Signature
Firm Weston	Firm 5/17/06 1515	Firm 5/17/06 1815	Firm 5/17/06 1815	Firm	Firm
Date/Time 5/17/06 1515	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Boat set 1

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12750

DATE 5/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterococ	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 1	5/17/06	1425	H_2O	CH	1×100mL	X	X				ICE/ST	3°C	051706 7 SET 1
8 set 1		1405		SA									051706 8 SET 1
11 set 1		1345		SA									051706 11 SET 1
12 set 1		1206		SA									051706 12 SET 1
13 set 1		1233		SA									051706 13 SET 1
14 set 1		1330		SA									051706 14 SET 1
15 set 1		1315		SA									051706 15 SET 1
18 set 1		1430		SA									051706 18 SET 1
K set 1		1248		SA									051706 K SET 1
N set 1		1304		SA									051706 N SET 1
Temp blank		1206		SA				X				3°C	
12-SD set 1	5/17/06	1208	H_2O	CH	1×100mL	X	X				ice/ST		051706 12-SD SET 1

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Sam Adams and Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Cat Hartman	T. Gerbrich	T. Gerbrich			
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston	Weston	Weston Solutions		
Firm	Firm	Firm	Firm	Firm	Firm
5/17/06 1440	5/17/06 1445	5/17/06 1815	5/17/06 1815		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - BACT set 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12757

DATE 5/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal, calipoen	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 2	5/17/06	1712	H_2O	JP	1x100ml	X	X				ICE/ST	6°C	051706 1 SET 2
2 set 2		1700		NW									051706 2 SET 2
3 set 2		1615		NW									051706 3 SET 2
4 set 2		1625		NW									051706 4 SET 2
5 set 2		1652		JP									051706 5 SET 2
6 set 2		1805		NW									051706 6 SET 2
9 set 2		1742		NW									051706 9 SET 2
10 set 2		1725		NW									051706 10 SET 2
16 set 2		1830		NW									051706 16 SET 2
19 set 2		1810		NW									051706 19 SET 2
temp blank		1805		NW				X				6°C	
21W set 2		1605		JP		X	X						051706 21W set 2
22W set 2		1750		JP		X	X						051706 22W set 2

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Niki Woodward & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Samantha Leskie	Samantha Leskie			
Signature J. Pendergraft	Signature	Signature	Signature Wesley	Signature	Signature
Firm Weston	Firm Weston	Firm Weston	Firm 5/17/06 2114	Firm	Firm
Date/Time 5/17/06	Date/Time 5-17-06 1920	Date/Time 5-17-06 2114	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact set 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12751

DATE 5.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: Temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 2	5.17.06	1822	H_2O	CH	1x100mL	X	X				ICE/ST	6°C	051706 7 SET 2
8 set 2		1805		CH									051706 8 SET 2
11 set 2		1742		CH									051706 11 SET 2
12 set 2		1607		CH									051706 12 SET 2
13 set 2		1615		CH									051706 13 SET 2
14 set 2		1715		CH									051706 14 SET 2
15 set 2		1710		CH									051706 15 SET 2
18 set 2		1815		CH									051706 18 SET 2
K set 2		1655		CH									051706 K SET 2
N set 2		1640		CH									051706 N SET 2
Temp blank		1608		CH				X				6°C	
18-SD set 2	5.17.06	1815	H_2O	CH	1x100mL	X	X				ICE/ST		051706 18-SD SET 2

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Sam Adams & Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: C Hartman	Signature: Samantha Leskie	Signature: Samantha Leskie	Signature:	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm:	Firm:
Date/Time: 5/17/06 1922	Date/Time: 5-17-06 1922	Date/Time: 5-17-06 2114	Date/Time: 5/17/06 1922 2114	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - BACT set 3

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4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12758

DATE 5/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 3	5/17/06	2112	H_2O	NW	(1x100mL	X	X				ICE/ST	2.0°C	051806 1 SET 3
2 set 3		2105		JP									051806 2 SET 3
3 set 3		2012		JP									051806 3 SET 3
4 set 3		2035		JP									051806 4 SET 3
5 set 3		2050		JP									051806 5 SET 3
6 set 3		2148		JP									051806 6 SET 3
9 set 3		2140		JP									051806 9 SET 3
10 set 3		2125		JP									051806 10 SET 3
16 set 3		2221		JP									051806 16 SET 3
19 set 3		2200		NW									051806 19 SET 3
temp blank		2035		NW				X				2.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Niki Woodward & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston Solutions, INC				
Firm	Firm	Firm	Firm	Firm	Firm
5/17/06	5/18/06 0115				
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time
5/18/06 0115					

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - BACT set 3

WESTON SOLUTIONS

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☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12752

DATE 5.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterococcus	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 3	5.17.06	2222	H_2O	CH	1×100mL	X	X				ICE/ST	2.0°C	051806 7 SET 3
8 set 3		2200		CH									051806 8 SET 3
11 set 3		2145		CH									051806 11 SET 3
12 set 3		2004		CH									051806 12 SET 3
13 set 3		2013		CH									051806 13 SET 3
14 set 3		2120		CH									051806 14 SET 3
15 set 3		2110		CH									051806 15 SET 3
18 set 3		2220		CH									051806 18 SET 3
K set 3		2036		CH									051806 K SET 3
N set 3		2055		CH									051806 N SET 3
Temp blank		2002		CH				X				2.0°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Sam Adams & Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston Solutions, Inc.	Firm	Firm	Firm	Firm
Date/Time: 5.18.06 0120	Date/Time: 5/18/06 0120	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - Bact set 4

WESTON SOLUTIONS

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- [ ] 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
- [ ] 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
- [ ] 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12759

DATE 5/18/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: WESTON

ADDRESS: -See above-

PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 4	5/18/06	0132	H_2O	DM	1x100mL	X	X				ICE/ST	2.0°C	051806 1 SET 4
2 set 4		0112		JS									051806 2 SET 4
3 set 4		0025		JS									051806 3 SET 4
4 set 4		0040		DM									051806 4 SET 4
5 set 4		0100		JS									051806 5 SET 4
6 set 4		0220		DM									051806 6 SET 4
9 set 4		0208		DM									051806 9 SET 4
10 set 4		0149		JS									051806 10 SET 4
16 set 4		0249		DM									051806 16 SET 4
19 set 4		0228		DM									051806 19 SET 4
temp blank		0027		JS				X				2.0 ec	
21 W SET 4	5/18/06	0259	H_2O	DM	1x100mL	X	X				X		051806 21W SET 4

SPECIAL INSTRUCTIONS/COMMENTS:

Sampled by: DAN McCOY & JEN SCHOLLEE

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: WESTON	Firm: WESTON	Firm: Weston	Firm	Firm
Date/Time: 5/18/06 0400	Date/Time: 5-18-06 0400	Date/Time: 5-18-06 0545	Date/Time: 5-18-06 0545	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact set 4

WESTON SOLUTIONS

- [x] 2433 Impala Drive • Carlsbad, CA 92008 • (760) 931-8081, FAX 931-1580
- [ ] 98 Main St., Ste. #428 • Tiburon, CA 94920 • (415) 435-1847, FAX 435-0479
- [ ] 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
- [ ] 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
- [ ] 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12753

DATE 5/18/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Amand

COMPANY: WESTON

ADDRESS: -see above-

PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 4	5/18/06	0313	H20	LC	1x100ml	X	X		ICE/ST	2.0°C	051806 7 SET 4
~~8 set 4~~		0350		JSDM							Sample exists!
11 set 4		0230									051806 11 SET 4
12 set 4		0000									051806 12 SET 4
13 set 4		0020									051806 13 SET 4
14 set 4		0200									051806 14 SET 4
15 set 4		0255									051806 15 SET 4
18 set 4		0320									051806 18 SET 4
K set 4		0110									051806 K SET 4
N set 4		0100									051806 N SET 4
Temp blank		0000						X		2.0°C	
21E set 4		0240									051806 21E SET 4
22E set 4		0240									051806 22E SET 4
8 SET 4		0350				X	X				051806 8 SET 4

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Lawrence Compagna and Michelle Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature: [signature]	Signature: [signature]	Signature	Signature
Firm: Weston	Firm: WeTech	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 5/18/06 0400	Date/Time: 5-19-06 0400	Date/Time: 5-18-06 0845	Date/Time: 5-18-06 0545	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

☒ 2433 Impala Drive • Carlsbad, CA 92008 • (760) 931-8081, FAX 931-1580
☐ 98 Main St., Ste. #428 • Tiburon, CA 94920 • (415) 435-1847, FAX 435-0479
☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12328

DATE 03·18·06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey Dry #4
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston
ADDRESS: See above
PHONE/FAX:

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	ANALYSIS/TEST REQUESTED: Enclso.	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
CF Set 4	03·18·06	0055	W	AW	1/100mL	X	X	ICE/ST	2.0 °C	051806 CF SET 4
DY Set 4	↓	0144	↓	↓	↓	↓	↓	↓	↓	051806 DY SET 4
RZ Set 4	↓	0307	↓	↓	↓	↓	↓	↓	↓	051806 RZ SET 4

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Alison Witheridge

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 5·18·06 0545	Date/Time: 5-18-06 0545	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 17-18, 2006
Date Test Started: June 17-18, 2006
Date Test Ended: June 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 1	061706 1 Set 1	6/17/2006	0936	<20	10
2 Set 1	061706 2 Set 1	6/17/2006	0915	300	<10
3 Set 1	061706 3 Set 1	6/17/2006	0816	<20	<10
4 Set 1	061706 4 Set 1	6/17/2006	0838	<20	20
5 Set 1	061706 5 Set 1	6/17/2006	0900	<20	<10
6 Set 1	061706 6 Set 1	6/17/2006	1010	20	<10
7 Set 1	061706 7 Set 1	6/17/2006	1015	60	10
8 Set 1	061706 8 Set 1	6/17/2006	0955	110	31
9 Set 1	061706 9 Set 1	6/17/2006	1001	110	10
10 Set 1	061706 10 Set 1	6/17/2006	0947	300	10
11 Set 1	061706 11 Set 1	6/17/2006	0935	<20	<10
12 Set 1	061706 12 Set 1	6/17/2006	0805	20	467
13 Set 1	061706 13 Set 1	6/17/2006	0810	<20	<10
14 Set 1	061706 14 Set 1	6/17/2006	0915	700	1,145
15 Set 1	061706 15 Set 1	6/17/2006	0905	300,000	2,187
16 Set 1	061706 16 Set 1	6/17/2006	1040	3,000	576
18 Set 1	061706 18 Set 1	6/17/2006	1020	300	<10
19 Set 1	061706 19 Set 1	6/17/2006	1020	170E	<10
K Set 1	061706 K Set 1	6/17/2006	0855	<20	<10
N Set 1	061706 N Set 1	6/17/2006	0840	70	10
O-1 Set 1	*061706 O-1 Set 1*	6/17/2006	0823	<20	<10
O-2 Set 1	*061706 O-2 Set 1*	6/17/2006	0800	20	<10
O-3 Set 1	*061706 O-3 Set 1*	6/17/2006	0810	2,300	27,230
O-4 Set 1	*061706 O-4 Set 1*	6/17/2006	0848	500,000	2,559
O-5 Set 1	*061706 O-5 Set 1*	6/17/2006	0900	220	63
O-6 Set 1	*061706 O-6 Set 1*	6/17/2006	0908	230	399
O-7 Set 1	*061706 O-7 Set 1*	6/17/2006	0922	<20	<10
O-8 Set 1	*061706 O-8 Set 1*	6/17/2006	0933	<20	<10
O-9 Set 1	*061706 O-9 Set 1*	6/17/2006	1006	17,000	1,043
O-10 Set 1	*061706 O-10 Set 1*	6/17/2006	1024	300	256
O-11 Set 1	*061706 O-11 Set 1*	6/17/2006	1028	230	187
O-12 Set 1	*061706 O-12 Set 1*	6/17/2006	1040	110	836
21W	*061706 21W*	6/17/2006	0920	30,000	9,097

****Spot samples and Sites 8,14,15,16 & 19***
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 17-18, 2006
Date Test Started: June 17-18, 2006
Date Test Ended: June 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000 MPN/100mL*
IDEXX Enterolert analysis based on dilutions providing results between 10 and 24,196 MPN/100mL*

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 2	061706 1 Set 2	6/17/2006	1320	<20	<10
2 Set 2	061706 2 Set 2	6/17/2006	1306	20	<10
3 Set 2	061706 3 Set 2	6/17/2006	1210	20	<10
4 Set 2	061706 4 Set 2	6/17/2006	1230	<20	<10
5 Set 2	061706 5 Set 2	6/17/2006	1253	20	20
6 Set 2	061706 6 Set 2	6/17/2006	1401	<20	<10
7 Set 2	061706 7 Set 2	6/17/2006	1355	40	<10
8 Set 2	061706 8 Set 2	6/17/2006	1340	40	<10
9 Set 2	061706 9 Set 2	6/17/2006	1348	40	<10
10 Set 2	061706 10 Set 2	6/17/2006	1334	<20	<10
11 Set 2	061706 11 Set 2	6/17/2006	1320	<20	<10
12 Set 2	061706 12 Set 2	6/17/2006	1200	<20	<10
13 Set 2	061706 13 Set 2	6/17/2006	1210	40	<10
14 Set 2	061706 14 Set 2	6/17/2006	1300	<20	10
15 Set 2	061706 15 Set 2	6/17/2006	1255	30,000	1,112
16 Set 2	061706 16 Set 2	6/17/2006	1422	3,000	350
18 Set 2	061706 18 Set 2	6/17/2006	1355	20	10
19 Set 2	061706 19 Set 2	6/17/2006	1408	<20	<10
K Set 2	061706 K Set 2	6/17/2006	1245	40	<10
N Set 2	061706 N Set 2	6/17/2006	1230	20	<10
O-13 Set 2	*061706 O-13 Set 2*	6/17/2006	1152	140,000	18,600
O-14 Set 2	*061706 O-14 Set 2*	6/17/2006	1205	40	10
O-15 Set 2	*061706 O-15 Set 2*	6/17/2006	1225	<20	<10
O-16 Set 2	*061706 O-16 Set 2*	6/17/2006	1340	2,200	30
O-17 Set 2	*061706 O-17 Set 2*	6/17/2006	1350	170,000	16,785
O-18 Set 2	*061706 O-18 Set 2*	6/17/2006	1405	>16,000	74

Spot samples and Sites 8,14,15,16 & 19
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 17-18, 2006
Date Test Started: June 17-18, 2006
Date Test Ended: June 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 3	061706 1 Set 3	6/17/2006	1724	<20	30
2 Set 3	061706 2 Set 3	6/17/2006	1720	20	<10
3 Set 3	061706 3 Set 3	6/17/2006	1620	<20	20
4 Set 3	061706 4 Set 3	6/17/2006	1640	170	122
5 Set 3	061706 5 Set 3	6/17/2006	1700	300	10
6 Set 3	061706 6 Set 3	6/17/2006	1808	>16,000	<10
7 Set 3	061706 7 Set 3	6/17/2006	1815	<20	10
8 Set 3	061706 8 Set 3	6/17/2006	1752	<20	<10
9 Set 3	061706 9 Set 3	6/17/2006	1752	90	10
10 Set 3	061706 10 Set 3	6/17/2006	1742	300	<10
11 Set 3	061706 11 Set 3	6/17/2006	1730	<20	<10
12 Set 3	061706 12 Set 3	6/17/2006	1607	20	<10
13 Set 3	061706 13 Set 3	6/17/2006	1617	<20	<10
14 Set 3	061706 14 Set 3	6/17/2006	1713	20	41
15 Set 3	061706 15 Set 3	6/17/2006	1705	50,000	860
16 Set 3	061706 16 Set 3	6/17/2006	1830	35,000	3,184
18 Set 3	061706 18 Set 3	6/17/2006	1813	<20	<10
19 Set 3	061706 19 Set 3	6/17/2006	1825	<20	<10
K Set 3	061706 K Set 3	6/17/2006	1655	1,100	908
N Set 3	061706 N Set 3	6/17/2006	1641	80	10
O-19 Set 3	*061706 O-19 Set 3*	6/17/2006	1558	2,200,000	>241,960
O-20 Set 3	*061706 O-20 Set 3*	6/17/2006	1603	<20	<10
O-21 Set 3	*061706 O-21 Set 3*	6/17/2006	1645	700	17,821
O-22 Set 3	*061706 O-22 Set 3*	6/17/2006	1707	358E	2,909
O-23 Set 3	*061706 O-23 Set 3*	6/17/2006	1710	220	11,776
O-24 Set 3	*061706 O-24 Set 3*	6/17/2006	1720	220,000	98,039
O-25 Set 3	*061706 O-25 Set 3*	6/17/2006	1743	<20	10
O-26 Set 3	*061706 O-26 Set 3*	6/17/2006	1758	12,339E	3,076
O-27 Set 3	*061706 O-27 Set 3*	6/17/2006	1810	*	<10
22W Set 3	*061706 22W Set 3*	6/17/2006	1800	*	369

*Due to technician error, samples O-27 and 22W Set 3 were not analyzed for fecal coliforms.

Spot samples and Sites 8,14,15,16 & 19

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 17-18, 2006
Date Test Started: June 17-18, 2006
Date Test Ended: June 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 4	061806 1 Set 4	6/17/2006	2139	<20	<10
2 Set 4	061806 2 Set 4	6/17/2006	2126	40	20
3 Set 4	061806 3 Set 4	6/17/2006	2036	<20	<10
4 Set 4	061806 4 Set 4	6/17/2006	2053	80	51
5 Set 4	061806 5 Set 4	6/17/2006	2115	130	145
6 Set 4	061806 6 Set 4	6/17/2006	2255	116E	52
7 Set 4	061806 7 Set 4	6/17/2006	2255	130	10
8 Set 4	061806 8 Set 4	6/17/2006	2315	20	10
9 Set 4	061806 9 Set 4	6/17/2006	2211	140	<10
10 Set 4	061806 10 Set 4	6/17/2006	2149	<20	<10
11 Set 4	061806 11 Set 4	6/17/2006	2225	20	<10
12 Set 4	061806 12 Set 4	6/17/2006	2015	<20	<10
13 Set 4	061806 13 Set 4	6/17/2006	2042	40	<10
14 Set 4	061806 14 Set 4	6/17/2006	2200	<20	51
15 Set 4	061806 15 Set 4	6/17/2006	2205	230,000	2,254
16 Set 4	061806 16 Set 4	6/17/2006	2230	30,000	3,448
18 Set 4	061806 18 Set 4	6/17/2006	2250	260	31
19 Set 4	061806 19 Set 4	6/17/2006	2222	40	10
K Set 4	061806 K Set 4	6/17/2006	2250	<20	<10
N Set 4	061806 N Set 4	6/17/2006	2117	<20	<10
O-28 Set 4	*061806 O-28 Set 4*	6/17/2006	2105	<20	<10
O-29 Set 4	*061806 O-29 Set 4*	6/17/2006	2115	170	119
O-30 Set 4	*061806 O-30 Set 4*	6/17/2006	2128	80	84
O-31 Set 4	*061806 O-31 Set 4*	6/17/2006	2132	20	142
30E Set 4	*061806 30E Set 4*	6/17/2006	2130	80	<10

***Spot samples and Sites 8,14,15,16 & 19**

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 17-18, 2006
Date Test Started: June 17-18, 2006
Date Test Ended: June 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 5	061806 1 Set 5	6/18/2006	0115	<20	<10
2 Set 5	061806 2 Set 5	6/18/2006	0059	<20	<10
3 Set 5	061806 3 Set 5	6/18/2006	0018	20	<10
4 Set 5	061806 4 Set 5	6/18/2006	0030	20	20
5 Set 5	061806 5 Set 5	6/18/2006	0050	40	<10
6 Set 5	061806 6 Set 5	6/18/2006	0205	80	20
7 Set 5	061806 7 Set 5	6/18/2006	0232	70	52
8 Set 5	061806 8 Set 5	6/18/2006	0300	20	31
9 Set 5	061806 9 Set 5	6/18/2006	0150	40	<10
10 Set 5	061806 10 Set 5	6/18/2006	0025	<20	<10
11 Set 5	061806 11 Set 5	6/18/2006	0220	20	<10
12 Set 5	061806 12 Set 5	6/18/2006	0000	<20	<10
13 Set 5	061806 13 Set 5	6/18/2006	0020	40	20
14 Set 5	061806 14 Set 5	6/18/2006	0145	130	41
15 Set 5	061806 15 Set 5	6/18/2006	0200	300,000	1,553
16 Set 5	061806 16 Set 5	6/18/2006	0028	11,000	905
18 Set 5	061806 18 Set 5	6/18/2006	0240	70	41
19 Set 5	061806 19 Set 5	6/18/2006	0217	80	10
K Set 5	061806 K Set 5	6/18/2006	0055	<20	10
N Set 5	061806 N Set 5	6/18/2006	0050	40	<10

**Spot samples and Sites 8,14,15,16 & 19*
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 17-18, 2006
Date Test Started: June 17-18, 2006
Date Test Ended: June 18-19, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 6	061806 1 Set 6	6/18/2006	0511	<20	<10
2 Set 6	061806 2 Set 6	6/18/2006	0457	<20	10
3 Set 6	061806 3 Set 6	6/18/2006	0418	<20	<10
4 Set 6	061806 4 Set 6	6/18/2006	0429	<20	10
5 Set 6	061806 5 Set 6	6/18/2006	0449	20	20
6 Set 6	061806 6 Set 6	6/18/2006	0550	1,100	1,782
7 Set 6	061806 7 Set 6	6/18/2006	0707	300	166
8 Set 6	061806 8 Set 6	6/18/2006	0725	20	41
9 Set 6	061806 9 Set 6	6/18/2006	0543	130	10
10 Set 6	061806 10 Set 6	6/18/2006	0522	20	<10
11 Set 6	061806 11 Set 6	6/18/2006	0625	20	<10
12 Set 6	061806 12 Set 6	6/18/2006	0400	40	<10
13 Set 6	061806 13 Set 6	6/18/2006	0430	20	10
14 Set 6	061806 14 Set 6	6/18/2006	0605	40	1,793
15 Set 6	061806 15 Set 6	6/18/2006	0550	60,000	2,590
16 Set 6	061806 16 Set 6	6/18/2006	0613	3,000	2,613
18 Set 6	061806 18 Set 6	6/18/2006	0655	500	341
19 Set 6	061806 19 Set 6	6/18/2006	0601	170	75
K Set 6	061806 K Set 6	6/18/2006	0505	80	133
N Set 6	061806 N Set 6	6/18/2006	0500	<20	31
31E Set 6	*061806 31E Set 6*	6/18/2006	0528	5,000	2,909
32E Set 6	*061806 32E Set 6*	6/18/2006	0530	20	723
33E Set 6	*061806 33E Set 6*	6/18/2006	0532	1,300	3,129
O-32	*061806 O-32*	6/18/2006	0500	<20	52
Field Blank	*061806 Field Blank*	6/18/2006	0613	<20	<10

Spot samples and Sites 8,14,15,16 & 19

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100ml
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100ml

Italicized font= spot samples

Rosabel Dias
QA/QC Officer (Rosabel Dias)

08/29/2006
Date

Anthony Trinh
Microbiology Lab Supervisor (Anthony Trinh)

8/29/06
Date

WEST - Bact set 1

WESTON SOLUTIONS

☒ 2433 Impala Drive • Carlsbad, CA 92008 • (760) 931-8081, FAX 931-1580
☐ 98 Main St., Ste. #428 • Tiburon, CA 94920 • (415) 435-1847, FAX 435-0479
☐ 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12653

DATE 6/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 1	6/17/06	0936	H_2O	NW	1x100ml	X	X				ICE/ST	2° C	061706 1SET1
2 set 1		~~0818~~ 0915		NW									061706 2SET1
3 set 1		~~0818~~ 0916		NW									061706 3SET1
4 set 1		0838		JP									061706 4SET1
5 set 1		0900		JP									061706 5SET1
6 set 1		1010		NW									061706 6SET1
9 set 1		1001		NW									061706 9SET1
10 set 1		~~0948~~	0947	JP									061706 10SET1
16 set 1		1040		JP									061706 16SET1
19 set 1		1020		NW									061706 19SET1
temp blank		1044		JP				X					
21W		0920		JP									061706 21W

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jeanette Pendergraft & Niki Woodward

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston	Weston	Weston		
Firm	Firm	Firm	Firm	Firm	Firm
6/17/06 1100	06.17.06 11:20	6/17/06 1340	6/17/06 1340		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12321

DATE 06.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MDR

PROJECT MANAGER: Alison Witheridge

COMPANY: See Above

ADDRESS: "

PHONE/FAX: "

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterococcus	ANALYSIS/TEST REQUESTED: PCR	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
O-1	06.17.06	0823	W	TW	1-1Liter						4°C ice	20 C	061706 O-1
O-2	↓	0800	↓	↓	↓	↓	↓				↓	↓	061706 O-2
O-3		0810											061706 O-3
O-4		0848											061706 O-4
O-5		0900											061706 O-5
O-6		0908											061706 O-6
O-7		0922											061706 O-7
O-8		0935											061706 O-8
O-9		1006											061706 O-9
O-10		1024											061706 O-10
O-11		1028											061706 O-11
O-12		1040			↓	↓	↓						061706 O-12
O-3P	↓	0820	↓	↓	1 SL			✓			↓	↓	061706 O-3P

SPECIAL INSTRUCTIONS/COMMENTS: SAMPLED BY TOMMY WELLS

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Tommy Wells	Tom Gerlinger	Tom Gerlinger			
Signature: Weston	Signature: Weston	Signature: Weston	Signature: Weston	Signature	Signature
Firm: 06.17.06 1050	Firm: 06.17.06 1050	Firm: 6/17/06 1340	Firm: 6/17/06 1740	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact set 1

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- [ ] 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12925

DATE 6.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: Weston

ADDRESS: - see above -

PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 1	6.17.06	1015	H2O	SA	1x100ml	X	X				ICE/ST	2°C	061706 7 SET 1
8 set 1		0955											061706 8 SET 1
11 set 1		0935											061706 11 SET 1
12 set 1		0805											061706 ~~13 SET 1~~ 12 SET 1
13 set 1		0810											061706 13 SET 1
14 set 1		0915											061706 14 SET 1
15 set 1		0905											061706 15 SET 1
18 set 1		1020											061706 18 SET 1
K set 1		0855											061706 K SET 1
N set 1		0840											061706 N SET 1
Temp blank		0800						X					

SPECIAL INSTRUCTIONS/COMMENTS:

Sampled by: Laurence Campagna & Sam Adams

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: WESTON	Signature: Tom Gallagher	Signature: Tom Gallagher	Signature:	Signature	Signature
Firm: 6.17.06 1100	Firm: Weston 06.17.06 11:00	Firm: Weston 6/17/06 1340	Firm: Weston 1340 6/17/06	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST – Bact Set 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12924

DATE 6·17·06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
7 set 2	6·17·06	1355	H2O	[illegible]	X100	X	X				ICE/ST	2° C	061706 7set2
8 set 2		1340											061706 8set2
11 set 2		1320											061706 11set2
12 set 2		1200											061706 12set2
13 set 2		1210											061706 13set2
14 set 2		1300											061706 14set2
15 set 2		1255											061706 15set2
18 set 2		1355											062706 18set2
K set 2		1245											061706 Kset2
N set 2		1230											061706 Nset2
Temp blank		1200						X					

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Sam Adams & Laurence Campagna

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature: Cynthia McClain	Signature: Cynthia McClain	Signature	Signature	Signature
Firm: WESTON	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 6·17·06 1530	Date/Time: 6/17/06 1530	Date/Time: 6/17/06 1810	Date/Time: 6/17/06 1810	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - Bact Set 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12652

DATE 6/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
1 Set 2	6/17/06	1320	H2O	& NW	1x100mL	X	X				ICE/ST	2° C	061706 1 set 2
2 set 2		1306		NW									061706 2 set 2
3 set 2		1210		NW									061706 3 set 2
4 set 2		1230		JP									061706 4 set 2
5 set 2		1253		JP									061706 5 set 2
6 set 2		1401		NW									061706 6 set 2
9 set 2		1348		NW									061706 9 set 2
10 set 2		1334		JP									061706 10 set 2
16 set 2		1422		JP									061706 16 set 2
19 set 2		1408		NW									061706 19 set 2
temp blank		1210		NW				X					

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Niki Woodward & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Crystal McCrain	Crystal McCrain			
Signature J. Pendergraft	Signature	Signature	Signature	Signature	Signature
Firm Weston	Firm Weston	Firm Weston	Firm Weston	Firm	Firm
Date/Time 6/17/06 1530	Date/Time 6/17/06 1530	Date/Time 6/17/06 1810	Date/Time 6/17/06 1810	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Bact - Observations - Set 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12322

DATE 06.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MDR
PROJECT MANAGER: Alison Witheridge
COMPANY: see above
ADDRESS: 11
PHONE/FAX: 4

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal Coliform enterococcus					PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
O-13	06.17.06	1152	W	TW	1-100ml						4°C ICE	2°C	061706 O-13
O-14	↓	1205	↓	↓	↓	↓					↓	↓	061706 O-14
O-15		1225											061706 O-15
O-16		1340											061706 O-16
O-17		1350											061706 O-17
O-18	↓	1405	↓	↓	↓	↓					↓	↓	061706 O-18

SPECIAL INSTRUCTIONS/COMMENTS: SAMPLED BY TOMMY WELLS

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Tommy Wells	Signature: Crystal McClain	Signature: Crystal McClain	Signature:	Signature:	Signature:
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm:	Firm:
Date/Time: 06.17.06 1515	Date/Time: 6/17/06 1515	Date/Time: 1810 6/17/06	Date/Time: 1810 6/17/06	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12317

DATE 06.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MOR
PROJECT MANAGER: Alison Witheridge
COMPANY: Weston
ADDRESS: see above
PHONE/FAX: "

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal/Coliform entrococcus	ANALYSIS/TEST REQUESTED: PCR	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
O-19	06.17.06	1558	W	TW	1-100ml	✓		4°C & ICE		061706 O-19
O-20	↓	1603	↓	↓	↓	↓		↓		061706 O-20
O-21	↓	1645	↓	↓	↓	↓		↓		061706 O-21
O-22	↓	1707	↓	↓	↓	↓		↓		061706 O-22
O-23	↓	1710	↓	↓	↓	↓		↓		061706 O-23
O-24	↓	1720	↓	↓	↓	↓		↓		061706 O-24
O-25	↓	1743	↓	↓	↓	↓		↓		061706 O-25
O-26	↓	1758	↓	↓	↓	↓		↓		061706 O-26
O-27	↓	1810	↓	↓	↓	↓		↓		061706 O-27
Temp ~~O-28~~ TW	↓		↓	↓	↓	↓		↓	4.0°C	
O-3B	↓	1835	↓	↓			✓	↓		061706 O-3B

SPECIAL INSTRUCTIONS/COMMENTS: SAMPLED BY TOMMY WELLS

SHIPPING:
Shipping VIA:
Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Tommy Wells					
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston				
Firm	Firm	Firm	Firm	Firm	Firm
06.17.06 2100	6/17/06 2100				
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - BACT Set 3

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12651

DATE 6/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
1 set 3	6/17/06	1724	H_2O	NW	1x100ml	X	X				ICE/ST		061706 1 set 3
2 set 3		1720		NW									061706 2 set 3
3 set 3		1620		NW									061706 3 set 3
4 set 3		1640		JP									061706 4 set 3
5 set 3		1700		JP									061706 5 set 3
6 set 3		1808		NW									061706 6 set 3
9 set 3		1752		NW									061706 9 set 3
10 set 3		1742		JP									061706 10 set 3
16 set 3		1830		JP									061706 16 set 3
19 set 3		1825		SA									061706 19 set 3
temp blank		1622		NW				X				4.0°C	
22W set 3		1800		JP							X		

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Niki Woodward & Jeanette Pendergraft

SHIPPING:
Shipping VIA:
Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston				
Firm	Firm	Firm	Firm	Firm	Firm
6/17/06 2100	6/17/06 2100				
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact Det 3

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12923

DATE 6.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: WESTON
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 3	6.17.06	1815	H_2O	SA	1x100mL	X	X				ICE/ST		7CH 061706 7set3
8 set 3		1752											061706 8set3
11 set 3		1730											061706 11 set 3
12 set 3		1607											061706 12 set 3
13 set 3		1617											061706 13 set 3
14 set 3		1713											061706 14 set 3
15 set 3		1705											061706 15 set 3
18 set 3		1813											061706 18 set 3
K set 3		1655											061706 K set 3
N set 3		1641											061706 N set 3
Temp blank		1605						X				4.0°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Lawrence Campagna & Sam Adams

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [illegible]	Signature: [illegible]	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 6.17.06 2100	Date/Time: 6/17/06 2100	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - Bact set 4

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12650

DATE_____ PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 4	6/17	2139	H_2O	DS/SL	1x100ml	X	X				ICE/ST	2°C	061806 1 Set 4
2 set 4		2126											061806 2 set 4
3 set 4	6/17	2086											061806 3 set 4
E 4 set 4		2053											061806 4 set 4
5 set 4		2115											061806 5set 4
E 6 set 4		2255											061806 6 set 4
9 set 4		2211											061806 9 set 4
10 set 4		2149											061806 10 set 4
16 set 4		2230											061806 16 set 4
19 set 4		2222											061806 19 set 4
temp blank		2052						X					

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Jennifer Schollee & Sheri Ledbetter

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature Crystal McClain	Signature Crystal McClain	Signature Weston	Signature	Signature
Firm Weston	Firm Weston	Firm Weston	Firm 6/18/06 0130	Firm	Firm
Date/Time 6/17/06 2333	Date/Time 6/17/06 2333	Date/Time 6/18/06 0130	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Bact observations

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☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12319

DATE 6.17.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey Dry Weather
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	ANALYSIS/TEST REQUESTED: Entero.				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
O-28	6.17.06	2105	W	AW	100mL	X	X				ICE/ST	20C	061806 O-28
O-29	↓	2115	↓	↓	↓	↓	↓				↓	↓	061806 O-29
O-30		2128											061806 O-30
O-31		2132											061806 O-31

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Alison Witheridge

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: Cystal McClain	Signature: Cystal McClain	Signature: [signature]	Signature	Signature
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 6.17.06 2330	Date/Time: 6-17-06 2350	Date/Time: 6/18/06 0130	Date/Time: 6/18/06 0130	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact set 4

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12922

DATE 6/17/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumard

COMPANY: WESTON

ADDRESS: -see above-

PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 4	6/16/06	2255	H2O	CH, ME	1x100ml	X	X				ICE/ST	2°C	061806 7 set 4
8 set 4		2315											061806 8 set 4
E 11 set 4		2225											061806 11 set 4
12 set 4		2015											061806 12 set 4
13 set 4		2042											061806 13 set 4
14 set 4		2200											061806 14 set 4
15 set 4		2205											061806 15 set 4
18 set 4		2250											061806 18 set 4
K set 4		2250											061806 K set 4
N set 4		2117											061806 N set 4
Temp blank		2015						X					
30E set 4	6/17/06	2130		ME		X	X						061806 30E set 4

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Michelle Evans and Cathy Harman

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Michelle Evans	Signature: Crystal McClain	Signature: Crystal McClain	Signature:	Signature	Signature
Firm: Weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 2330 6/17/06	Date/Time: 2330 6/17/06	Date/Time: 6/18/06 0130	Date/Time: 6/18/06 0130	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - BACT set 5

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12649

DATE_____ PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 set 5	6/18/06	0115	H2O	JS/SL	1x500ml	X	X				ICE/ST		061806 1set5
2 set 5		0059											061806 2 set5
3 set 5		0018											061806 3 set5
4 set 5		0030											061806 4 set5
5 set 5		0050											061806 5 set5
6 set 5		0205											061806 6 set5
9 set 5		0150											061806 9 set5
10 set 5		0025											061806 10 set5
16 set 5		0028											061806 16 set5
19 set 5		0217											061806 19 set5
temp blank		0030						X					

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jennifer Scholkee and Shein Ledbetter

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm Weston	Firm 6/18/06 0300	Firm 6/18/06 0505	Firm 6/18/06 0505	Firm	Firm
Date/Time 6/18/06 0300	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact set 5

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12921

DATE 6/18/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L Amand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 5	6/18/06	0232	H2O	CH/ME	1x100mL	X	X				ICE/ST		061806 7set5
8 set 5		0300											061806 8set5
11 set 5		0220											061806 11set5
12 set 5		0000											061806 12set5
13 set 5		0020											061806 13set5
14 set 5		0145											061806 14set5
15 set 5		0200											061806 15set5
18 set 5		0240											061806 18set5
K set 5		0055											061806 Kset5
N set 5		0050											061806 Nset5
Temp blank		0000						X					

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Cathy Hartman and Michelle Evans

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Michelle Evans	Tom Gabrijan	Tom Gabrijan	Rosa Sefus		
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston	Weston	Weston Solutions, INC.		
Firm	Firm	Firm	Firm	Firm	Firm
6/18/06 0315	6/18/06 0315	6/18/06 0505	6/18/06 0505		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

EAST - Bact set 6

WESTON SOLUTIONS

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- [ ] 1440 Broadway, Ste. 908 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710
- [ ] 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
- [ ] 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12920

DATE 6/18/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: WESTON

ADDRESS: -see above-

PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 set 6	6/18/06	0707	H2O	CH/ME	1x100mL	X	X				ICE/ST		061806 7 set 6
8 set 6		0725											061806 8 set 6
11 set 6		0625											061806 11 set 6
12 set 6		0400											061806 12 set 6
13 set 6		0430											061806 13 set 6
14 set 6		0605											061806 14 set 6
15 set 6		0550											061806 15 set 6
18 set 6		0655											061806 18 set 6
K set 6		0505											061806 K set 6
N set 6		0500											061806 N set 6
Temp blank		0400						X					
31E set 6		0528		ME		X	X						061806 31E set6
32E set 6		0530		CH									061806 32E set6
33E set 6		0532		CH									061806 33E set6

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Cathy Hoffman and Michelle Evans

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Michelle Evans	Signature:	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston Solutions, Inc.	Firm	Firm	Firm	Firm
Date/Time: 6/18/06 0945	Date/Time: 6/18/06 0945	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12314

DATE 6.18.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey DryWeather
PROJECT MANAGER: L. Armand
COMPANY: Weston
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Col.	ANALYSIS/TEST REQUESTED: Entero.	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
0-32	6-18-06	0500	W	AW	100mL	X	X				ICE/ST		061806 0-32

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Alison Witheridge

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Jes for	Signature: Weston	Signature: Weston	Signature: Weston Solutions, Inc.	Signature	Signature
Firm: 6.18.06 0700	Firm: 6/18/06 0700	Firm: 6/18/06 0936	Firm: 6/18/06 0936	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WEST - Bact Set 6

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12660

DATE_____ PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: Weston

ADDRESS: -See above-

PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 Set 6	6/18/06	0511	H_2O	SS/SL	1x100ML	X	X				ICE/ST		061806 1set6
2 Set 6		0457											061806 2set6
3 Set 6		0418											061806 3set6
4 Set 6		0429											061806 4set6
5 Set 6		0449											061806 5set6
6 Set 6		0550											061806 6set6
9 Set 6		0543											061806 9set6
10 Set 6		0522											061806 10set6
16 Set 6		0613											061806 16set6
19 Set 6		0601											061806 19set6
temp blank		0511						X					
Field Blank		0613				X	X						

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: Jennifer Schollee & Sheri Ledbetter

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Sheri Ledbetter	Signature: Weston Solutions, Inc.	Signature	Signature	Signature	Signature
Firm: Weston	Firm: 6/18/06 0830	Firm	Firm	Firm	Firm
Date/Time: 6/18/06 0830	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Event Special Study
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 25, 2006
Date Test Started: May 25, 2006
Date Test Ended: May 26, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
E1M-A Set 0	052506 E1M-A Set 0	5/25/2006	0820	<20	10
E1M-B Set 0	052506 E1M-B Set 0	5/25/2006	0821	40	30
E1M-C Set 0	052506 E1M-C Set 0	5/25/2006	0825	170	<10
E1M-A Set 1	052506 E1M-A Set 1	5/25/2006	0905	20	<10
E1M-B Set 1	052506 E1M-B Set 1	5/25/2006	0905	20	<10
E1M-C Set 1	052506 E1M-C Set 1	5/25/2006	0906	20	90
E2M Set 1	052506 E2M Set 1	5/25/2006	0913	20	<10
E3M Set 1	052506 E3M Set 1	5/25/2006	0919	40	<10
E4M Set 1	052506 E4M Set 1	5/25/2006	0926	<20	<10
E5M Set 1	052506 E5M Set 1	5/25/2006	0931	40	30
E6M Set 1	052506 E6M Set 1	5/25/2006	0934	<20	10
E7M Set 1	052506 E7M Set 1	5/25/2006	0939	<20	<10
E8M Set 1	052506 E8M Set 1	5/25/2006	0942	<20	<10
E9M Set 1	052506 E9M Set 1	5/25/2006	0947	<20	<10
B1-A Set 1	052506 B1-A Set 1	5/25/2006	0905	13,000	275
B1-B Set 1	052506 B1-B Set 1	5/25/2006	0906	13,000	400
B1-C Set 1	052506 B1-C Set 1	5/25/2006	0907	5,000	272
X1T Set 1	052506 X1T Set 1	5/25/2006	0922	20	10
X2T Set 1	052506 X2T Set 1	5/25/2006	0935	40	<10
X3T Set 1	052506 X3T Set 1	5/25/2006	0945	300	<10
X4T Set 1	052506 X4T Set 1	5/25/2006	0950	140	30
X5T Set 1	052506 X5T Set 1	5/25/2006	0955	170	85
X6T Set 1	052506 X6T Set 1	5/25/2006	1005	1,300	201
X1M Set 1	052506 X1M Set 1	5/25/2006	0920	40	<10
E1T Set 1	052506 E1T Set 1	5/25/2006	0904	80	10
E2T Set 1	052506 E2T Set 1	5/25/2006	0911	<20	20
E3T Set 1	052506 E3T Set 1	5/25/2006	0921	500	<10
E4T Set 1	052506 E4T Set 1	5/25/2006	0924	300	10
E5T Set 1	052506 E5T Set 1	5/25/2006	0931	110	<10
E6T Set 1	052506 E6T Set 1	5/25/2006	0934	300	<10
E7T Set 1	052506 E7T Set 1	5/25/2006	0939	130	<10
E8T Set 1	052506 E8T Set 1	5/25/2006	0942	130	10
E9T Set 1	052506 E9T Set 1	5/25/2006	0947	20	<10
E10T Set 1	052506 E10T Set 1	5/25/2006	0950	<20	<10
E11T Set 1	052506 E11T Set 1	5/25/2006	0955	20	<10

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Event Special Study
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 25, 2006
Date Test Started: May 25, 2006
Date Test Ended: May 26, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
X1M Set 2	052506 X1M Set 2	5/25/2006	1132	20	10
X1T Set 2	052506 X1T Set 2	5/25/2006	1131	20	<10
X2T Set 2	052506 X2T Set 2	5/25/2006	1135	40	10
X3T Set 2	052506 X3T Set 2	5/25/2006	1145	<20	20
X4T Set 2	052506 X4T Set 2	5/25/2006	1150	170	10
X5T Set 2	052506 X5T Set 2	5/25/2006	1155	800	31
X6T Set 2	052506 X6T Set 2	5/25/2006	1200	1700	173
E1T Set 2	052506 E1T Set 2	5/25/2006	1130	40	<10
E2T Set 2	052506 E2T Set 2	5/25/2006	1135	20	10
E3T Set 2	052506 E3T Set 2	5/25/2006	1140	20	<10
E4T Set 2	052506 E4T Set 2	5/25/2006	1145	20	<10
E5T Set 2	052506 E5T Set 2	5/25/2006	1150	<20	<10
E6T Set 2	052506 E6T Set 2	5/25/2006	1155	20	<10
E7T Set 2	052506 E7T Set 2	5/25/2006	1200	20	<10
E8T Set 2	052506 E8T Set 2	5/25/2006	1205	<20	<10
E9T Set 2	052506 E9T Set 2	5/25/2006	1210	<20	<10
E10T Set 2	052506 E10T Set 2	5/25/2006	1212	20	<10
E11T Set 2	052506 E11T Set 2	5/25/2006	1215	<20	<10
E1M Set 2	052506 E1M Set 2	5/25/2006	1130	<20	<10
E2M Set 2	052506 E2M Set 2	5/25/2006	1135	20	<10
E3M Set 2	052506 E3M Set 2	5/25/2006	1140	<20	<10
E4M Set 2	052506 E4M Set 2	5/25/2006	1145	20	<10
E5M Set 2	052506 E5M Set 2	5/25/2006	1150	<20	<10
E6M Set 2	052506 E6M Set 2	5/25/2006	1155	<20	<10
E7M Set 2	052506 E7M Set 2	5/25/2006	1200	20	<10
E8M Set 2	052506 E8M Set 2	5/25/2006	1205	<20	<10
E9M Set 2	052506 E9M Set 2	5/25/2006	1210	<20	10

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Event Special Study
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 25, 2006
Date Test Started: May 25, 2006
Date Test Ended: May 26, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
X1M Set 3	052506 X1M Set 3	5/25/2006	1357	<20	<10
X1T Set 3	052506 X1T Set 3	5/25/2006	1356	<20	<10
X2T Set 3	052506 X2T Set 3	5/25/2006	1400	<20	<10
X3T Set 3	052506 X3T Set 3	5/25/2006	1410	70	<10
X4T Set 3	052506 X4T Set 3	5/25/2006	1415	80	<10
X5T Set 3	052506 X5T Set 3	5/25/2006	1420	170	10
X6T Set 3	052506 X6T Set 3	5/25/2006	1425	500	52
E1T Set 3	052506 E1T Set 3	5/25/2006	1400	3,500	122
E2T Set 3	052506 E2T Set 3	5/25/2006	1410	70	<10
E3T-A Set 3	052506 E3T-A Set 3	5/25/2006	1418	110	<10
E3T-B Set 3	052506 E3T-B Set 3	5/25/2006	1418	20	<10
E3T-C Set 3	052506 E3T-C Set 3	5/25/2006	1418	110	<10
E4T Set 3	052506 E4T Set 3	5/25/2006	1425	110	<10
E5T Set 3	052506 E5T Set 3	5/25/2006	1430	2,300	63
E6T Set 3	052506 E6T Set 3	5/25/2006	1433	<20	<10
E7T Set 3	052506 E7T Set 3	5/25/2006	1436	80	<10
E8T Set 3	052506 E8T Set 3	5/25/2006	1440	500	10
E9T Set 3	052506 E9T Set 3	5/25/2006	1442	80	<10
E10T Set 3	052506 E10T Set 3	5/25/2006	1445	1,100	<10
E11T Set 3	052506 E11T Set 3	5/25/2006	1450	20	<10
E1M Set 3	052506 E1M Set 3	5/25/2006	1400	<20	20
E2M Set 3	052506 E2M Set 3	5/25/2006	1410	<20	<10
E3M Set 3	052506 E3M Set 3	5/25/2006	1418	70	<10
E4M Set 3	052506 E4M Set 3	5/25/2006	1425	<20	<10
E5M Set 3	052506 E5M Set 3	5/25/2006	1430	20	<10
E6M Set 3	052506 E6M Set 3	5/25/2006	1433	20	<10
E7M Set 3	052506 E7M Set 3	5/25/2006	1436	<20	10
E8M Set 3	052506 E8M Set 3	5/25/2006	1440	20	<10
E9M Set 3	052506 E9M Set 3	5/25/2006	1442	<20	<10

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Dry Event Special Study
Client Sample ID: See below
Weston Sample ID: See below

Date Received: May 25, 2006
Date Test Started: May 25, 2006
Date Test Ended: May 26, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
X1M Set 4	052506 X1M Set 4	5/25/2006	1701	<20	<10
X1T-A Set 4	052506 X1T-A Set 4	5/25/2006	1702	20	<10
X1T-B Set 4	052506 X1T-B Set 4	5/25/2006	1703	<20	<10
X1T-C Set 4	052506 X1T-C Set 4	5/25/2006	1704	20	10
X2T Set 4	052506 X2T Set 4	5/25/2006	1705	20	<10
X3T Set 4	052506 X3T Set 4	5/25/2006	1715	20	<10
X4T Set 4	052506 X4T Set 4	5/25/2006	1720	20	10
X5T Set 4	052506 X5T Set 4	5/25/2006	1725	230	<10
X6T Set 4	052506 X6T Set 4	5/25/2006	1730	1300	109
E1T Set 4	052506 E1T Set 4	5/25/2006	1700	<20	30
E2T Set 4	052506 E2T Set 4	5/25/2006	1710	20	10
E3T Set 4	052506 E3T Set 4	5/25/2006	1715	<20	<10
E4T Set 4	052506 E4T Set 4	5/25/2006	1720	<20	<10
E5T Set 4	052506 E5T Set 4	5/25/2006	1723	20	10
E6T Set 4	052506 E6T Set 4	5/25/2006	1726	<20	<10
E7T Set 4	052506 E7T Set 4	5/25/2006	1730	<20	<10
E8T Set 4	052506 E8T Set 4	5/25/2006	1732	<20	<10
E9T Set 4	052506 E9T Set 4	5/25/2006	1740	<20	<10
E10T Set 4	052506 E10T Set 4	5/25/2006	1742	20	<10
E11T Set 4	052506 E11T Set 4	5/25/2006	1745	40	<10
E1M Set 4	052506 E1M Set 4	5/25/2006	1700	20	<10
E2M Set 4	052506 E2M Set 4	5/25/2006	1710	20	<10
E3M Set 4	052506 E3M Set 4	5/25/2006	1715	20	<10
E4M Set 4	052506 E4M Set 4	5/25/2006	1720	<20	<10
E5M Set 4	052506 E5M Set 4	5/25/2006	1723	<20	<10
E6M Set 4	052506 E6M Set 4	5/25/2006	1726	40	<10
E7M Set 4	052506 E7M Set 4	5/25/2006	1730	<20	<10
E8M Set 4	052506 E8M Set 4	5/25/2006	1732	<20	<10
E9M Set 4	052506 E9M Set 4	5/25/2006	1740	20	<10
Blank-JS	052506 Blank-JS	5/25/2006	1820	<20	10

QA/QC Officer (Rosabel Dias) — Date 08/29/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date 8/29/06

Boat - PreAMP

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CHAIN OF CUSTODY

12787

DATE 5-25-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal colif.	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
E1M a Set0	5/25/06	0820	H_2O	JS/DO	1x100mL	X	X				ICE/ST		052506 E1M a Set0
E1M b Set0	↓	0821	↓	↓	↓	X	X				↓		052506 E1M b Set0
E1M c Set0		0825				X	X						052506 E1M c Set0
Temp blank		0826	H_2O		1x100mL			X			ICE/ST	2.0 °C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jennifer Schollée + Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
JSchollée	Jeanette Pendergraft	Jeanette Pendergraft			
Signature: Weston Solns	Signature: J. Pendergraft	Signature: J. Pendergraft	Signature: Weston Solutions	Signature	Signature
Firm: 5/25/06 1035	Firm: Weston Solns.	Firm: Weston Solns.	Firm: 5/25/06 1240	Firm	Firm
Date/Time	Date/Time: 5/25/06 1035	Date/Time: 5/25/06 1240	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat - Rand 1

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CHAIN OF CUSTODY

12788

DATE 5-25-06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amaral
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coli	ANALYSIS/TEST REQUESTED: entero	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
E1M a Set1	0905	5-25	H2O	JS/DO	400ML	X	X	ICE/ST		052506 E1M a Set1
E1M b Set1	0905									052506 E1M b Set1
E1M c Set1	0906									052506 E1M c Set1
E1T Set1	0904									052506 E1T Set1
E2M Set1	0913									052506 E2M Set1
E2T Set1	0911									052506 E2T Set1
E3M Set1	0919									052506 E3M Set1
E3T Set1	0921									052506 E3T Set1
E4M Set1	0926									052506 E4M Set1
E4T Set1	0924									052506 E4T Set1
E5M Set1	0931									052506 E5M Set1
E5T Set1	0931									052506 E5T Set1
E6M Set1	0934									052506 E6M Set1
E6T Set1	0934									052506 E6T Set1
E7M Set1	0939									052506 E7M Set1

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jennifer Schollée + Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J Schollée	Jeanette Pendergraft	Jeanette Pendergraft			
Weston Solns	J. Pendergraft	J. Pendergraft	Weston Solutions		
Firm: 5/25/06 1035	Weston Solns.	Weston Solns.	5/25/06 1240		
Date/Time	5/25/06 1035	5/25/06 1240	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat - Round 1

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CHAIN OF CUSTODY

12786

DATE 5-25-06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliv	enteroco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
E7T Set 1	5-25-06	0939	H_2O	SA	1x100ML	X	X				ICE/ST		052506 E7T Set1
E8M Set 1		0942											052506 E8M Set1
E8T Set 1		0942											052506 E8T Set1
E9M Set 1		0943											052506 E9M Set1
E9T Set 1		0947											052506 E9T Set1
E10T Set 1	~~5-25-06~~	0950											052506 E10T Set1
E11T Set 1	~~5-25-06~~	0955											052506 E11T Set1
Temp blank		0907	H_2O		1x100ML			X			ICE/ST	2.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jennifer Schollée and Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
JE Schollée	Janette Pendegraft	Janette Pendegraft			
Signature: Weston Solns	Signature: J. Pendegraft	Signature	Signature: Weston Solutions	Signature	Signature
Firm: 5/25/06 1035	Firm: Weston Solns.	Firm: Weston Solns.	Firm: 5/25/06 1240	Firm	Firm
Date/Time	Date/Time: 5/25/06 1035	Date/Time: 5/25/06 1240	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Oxford - Rand 1

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CHAIN OF CUSTODY

12762

DATE 5.25.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Arnand
COMPANY: Weston
ADDRESS: - See above -
PHONE/FAX: - See above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
B1 a Set 1	5.25.06	0905	H_2O	SA	1x100mL	X	X				ICE/ST		052506 B1a set1
B1 b Set 1		0906											052506 B1b set1
B1 c Set 1		0907											052506 B1c set1
X1T Set 1		0922											052506 X1T set1
X1M Set 1		0920											052506 X1M set1
X2T Set 1		0935											052506 X2T set1
X3T Set 1		0945											052506 X3T set1
X4T Set 1		0950											052506 X4T set1
X5T Set 1		0955											052506 X5T set1
X6T Set 1		1005											052506 X6T set1
Temp blank		0930	H_2O		1x100mL			X			ICE/ST	2.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: LC & SA — LAURENCE CAMPAGNA & SAM ADAMS

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Sam Adams	Jeanette Pendergraft	Jeanette Pendergraft			
Signature	Signature J. Pendergraft	Signature J. Pendergraft	Signature Weston Solutions	Signature	Signature
Firm Weston Solns.	Firm Weston Solns	Firm Weston Solns.	Firm 5/25/06 1240	Firm	Firm
Date/Time 5/25/06 1035	Date/Time 5/25/06 1035	Date/Time 5/25/06 1240	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Oxford - Rand 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12791

DATE 5.25.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: - see above -
PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
X1T Set 2	5.25.06	1131	H2O	SS	1x100mL	X	X				ICE/ST		052506 X1T Set 2
X1M Set 2		1132											052506 X1M Set 2
X2T Set 2		1135											052506 X2T Set 2
X3T Set 2		1145											052506 X3T Set 2
X4T Set 2		1150											052506 X4T Set 2
X5T Set 2		1155											052506 X5T Set 2
X6T Set 2		1200											052506 X6T Set 2
Temp blank		1130	H2O		1x100mL			X			ICE/ST		

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Laurence Campagna & Sam Adams

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
L. Campagna					
Signature	Signature	Signature	Signature	Signature	Signature
Weston Sol.	Weston	Weston			
Firm	Firm	Firm	Firm	Firm	Firm
5.25.06 1435	5-25-06 14:35	5-25-06 1705			
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat - Round 2

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CHAIN OF CUSTODY

12785

DATE 5/25/06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Allard
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterococ				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
E1M Set 2	5/25/06	1130	H2O	JS/DO	1x100mL	X	X				ICE/ST		052506 E1M Set 2
E1T Set 2		1130											052506 E1T Set 2
E2M Set 2		1135											052506 E2M Set 2
E2T Set 2		1135											052506 E2T Set 2
E3M Set 2		1140											052506 E3M Set 2
E3T Set 2		1140											052506 E3T Set 2
E4M Set 2		1145											052506 E4M Set 2
E4T Set 2		1145											052506 E4T Set 2
E5M Set 2		1150											052506 E5M Set 2
E5T Set 2		1150											052506 E5T Set 2
E6M Set 2		1155											052506 E6M Set 2
E6T Set 2		1155											052506 E6T Set 2
E7M Set 2		1200											052506 E7M Set 2
E7T Set 2		1200											052506 E7T Set 2
E8M Set 2		1205											052506 E8M Set 2

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Jennifer Schollée & Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Weston Solutions	Signature: Weston	Signature: Weston	Signature: Weston Solutions	Signature	Signature
Firm: 5/25/06 1505	Firm: 5-25-06 1505	Firm: 5-25-06 1705	Firm: 5/25/06 1705	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat - Rand 2

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12784

DATE 5/25/06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
E8T Set 2	5-25-06	1205	H_2O	JS/DO	1x100mL	X	X				ICE/ST		052506 E8T Set 2
E9M Set 2		1210											052506 E9M Set 2
E9T Set 2		1210											052506 E9T Set 2
E10T Set 2		1212											052506 E10T Set 2
E11T Set 2		1215											052506 E11T Set 2
Temp blank		1130	H_2O					X			ICE/ST		

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jennifer Schollée + Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J Schollée	Signature: McKenzie	Signature: M Owen	Signature: [illegible]	Signature:	Signature:
Firm: weston Solu	Firm: WESTON	Firm: WESTON	Firm: weston	Firm:	Firm:
Date/Time: 5/25/06 1505	Date/Time: 5-25-06 1505	Date/Time: 5-25-06 1705	Date/Time: 5/25/06 1705	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Oxford - Rand 3

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12790

DATE 5.25.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: WESTON

ADDRESS: - See above -

PHONE/FAX: - see above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	enterco	temp			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
X1T Set 3	5.25.06	1356	H2O	[illegible]	1x100mL	X	X				ICE/ST		052506 X1T Set3
X1M Set3		1357											~~0526A~~ 052506 X1M Set3
X2T Set 3		1400											052506 X2T Set3
X3T Set 3		1410											052506 X3T Set3
X4T Set3		1415											052506 X4T Set3
X5T Set3		1420											052506 X5T Set3
X6T Set3		1425	↓		↓	↓	↓				↓		052506 X6T Set3
Temp blank	↓	1355	H2O	↓	1x100mL			X			ICE/ST		

SPECIAL INSTRUCTIONS/COMMENTS: LAURENCE SAM

Sampled by: L. Campagna & S. Adams

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
L. Campagna	[signature]	[signature]	[signature]		
Signature: Weston Sol.	Signature: WESTON	Signature: WESTON	Signature: Weston Solutions	Signature	Signature
Firm: 5.25.06 1435	Firm: 5-25-06 14:35	Firm: 5-25-06 17:05	Firm: 5/25/06 1705	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat - Round 3

WESTON SOLUTIONS

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- [ ] 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12782

DATE 5/25/06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey

PROJECT MANAGER: L. Aumand

COMPANY: WESTON

ADDRESS: -see above-

PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
E7T Set3	5/25/06	1436	H2O	JS/DO	1x100mL	X	X				ICE/ST		052506 E7T Set3
E8M Set3		1440											052506 E8M Set3
E8T Set3		1442											052506 E8T Set3
E9M Set3		1442											052506 E9M Set3
E9T Set3		1445											052506 E9T Set3
E10T Set3		1445											052506 E10T Set3
E11T Set3		1450											052506 E11T Set3
Temp blank		1400	H2O		1x100mL			X			ICE/ST		

SPECIAL INSTRUCTIONS/COMMENTS:

Sampled by: Damon Owen & Jennifer Schollee

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Weston Solutions	Signature: WESTON	Signature: WESTON	Signature: Weston Solutions	Signature	Signature
Firm: 5/25/06 1505	Firm: 5-25-06 1505	Firm: 5-25-06 1705	Firm: 5/25/06 1705	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat - Round 3

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CHAIN OF CUSTODY

12783

DATE 5/25/06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Amand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coli.	ANALYSIS/TEST REQUESTED: ENTERO				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
E1M Set3	5/25/06	1400	H2O	JS/DO	1 (100) HL	X	X				ICE/ST		052506 E1M &t3
E1T Set3		1400											052506 E1T &t3
E2M Set 3		1410											052506 E2M&t3
E2T Set 3		1410											052506 E2T &t3
E3M Set3		1418											052506 E3M &t3
E3T a Set3		1418											052506 E3T a &t3
E3T b Set3		1418											052506 E3T b &t3
E3T c Set3		1418											052506 E3Tc &t3
E4M Set3		1425											052506 E4M &t3
E4T Set 3		1425											052506 E4T &t3
E5M Set 3		1430											052506 E5M &t3
E5T Set3		1430											052506 E5T &t3
E6M Set 3		1433											052506 E6M &t3
E6T Set3		1433											052506 E6T &t3
E7M Set3		1436											052506 E7M &t3

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jennifer Schaller and Damon Oven

SHIPPING:
Shipping VIA:
Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J Schaller	Signature: M Hines	Signature: M Hines	Signature: [illegible]	Signature:	Signature:
Firm: Weston Solutions	Firm: WESTON	Firm: WESTON	Firm: Weston Solutions	Firm:	Firm:
Date/Time: 5/25/06 1505	Date/Time: 5-25-06 1605	Date/Time: 5-25-06 1705	Date/Time: 5/25/06 1705	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Oxford - Rand 4

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12789

DATE 5.25.06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco	ANALYSIS/TEST REQUESTED: temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
X1T a Set4	5.25.06	1702	H20	SG	1x100ML	X	X				ICE/ST		052506 X1T a Set4
X1T b Set4		1703											052506 X1T b Set4
X1T c Set4		1704											052506 X1T c Set4
X1M Set4		1701											052506 X1M Set4
X2T Set4		1705											052506 X2T Set4
X3T Set4		1715											052506 X3T Set4
X4T Set4		1720											052506 X4T Set4
X5T Set4		1725											052506 X5T Set4
X6T Set4		1730											052506 X6T Set4
Temp blank		1700	H20		1x100ML			X			ICE/ST		

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by: L. Campagna (LAURENCE) & S. Adams (SAM)

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: SAM	Signature:	Signature:	Signature:	Signature:	Signature:
Firm: WESTON	Firm: Weston Solutions, Inc.	Firm: Weston Solutions Inc	Firm:	Firm:	Firm:
Date/Time: 5.25.06 1950	Date/Time: 05/25/06 1950	Date/Time: 5/25/06 1950	Date/Time:	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat - Round 4

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CHAIN OF CUSTODY

12781

DATE 5/25/06 PAGE 1 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston
ADDRESS: -see above-
PHONE/FAX: -see above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterco				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
E1M Set 4	5-25-06	1700	H2O	JS/DO	1x100mL	X	X				ICE/ST		052506 E1M Set 4
E1T Set 4		1700											052506 E1T Set 4
E2M Set 4		1710											052506 E2M Set 4
E2T Set 4		1710											052506 E2T Set 4
E3M Set 4		1715											052506 E3M Set 4
E3T Set 4		1715											052506 E3T Set 4
E4M Set 4		1720											052506 E4M Set 4
E4T Set 4		1720											052506 E4T Set 4
E5M Set 4		1723											052506 E5M Set 4
E5T Set 4		1723											052506 E5T Set 4
E6M Set 4		1724											052506 E6M Set 4
E6T Set 4		1726											052506 E6T Set 4
E7M Set 4		1730											052506 E7M Set 4
E7T Set 4		1730											052506 E7T Set 4
E8M Set 4		1732											052506 E8M Set 4

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Jennifer Scholke + Damon Owen

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J Scholke	Signature:	Signature	Signature	Signature	Signature
Firm: Weston Solutions	Firm: Weston Solutions, Inc.	Firm	Firm	Firm	Firm
Date/Time: 5/25/06 2030	Date/Time: 5/25/06 2030	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Boat – Round 4

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CHAIN OF CUSTODY

12792

DATE 5/25/06 PAGE 2 OF 2

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Arnand
COMPANY: Weston
ADDRESS: -See above-
PHONE/FAX: -See above-

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal/coli	enterco	temp			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
EBT Set4	5/25/06	1732	H2O	JS/DO	1x100mL	X	X				ICE/ST		052506 EBT Set4
E9M Set4		1740											052506 E9M Set4
E9T Set4		1740											052506 E9T Set4
E10T Set4		1742											052506 E10T Set4
E11T Set4		1745											052506 E11T Set4
Temp blank		1700	H2O		1x100mL			X			ICE/ST		
Blank-JS	5/25	1820	H2O	JS/DO		X	X				ice/ST		052506 BLANK-JS

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Owen + Jennifer Schollée

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature: [signature]	Signature	Signature	Signature
Firm: Weston Solns	Firm: Weston Solutions, Inc.	Firm: Weston Solutions	Firm	Firm	Firm
Date/Time: 5/25/06 2030	Date/Time: 05/25/06 2030	Date/Time: 5/25/06 2030	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey- Sediment
Client Sample ID: 36 samples - see below

Date Received: 1/27/06
Date Test Started: 1/27/06
Date Test Ended: 1/28/06
Matrix: Sediment

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223B

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 10-8,000,000 MPN/50 mL
IDEXX Enterolert analysis based on dilutions providing results between 5-120,980 MPN/50 mL

Sample Date	Sample ID	Enterocci per Dry Gram*	Fecal Coliforms per Dry Gram*
1/27/2006	012706 MDR1A	1	31
1/27/2006	012706 MDR 2A	<1	8
1/27/2006	012706 MDR 3A	2	<1
1/27/2006	012706 MDR 4A	6	30
1/27/2006	012706 MDR 5A	131	5
1/27/2006	012706 MDR 6A	4	10
1/27/2006	012706 MDR 7A	<1	2
1/27/2006	012706 MDR 1B	<1	<2
1/27/2006	012706 MDR 2B	<1	<2
1/27/2006	012706 MDR 3B	<1	<1
1/27/2006	012706 MDR 4B	1	1
1/27/2006	012706 MDR 5B	<1	<1
1/27/2006	012706 MDR 6B	3	<1
1/27/2006	012706 MDR 1C	<1	<1
1/27/2006	012706 MDR 2C	<1	<1
1/27/2006	012706 MDR 3C	<1	<1
1/27/2006	012706 MDR 4C	<1	<1
1/27/2006	012706 MDR 5C	<2	<3
1/27/2006	012706 MDR 6C	<1	<1
1/27/2006	012706 MDR 7C	<1	<1
1/27/2006	012706 MDR 1D	<1	<1
1/27/2006	012706 MDR 2D	<1	<1
1/27/2006	012706 MDR 3D	<1	<1
1/27/2006	012706 MDR 4D	<1	<2
1/27/2006	012706 MDR 5D	<1	<1
1/27/2006	012706 MDR 6D	<1	<1

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey- Sediment
Client Sample ID: 36 samples - see below

Date Received: 1/27/06
Date Test Started: 1/27/06
Date Test Ended: 1/28/06
Matrix: Sediment

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223B

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 10-8,000,000 MPN/50 mL
IDEXX Enterolert analysis based on dilutions providing results between 5-120,980 MPN/50 mL

1/27/2006	012706 MDR 1E	<1	3
1/27/2006	012706 MDR 2E	<1	<1
1/27/2006	012706 MDR 3E	1	<1
1/27/2006	012706 MDR 4E	<1	<1
1/27/2006	012706 MDR 5E	1	<1
1/27/2006	012706 MDR 6E	<1	<1
1/27/2006	012706 MDR 7E	189	12
1/27/2006	012706 MDR 2D Field dup	1	<1
1/27/2006	012706 MDR 3A Field Dup	<1	<1
1/27/2006	012706 MDR 6C Field Dup	<1	<1
1/27/2006	012706 MDR 8F	<1	<1

*** Rounded values**

QA/QC Officer (Rosabel Dias)

08/29/2006
Date

Microbiology Lab Supervisor (Anthony Trinh

8/29/06
Date

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CHAIN OF CUSTODY

№ 11830

DATE 01/27/06 PAGE 1 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY / MOTHER'S BEACH SEDIMENT SURVEY
PROJECT MANAGER: L. AUMAND
COMPANY: WESTON
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal	Entero				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
1A	01/27/06	1338	~~H2O~~ Sediment	JP	1x100ml Plastic	X	X				Ice/ST		~~012706~~ A
1B		1340											~~012706~~ A
1C		1345											~~012706~~ A
1D		1347											~~012706~~ A
1E		1350											~~012706~~ A
2A		1357											~~012706~~ A
2B		1400											~~012706~~ A
2C		1403											~~012706~~ A
2D		1405											~~012706~~ A
2D-DUP		1406											
2E		1410											
3A		1420											
3A-DUP		1422											
3B		1430											
3C		1432											

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by Alison Witheridge & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston Solutions	Firm	Firm	Firm	Firm
Date/Time: 1.27.06 1852	Date/Time: 1/27/06 1852	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11833

DATE 01/27/06 PAGE 2 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY/MOTHERS BEACH SEDIMENT SURVEY
PROJECT MANAGER: L. ARMAND
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterococcus				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
4A	1/27/06	1337	Water Sediment	AW	1x 100mL P	X	X				ICE/ST		
4B		1340											
4C		1342											
4D		1345											
4E		1347											
5A		1353											
5B		1355											
5C		1400											
5D		1403											
5E		1405											
6A		1416											
6B		1419											
6C		1422											
6C DUP		1423											
6D		1426											

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Alison Witheridge & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston Solutions	Firm	Firm	Firm	Firm
Date/Time: 1.27.06 1852	Date/Time: 1/27/06 1852	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11832

DATE 01/27/06 PAGE 3 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey / Mother's Beach Sediment Survey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterococcus				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
6E	01/27/06	1428	~~H2O~~ Sediment	AW	1x 100ml plastic	X	X				Ice / ST		
7A		1436											
7C		1439											
7E		1441		↓									
3D		1434		JP									
3E		1437		JP									
8F	↓	1453	↓	AW	↓	↓	↓						

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by Alison Witheridge + Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: WESTON	Signature: Weston Solutions	Signature	Signature	Signature	Signature
Firm: 1.27.06 1852	Firm: 1/27/06 1852	Firm	Firm	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey- Sediment
Client Sample ID: 37 samples - see below

Date Received: 6/15/06
Date Test Started: 6/15/06
Date Test Ended: 6/28/06
Matrix: Sediment
Water*

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223B

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 10-8,000,000 MPN/50 mL
IDEXX Enterolert analysis based on dilutions providing results between 5-120,980 MPN/50 mL
Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100 mL*
IDEXX Enterolert analysis based on dilutions providing results between 10-241,960 MPN/100 mL*

Sample Date	Weston Sample ID	Enterocci per Dry Gram**	Fecal Coliforms per Dry Gram**
6/15/2006	061506 1A	1	<1
6/15/2006	061506 1B	<1	<1
6/15/2006	061506 1C	<1	<1
6/15/2006	061506 1C dup	<1	<1
6/15/2006	061506 1D	<1	<1
6/15/2006	061506 1E	<1	<1
6/15/2006	061506 2A	<1	2
6/15/2006	061506 2B	<1	<1
6/15/2006	061506 2C	<1	<1
6/15/2006	061506 2D	<1	<1
6/15/2006	061506 2E	<1	<1
6/15/2006	061506 3A	1	<1
6/15/2006	061506 3B	2	<1
6/15/2006	061506 3C	1	<1
6/15/2006	061506 3D	1	<1
6/15/2006	061506 3E	1	<1
6/15/2006	061506 3E dup	<1	<1
6/15/2006	061506 4A	1	<1
6/15/2006	061506 4B	18	<1
6/15/2006	061506 4C	12	<1
6/15/2006	061506 4D	2	<1
6/15/2006	061506 4E	<1	<1
6/15/2006	061506 5A	1	<1

6/15/2006	061506 5A dup	1	<1
6/15/2006	061506 5B	2	5
6/15/2006	061506 5C	40	1
6/15/2006	061506 5D	2	<1
6/15/2006	061506 5E	1	1
6/15/2006	061506 6A	3	<1
6/15/2006	061506 6B	1	<1
6/15/2006	061506 6C	3	<1
6/15/2006	061506 6D	<1	<1
6/15/2006	061506 6E	<1	17
6/15/2006	061506 7A	1	<1
6/15/2006	061506 7C	7	122
6/15/2006	061506 7E	<1	1
6/15/2006	061506 BR-1	243	500

*** For Sample BR-1**

**** Rounded values**

QA/QC Officer (Rosabel Dias)

08/28/2006
Date

Microbiology Lab Supervisor (Anthony Trinh

8/28/06
Date

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CHAIN OF CUSTODY

12567

DATE 6·15·06 PAGE 3 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey Sediment
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliforms	ANALYSIS/TEST REQUESTED: Enterococci	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
6C	6/15/06	0810	Sediment	JS	1x 100mL	X	X	Ice IST		061506 6C
6D		0812								061506 6D
6E		0814								061506 6E
7A		0740								061506 7A
7C		0745								061506 7C
7E		0744								061506 7E
BR-1		0735	H_2O							061506 BR-1

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by Jeanette Pendergraft & Jennifer Schollee

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft					
Signature J. Pendergraft	Signature	Signature	Signature	Signature	Signature
Firm Weston Solns.	Firm Weston Solns.	Firm	Firm	Firm	Firm
Date/Time 6·15·06 / 1115	Date/Time 6·15·06 / 1115	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12566

DATE 6·15·06 PAGE 2 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey Sediment
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliforms	ANALYSIS/TEST REQUESTED: Enterococci	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3E	6-15-06	0817	Sediment	JMP	1 500ml plastic	X	X	Ice | ST		061506 3E
3E-Dup		0817		JMP						061506 3E-Dup
4A		0751		JS						061506 4A
4B		0753		JS						061506 4B
4C		0755								061506 4C
4D		0756								061506 4D
4E		0758								061506 4E
5A		0750								061506 5A
5B		0807								061506 5B
5C		0805								061506 5C
5D		0802								061506 5D
5E		0801								061506 5E
5A-Dup		0802								061506 5A-Dup
6A		0748								061506 6A
6B		0809						"		061506 6B

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by Jeanette Pendergraft & Jennifer Schollee

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Anthony Trinh				
Signature: J. Pendergraft	Signature	Signature	Signature	Signature	Signature
Firm: Weston Solns.	Firm: Weston Solns.	Firm	Firm	Firm	Firm
Date/Time: 6·15·06 | 1115	Date/Time: 6·15·06 | 1115	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12565

DATE 6·15·06 PAGE 1 OF 3

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey Sediment
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliforms	ANALYSIS/TEST REQUESTED: Enterococci	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1A	6-15-06	0747	Sediment	JMP	1 from plastic	X	X	Ice | ST		061506 1A
1B		0750								061506 1B
1C		0751								061506 1C
1C-Dup		0751								061506 1C-Dup
1D		0753								061506 1D
1E		0755								061506 1E
2A		0743								061506 2A
2B		0804								061506 2B
2C		0801								061506 2C
2D		0800								061506 2D
2E		0758								061506 2E
3A		0740								061506 3A
3B		0823								061506 3B
3C		0821								061506 3C
3D		0820								061506 3D

SPECIAL INSTRUCTIONS/COMMENTS: sampled by Jeanette Pendergraft & Jennifer Schollee

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Anthony Trinh				
Signature: J. Pendergraft	Signature:	Signature	Signature	Signature	Signature
Firm: Weston Solns.	Firm: Weston Solns.	Firm	Firm	Firm	Firm
Date/Time: 6·15·06 | 1115	Date/Time: 6·15·06 | 1115	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Investigations
Client Sample ID: See Below -3 Samples
Weston Sample ID: See Below

Date Received: October 19, 2005
Date Test Started: October 19, 2005
Date Test Ended: October 23, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Total/Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20 - 16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 - 2,419,600 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
DP-1	101905 DP 1	10/19/2005	1445	<20	<10
DP-2	101905 DP 2	10/19/2005	1445	300	10
DP-3	101905 DP 3	10/19/2005	1445	1,100	309

QA/QC Officer (Rosabel Dias) — Date: 08/29/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/29/06

Revised 5/25/06

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CHAIN OF CUSTODY

№ 10979

DATE 10/19/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey Investigations
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston Solns. Inc.
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS (PLASTIC)	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterococci				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
DP-1	10/19/05	1445	H_2O	SA	1x1 Liter	X	X				Ice		101905 DP-1
DP-2	↓	↓	↓	SA	↓	↓	↓				↓		101905 ~~DP-2~~ DP-2
DP-3	↓	↓	↓	SA	↓	↓	↓				↓		101905 DP-3

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Sam Adams & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft					
Signature: J. Pendergraft	Signature: Weston Solutions	Signature	Signature	Signature	Signature
Firm: Weston	Firm: 10/19/05 1700	Firm	Firm	Firm	Firm
Date/Time: 10/19/05 17:00	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: Marina del Rey
Project: Dry Weather Survey
Client Sample ID: 3 Samples - See Below
Weston Sample ID: 3 Samples - See Below

Date Received: December 14, 2005
Date Test Started: December 14, 2005
Date Test Ended: December 17, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C, E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 2-1,600,000 MPN/100mL
IDEXX Colilert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
DP-1	121405 DP 1	12/14/2005	1441	<20	<10
DP-2	121405 DP 2	12/14/2005	1445	330	85
E1100	121405 E1100	12/14/2005	1430	230	41

Approved

Date 1/3/06

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CHAIN OF CUSTODY

№ 10945

DATE 12.14.05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Arnaud
COMPANY: WESTON
ADDRESS: - See above -
PHONE/FAX: - See above -

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal	ANALYSIS/TEST REQUESTED: Enterococcus				PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
DP-1	12.14.05	1441	H_2O	[illegible]	1x100	X	X				ICE/ST		121405 DP-1
DP-2	↓	1445	↓	[illegible]	1x100	X	X				↓		121405 DP-2
E1100	↓	1430	↓	[illegible]	1x100	X	X				↓		121405 E1100

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by S. Adams

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Signature: [signature]	Signature	Signature	Signature	Signature
Firm: WESTON	Firm: Weston Solutions	Firm	Firm	Firm	Firm
Date/Time: 12.14.05 1745	Date/Time: 12/14/05 1745	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Upstream Sampling
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 6, 2006
Date Test Started: June 6, 2006
Date Test Ended: June 7, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221 C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
BT-1	060606 BT-1	6/6/2006	0900	9,000	4,874
BT-2	060606 BT-2	6/6/2006	0900	13,000	9,608
LT-1	060606 LT-1	6/6/2006	0920	17,000	2,755

QA/QC Officer (Rosabel Dias) — 08/29/2006 Date

Microbiology Lab Supervisor (Anthony Trinh) — 8/29/06 Date

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CHAIN OF CUSTODY

12950

DATE 6·6·06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey - Upstream Monit.
PROJECT MANAGER: L. Aumand
COMPANY: WESTON
ADDRESS: -See above-
PHONE/FAX: -See above-

	SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: temp	fecal coliform	enterococcus			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
F	BT-1	6-6-06	0900	H_2O	SA	1x1000mL		X	XX			ICE / ST		060606 BT-1
E	BT-2	↓	0900	↓	↓	↓		XX	XX			↓		060606 BT-2
	LT-1		0920					X	X					060606 LT-1
	Temp blank	↓	0900	↓	↓	↓	X					↓	1.0°C	

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Damon Owen & Sam Adams

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
WESTON	Weston				
Firm	Firm	Firm	Firm	Firm	Firm
6-6-06 1430	6-6-06 1430				
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Upstream Sampling
Client Sample ID: See below
Weston Sample ID: See below

Date Received: June 13, 2006
Date Test Started: June 13, 2006
Date Test Ended: June 14, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221 C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Coliform analyses based on dilutions providing results between 20-1,600,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
BT01	061306BT01	6/13/2006	1034	8,000	54,750
BT03	061306BT03	6/13/2006	1130	30,000	3,654
LT01	061306LT01	6/13/2006	1200	300	241
LT02	061306LT02	6/13/2006	1220	5,000	4,106

QA/QC Officer — Date: 07/17/2006

Microbiology Lab Supervisor — Date: 7/17/06

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CHAIN OF CUSTODY

12220

DATE 13 June 2006 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey upstream sampling
PROJECT MANAGER: Larissa Romano
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: " "

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterococcus				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
BT01	6.13.06	1034	H_2O	DO	1x100mL	X	X				blue ice		061306 BT01
BT03		1130				X	X						061306 BT03
LT01		1200				X	X						061306 LT01
LT02		1220				X	X						061306 LT02
temp blank	6.13.06	1034										10°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Damon Owen + Jennifer Schober

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston Solutions, Inc.	Firm	Firm	Firm	Firm
6/13/06 / 1624	6/13/06 1624	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: MDR- Upstream Sampling
Client Sample ID: See Below
Weston Sample ID: See Below

Date Received: 6/19/06
Date Test Started: 6/19/06
Date Test Ended: 6/20/06
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20 - 16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 - 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
BT-1	061906 BT-1	6/19/2006	1145	13,000	2,755
LT-1	061906 LT-1	6/19/2006	1215	1,100	145

QA/QC Officer

8/28/2006
Date

Microbiology Lab Supervisor

8/28/06
Date

Revised 5/25/06

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CHAIN OF CUSTODY

6/19/06 12543

DATE ~~6-19-06~~ BD PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY UPSTREAM SAMPLING

PROJECT MANAGER: LARISSA AUMAND

COMPANY: WESTON

ADDRESS: See Above

PHONE/FAX: " "

SAMPLE I.D.	DATE (6/19/06)	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: fecal coliform	ANALYSIS/TEST REQUESTED: enterococcus	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
BT1	~~6-18-06~~	1145	H_2O	DO	1×100mL	X	X	ice/ST		061906 BT1
LT1	↓	1215	↓	DO	↓	X	X	↓		061906 LT1

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by: Jennifer Schober

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston Solutions				
Firm	Firm	Firm	Firm	Firm	Firm
6-19-06/1548	6/19/06 1548				
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: November 9-10, 2005
Date Test Started: November 9-10, 2005
Date Test Ended: November 10-11, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 1	110905 1 Set 1	11/9/2005	1155	<20	10
2 Set 1	110905 2 Set 1	11/9/2005	1140	1,300	1,236
3 Set 1	110905 3 Set 1	11/9/2005	1055	300	183
4 Set 1	110905 4 Set 1	11/9/2005	1135	20	<10
5 Set 1	110905 5 Set 1	11/9/2005	1252	<20	20
6 Set 1	110905 6 Set 1	11/9/2005	1310	230	670
7 Set 1	110905 7 Set 1	11/9/2005	1305	300	908
8 Set 1	110905 8 Set 1	11/9/2005	1215	50,000	26,125
9 Set 1	110905 9 Set 1	11/9/2005	1230	800	3,654
10 Set 1	110905 10 Set 1	11/9/2005	1215	5,000	3,076
11 Set 1	110905 11 Set 1	11/9/2005	1305	1,300	2,603
12 Set 1	110905 12 Set 1	11/9/2005	1050	5,000	201
13 Set 1	110905 13 Set 1	11/9/2005	1200	230	738
14 Set 1	110905 14 Set 1	11/9/2005	1115	23,000	36,087
15 Set 1	110905 15 Set 1	11/9/2005	1100	3,000	932
16 Set 1	110905 16 Set 1	11/9/2005	1132	300,000	51,721
19 Set 1	110905 19 Set 1	11/9/2005	1332	500	602

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: November 9-10, 2005
Date Test Started: November 9-10, 2005
Date Test Ended: November 10-11, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 2	110905 1 Set 2	11/9/2005	1515	<20	98
2 Set 2	110905 2 Set 2	11/9/2005	1500	500	959
3 Set 2	110905 3 Set 2	11/9/2005	1415	110	1,014
4 Set 2	110905 4 Set 2	11/9/2005	1432	500	20
5 Set 2	110905 5 Set 2	11/9/2005	1530	20	<10
6 Set 2	110905 6 Set 2	11/9/2005	1609	5,000	3,454
7 Set 2	110905 7 Set 2	11/9/2005	1618	220	86
8 Set 2	110905 8 Set 2	11/9/2005	1522	13,000	14,300
9 Set 2	110905 9 Set 2	11/9/2005	1545	130	197
10 Set 2	110905 10 Set 2	11/9/2005	1530	340	161
11 Set 2	110905 11 Set 2	11/9/2005	1557	8,000	1,553
12 Set 2	110905 12 Set 2	11/9/2005	1420	2,300	512
13 Set 2	110905 13 Set 2	11/9/2005	1445	130	397
14 Set 2	110905 14 Set 2	11/9/2005	1437	28,000	21,426
15 Set 2	110905 15 Set 2	11/9/2005	1422	23,000	6,888
16 Set 2	110905 16 Set 2	11/9/2005	1453	170,000	57,943
19 Set 2	110905 19 Set 2	11/9/2005	1510	130	717

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: November 9-10, 2005
Date Test Started: November 9-10, 2005
Date Test Ended: November 10-11, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 3	110905 1 Set 3	11/9/2005	1800	40	389
2 Set 3	110905 2 Set 3	11/9/2005	1740	<20	218
3 Set 3	110905 3 Set 3	11/9/2005	1710	<20	10
4 Set 3	110905 4 Set 3	11/9/2005	1730	230	98
5 Set 3	110905 5 Set 3	11/9/2005	1830	70	31
6 Set 3	110905 6 Set 3	11/9/2005	1850	50,000	6,945
7 Set 3	110905 7 Set 3	11/9/2005	1909	13,000	6,382
8 Set 3	110905 8 Set 3	11/9/2005	1810	30,000	9,603
9 Set 3	110905 9 Set 3	11/9/2005	1820	13,000	1,869
10 Set 3	110905 10 Set 3	11/9/2005	1810	130	243
11 Set 3	110905 11 Set 3	11/9/2005	1820	110	145
12 Set 3	110905 12 Set 3	11/9/2005	1712	230	52
13 Set 3	110905 13 Set 3	11/9/2005	1735	<20	10
14 Set 3	110905 14 Set 3	11/9/2005	1733	23,000	12,229
15 Set 3	110905 15 Set 3	11/9/2005	1715	13,000	6,828
16 Set 3	110905 16 Set 3	11/9/2005	1752	80,000	46,111

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: November 9-10, 2005
Date Test Started: November 9-10, 2005
Date Test Ended: November 10-11, 2005
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 4	111005 1 Set 4	11/9/2005	2100	80	146
2 Set 4	111005 2 Set 4	11/9/2005	2050	130	86
3 Set 4	111005 3 Set 4	11/9/2005	2022	70	106
4 Set 4	111005 4 Set 4	11/9/2005	2038	80	<10
5 Set 4	111005 5 Set 4	11/9/2005	2140	40	41
6 Set 4	111005 6 Set 4	11/9/2005	2151	23,000	12,007
7 Set 4	111005 7 Set 4	11/9/2005	2220	80,000	6,701
8 Set 4	111005 8 Set 4	11/9/2005	2105	300,000	22,818
9 Set 4	111005 9 Set 4	11/9/2005	2120	23,000	3,267
10 Set 4	111005 10 Set 4	11/9/2005	2110	2,300	4,611
11 Set 4	111005 11 Set 4	11/9/2005	2142	1,100	1,350
12 Set 4	111005 12 Set 4	11/9/2005	2015	170	10
13 Set 4	111005 13 Set 4	11/9/2005	2046	20	<10
14 Set 4	111005 14 Set 4	11/9/2005	2028	7,000	13,169
15 Set 4	111005 15 Set 4	11/9/2005	2021	50,000	26,025
16 Set 4	111005 16 Set 4	11/9/2005	2042	1,300	72,699
18 Set 4	111005 18 Set 4	11/9/2005	2130	<20	<10

Italicized font= spot samples

QA/QC Officer (Rosabel Dias) — Date: 08/29/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/29/06

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CHAIN OF CUSTODY

№ 11169

DATE 11/9/05 PAGE 1 OF 3 (1)

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Carissa Aumand
COMPANY: WESTON SOLUTIONS
ADDRESS: 2433 Impala Dr.
PHONE/FAX: 760-931-8081

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Enterco	temp°			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
F 12 SET 1 E TK	11/9/05	1050	H2O	CH	1x100mL	X	X				ice/ST		110905 12 Set 1E TK
13 SET 1 E TK	↓	1200	↓	↓	↓	↓	↓				↓		110905 13 Set 1E TK
11 SET 1 E TK	↓	1305	↓	↓	↓	↓	↓				↓	6°C	110905 11 Set 1E TK
Temp blank	↓	1050						X					

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Samantha Ceskie and Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Cathy Hartman	ERICA LIVINGSTON	ERICA LIVINGSTON			
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston Solns	Weston Solns	Weston Solutions Inc		
Firm	Firm	Firm	Firm	Firm	Firm
Date/Time 11/9/05 1401	Date/Time 11/9/05 1401	Date/Time 11/9/05 1630	Date/Time 11/9/05 1630	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11161

DATE 11-9-05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Armand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
14 Set 1	11-9-05	1115	H_2O	[illegible]	1	X	X				ice/ST		110905 14Set1
15 Set 1	↓	1100	↓	↓	1	X	X				↓		110905 15Set1
16 Set 1		1132			1	X	X						110905 16Set1
5 Set 1		1252			1	X	X						110905 5Set1
6 Set 1		1310			1	X	X						110905 6Set1
8 Set 1		1215			1	X	X						110905 8Set1
temp control		1104			1			X				6°C	—
19 Set 1 MS TK	11-9-05	1332	H_2O	[illegible]	1	X	X				ice/ST		110905 19Set1MSTK

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Jennifer Scholler + Dan McCoy

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
[signature]	Erica Livingston	Erica Livingston	ROSABEL DIAS		
Signature: Weston Solns	Signature:	Signature:	Signature:	Signature:	Signature:
Firm: 11-9-05 1333	Firm: Weston Solns	Firm: Weston Solns	Firm: Weston Solutions, INC	Firm:	Firm:
Date/Time:	Date/Time: 11/9/05 1333	Date/Time: 11/9/05 1630	Date/Time: 11/9/05 1630	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11179

DATE 11/09/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	Fecal Coliform	Entero.	Temp Blank			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
					ANALYSIS/TEST REQUESTED							FOR WESTON USE ONLY	
Temp Blank	11/9/05	11:30	H_2O	AH	1x500ml plastic			X			Ice/ST	6°C	—
1 Set 1	↓	11:55	↓	AH	↓	X	X				↓		110905 1Set1
2 Set 1		11:40		AH									110905 2 Set1
3 Set 1		10:55		JMP									110905 3Set1
4 Set 1		11:35		JMP									110905 4Set1
7 Set 1		13:05		JMP									110905 7Set1
9 Set 1		12:30		JMP									110905 9Set1
10 Set 1		12:15		JMP									110905 10Set1

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by Amy Hamilton & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Erica Livingston	Erica Livingston	Rosabel Dias		
Signature J. Pendergraft	Signature	Signature	Signature Rosa Dias	Signature	Signature
Firm Weston Solns.	Firm Weston Soln's	Firm Weston Soln's	Firm Weston Solutions, Inc.	Firm	Firm
Date/Time 11/9/05 13:30	Date/Time 11/9/05 1330	Date/Time 11/9/05 1630	Date/Time 11/9/05 1630	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12052

DATE 11/09/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS (1 Liter Plastic)	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero.	Temp Blank			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
1 Set 2	11/09/05	15:15	H_2O	JMP	1	X	X				Ice/ST		110905 1 Set 2
2 Set 2		15:00		JMP									110905 2 Set 2
3 Set 2		1415		AH									110905 3 Set 2
4 Set 2		1432		AH									110905 4 Set 2
9 Set 2		1545		AH									110905 9 Set 2
10 Set 2		1530		AH									110905 10 Set 2
19 Set 2 ~~bb~~ TK		1510		AH									110905 19 Set 2 ~~bb~~ TK
Temp Blank		1440		AH				X				2°C	—

SPECIAL INSTRUCTIONS/COMMENTS: sampled by Amy Hamilton & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Crystal McCraine	Crystal McCraine	Anthony Tinh		
Signature: Jeanette Pendergraft	Signature: Crystal McCraine	Signature: Crystal McCraine	Signature	Signature	Signature
Firm: Weston Solns.	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 11/09/05 16:20	Date/Time: 11/9/05 1620	Date/Time: 11/9/05 1933	Date/Time: 11/9/05 1933	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11157

DATE 11-9-05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	ANALYSIS/TEST REQUESTED: Enterococ				PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
5 Set 2	11-9-05	1530	H_2O	JLS	1	X	X				ice/ST		110905 5 Set 2
6 Set 2		1559			1	X	X						110905 6 Set 2
7 Set 2		1618			1	X	X						110905 7 Set 2
8 Set 2		1522			1	X	X						110905 8 Set 2
14 Set 2		1437			1	X	X						110905 14 Set 2
15 Set 2		1422			1	X	X						110905 15 Set 2
16 Set 2		1453			1	X	X						110905 16 Set 2

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Dan McCoy / Jennifer Schaller

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: [signature]	Crystal McCraine	Crystal McCraine	Anthony Trish		
Signature: Weston Sol	Signature: Crystal McCraine	Signature: Crystal McCraine	Signature: [signature]	Signature	Signature
Firm: 11-9-05 1605	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time	Date/Time: 11-9-05 1615	Date/Time: 11/9/05 1931	Date/Time: 11/9/05 1931	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12049

DATE 11/9/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Larissa Armand
COMPANY: Weston
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Perch	Endo	Tert-Bu			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
12 SET 2E TK	11/9/05	1420	H2O	CH	1x1 oz L	X	X				Ice/ST		110905 12 Set 2E TK
13 SET 2E TK	↓	1445	↓	CH	↓	↓	↓				↓		110905 13 Set 2E TK
11 SET 2E TK	↓	1557	↓	CH	↓	↓	↓				↓		110905 11 Set 2E TK
TEMP BLANK	11/9/05	1420	H2O	CH	1x 1oz L	↓	↓	X			↓	2°C	—

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Samantha Leskie and Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Cathy Hartman	Crystal McGraine	Crystal McGraine	Anthony Trinh		
Signature: Cathy Hartman	Signature: Crystal McGraine	Signature: Crystal McGraine	Signature: Anthony Trinh	Signature	Signature
Firm: weston	Firm: Weston	Firm: Weston	Firm: Weston	Firm	Firm
Date/Time: 11/9/05 1634	Date/Time: 11/9/05 1634	Date/Time: 11/9/05 1931	Date/Time: 11/9/05 1931	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12056

DATE 11/09/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS (1 X 1L Plastic)	Fecal coliform	Entero.	Temp Blank			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
Temp Blank	11/09/05	17:10	H_2O	JMP	1			X			Ice / ST	10 C	—
3 set3		17:10		JMP		X	X						110905 3 set3
4 set3		17:30		JMP									110905 4 set3
2 set3		17:40		AH									110905 2 set3
1 set3		18:00		AH									110905 1 set3
10 set3		18:10		JMP									110905 10 set3
9 set3		18:20		JMP									110905 9 set3

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by Amy Hamilton & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Michelle Evans	Michelle M S			
Signature: J. Pendergraft	Signature: Michelle M S	Signature: Weston	Signature: Weston	Signature	Signature
Firm: Weston Solns.	Firm: Weston Solns.	Firm: 11/9/05 2212	Firm: 11/9/05 2212	Firm	Firm
Date/Time: 11/09/05 1955	Date/Time: 11/09/05 1955	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1675
☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

№ 11163

DATE 11/9/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston
ADDRESS: see above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Read a.l.for	ANALYSIS/TEST REQUESTED: entero	ANALYSIS/TEST REQUESTED: temp °	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 Set 3E ~~TK~~	11/9/05	1712	H2O	~~SE~~ CH	1x100mL	X	X				ILE/SS	↓	110905 12 Set 3E ~~TK~~
13 Set 3E ~~TK~~	↓	1735	↓	↓	↓	↓	↓				↓		110905 13 Set 3E ~~TK~~
11 Set 3E ~~TK~~	↓	1820	↓	↓	↓	↓	↓				↓	↓	110905 11 Set 3E ~~TK~~
Temp blank	11/9/05	1712	H2O	CH	1x100mL			X			↓	1°C	—

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by Samantha Leskie and Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	~~RECEIVED BY~~	RELINQUISHED BY	~~RECEIVED BY~~	RELINQUISHED BY	RECEIVED BY
Cathy Hartman	Michele M.S	Michele M.S			
Signature	Signature	Signature	Signature	Signature	Signature
Firm Weston	Firm Weston 11/9/05 2000	Firm Weston 11/9/05 2212	Firm Weston 11/9/05 2212	Firm	Firm
Date/Time 11/9/05 2000	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12065

DATE 11/9/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY
PROJECT MANAGER: Larissa Dumand
COMPANY: Weston
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: FECAL COLIFORM	ENTERO	TEMP ℄			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
6 SET 3	11/9/05	1850	WATER	DM/JS	1						ICE / ST	10 C	110905 6 Set 3
7 SET 3		1909			1								110905 7 Set 3
5 SET 3		1830			1								110905 5 Set 3
14 SET 3		1733			1								110905 14 Set 3
8 SET 3		1810			1								110905 8 Set 3
TEMP ℄		1841			1			X					
16 SET 3		1752			1	X	X						110905 16 Set 3
15 SET 3		1715			1	X	X						110905 15 Set 3

SPECIAL INSTRUCTIONS/COMMENTS:
SAMPLED BY JEN SCHOLLÉE & DAN McCOY

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: JSchollée	Signature: TMitchell MS	Signature: TMitchell MS	Signature:	Signature:	Signature:
Firm: weston solin	Firm: weston	Firm: weston	Firm: weston	Firm:	Firm:
Date/Time: 11-9-05 1950	Date/Time: 11/9/05 1950	Date/Time: 11/9/05 2212	Date/Time: 11/9/05 2212	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

№ 11166

DATE 11/09/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solns.
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	Fecal Coliform	Entero.	Temp Blank			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
					1x100mL Plastic	ANALYSIS/TEST REQUESTED						FOR WESTON USE ONLY	
Temp Blank	11/09/05	2020	H_2O	JMP	1	~~X~~	~~X~~	X			ICE/ST	1°C	———
18 Set 4		2130		AH		X	X						111005 18 Set 4
3 Set 4		2022		JMP									111005 3 Set 4
4 Set 4		2038		JMP									111005 4 Set 4
2 Set 4		2050		AH									111005 2 Set 4
1 Set 4		2100		AH									111005 1 Set 4
10 Set 4		2110		JMP									111005 10 Set 4
9 Set 4	↓	2120	↓	JMP	↓	↓	↓				↓	↓	111005 9 Set 4

SPECIAL INSTRUCTIONS/COMMENTS:
sampled by Amy Hamilton & Jeanette Pendergraft

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Jeanette Pendergraft	Anthony Trinh				
Signature: J. Pendergraft	Signature	Signature	Signature	Signature	Signature
Firm: Weston Solns.	Firm: Weston Solns.	Firm	Firm	Firm	Firm
Date/Time: 11/10/05 00:10	Date/Time: 11/10/05 0010	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12061

DATE 11-9-05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Armand
COMPANY: Weston Solu
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal col	Entero	temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	WESTON LAB ID
5 Set 4	11-9-05	2140	H_2O	JS	1	X	X				ice/ST	10 C	111005 5 Set 4
6 Set 4		2151			1	X	X						111005 6 Set 4
8 Set 4		2105			1	X	X						111005 8 Set 4
14 Set 4		2028			1	X	X						111005 14 Set 4
15 Set 4		2021			1	X	X						111005 15 Set 4
16 Set 4		2042			1	X	X						111005 16 Set 4
temp control	11-9-05	2150	H_2O	JS	1			X			ice/ST		

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Dan McCoy/Jennifer Schaller

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: JSchaller	Signature:	Signature	Signature	Signature	Signature
Firm: Weston Solu	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 11-10-05 0055	Date/Time: 11/10/05 0055	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

№ 11160

DATE 11/9/05 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: Larissa Aumand
COMPANY: Weston
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal Coliform	Entero	temp			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 SET 4E TK	11/9/05	2015	H2O	CH	1 HDPE	X	X				ice/ST	1°C	111005 12 Set 4E TK
13 SET 4E TK	↓	2046	↓	SL	↓	X	X				↓	↓	111005 13 Set 4E TK
11 SET 4E TK	↓	2142	↓	SL	↓	X	X				↓	↓	111005 11 Set 4E TK
TEMP BLANK	↓	2015	↓	CH	↓			X			↓	↓	—
7 SET 4E ~~MS~~ (CK) TK	11/9/05	2220	H2O	SL	1 HDPE	X	X				ice/ST	↓	111005 7 Set 4E TK

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Samantha Leskie & Cathy Hartman

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Cathy Hartman					
Signature: Cathy Hartman	Signature: Weston	Signature	Signature	Signature	Signature
Firm: Weston	Firm: 11/9/05 0108	Firm	Firm	Firm	Firm
Date/Time: 11/9/05 0108	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: February 18-19, 2006
Date Test Started: February 18-19, 2006
Date Test Ended: February 19-20, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 1	021806 1 Set 1	2/18/2006	2325	20	31
2 Set 1	021806 2 Set 1	2/18/2006	2300	70	663
3 Set 1	021806 3 Set 1	2/18/2006	2145	170	96
4 Set 1	021806 4 Set 1	2/18/2006	2220	130	153
5 Set 1	021806 5 Set 1	2/18/2006	2215	60	31
6 Set 1	021806 6 Set 1	2/18/2006	2233	1,300	1,723
7 Set 1	021806 7 Set 1	2/19/2006	0038	230	173
8 Set 1	021806 8 Set 1	2/19/2006	0010	30,000	4,611
9 Set 1	021806 9 Set 1	2/19/2006	0000	1,100	1,935
10 Set 1	021806 10 Set 1	2/18/2006	2345	340	249
11 Set 1	021806 11 Set 1	2/18/2006	2331	<20	73
12 Set 1	021806 12 Set 1	2/18/2006	2135	20	41
13 Set 1	021806 13 Set 1	2/18/2006	2212	20	63
14 Set 1	021806 14 Set 1	2/18/2006	2135	30,000	8,668
15 Set 1	021806 15 Set 1	2/18/2006	2054	5,000	8,823
16 Set 1	021806 16 Set 1	2/18/2006	2150	300,000	173,289
17 Set 1	021806 17 Set 1	2/18/2006	2118	13,000	10,758
18 Set 1	021806 18 Set 1	2/18/2006	2244	3,000	3,873

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: February 18-19, 2006
Date Test Started: February 18-19, 2006
Date Test Ended: February 19-20, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 2	021906 1 Set 2	2/19/2006	0200	<20	<10
2 Set 2	021906 2 Set 2	2/19/2006	0145	20	171
3 Set 2	021906 3 Set 2	2/19/2006	0115	40	120
4 Set 2	021906 4 Set 2	2/19/2006	0140	80	30
5 Set 2	021906 5 Set 2	2/19/2006	0155	20	10
6 Set 2	021906 6 Set 2	2/19/2006	0208	8,000	6,504
7 Set 2	021906 7 Set 2	2/19/2006	0320	23,000	3,641
8 Set 2	021906 8 Set 2	2/19/2006	0145	28,000	4,106
9 Set 2	021906 9 Set 2	2/19/2006	0230	170	>241,960
10 Set 2	021906 10 Set 2	2/19/2006	0210	40	<10
11 Set 2	021906 11 Set 2	2/19/2006	0227	20	175
12 Set 2	021906 12 Set 2	2/19/2006	0100	20	20
13 Set 2	021906 13 Set 2	2/19/2006	0121	<20	10
14 Set 2	021906 14 Set 2	2/19/2006	0116	170,000	3,873
15 Set 2	021906 15 Set 2	2/19/2006	0105	1,300	20,142
16 Set 2	021906 16 Set 2	2/19/2006	0128	130,000	41,058
18 Set 2	021906 18 Set 2	2/19/2006	0217	2,300	4,352

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: February 18-19, 2006
Date Test Started: February 18-19, 2006
Date Test Ended: February 19-20, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 3	021906 1 Set 3	2/19/2006	0425	20	10
2 Set 3	021906 2 Set 3	2/19/2006	0415	<20	<10
3 Set 3	021906 3 Set 3	2/19/2006	0345	80	52
4 Set 3	021906 4 Set 3	2/19/2006	0400	80	84
5 Set 3	021906 5 Set 3	2/19/2006	0429	20	41
6 Set 3	021906 6 Set 3	2/19/2006	0442	23,000	6,286
7 Set 3	021906 7 Set 3	2/19/2006	0500	50,000	3,947
8 Set 3	021906 8 Set 3	2/19/2006	0415	80,000	1,968
9 Set 3	021906 9 Set 3	2/19/2006	0445	800	64,882
10 Set 3	021906 10 Set 3	2/19/2006	0435	40	30
11 Set 3	021906 11 Set 3	2/19/2006	0505	<20	10
12 Set 3	021906 12 Set 3	2/19/2006	0345	<20	10
13 Set 3	021906 13 Set 3	2/19/2006	0515	<20	<10
14 Set 3	021906 14 Set 3	2/19/2006	0346	1,400,000	3,448
15 Set 3	021906 15 Set 3	2/19/2006	0335	70,000	2,064
16 Set 3	021906 16 Set 3	2/19/2006	0400	23,000	28,510
18 Set 3	021906 18 Set 3	2/19/2006	0450	13,000	5,436

Weston Solutions, Inc.

Analytical Report

Client: LADPW
Project: Marina del Rey Wet Weather Monitoring
Client Sample ID: See below
Weston Sample ID: See below

Date Received: February 18-19, 2006
Date Test Started: February 18-19, 2006
Date Test Ended: February 19-20, 2006
Matrix: Water

Bacterial Analysis Using Multiple Tube Fermentation/MPN and IDEXX Enterolert

Methods: SM 9221C & E and SM 9223

Microorganisms Tested: Fecal Coliforms and Enterococci

Bacterial Summary

Fecal coliform analysis based on dilutions providing results between 20-16,000,000 MPN/100mL
IDEXX Enterolert analysis based on dilutions providing results between 10 and 241,960 MPN/100mL

Sample ID	Weston ID	Date Sample Taken	Time Taken	Fecal Coliforms MPN/100 mL	Enterococci MPN/100 mL
1 Set 4	021906 1 Set 4	2/19/2006	0715	20	41
2 Set 4	021906 2 Set 4	2/19/2006	0655	13,000	5,475
3 Set 4	021906 3 Set 4	2/19/2006	0620	230	20
4 Set 4	021906 4 Set 4	2/19/2006	0640	170	96
5 Set 4	021906 5 Set 4	2/19/2006	0650	80	733
6 Set 4	021906 6 Set 4	2/19/2006	0705	80,000	6,766
7 Set 4	021906 7 Set 4	2/19/2006	0724	130,000	860
8 Set 4	021906 8 Set 4	2/19/2006	0638	1,300,000	5,208
9 Set 4	021906 9 Set 4	2/19/2006	0750	5,000	23,593
10 Set 4	021906 10 Set 4	2/19/2006	0730	3,000	11,874
11 Set 4	021906 11 Set 4	2/19/2006	0731	2,800	581
12 Set 4	021906 12 Set 4	2/19/2006	0606	20	<10
13 Set 4	021906 13 Set 4	2/19/2006	0624	<20	<10
14 Set 4	021906 14 Set 4	2/19/2006	0615	140,000	4,347
15 Set 4	021906 15 Set 4	2/19/2006	0605	23,000	4,352
16 Set 4	021906 16 Set 4	2/19/2006	0624	80,000	5,539
18 Set 4	021906 18 Set 4	2/19/2006	0715	30,000	2,359
Spot 1	*021906 Spot 1*	2/19/2006	0645	8000	2909
Field Blank	*021906 Field Blank*	2/19/2006	0750	<20	<10

Italicized font= spot samples

QA/QC Officer (Rosabel Dias) — Date: 08/29/2006

Microbiology Lab Supervisor (Anthony Trinh) — Date: 8/29/06

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☐ 152 Sunset View Lane • Sequim, WA 98382 • (360) 582-1758, FAX 582-1679
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CHAIN OF CUSTODY

12253

DATE 2-18-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA DEL REY
PROJECT MANAGER: L. AUMAND
COMPANY: Weston
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Tetra Tech	ANALYSIS/TEST REQUESTED: EVS 860	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
F 3 SET 1	2/18/06	2145	H2O	MA	1	X	X	Ice/5		021906 3 Set1
4 SET 1		2220								021906 4 Set1
2 SET 1		2300								021906 2 Set1
1 SET 1		2325								021906 1 Set1
10 SET 1		2345								021906 10 Set1
9 SET		2400								021906 9 Set1
	2/19/06	0000	MA							

SPECIAL INSTRUCTIONS/COMMENTS: SAMPLED BY MIKE AUMAND

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
M. Aumand			Lafreda Smith-Yarrell		
Signature: Weston	Signature: Weston Solutions	Signature: Weston Solutions	Signature: Weston Solutions	Signature	Signature
Firm: 2/19/06 0020	Firm: 2/19/06 0020	Firm: 2/19/06 0245	Firm: 2/19/06 0245	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12176

DATE 02/18/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: ~~BACT~~ Fecal Coliforms	Enterococci	Temp. Control			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
F12 SET 1	21806	2135	H2O	SL	1	X	X				ice/ST		021906 12 Set 1
13 SET 1		2212											021906 13 Set 1
11 SET 1		2331											021906 11 Set 1
								~~X~~					
TEMP		2135						X				4° C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Samantha Leslie

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston Solutions	Weston Solutions	Weston Solutions		
Firm	Firm	Firm	Firm	Firm	Firm
2-18-06 0030	2/19/06 0030	2/19/06 0245	2/19/06 0245		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12295

DATE 2/18/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Mainadel Rey
PROJECT MANAGER: Amand
COMPANY: Weston Solu
ADDRESS: see above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: ENTERO 1600 Total coliform	ANALYSIS/TEST REQUESTED: Fecal coliform	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	ANALYSIS/TEST REQUESTED	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
14 Set 1	2-18-06	2135	H_2O	SP	100mL	X	X					ice 1ST		021806 14 Set 1
18 Set 1		2244												021806 18 Set 1
6 Set 1		2233												021806 6 Set 1
17 Set 1		2118												021806 17 Set 1
5 Set 1		2215												021806 5 Set 1
16 Set 1		2150												021806 16 Set 1
15 Set 1		2054												021806 15 Set 1
8 Set 1	2-19-06	0010				X	X							~~021806~~ 8 Set 1 021906

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by S. Peterson and J. Schulke NOTE: 8 Set 1 Received 021906 0012

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Weston Solu	Signature: Weston Solutions	Signature: Weston Solutions	Signature: Weston Sol.	Signature	Signature
Firm: 2-18-06 2310	Firm: 2/18/06 2310	Firm: 2/18/06 0245	Firm: 2/19/06 0245	Firm	Firm
Date/Time	Date/Time	Date/Time: 2/19/06	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12179

DATE 02/19/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey
PROJECT MANAGER: L. Aumard
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Enterococcus	Fecal Coliform	Temp Control			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 SET 2	2-19-06	0100	H2O	SL	1	X	X				ice		021906 12 Set2
13 SET2	↓	0121	↓	↓	1	↓	↓				↓		021906 13 Set2
11 SET2	↓	0227	↓	↓	1	↓	↓				↓		025AW 021906 11 Set2
TEMP	↓	0100	↓	↓	1	not	not	X			↓	3.0°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Samantha Ceski

SHIPPING:
Shipping VIA:
Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Firm: Weston Solutions	Firm: Weston	Firm: Weston	Firm: WESTON SOL.	Firm	Firm
Date/Time: 2-19-06 0315	Date/Time: 2-19-06 0315	Date/Time: 2-19-06 0510	Date/Time: 2/19/06 0510	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12296

DATE 2-19-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Armand
COMPANY: Weston Solutions
ADDRESS: See above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Total coliform AND Entero	Fecal coliform	Temp			PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
5 Set 2	2-18-06	0955	H_2O	SP	100ml	X	X				ice / ST		021906 5Set2
6 Set 2		0208											021906 6Set2
16 Set 2		0128											021906 16Set2
8 Set 2		0145											021906 8Set2
14 Set 2		0116											021906 14Set2
15 Set 2		0105											021906 15Set2
F 7 Set 1		0038											021906 7 Set1
Temp Blank		0218						X					—
18 Set 2		0217			X	X	X						021906 18Set2

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled S. Peterson and J. Schollee - Sandy Peterson and Jennifer Schollée

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J Schollee	Signature: Crystal McCra	Signature: Crystal McCra	Signature: Jennifer Smith-Knuck	Signature	Signature
Firm: Weston Sol	Firm: Weston	Firm: Weston	Firm: Weston Sol	Firm	Firm
Date/Time: 2-19-06 0505	Date/Time: 2-19-06 0505	Date/Time: 2-19-06 0510	Date/Time: 2/19/06 0510	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12257

DATE 2-19-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: MARINA Del Rey
PROJECT MANAGER: L. Angwin
COMPANY: ~~See Above~~ Weston Solutions, Inc.
ADDRESS: see above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: TOC Coliform	ENTERO	TEMP 4oC	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3 Set 2	2-19-06	0115	H2O	MA	1	X	X	X	Ice/ST		021906 3Set2
4 Set 2	"	0140	"	"	"	"	"	"	"		021906 4Set2
2 Set 2	"	0145	"	"	"	"	"	"	"		021906 2Set2
1 Set 2	"	0200	"	"	"	"	"	"	"		021906 1Set2
10 Set 2	"	0210	"	"	"	"	"	"	"		021906 10Set2
F 9 Set 2	"	0230	"	"	"	"	"	"	"		021906 9Set2

SPECIAL INSTRUCTIONS/COMMENTS: samples collected by Mike Anghera

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
M. Angwin	Crystal McClain	Crystal McClain	Lynette Smith-Thweatt		
Signature	Signature	Signature	Signature	Signature	Signature
Weston	Weston	Weston	WESTON SOL		
Firm	Firm	Firm	Firm	Firm	Firm
2-19-06 0240	2-19-06 0240	2-19-06 0510	2/19/06 0510		
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

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CHAIN OF CUSTODY

12178

DATE 2·19·06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: enterococcus	ANALYSIS/TEST REQUESTED: F. coli storm	ANALYSIS/TEST REQUESTED: TEMP	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 SET3	2-19-06	0345	H2O	SL	1						ice		021906 12Set3
13 SET3		0515			1								021906 13Set3
11 SET3		0505			1								021906 11Set3
TEMP		0345			1			X				5.0°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Samantha Lesko

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston Solutions	Firm	Firm	Firm	Firm
2-19-06 0545	2/19/06 0545	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12246

DATE 2-19-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER	Marsh Sec Rey
PROJECT MANAGER	L. Ambrus
COMPANY	See Above
ADDRESS	See Above
PHONE/FAX	See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Freon Custom	ANALYSIS/TEST REQUESTED: EPA 8260	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3 Set 3	2-19-06	0345	H_2O	MA	1	X	X	Ice/ST		021906 3 Set 3
4 Set 3		0400								021906 4 Set 3
2 Set 3		0415								021906 2 Set 3
1 Set 3		0425								021906 1 Set 3
10 Set 3		0435								021906 10 Set 3
9 Set 3		0445								021906 9 Set 3

SPECIAL INSTRUCTIONS/COMMENTS: Samples By Mike Anstead

SHIPPING:

Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: M. Anstead	Signature: Tatiana Smith-Frank	Signature	Signature	Signature	Signature
Firm: Weston	Firm: Weston Solns	Firm	Firm	Firm	Firm
Date/Time: 2-19-06 0545	Date/Time: 2/19/06 0545	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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☐ 4729 NE View Drive • Port Gamble, WA 98364 • (360) 297-6903, FAX 297-6905

CHAIN OF CUSTODY

12289

DATE 2/19/06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: See above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: ENTERO AW Total coliform	ANALYSIS/TEST REQUESTED: Fecal coliform	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
7 Set 3	2+9/06	0500	H_2O	SP	1 500ml	X	X	ice / ST		021906 7 Set 3
15 Set 3		0335								021906 15 Set 3
7 Set 2		0320								021906 7 Set 2
6 Set 3		0442								021906 6 Set 3
16 Set 3		0400								021906 16 Set 3
8 Set 3		0415								021906 8 Set 3
5 Set 3		0429								021906 5 Set 3
14 Set 3		0346								021906 14 Set 3
18 Set 3		0450								021906 18 Set 3

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by S. Peterson / J. Schollee - Sandy Peterson / Jennifer Schollée

SHIPPING: Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: J Schollek	Signature: Jennifer Smith-Frank TK	Signature:	Signature:	Signature:	Signature:
Firm: Weston Sols	Firm: Weston Sol	Firm:	Firm: Weston	Firm:	Firm:
Date/Time: 2-19-06 ~~0600~~ 0545 TK	Date/Time: 2/19/06 0600	Date/Time:	Date/Time: 2/19/06 0545	Date/Time:	Date/Time:

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12249

DATE 2-19-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER	Marina Del Rey
PROJECT MANAGER	L. Aungst
COMPANY	See Above
ADDRESS	See Above
PHONE/FAX	See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: TRPH Carrollo	ANALYSIS/TEST REQUESTED: EPA 8015	ANALYSIS/TEST REQUESTED: Temp	ANALYSIS/TEST REQUESTED:	ANALYSIS/TEST REQUESTED:	PRESERVED HOW/ COMMENTS	FOR WESTON USE ONLY: SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
3 Set 4	2/19/06	0620	H_2O	MA	1	X	X				Ice/ST		021906 3 Set 4
Temp Blank		0605						X					~~021906~~ AW
4 Set 4		0640				X	X						021906 4 Set 4
Spot 1		0645											021906 Spot 1
2 Set 4		0655											021906 2 Set 4
1 Set 4		0715											021906 1 Set 4
10 Set 4		0730											021906 10 Set 4
9 Set 4		0750											021906 9 Set 4
Field Blank	2/19/06	0750	H_2O	MA	1	X	X				Ice/ST		021906 Field Blank

SPECIAL INSTRUCTIONS/COMMENTS:
samples collected by Mike Anchera

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: M. Aungst	Signature:	Signature	Signature	Signature	Signature
Firm: Weston	Firm: Weston	Firm	Firm	Firm	Firm
Date/Time: 2-19-06 1010	Date/Time: 2/19/06 1015	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12291

DATE 2-19-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: see above
PHONE/FAX: see above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Total Coliform ENTERO (E)	ANALYSIS/TEST REQUESTED: Fecal Coliform	PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
E 5 Set 4	2-19-06	0650	H_2O	SP	100mL	X	X	ice/ST		021906 5 Set 4
6 Set 4		0705								021906 6 Set 4
7 Set 4		0724								021906 7 Set 4
8 Set 4		0638								021906 8 Set 4
14 Set 4		0615								021906 14 Set 4
15 Set 4		0605								021906 15 Set 4
16 Set 4		0624								021906 16 Set 4
18 Set 4		0715								021906 18 Set 4

SPECIAL INSTRUCTIONS/COMMENTS:
Sampled by S. Peterson / V. Schollée – SANDY PETERSON / JENNIFER SCHOLLÉE

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
J Schollée	Ignacio Smith-Knuth				
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solu	WESTON SOL				
Firm	Firm	Firm	Firm	Firm	Firm
2-16/06 1115	2/19/06 1115				
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

WESTON SOLUTIONS

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CHAIN OF CUSTODY

12182

DATE 2-19-06 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER: Marina Del Rey
PROJECT MANAGER: L. Aumand
COMPANY: Weston Solutions
ADDRESS: See Above
PHONE/FAX: See Above

SAMPLE I.D.	DATE	TIME	MATRIX	INITIALS	NUMBER & TYPE OF CONTAINERS	ANALYSIS/TEST REQUESTED: Fecal coliform	Entero	Temp °			PRESERVED HOW/ COMMENTS	SAMPLE TEMP. UPON RECEIPT	FOR WESTON USE ONLY: WESTON LAB ID
12 SET 4	2-19-06	0606	H2O	SL	1	X	X	~~X~~			ICE/ST		021906 12Set4
13 SET 4	"	0624	"	"	1	"	"				"		021906 13Set4
11 SET 4	"	0731	"	"	1	"	"	~~X~~			"		021906 11Set4
TEMP	"	0605	"	"	1			X			"	4.0°C	

SPECIAL INSTRUCTIONS/COMMENTS: Sampled by Samantha Leskie

SHIPPING:
Shipping VIA: Airbill No:

SAMPLE CONDITION UPON RECEIPT (FOR WESTON USE ONLY):

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Weston Solutions	Weston Solutions INC.	Firm	Firm	Firm	Firm
2-19-05 11:05	02/19/06 1105	Date/Time	Date/Time	Date/Time	Date/Time

WHITE – return to originator • YELLOW – lab • PINK – retained by originator

APPENDIX E

Spot Sample Results

Comprehensive List of Spot Samples Collected during the Marina del Rey Bacterial Source Tracking Investigation
July 1, 2005 - June 30, 2006

Spot Sample ID	DRY Event #	Fecal Coliforms	Enterococci	Primary type	Secondary type	Comment
1	5	2200000	>241960	Washdown	Parking lot washdown	Sump pump discharge from underground garage cleaning; circle at Palawan toward Basin E; soapy water; squigy, pump
2	4	1700000	5731	Possible Illicit Connection	Possible IC/ID	Taken between EN20 and EN21; stormdrain
3	2	1,600,000	13,958	Washdown	Parking lot washdown	Sampled water being hosed down and pushed off from parking garage across from E1900
4	5	500000	2559	Washdown	Dumpster washdown	Best Western, Jamaica Bay Inn dumpsters; appears to be from dumpster area cleanout; washdown was not observed
5	5	170000	16785	Washdown	Parking lot washdown	End of Thatcher Street; past Princeton st.; lot cleaning; high rise parking lot; power washing
6	4	80000	3130	Washdown	Restaurant runoff	Cheesecake Factory
7	3	50,000	1,145	Possible Illicit Connection	Possible IC/ID	Water flowing out of pipe b/w EN20 and EN21. Had been flowing for at least 4 hours
8	5	30000	9097	Irrigation	Irrigation	Possible irrigation runoff; water on side of road; lots of vegetation
9	2	28,000	98,039	Washdown	Restaurant runoff	Near Site 6 and Site 7, appeared to be restaurant washdown from the 2nd floor
10	2	17,000	16,695	Washdown	Restaurant runoff	Tony P's runoff; sampled downstream at storm drain; smells and looks like grease
11	5	17000	1043	Possible Illicit Connection	Possible IC/ID	"Storm drain by dock E2000"; same as Spot 3 and 7.
12	5	>16000	74	Washdown	Building washdown	Washout of building/store; Near 730 Washington Blvd.
13	5	12339E	3076	Other	A/C Runoff	Library on Admiralthy and Bali; appears to be runoff from A/C unit on roof
14	4	8000	2909	Unknown		Meter(?) in front of Del Rey Yacht Club; ponded water
15	2	5,000	36,540	Washdown	Restaurant runoff	Tony P's runoff; sampled upstream near restaurant dumpster; smells and looks like grease
16	5	5000	2909	Washdown	Restaurant runoff	Runoff into drain; appears to be clogging with grease (located at Tony P's) approx. 15 feet from Spot 29.
17	4	5000	420	Washdown	Boat Washdown	Boat parking lot near O, boat washoff runoff
18	2	3,000	43,517	Washdown	Restaurant runoff	Tony P's runoff; sampled upstream near restaurant dumpster after JU when flow increased; smells and looks like grease
19	4	3000	437	Irrigation	Irrigation	Irrigation runoff over parking lot; sampled at grate; near site B
20	5	2300	27230	Washdown	Bathroom washdown	Palawan restroom; runoff to beach, 4 flows (PCR sample taken - neg for gen and human)
21	1	2300	712	Irrigation	Irrigation	Spot sample D1200 - irrigation runoff entering drain
22	2	900	9,075	Irrigation	Irrigation	looks like irrigation runoff from across the street from Site 2
23	4	900	3873	Irrigation	Irrigation	Near Site 18, runoff near planters, ponded; broken sprinkler
24	4	800	110	Unknown	Parking lot	Came from apartments near Site 10
25	5	700	17821	Unknown	Residential discharge	3912 Redwood; resident discharge water; pool? Hot tub? Unknown
26	5	Not processed	369	Unknown	Residential discharge	Between E2100 and E2300; black pvc pipe coming from parking garage at 14006 , causing runoff to street and collecting between road and sidwalk
27	Sed	500	243	Washdown	Bathroom washdown	Restroom at Mother's Beach Picnic area - middle of beach
28	5	110	836	Washdown	boat/person washdown	Restroom on Palawan Way; boat and person wash off
29	5	20	723	Washdown	Restaurant runoff	Water dripping from Tony P's deck and running off; water ponded under deck; observed spraying off windows at uppder deck
30	5	230	399	Irrigation	Irrigation	1/2 way down Bali Way to MDR Hotel
31	4	230	336	Irrigation	Irrigation	Runoff from Ritz
32	5	20	142	Unknown	Other - Hotel	Same flow as O-30; receiving water sample
33	2	80	135	Washdown	Boat Washdown	wash down of something was not seen; sampled last trickles @ the boatyard @ the end of Mother's Beach, Site 5
34	5	170	119	Unknown	Other - Hotel	At Ritz on Admiralty; flow from rectangular drain; high flow; flows from Ritz to fire station; sample collected in front of fire station before going into drain
35	5	220	63	Washdown	Parking lot washdown	Café del Rey; appears t be from parking lot cleaning; water all the way to diner restaurant

Comprehensive List of Spot Samples Collected during the Marina del Rey Bacterial Source Tracking Investigation
July 1, 2005 - June 30, 2006

Spot Sample ID	DRY Event #	Fecal Coliforms	Enterococci	Primary type	Secondary type	Comment
36	4	170	72	Washdown	Other - Hotel	2nd floor by Ritz, washing deck
37	5	80	84	Unknown	Hotel	Same flow as above; flow from storm drain near F100 CYC; to left of placard EN44
38	5	80	<10	Other		smelled sewage; heard plopping, ballparked area with sample; slig 3319 near site L
39	4	40	20	Washdown	Boat Washdown	Near Site 12 and Q, E1600 boats washed out w/ Comet
40	5	40	10	Irrigation	Irrigation	Grand view and Van Buren
41	2	40	<10	Other	Sewage Pump out	Popeye's pumpout servicing a boat. Sampled after boat left (Set 6)
42	3	20	<10	Other	Boat discharge	Heard bubbling up from Endeavour and saw scump; at Site 1
43	3	20	<10	Washdown	Restaurant runoff	Sampled ponded water in front of Tony P's
44	4	20	<10	Vistor Behavior	Boat discharge	Boat discharge near N
45	5	20	<10	Washdown	Boat Washdown	Palawan restroom; runoff to road
46	1	20	<10	Visitor Behavior	Bilge	D1300 spot sample; bilge water 100ml/0.5 sec
47	4	<20	41	Irrigation	Irrigation	overwatering through parking lot by Site 12
48	2	<20	10	Unknown	Possible Boat Discharge	took Bacteria sample at Site G, smelled of sewage
49	4	<20	10	Maintenance	Hotel	Deck washing, ponded gutter water at Ritz; drainage unknown
50	2	<20	<10	Vistor Behavior	Incorrect disposal	Ice left by vistor melting on top of stormdrain b/w FN10 and FN11
51	2	<20	<10	Vistor Behavior	Boat discharge	F2319 "Canary Clipper" discharge-near site M
52	3	<20	<10	Maintenance	Unknown	across from D2000-maintenance truck dripping water from hydrant
53	3	<20	<10	Irrigation	Irrigation	taken near site 18
54	4	<20	<10	Maintenance	Parking lot	Near E2300 sign 1400b on parking structure
55	5	<20	<10	Irrigation	Irrigation	Plawan way median at 15 min. parking
56	5	<20	<10	Washdown	Car washing	Palawan restroom
57	5	<20	<10	Maintenance	Hotel	At Ritz on Admiralty; flow from rectangular drain; high flow; flows from Ritz to fire station
58	5	Not processed	<10	Washdown	Building/Parking Lot Washdown	MdR Hotel at end of Bali Way; soapy runoff
Outside of Back Basins						
	5	**220000**	**98039**	Washdown	Restaurant	California Pizza Kitchen; drainage in street; appears to be from California Pizza Kitchen garbage area; could hear water and disches in garbage area.
	5	**140000**	**18600**	Washdown	Dumpster washdown	Runoff from McDonald's dumpster washout; chevron at line on Mindaneo Way
RW	3	**3,000**	**1,012**	Other	Other	Sample taken from inside the trash boom at Site 15
RW	3	**3,000**	97	Possible IC/ID	Possible IC/ID	Receiving water from in front of EN20 and EN21
	5	**2200**	30	Washdown	Building/Parking Lot Washdown	Carwash runoff; 3223 Washington World Gym HQ
RW	5	**1300**	**3129**	Washdown	Restaurant	Receiving water from restuaruant runoff in harbor
	5	358E	**2909**	Other	Roof drainage	Back of Shopping Center between Fiji and Mindanao and Admiralty and Lincoln
	5	300	**256**	Irrigation	Irrigation	By harbor residences; Via Marina and Panay Way
	4	230	**543**	Irrigation	Irrigation	From Marriot on Via Marina, lots of runoff; broken sprinkler
	5	230	**187**	Irrigation	Irrigation	Toward end of Panay Way
	5	220	**11776**	Irrigation	Irrigation	Back of Shopping Center between Fiji and Mindanao and Admiralty and Lincoln
	5	<20	52	Irrigation	Irrigation	Broken sprinkler head across from Ritz on admiralty; Doesn't appear to be draining into any storm drains
	5	<20	10	Unknown	Unknown	Marriot at Admiralthy and Washington; possible sump drain; low flow at sample appeared to have high flow
	5	<20	<10	Irrigation	Irrigation	West Marine
	5	<20	<10	Washdown	Boat washdown	Boat dry dock lot north side of Mindanao Way; appears to be runoff from boat washing
	5	<20	<10	Unknown	Unknown	Flow out of pipes from building; back of building; 500 block Washington; 3 pipes

RW - Receiving Water Sample

APPENDIX F

Animal List for Library Samples

Appendix F. Library Data Log

ML	Mallard	GB	Great Blue Heron
SE	Snowy Egret	WF	Greylag Goose
RD	Rock Dove (ferrel pigeon)	AC	American Coot
CR	Crow	DC	Double Crested Cormorant
DG	Dog	GW	Peking Duck (White Domestic)
SG	Seagull (California Gull)	CG	Canadian Goose
BC	Brandt's Cormorants	BP	Brown Pelican
	Black Crowned Night		
NH	Heron	CH	California Halibut
GS	Ground Squirrel	RR	Rat
HF	House Finch	WT	Willet
WG	Western Gull	GE	Great Egret
MG	Marbled Godwit		

Sample ID	Date	Time	Location	Suspected Source	Comments
ML-001	8/24/2005	12:00	Oxford Basin BP	Mallard female	runny poo, hard to get
ML-002	8/24/2005	12:23	Oxford Basin BP	Mallard female	didn't see it drop but only 1/20 was not mallard
SE-001	8/24/2005	12:30	OB BP	Snowy Egret	
RD-001	8/24/2005	14:40	Mothers Beach	Rock Dove (Ferrel Pigeon)	
RD-002	9/20/2005	13:15	Mothers Beach	Rock Dove (Ferrel Pigeon)	
RD-003	10/19/2005	10:37	Mothers Beach	Rock Dove (Ferrel Pigeon)	Palawan-Basin D sidewalk across parking lot entrance
ML-003	10/19/2005	13:50	Oxford Basin BP	Mallard	from concrete edge of pond 90 percent certain duck was sitting and then flew away
CR-001	10/19/2005	14:15	Oxford Basin Parking Lot	Crow	In parking lot of Oxford Basin, bird on wire
RD-004	11/15/2005	13:13	Mothers Beach	Rock Dove (pigeon)	sidewalk at Mathers 90 percent sure of species
SE-003	12/14/2005	13:30	Little trash gate	Snowy Egret	extremely runny 75 % sure of species
No Birds/animals	1/3/2006				
DG-001	1/24/2006	11:20	Admiralty Park	Dog	Immediately across the street. Frm Café Del Rey at black gate 100%
CR-002	1/24/2006	12:35	Parking lot on Palawan near Mother's Beach number 9	Crow	Sitting on light pole. Saw poop drop 90%
CR-003	1/24/2006	12:40	Parking lot on Palawan near Mother's Beach number 9	Crow	Sitting on branch. Saw poop drop 90%
RD-005	1/24/2006	12:45	Parking lot on Palawan near Mother's Beach number 9	Rock Dove	90 % feeding on bird seed
RD-006	1/24/2006	12:55	Parking lot on Palawan near Mother's Beach number 9	Black & White Pigeon	100% feeding on bird seed
SG-001	1/24/2006	14:20	Mothers Beach	Brown Sea Gull	100% saw it poop on sand
SG-002	1/24/2006	14:40	Mothers Beach	Sea Gull	75% saw it poop hen walked up to it,but there were a few around, this looked best
DG-002a	1/24/2006	15:00	Burton Chace Park	Dog (Golden	a 100% frm clean middle sample into syringe (no falcon tube)
DG-002b	1/24/2006	15:05	Burton Chace Park	Dog (Golden	b-frm foil xfered to Falcon tube 100%
RD-007	2/9/2006	10:15	Burton Chace Park	Rock Dove	100% Rainbow regular
RD-008	2/9/2006	10:17	Burton Chace Park	Rock Dove	100% Rainbow regular
RD-009	2/9/2006	10:18	Burton Chace Park	Rock Dove	100% Rainbow regular
RD-010	2/9/2006	10:20	Burton Chace Park	Rock Dove	100% Rainbow regular
SG-003	2/9/2006	10:33	Burton Chace Park	Sea Gull	100% Grey & white with yellowish/grn legs
SG-004	2/9/2006	10:40	Burton Chace Park	Sea Gull	100% Grey & white with yellowish/grn legs

Appendix F. Library Data Log

SG-009	2/9/2006	10:44	Burton Chace Park	Sea Gull (WG not SG (change submitted 4/27) JP)	100% Huge one w/ pink legs (3x size of reg) sharp colors
CR-004	2/9/2006	11:50	Burton Chace Park	Crow	100% liq. w/ syringe
CR-005	2/9/2006	12:12	Burton Chase Park	Crow	100% tiny amt.
SG-005	2/9/2006	13:45	Mothers Beach	Sea Gull	100% small sample; Sandy
SG-006	2/9/2006	13:56	Mothers Beach	Sea Gull	100% brown white bubbly poo
SG-007	2/9/2006	14:00	Mothers Beach	Sea Gull	100%
SG-008	2/9/2006	14:05	Mothers Beach	Sea Gull	90%
SG-009	2/21/2006	12:30	Channel & Donte	Sea Gull	90% sitting on post
RD-011	2/21/2006	12:40	Channel & Donte	Rock Dove/Pigeon	90%
RD-012	2/21/2006	12:43	Channel & Donte	Rock Dove/Pigeon	90%
RD-013	2/21/2006	12:56	Channel & Donte	Rock Dove/Pigeon	90%
SG-010	2/21/2006	13:15	Channel & Donte	Sea Gull	100% very little
SG-011	2/21/2006	13:22	Channel & Donte	Sea Gull	100% May be contam. Bc was frm under pole where old poo was
SG-012	2/21/2006	14:30	Channel & Donte	Sea Gull	100%
SG-013	2/21/2006	14:32	Ballona Lagoon	Sea Gull	100% very little bc avoiding mud
SG-014	2/21/2006	14:40	Ballona Lagoon	Sea Gull	100% frm. Mud, but piled up good
ML-004	2/21/2006	14:50	Ballona Lagoon	Mallard (duck)	75% surveyed are, then bunch of ducks came & resurveyed whn. Looked like 1 pooed & got sample
SG-015	3/8/2006	11:50	Mothers Beach	Sea Gull	95%
SG-016	3/8/2006	11:55	Mothers Beach	Sea Gull	95%
SG-017	3/8/2006	12:00	Mothers Beach	Sea Gull	95%
SG-018	3/8/2006	12:00	Mothers Beach	Sea Gull	95%
BC-001	3/8/2006	12:10	Mother's Dock	Brandt's Cormorants	95%
BC-002	3/8/2006	12:15	Mother's Dock	Brandt's Cormorants	95%
BC-003	3/8/2006	12:20	Mother's Dock	Brandt's Cormorants	95% bad?
RD-014	3/8/2006	13:00	Burton Chace Park	Rock Dove	100%
RD-015	3/8/2006	12:55	Burton Chace Park	Rock Dove	100%
RD-016	3/8/2006	13:05	Burton Chace Park	Rock Dove	100%
RD-017	3/8/2006	13:05	Burton Chace Park	Rock Dove	100%
RD-018	3/8/2006	13:40	Channel & Donte	Rock Dove	100%
ML-005	3/8/2006	13:45	Channel & Donte	Mallard	100%
RD-019	3/8/2006	13:45	Channel & Donte	Rock Dove	100%
RD-020	3/8/2006	13:50	Channel & Donte	Rock Dove	100%
DG-003	3/8/2006	14:35	Ballona Lagoon	Dog	100%
NH-001	3/14/2006	10:40	Oxford Basin	Blackcrowned Night Heron	100% runny, sample from concrete crusted with dry guano. Sampled surface
GS-001	3/14/2006	11:10	Oxford Basin (Big Trash Gate)	Ground Squirrel	95%-Foraging sqrl. On tree branch; moist!
HF-001	3/14/2006	12:30	Burton Chace Park	House Finch	90%-Feeding
WG-001	3/14/2006	13:10	Channel & Donte	Western Gull	100%-Perched
RD-021	3/14/2006	15:00	Channel & Donte	Rock Dove	100%-Perched
RD-022	3/14/2006	15:05	Channel & Donte	Rock Dove	100%-Perched
MG-001	3/14/2006	14:30	Ballona Lagoon	Marbled Godwit	90%-Shore Feeding
RD-023	3/16/2006	10:35	Channel & Donte	Rock Dove	95%-Feeding
RD-024	3/16/2006	10:37	Channel & Donte	Rock Dove	95%-Feeding
RD-025	3/16/2006	10:38	Channel & Donte	Rock Dove	95%-Feeding
WG-003	3/16/2006	11:00	Channel & Donte	Western Gull	80%-Feeding
WG-002	3/16/2006	11:05	Channel & Donte	Western Gull (brownish)	100%-Perched very little sample available
WG-004	3/16/2006	11:07	Channel & Donte	Western Gull	95%- Perched
WG-005	3/16/2006	11:07	Channel & Donte	Western Gull	75%-Perched

Appendix F. Library Data Log

RD-026	3/16/2006	12:10	Burton Chace Park	Rock Dove	75%-Feeding
RD-027	3/16/2006	12:10	Burton Chace Park	Rock Dove	75%-Feeding
RD-028	3/16/2006	12:10	Burton Chace Park	Rock Dove	75%-Feeding
WG-006	3/16/2006	12:15	Burton Chace Park	Western Gull (brownish)	100%-Perched
WG-007	3/16/2006	12:35	Burton Chace Park	Western Gull (Brown)	95%-Perched
HF-002	3/16/2006	12:40	Burton Chace Park	House Finch	95%-Perched
HF-003	3/16/2006	12:45	Burton Chace Park	House Finch	95%-Perched/Feeding
ML-006	3/23/2006	6:30	Ballona Creek at Topsoil St.	Mallard Duck	fed w/ bread
ML-007	2/23/2006	12:15	Ballona Wetland N end	Mallard Duck	hanging out on shore
WF-001	3/23/2006	12:15	Ballona Wetland N end	Greylag Goose	hanging out on shore
AC-001	3/23/2006	12:40	Ballona Wetland E side	American Coot	hanging out on shore
AC-002	3/23/2006	12:45	Ballona Wetland E side	American Coot	hanging out on shore
AC-003	3/23/2006	12:50	Ballona Wetland E side	American Coot	hanging out on shore
DC-001	3/23/2006	13:10	Coast Guard Facility West Fiji Way	Double Crested Cormorant	daytime roost
DC-002	3/23/2006	13:20	Coast Guard Facility West Fiji Way	Double Crested Cormorant	daytime roost
GB-001	3/23/2006	13:40	UCLA rec fac W end Fiji	Great Blue Heron	nest site
GB-002	3/23/2006	13:45	UCLA rec fac W end Fiji	Great Blue Heron	3 chicks in nest, may be same bird as 001 but don't believe so
ML-007	4/6/2006	11:15	Del Rey Lagoon	Mallard Duck	Fed
ML-008	4/6/2006	11:30	Del Rey Lagoon	Mallard Duck	
GW-001	4/6/2006	11:45	Del Rey Lagoon	Peking Duck	pot. Hybrid. White orange feet and bill
CG-001	4/6/2006	12:30	Ballona Creek Break water	Canadian Goose	sitting on bank
CG-002	4/6/2006	12:30	Ballona Creek Break water	Canadian Goose	sitting on bank
CG-003	4/6/2006	12:40	Ballona Creek Break water	Canadian Goose	sitting on bank
DG-004	4/6/2006	13:00	Admiralty Parking Lot	Dog (Dalmation)	steamer
GB-003	4/6/2006	13:50	Coast Guard Halibut	Great Blue Heron	Chick in nest
DG-005	4/6/2006	13:10	Dock E800	Dog (Golden)	
SE-004	4/12/2006	12:45	little trash gate roost in parking lot	Snowy Egret	nest site
SE-005	4/12/2006	12:45	little trash gate roost in parking lot	Snowy Egret	nest site
ML-008	4/12/2006	15:10	Del Rey Lagoon North	Mallard	hungry
AC-003	4/12/2006	15:40	Del Rey Lagoon South	American Coot	hanging out
AC-004	4/12/2006	15:40	Del Rey Lagoon South	American Coot	hanging out
AC-005	4/12/2006	15:40	Del Rey Lagoon South	American Coot	hanging out
DC-003	4/12/2006	16:10	Ballona Creek bike path past UCLA	Double Crested Cormorant	resting on shore
DC-004	4/12/2006	16:10	Ballona Creek bike path past UCLA	Double Crested Cormorant	resting on shore
RD-029	4/12/2006	17:20	Dock 52 Entrance	Rock Dove	doin the coot-coot
RD-030	4/12/2006	17:20	Dock 52 Entrance	Rock Dove	doin the coot-coot
RD-031	4/12/2006	17:20	Dock 52 Entrance	Rock Dove	doin the coot-coot
GB-004	4/26/2006	12:55	Coast Guard Facility	Great Blue Heron	perched
GB-005	4/26/2006	13:00	Coast Guard Facility	Great Blue Heron	in tree
GB-006	4/26/2006	13:00	Coast Guard Faciliy	Great Blue Heron	in tree
DC-005	4/26/2006	13:30	Ballona Crk Jetty N side	Double Crested Cormorant	sitting on rip-rap
DC-006	4/26/2006	13:30	Ballona Crk Jetty N side	Double Crested Cormorant	sittin on rip-rap
ML-009	4/26/2006	14:10	Del Rey Lagoon East	Mallard Duck	fed w/ bread
ML-010	4/26/2006	14:20	Del Rey Lagoon East	Mallard Duck female	sitting
CG-004	4/26/2006	15:10	Ballona Crk jetty N side 75 yrds UCLA	Canadian Goose	sitting
CG-005	4/26/2006	15:10	Ballona Crk jetty N side 75 yrds UCLA	Canadian Goose	sitting
CG-006	4/26/2006	15:20	Ballona Crk jetty N side 75 yrds UCLA	Canadian Goose	ornery goose

Appendix F. Library Data Log

RD-032	4/26/2006	16:10	Channel & Donte	Rock Dove/Pigeon	
RD-033	4/26/2006	16:10	Channel & Donte	Rock Dove/Pigeon	
RD-034	4/26/2006	16:10	Channel & Donte	Rock Dove/Pigeon	
		Changed Sample ID fm SG-009 on 2-			
WG-008	4/27/2006	9-06			
DG-006	5/10/2006	11:20	Admiralty Park	Dog	90%
SE-006	5/10/2006	11:30	Admiralty Park	Snowy Egret	90%
SE-007	5/10/2006	11:55	Admiralty Park	Snowy Egret	90%
RD-035	5/10/2006	13:05	Burton Chace Park	Rock Dove	100%
RD-036	5/10/2006	13:08	Burton Chace Park	Rock Dove	100%
RD-037	5/10/2006	13:10	Burton Chace Park	Rock Dove	100%
SE-008	5/10/2006	14:20	Admiralty Park	Snowy Egret	
DG-007	5/10/2006	14:30	Admiralty Park	Dog	
NH-002	5/23/2006	11:20	Oxford Basin big trash gate	Black Crowned Night Heron	90% (there was writing here that I couldn't read)
CG-007	5/23/2006	12:45	Ballona Creek at UCLA	Canadian Goose	100% surely
CG-008	5/23/2006	12:45	Ballona Creek at UCLA	Canadian Goose	100%
CG-009	5/23/2006	12:45	Ballona Creek at UCLA	Canadian Goose	100%
WG-009	5/23/2006	14:15	Sand Venice Beach	Western Gull	eating lentils & pumpernickel
WG-010	5/23/2006	14:30	Sand Venice Beach	Western Gull	eating lentils & pumpernickel
WG-011	5/23/2006	14:30	Sand Venice Beach	Western Gull	eating lentils & pumpernickel
BP-001	5/25/2006	13:00	Bait Dock	Brown Pelican	anchovy peaches
DG-008	6/6/2006	9:50	Admiralty Park	Dog (Beagle)	lots of corn
CH-001	6/6/2006	10:20	Bait Dock	Halibut	you can squeeze a Halibut for poop
BP-002	6/6/2006	10:30	Bait Dock	Pelican	
BP-003	6/6/2006	10:35	Bait Dock	Pelican	
BP-004	6/6/2006	10:40	Bait Dock	Pelican	
WG-012	6/6/2006	11:15	Ballona Creek N	Western Gull	
MG-002	6/6/2006	11:25	Ballona Creek N	Marbled Godwit	
MG-003	6/6/2006	11:30	Ballona Creek N	Marbled Godwit	
MG-004	6/6/2006	11:35	Ballona Creek N	Marbled Godwit	
ML-011	6/6/2006	11:40	Ballona Creek S	Mallard male	
RR-001	6/6/2006	11:45	Ballona Creek S	Rat	Large colony S side of Ball. Crk at del Rey tide gate
SE-009	6/13/2006	8:10	Bait Dock	Snowy Egret	eating sardines
BP-005	6/13/2006	8:05	Bait Dock	Brown Pelican	eating sardines
BP-006	6/13/2006	8:15	Bait Dock	Brown Pelican	eating sardines
BP-007	6/13/2006	8:45	Bait Dock	Brown Pelican	eating sardines
NH-003	6/13/2006	13:00	O.B. Little Trash	Black Crowned Night Heron	Juvenile
CR006	6/13/2006	13:44	Ballona Creek S by ped. Bridge	Crow	
WT001	6/13/2006	14:00	Ballona Creek S bike path	Willet	Bird black beak, grey legs, wings black and white, grey body. Group sitting on rocks
WT002	6/13/2006	14:00	Ballona Creek S bike path	Willet	Bird black beak, grey legs, wings black and white, grey body. Group sitting on rocks
WT003	6/13/2006	14:00	Ballona Creek S bike path	Willet	
BP-008	6/19/2006	8:00	Bait Dock	Brown Pelican	
BP-009	6/19/2006	8:00	Bait Dock	Brown Pelican	
BP-010	6/19/2006	8:00	Bait Dock	Brown Pelican	
SE-010	6/19/2006	8:00	Bait Dock	Snowy Egret	
SE-011	6/19/2006	8:00	Bait Dock	Snowy Egret	
SE-012	6/19/2006	8:00	Bait Dock	Snowy Egret	

Appendix F. Library Data Log

NH-004	6/19/2006	8:00	Bait Dock	Black Crowned Night Heron	adult
NH-005	6/19/2006	8:00	Bait Dock	Black Crowned Night Heron	adult
NH-006	6/19/2006	8:00	Bait Dock	Black Crowned Night Heron	adult
GE-001	6/19/2006	8:00	Bait Dock	Great Egret	large bird (~1m tall) black legs & feet yellow bill w/ some black on top white w/ tailing tail feather tinted slightly yellow
RD-038	6/19/2006	12:30	Via Marina	Rock Dove	
RD-039	6/19/2006	12:30	Via Marina	Rock Dove	
RD-040	6/19/2006	12:30	Via Marina	Rock Dove	
WF-002	6/19/2006	13:30	Del Rey Lagoon park on Pacific Ave	Grey Lag Goose	2 adults and 7 goslings
WF-003	6/19/2006	13:30	Del Rey Lagoon park on Pacific Ave	Grey Lag Goose	
WF-004	6/19/2006	13:30	Del Rey Lagoon park on Pacific Ave	Grey Lag Goose	
ML-012	6/19/2006	13:40	Del Rey Lagoon	Mallard	
WT-004	6/19/2006	13:45	Del Rey Lagoon	Willet	
WT-005	6/19/2006	13:45	Del Rey Lagoon	Willet	
WT-006	6/18/2006	13:45	Del Rey Lagoon	Willet	

APPENDIX G

Visual Observations from Library Sample Collection

Appendix G-1. Library Observations for Birds

Date	Time	Station ID	Sampler1	Sampler2	Species	Abundance	Behavior1	Behavior2	Behavior3	Comments
8/24/2005	11:43	Oxford Basin	EL	AW	Snowy Egret	17	flying	feeding in the water	shore feeding	
8/24/2005	11:43	Oxford Basin	EL	AW	Ducks	20	swimming	drinking	wading	
8/24/2005	11:43	Oxford Basin	EL	AW	Heron	5	solitary			
8/24/2005	11:43	Oxford Basin	EL	AW	Pigeons	5	flying			
8/24/2005	11:43	Oxford Basin	EL	AW	Gulls	5	flying			
8/24/2005	11:43	Mother's Beach	EL	AW	Pigeons	5	picking through litter			
9/20/2005	11:30	Oxford Basin	SA	AW	Ducks	25	feeding in the water	shore feeding	swimming	
9/20/2005	11:30	Oxford Basin	SA	AW	Egyption Goo	1	solitary			
9/20/2005	11:30	Oxford Basin	SA	AW	Heron	1	solitary			
9/20/2005	11:30	Oxford Basin	SA	AW	Egret	5	flying	shore feeding		
10/19/2005	10:37	Mother's Beach	SA	JP	Pigeons	5	walking	picking at ground		
10/19/2005	10:37	Mother's Beach	SA	JP	Ducks	5	feeding in the water			
10/19/2005	10:37	Mother's Beach	SA	JP	Crows	5	feeding in the water			
11/15/2005	13:16	Mother's Beach	SA		Pelicans	2	swimming			
11/15/2005	13:16	Mother's Beach	SA		Pigeons	8	walking			
12/14/2005	14:00	Mother's Beach	SA		Gulls	8	feeding in the water	shore feeding		
12/14/2005	14:00	Mother's Beach	SA		Pelicans	2	feeding in the water	shore feeding		
12/14/2005	13:30	Oxford Basin (Little trash grate)	SA		Snowy Egret	5	feeding in the water	swimming		
12/14/2005	13:30	Oxford Basin (Little trash grate)	SA		Ducks	5	feeding in the water	swimming		
12/14/2005	14:55	Oxfor Basin (Big trash grate)	SA		Shorebirds	5	feeding in the water			
1/24/2006	12:00	Admiralty Park (across from Café del Rey)	JP		Crows	2	solitary			
1/24/2006	12:30	Parking Lot #9	JP		Pigeons	25	shore feeding			
1/24/2006	12:30	Parking Lot #9	JP		Crows	2	shore feeding			
1/24/2006	14:00	Mother's Beach	JP		Gulls	46	flying	feeding in the water	swimming	
1/24/2006	14:00	Mother's Beach	JP		Shorebirds (la	25	feeding in the water	shore feeding		
1/24/2006	14:00	Mother's Beach	JP		Shorebirds (ti	63	feeding in the water	shore feeding		
2/9/2006	10:10	Burton Chace Park	JP		Pigeons	25	shore feeding			
2/9/2006	10:10	Burton Chace Park	JP		Gulls	5	solitary			
2/9/2006	13:25	Mother's Beach	JP		Crows	5	feeding in the water	solitary		Most birds were grouped at water's edge in front of blue
2/9/2006	13:25	Mother's Beach	JP		Gulls	58	solitary			
2/9/2006	13:25	Mother's Beach	JP		Sandpipers	5	feeding in the water			
2/21/2006	11:30	Ballona Lagoon	JP		Heron	1	solitary			
2/21/2006	12:35	Basin A	JP		Pigeons	63	shore feeding	hand fed		More pigeons seen here feeding in greas than ever seen before
2/21/2006	12:35	Basin A	JP		Gulls	12	solitary			
2/21/2006	12:35	Basin A	JP		Crows	1	solitary			
2/21/2006	13:35	Ballona Lagoon	JP		Ducks	48	feeding in the water			
2/21/2006	13:35	Ballona Lagoon	JP		Snowy Egret	4	feeding in the water	solitary		
2/21/2006	13:35	Ballona Lagoon	JP		Sandpipers	11	shore feeding			
2/21/2006	13:35	Ballona Lagoon	JP		Geese	3	swimming			
2/21/2006	15:00	Mother's Beach	JP		Gulls	75	shore feeding	solitary		
2/21/2006	15:00	Mother's Beach	JP		Cormorant	4	solitary			end of dock near kayaks
3/8/2006	11:45	Mother's Beach	JP		Gulls	225	swimming	solitary		
3/8/2006	11:45	Mother's Beach	JP		Shorebirds	5	feeding in the water	swimming		
3/8/2006	12:35	Admiralty Park	JP	SA	Unidentified	1	solitary			saw little bird on rock unter tree; poo and got sample, but couldn't id it.
3/8/2006	12:55	Burton Chace Park	SA	JP	Pigeons	31	hand fed			

Appendix G-1. Library Observations for Birds

Date	Time	Station ID	Sampler1	Sampler2	Species	Abundance	Behavior1	Behavior2	Behavior3	Comments
3/8/2006	13:30	Channel and Dante	SA	JP	Pigeons	230	hand fed			
3/8/2006	13:30	Channel and Dante	SA	JP	Ducks	2	hand fed			
3/8/2006	13:30	Channel and Dante	SA	JP	Gulls	25				
3/8/2006	14:00	Ballona Lagoon	SA	JP	Ducks	25	shore feeding	swimming		
3/8/2006	14:00	Ballona Lagoon	SA	JP	Gulls	25	shore feeding			
3/8/2006	14:00	Ballona Lagoon	SA	JP	Geese	3	swimming	walking		
										black-crowned night
3/14/2006	10:40	Oxford Basin (big trash grate)	DO		Heron	5	nesting	roosting		heron
3/14/2006	10:40	Oxford Basin (big trash grate)	DO		Finch	100	shore feeding	in a flock		
3/14/2006	10:40	Oxford Basin (big trash grate)	DO		Gulls	10	perched			
3/14/2006	10:40	Marina Way, north jetty	DO		Pigeons	25	perched			
3/14/2006	10:40	Marina Way, north jetty	DO		Shorebirds	20	shore feeding			Marbled godwits
3/16/2006	10:30	Channel and Dante	SA	JP	Gulls	25	flying	shore feeding	in a flock	
3/16/2006	10:30	Channel and Dante	SA	JP	Pigeons	25	flying	shore feeding	in a flock	
3/16/2006	10:30	Channel and Dante	SA	JP	Pelicans	5	flying	feeding in the water		
3/16/2006	10:30	Channel and Dante	SA	JP	Crows	5	nesting			
3/16/2006	12:00	Burton Chace Park	SA	JP	Gulls	5	sitting			
3/16/2006	12:00	Burton Chace Park	SA	JP	Pigeons	25	in a flock			
3/16/2006	12:00	Burton Chace Park	SA	JP	Finch	5	shore feeding			
3/23/2006		Ballona Creek	DO		Geese	2	shore feeding			
3/23/2006		Ballona Creek	DO		Ducks	15	shore feeding			
3/23/2006		Ballona Creek	DO		Coots	75	shore feeding			
3/23/2006	7:30	Ballona Creek	DO		Ducks	25	shore feeding			
3/23/2006	7:30	Ballona Creek	DO		Heron	5	nesting			
3/23/2006	7:30	Ballona Creek	DO		Cormorant	10				
3/23/2006	14:30	Ballona Creek	DO		Heron	5	nesting			
4/6/2006	11:15	Del Rey Lagoon	DO		Ducks	25	shore feeding			
4/12/006		Oxford Basin (Little trash grate)	DO		Snowy Egret	5	nesting			
4/12/006		Del Rey Lagoon	DO		Ducks	25	shore feeding			ducks and coots
4/26/2006		Coast Guard Facility	DO	SA	Heron	6	nesting			
4/26/2006		Ballona Creek Jetty	DO	SA	Cormorant	5	sitting			
4/26/2006		Ballona Creek Jetty	DO	SA	Geese	3	swimming	walking		
4/26/2006		Del Rey Lagoon	DO	SA	Ducks	5	sitting			
4/26/2006		Del Rey Lagoon	DO	SA	Gulls	25	shore feeding			
4/26/2006		Del Rey Lagoon	DO	SA	Finch	15	perched			
4/26/2006		Del Rey Lagoon	DO	SA	Shorebirds	23	shore feeding			
4/26/2006		Del Rey Lagoon	DO	SA	Geese	1	sitting			
4/26/2006		Channel and Dante	DO	SA	Pigeons	15	perched	hand fed		
										black-crowned night
5/23/2006			DO		Heron	6	perched			heron
5/23/2006			DO		Geese	8	shore feeding			
5/23/2006			DO		Gulls	30	shore feeding			
5/23/2006			DO		Pigeons	30	shore feeding			
6/6/2006	10:00	Bait Dock	DO	SA	Gulls	5	feeding in the water			
6/6/2006	10:00	Bait Dock	DO	SA	Pelicans	25	flying	feeding in the water	in a flock	
6/6/2006	10:00	Bait Dock	DO	SA	Egret	15	perched			
6/6/2006	11:00	Ballona Creek	DO	SA	Gulls	5	shore feeding			
6/6/2006	11:00	Ballona Creek	DO	SA	Ducks	1	shore feeding	solitary		

Appendix G-2. Library Observations for Animals

Date	Time	Station ID	Sampler1	Sampler2	Species	Abundance	Behavior1	Behavior2	Behavior3
8/24/2005	11:43	Oxford Basin	EL	AW	Squirrels	4	burrowing		
9/20/2005	11:30	Oxford Basin	SA	AW	Squirrels	2	burrowing		
12/14/2005	11:30	Oxford Basin	SA		Squirrels	4	burrowing		
1/24/2006	11:20	Admiralty Park (across from Café del Rey)	JP		Dog	5	playing	walking	running
1/24/2006	11:20	Admiralty Park (across from Café del Rey)	JP		Squirrels	1	hand fed by people		
1/24/2006	14:50	Burton Chace Park	JP		Dog	4	walking		
2/9/2006	10:10	Burton Chace Park	JP		Squirrels	2	hand fed by people	climbing trees	
2/9/2006	10:10	Burton Chace Park	JP		Dog	4	walking		
3/8/2006	14:00	Ballona Lagoon	SA	JP	Dog	2	walking		
3/14/2006	10:40	Oxford Basin (big trash grate)	DO		Squirrels	5	shore feeding		
3/16/2006	10:30	Channel and Dante	SA	JS	Dog	4	walking		
3/16/2006	12:00	Burton Chace Park	SA	JS	Cat	2	stalking		
3/16/2006	12:00	Burton Chace Park	SA	JS	Squirrels	1	climbing		
6/6/2006	9:50	Admiralty Park	SA	DO	Dog	1	walking		

APPENDIX H

CCTV Investigations Results

Appendix H. Summary of CCTV Investigation in Marina del Rey Harbor

Date of Investigation	Distance	RunNumber	FlowDirection	Pipe Size	AssetLocation	Material	StartID	EndID	Structural Rating	O&M Rating	Pacp Quick Overall Rating	Structural Comment	O&M Comment
4/21/2006 9:14	292.4	2	Downstream	15	Via Regata	Vitrified Clay Pipe	0002-1437	0012-1437	4100	2400	4124	Fracture Multiple	Deposits Attached Grease; Deposits Attached Other
4/21/2006 8:52	20.7	1	Downstream	15	Admiralty Wy	Vitrified Clay Pipe	0003-1437	0002-1437	0	2100	2100		Deposits Attached Grease
5/23/2006 10:23	38	6	Downstream	18	Easement	Vitrified Clay Pipe	0006-1437	0008-1437	2100	0	2100	Fracture Circumferential	
5/23/2006 9:01	146.3	3	Downstream	18	0	Vitrified Clay Pipe	0007-1437	0006-1437	4100	3G21	413G	Fracture Multiple	Deposits Ingressed Other, Water Level Sag, Deposits Attached Other
5/23/2006 9:30	202.7	4	Downstream	8	Alley	Vitrified Clay Pipe/Cast Iron	0009-1437	0006-1437	3111	2700	3127	Surface Corrosion Metal Pipe; Joint Offset Medium	4 Deposits Attached Grease; 2 Water Level Sags; 1 Obstacle in Joint; Intruding Sealing Ring
5/23/2006 10:05	15	5	Upstream	8	Easement	Vitrified Clay Pipe	0009-1437	0006-1437	3100	2100	3121	Deposits Attached Grease	Surface Corrosion; Metal Pipe
5/23/2006 8:50	106.9	2	Downstream	18	Admiralty Wy	Vitrified Clay Pipe	0011-1437	0007-1437	0	2100	2100		Deposits Attached Other
4/21/2006 9:56	67	3	Downstream	15	Via Regata	Vitrified Clay Pipe	0012-1437	0013-1437	0	3121	3121		Deposites Attached Grease
4/21/2006 10:10	79.9	4	Downstream	15	Via Regata	Vitrified Clay Pipe	0013-1437	0014-1437	0	2100	2100		Deposits Attached Grease
4/21/2006 10:31	223	5	Downstream	18	0	Vitrified Clay Pipe	0014-1437	0015-1437	0	3123	3123		Obstacle Rocks; Deposites Attached Other; Deposites Attached Grease
4/21/2006 10:50	245.8	6	Downstream	18	0	Vitrified Clay Pipe	0015-1437	0016-1437	4132	2200	4132	1 Fracture Multiple; 2 Crack Multiple; 1 Fracture Circumferential; 1 Joint Offset Medium	Deposits Attached Grease; Deposits Attached Other
4/21/2006 12:22	217.8	7	Downstream	18	0	Vitrified Clay Pipe	0016-1437	0017-1437	0	2400	2400		Deposits Attached Grease; Deposits Attached Other
4/21/2006 12:39	231.9	8	Downstream	18	0	Vitrified Clay Pipe	0017-1437	0018-1437	2111	2700	2811	Fracture Circumferential;Joint Offset Medium	Infil Weeper (inside fracture); Deposits Attached Grease; Deposits Attached Other;
4/21/2006 12:59	222	9	Downstream	18	0	Vitrified Clay Pipe	0018-1437	0019-1437	0	2300	2300		Deposits Attached Other; Deposits Attached Grease
4/21/2006 13:39	147	10	Downstream	18	0	Vitrified Clay Pipe	0019-1437	0114-1438	0	2100	2100		Deposits Attached Grease; Deposits Attached Other
4/21/2006 14:49	405.6	13	Downstream	12	Alley	LVCP	0020-1438	0124-1438	3200	3C23	3C23	Lining Failure Wrinkled	Water Level Sag; Deposits Attached Grease
4/24/2006 13:43	312	10	Downstream	8	Alley	Vitrified Clay Pipe	0079-1438	0080-1438	5241	3127	5241	2 Broken Soil Visible; Fracture Multiple; Crack Multiple;	Roots Medium Joint; Deposits Attached Grease; Roots Fine Joint
4/24/2006 10:44	288.2	5	Downstream	15	Alley	LCVP	0080-1438	0081-1438	0	312C	312C	Water Level Sag; Deposits Attached Grease	
4/24/2006 11:49	287.5	6	Downstream	15	Alley	LCVP	0081-1438	0082-1438	0	2900	2900		Deposits Attached Grease
4/24/2006 12:05	279.1	7	Downstream	15	Alley	LCVP	0082-1438	0083-1438	0	0	0		
4/24/2006 12:44	159.2	8	Downstream	15	Alley	LCVP	0083-1438	0197-1438	0	0	0		
4/24/2006 13:13	384.2	7	Downstream	8	Alley	LCVP	0096-1438	0097-1438	3100	413B	413B	Lining Failure Blistered	Deposits Attached Grease; Deposits Ingressed Other; Water Level Sag; Abandoned Survey due to large grease
4/25/2006 11:07	396.6	5	Downstream	15	Alley	LCVP	0098-1438	0080-1438	0	3221	3221		Deposits Attached Grease; Infil Dripper
4/24/2006 9:50	178.3	4	Downstream	15	Alley	LCVP	0098-1438	0080-1438	0	412E	412E	30% of pipe - Deposits Attached Grease… Ended survey due to Grease	
4/24/2006 8:30	322.4	2	Downstream	12	Alley	LCVP	0099-1438	0098-1438	0	322O	322O		Infil Dripper; Water Level Sag; Deposits Attached Grease
4/24/2006 12:02	446.2	5	Downstream	8	Alley	LCVP	0100-1438	0198-1438	0	3A24	3A24		Water Level Sag; Deposits Attached Grease

Appendix H. Summary of CCTV Investigation in Marina del Rey Harbor

Date of Investigation	Distance	RunNumber	FlowDirection	Pipe Size	AssetLocation	Material	StartID	EndID	Structural Rating	O&M Rating	Pacp Quick Overall Rating	Structural Comment	O&M Comment
4/24/2006 10:32	360.4	4	Downstream	8	Palawan Wy	LCVP	0101-1438	0100-1438	5431	413E	5441	3 Hole Void Visible; Broken Void Visible @ Lateral; Crack Multiple @Lateral; Crack Longitudinal @ Lateral; Fracture Circumferential @ Lateral	Infil Runner; Water Level Sag; Deposits Attached Grease; Deposits Attached Other
4/25/2006 13:39	177.5	8	Downstream	8	Alley	LCVP	0102-1438	0101-1438	0	4122	4122		Deposits Attached Grease - Abanded Survey due to grease
4/25/2006 14:00	227.2	9	Upstream	8	Alley	LCVP	0102-1438	0101-1438	0	4731	4731		Camera Underwater; Water Level Sag; Abandoned Survey due to grease - continuation of Run 8
4/25/2006 12:43	77.6	6	Downstream	8	Alley	LCVP	0103-1438	0102-1438	0	2800	2800		Deposits Attached Grease - Abanded Survey due to debris
4/25/2006 13:04	323.8	7	Upstream	8	Alley	LCVP	0103-1438	0102-1438	0	312P	312P		Deposits Attached Grease - Continuation of Run 6
4/25/2006 10:01	402	4	Upstream	8	Alley	Vitrified Clay Pipe	0104-1438	0103-1438	0	2414	2414		Water Level Sag; Deposits Attached Grease; Roots Fine Joint
4/25/2006 7:26	355.4	1	Upstream	8	Alley	Vitrified Clay Pipe/Cast Iron	0105-1438	0106-1438	0	4131	4131		Roots Ball Joint - Unable to continue due to roots; Roots Medium Joint,Water Level Sag; Roots Fine Joint
4/25/2006 8:09	402.5	2	Downstream	8	Alley	LCVP	0106-1438	0107-1438	0	2100	2100		Water Level Sag
4/25/2006 9:01	402.1	3	Downstream	8	Alley	LCVP	0107-1438	0108-1438	0	3100	3100		Infil Dripper
4/24/2006 9:44	341.2	3	Downstream	8	0	LCVP	0108-1438	0101-1438	0	3F2F	3F2F		Water Level Sag; Deposits Attached Grease; (Intruding Sealing Ring)
4/24/2006 8:59	400	2	Downstream	8	Palawan Wy	LCVP	0109-1438	0108-1438	0	3122	3122		Roots Medium Lateral; Deposits Attached Grease
4/24/2006 8:04	284.6	1	Downstream	12	Alley	LCVP	0110-1438	0099-1438	0	3123	3123	Infil Dripper	Deposits Attached Grease
4/24/2006 9:12	4.3	3	Upstream	8	Alley	Vitrified Clay Pipe	0111-1438	0110-1438				Abandoned Survey - Unable to fit camera	
5/23/2006 8:14	191.3	1	Downstream	18	0	Vitrified Clay Pipe	0111-1438	0011-1437	0	4131	4131		Camera Underwater; Deposits ingressed Other; Desposits Attached Other
4/21/2006 14:10	144.2	12	Downstream	18	Promenade Wy	Vitrified Clay Pipe	0113-1438	0111-1438	3121	4131	4132	Crack Multiple; Fracture Circumferential; Joint Offset Medium	Camera Underwater; Obstacle Rocks; Deposits Attached Other; Deposits Attached Grease; Deposites Ingressed Other
4/21/2006 14:00	11.9	11	Downstream	18	Promenade Wy	Vitrified Clay Pipe	0114-1438	0113-1438	0	2100	2100		Deposits Attached Grease
4/24/2006 7:50	402.3	1	Downstream	12	Alley	LCVP	0124-1438	0123-1438	3100	3L2A	3L2A	Lining Failure Wrinkled	Water Level Sag; Deposits Attached Grease
4/24/2006 12:57	165.2	9	Downstream	15	Alley	LCVP	0197-1438	0084-1438	0	0	0		
4/24/2006 12:36	103.2	6	Downstream	8	Alley	LCVP	0198-1438	0099-1438	0	2300	2300		Deposits Attached Grease; Deposits Ingressed Other

APPENDIX I

Responses from Bacterial Source Questionnaire

Response Number	Start Date	BOATER PRACTICES												
		How often have you seen boats get hosed off in a typical week?						How often have you noticed any discharge from boats in a week?						Please add any additional information pertaining to your observations/ knowledge of boater practices around Marina del Rey Harbor here.
		I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Basin__, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.	I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Basin__, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.	Open-Ended Response
1	11/8/2005 15:10													
2	12/23/2005 18:12	I have not noticed						I have not noticed						
3	12/23/2005 22:55		<2 times				A few times from the walkway area around the MDR County Library.	I have not noticed					A few times from the walkway area around the MDR County Library.	None
4	12/28/2005 23:32	I have not noticed						I have not noticed						
5	12/31/2005 11:26			3-5 times				I have not noticed						
6	1/9/2006 20:08		<2 times						<2 times					I've seen some boats use more than a cup of detergent to soap down the boats prior to rinsing off. This runs directly to the marina.
7	1/9/2006 22:54	I have not noticed						I have not noticed						
8	1/10/2006 7:37		<2 times				E basin and H basin	I have not noticed						Comet and bleach is used for cleaning topsides, boys club docks - burton chace park - were sanded last year without and debris catching devices - all sawdust and paint chips went into the marina.
9	1/10/2006 10:07		<2 times						<2 times					
10	1/10/2006 10:08	I have not noticed						I have not noticed						
11	1/10/2006 10:10	I have not noticed						I have not noticed						
12	1/10/2006 12:12			3-5 times					<2 times					
13	1/10/2006 12:39					>11 times	All Basins. But, they are washing off salt from the boat not toxins. Unless, you consider salt water a toxin	I have not noticed					People use the new pump out station or go 5 miles out	I belong to 3 sailing clubs. All 3 clubs are keenly aware of the water problems and are very responsible about what goes into the bay!
14	1/10/2006 16:18				6-10 times		Basin E						Basin E once in awhile	
15	1/10/2006 16:48		<2 times						<2 times					
16	1/10/2006 17:25			3-5 times			Basin G, Transient docks,	I have not noticed						The availability of pump-outs has decreased the number of boats discharging in the Marina
17	1/11/2006 9:50		<2 times					I have not noticed						
18	1/11/2006 20:12		<2 times						<2 times				B basin, oil slick from about the 1100 dock	
19	1/12/2006 7:58	I have not noticed						I have not noticed					i'm not near the harbor as often as I used to be (we sold our boat)	
20	1/12/2006 8:46			3-5 times			Anywhere from Basin D out to main channel	I have not noticed						Leakage from the gas dock - over topping tanks by boaters who either don't know what they are doing or aren't paying attention.
21	1/13/2006 17:12	I have not noticed						I have not noticed						no
22	1/13/2006 17:33		<2 times				More in the summer. Tahiti Marina area; Also near Marina Harbor.	I have not noticed						
23	1/17/2006 16:29			3-5 times			Fishing boats at Fisherman's village wash down every day.			3-5 times			FIsherman's village	Hornblower does lots of varnishing that puts scraped varnish into the water
24	1/17/2006 16:55					>11 times	Launch Ramp area, Baywatch dock		<2 times				Fish waste washdown on commercial fishing boats entering/leaving Dock 52	
25	1/18/2006 10:17			3-5 times					<2 times					

Response Number	Start Date	BOATER PRACTICES												
		How often have you seen boats get hosed off in a typical week?						How often have you noticed any discharge from boats in a week?						Please add any additional information pertaining to your observations/ knowledge of boater practices around Marina del Rey Harbor here.
		I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Basin__, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.	I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Basin__, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.	Open-Ended Response
26	1/18/2006 11:52	I have not noticed						I have not noticed						Sanding dust, dumping non-biodegradable cleaning solutions at the docks, throwing scraps into the water at the docks.
27	1/18/2006 15:27		<2 times					I have not noticed						
28	1/19/2006 11:40	I have not noticed						I have not noticed						
29	1/20/2006 8:12			3-5 times			Near the village and several other locations.	I have not noticed						I see people rinsing off their boats quite often when I'm walking my dogs through the marina.
30	1/20/2006 10:28		<2 times					I have not noticed						
31	1/21/2006 6:50				6-10 times		All basins, at docks	I have not noticed						
32	1/21/2006 13:14						Usually anytime a boat comes back to dock after going out into the bay, the boat is rinsed with fresh water. Other boats appear to have a maintenance service keep them clean. I have participated in work days on boats about once a month, when the boats are washed with marine approved soaps (biodegradable, non-sudsing).		<2 times				I reported a fuel leak in E-Basin to the sheriff's dept. This was sometime in the fall of 2005.	
33	1/21/2006 15:39	I have not noticed						I have not noticed						
34	1/25/2006 21:01				6-10 times		basin B, 2100 dock		<2 times				When i go to my boat on b basin 2100 there is often diesel residue in the water	The gas dock workers continually are over filling the tanks of the yachts and fuel is spilled. then to save the day, they use soap to dissolve the evidence...
35	1/26/2006 16:50					>11 times	ALL BOATS THROUGHOUT THE MARINA	I have not noticed						SOME BOAT WASHERS ARE MORE AWARE OF THE ENVIRONMENT THAN OTHERS AND USE SOAPS WHICH ARE ACCEPTABLE TO THE MARINA AND MARINA LIFE
36	1/29/2006 13:29				6-10 times			I have not noticed						
37	1/29/2006 19:05					>11 times	Everywhere - it is a common practice for privately owned boats as well as publicly owned ones					>11 times	everywhere - many boats have automatic bilge pumps - some are very oily	
38	1/31/2006 15:21	I have not noticed						I have not noticed						I do not go into the marina very often
39	1/31/2006 17:52						I AM HERE FIVE DAYS A WEEK. I SEE BOATS BEING WASHED OFTEN. I SELDOM SEE A PARTICULAR BOAT BEING WASHED MORE THAT ONCE A WEEK.	I have not noticed						
40	2/1/2006 12:09		<2 times				Fishermans village	I have not noticed						
41	2/1/2006 14:00	I have not noticed						I have not noticed						
42	2/9/2006 0:44		<2 times						<2 times				automatic bilge pumps occasonally	none of environmental concerns
43	2/9/2006 11:18	I have not noticed						I have not noticed						

Response Number	Start Date	BOATER PRACTICES												
		How often have you seen boats get hosed off in a typical week?						How often have you noticed any discharge from boats in a week?						Please add any additional information pertaining to your observations/ knowledge of boater practices around Marina del Rey Harbor here.
		I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Basin__, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.	I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Basin__, Dock Number, Slip Number, Fisherman's Village, etc.) or provide any further comments or observations.	Open-Ended Response
44	2/9/2006 21:55					>11 times	A basin 2200 dock. Every boat gets washed every week.		<2 times				When I see film on the water, or residue, I call the sheriff on the radio to track the flow.	I was aware of boats with no holding tanks in H basin, and reported them. One is now moved, was towed out. I suggest we have a marker tablet to detect discharge as other marinas do. We lived aboard at the Chesapeak bay and NEVER saw so many derelict vessels allowed to remain in the water. If someone has a permit, I would pray that the Coast guard or sheriff actually test the system, not just take the boaters word.
45	2/11/2006 9:33			3-5 times			DOCKS RENTED BY MARINA CITY CLUB				6-10 times		SAME DOCKS	
46	2/12/2006 18:32			3-5 times				I have not noticed						
47	2/13/2006 17:38					>11 times	Public Boat Launch facility in Basin G			3-5 times			Oil or gas slicks behind boats when motoring throught the marina.	Many boaters clean fish and toss the carcuss and guts into the water. This has been observed primarily at the public boat launch, but has been seen done also in the main channel. I have smelled sewage dischage on several occasions.
48	2/15/2006 12:36					>11 times	to many times, its such a waste of water!					>11 times	Too many times..its so sad to see this going in to our beautiful water	
49	2/16/2006 13:32													
50	2/22/2006 17:35					>11 times	Everyday my office has a view of the marina.						Everytime I go to the water near the marina	
51	2/23/2006 16:07	I have not noticed						I have not noticed						
52	3/8/2006 16:15	I have not noticed						I have not noticed						
53	3/8/2006 16:40	I have not noticed						I have not noticed						
54	3/8/2006 17:02			3-5 times						3-5 times				What about trash blown from boats on weekends? Lots of plastic bags in the water in Monday mornings in the summer.
55	3/9/2006 8:18	I have not noticed						I have not noticed						
56	3/9/2006 19:02			3-5 times			Many of the boats in the marina are wasked on a weekly or bi-monthly basis. I make sure my boat cleaner use environmentally friendly cleaners.		<2 times				C basin 1900 dock, the two boats along the wall are both liveaboard, have multiple people one them and never leave or have a pump service come to them. They are both pumping waste into the water and it smells around their boats.	I would have no problem as a live aboard being asked for proof of a pumping service or proof that the boat was out of the harbor and had the oppertunity to dump leagally.
57	3/10/2006 10:46						Clean up Manhattan Beach !!!						Clean up Manhattan Beach !!!	Clean up Manhattan Beach !!!
58	3/10/2006 10:59	I have not noticed						I have not noticed						
59	3/10/2006 12:27	I have not noticed						I have not noticed						
60	Mailed in		<2 times				Will not provide	I have not noticed					Anyone discharging will be evicted.	
Total Number of Responses	**60**	**19**	**13**	**11**	**4**	**8**	**25**	**37**	**12**	**3**	**1**	**2**	**19**	**19**

Response Number	Start Date	STORM DRAINS/RUNOFF OBSERVED																						
		What are the typical flow characteristics you have noticed from storm drains during dry weather?							What kinds of floatables have you observed near storm drain outlets?							What kind of odor have you observed near storm drain outlets?							Please add any more information pertaining to your observations/ knowledge of storm drains around Marina del Rey Harbor here.
		I have not observed flow from storm drains	None	Ponded	Trickle	Steady	High	Please specify location(s) (Examples: Basin__, Dock number, Fisherman's Village, Burton Chase Park, etc.) or provide any further comments or observations.	I have not observed floatables near storm drains	None	Oil	Garbage	Suds	Scum	Please specify location(s) (Examples: Basin__, Dock number, Fisherman's Village, Burton Chase Park, etc.) or provide any additional comments/observations.	I have not observed odors near storm drains	None	Chemical	Rotten eggs	Earthy	Fishy	Please specify location(s) (Examples: Basin__, Dock number, Fisherman's Village, Burton Chase Park, etc.) or provide any additional comments/observations	Open-Ended Response
1	11/8/2005 15:10																							
2	12/23/2005 18:12																							
3	12/23/2005 22:55				Trickle			Don't recall. I just have noticed it.						Scum	I don't recall but stuff coming out at times other than heavy rains seems very sludgy.	I have not observed odors near storm drains								
4	12/28/2005 23:32																							
5	12/31/2005 11:26		None									Garbage				I have not observed odors near storm drains								
6	1/9/2006 20:08	I have not observed flow from storm drains									Oil	Garbage	Suds	Scum						Earthy				
7	1/9/2006 22:54		None							None							None						I usually visit the marina during the dry summer months and have not witnessed storm drain activity.
8	1/10/2006 7:37				Trickle							Garbage	Suds	Scum	marina city towers, and the boat yard, public ramp, and mariners village, and area around eddies diner/harbor house and pond water release tunnel				Rotten eggs				They should be monitored, marked and identified so people can call in when there appears unusual flows or activities near them.
9	1/10/2006 10:07	I have not observed flow from storm drains									Oil	Garbage	Suds	Scum					Rotten eggs				
10	1/10/2006 10:08																							
11	1/10/2006 10:10																							
12	1/10/2006 12:12	I have not observed flow from storm drains									Oil				E Basin				Rotten eggs					
13	1/10/2006 12:39							Check with the Baykeepers. They clean them regularly and know what is going on.							Styrafoam is the worst problem I see.	I have not observed odors near storm drains								
14	1/10/2006 16:18				Trickle							Garbage							Rotten eggs				The Oxford Flood Control Basin drains into the harbor at the end of the driveway between Edie's Diner and FantaSea Yacht Charters
15	1/10/2006 16:48					Steady	High				Oil	Garbage				I have not observed odors near storm drains								
16	1/10/2006 17:25																							
17	1/11/2006 9:50	I have not observed flow from storm drains										Garbage			Styrofoam cups in the end of F-Basin. behind f-2400 dock	I have not observed odors near storm drains								
18	1/11/2006 20:12				Trickle						Oil	Garbage	Suds	Scum				Chemical	Rotten eggs					
19	1/12/2006 7:58																							
20	1/12/2006 8:46				Trickle							Garbage								Earthy				
21	1/13/2006 17:12																							
22	1/13/2006 17:33		None								Oil	Garbage								Earthy	Fishy		Occassionally, There are strong methane smells in Basin C and Basin E near the diner.
23	1/17/2006 16:29			Ponded				Admiralty Way is always flooded next to the Oxford basin during rains. The other side of the street (next to Marina City Club) usually floods too.			Oil	Garbage				I have not observed odors near storm drains							OFten blocked so nothing can drain
24	1/17/2006 16:55																							
25	1/18/2006 10:17																							
26	1/18/2006 11:52	I have not observed flow from storm drains							I have not observed floatables near storm drains							I have not observed odors near storm drains								
27	1/18/2006 15:27																							
28	1/19/2006 11:40																							
29	1/20/2006 8:12	I have not observed flow from storm drains									Oil		Suds	Scum	near the park and the village						Fishy	near the docks		
30	1/20/2006 10:28																							
31	1/21/2006 6:50	I have not observed flow from storm drains							I have not observed floatables near storm drains							I have not observed odors near storm drains								
32	1/21/2006 13:14	I have not observed flow from storm drains							I have not observed floatables near storm drains							I have not observed odors near storm drains								
33	1/21/2006 15:39																							
34	1/25/2006 21:01																							
35	1/26/2006 16:50	I have not observed flow from storm drains												Scum					Rotten eggs			AT THE LAGOON ALONG THE NORTH SIDE OF THE JETTY		

Response Number	Start Date	STORM DRAINS/RUNOFF OBSERVED																						
		What are the typical flow characteristics you have noticed from storm drains during dry weather?							What kinds of floatables have you observed near storm drain outlets?							What kind of odor have you observed near storm drain outlets?							Please add any more information pertaining to your observations/ knowledge of storm drains around Marina del Rey Harbor here.
		I have not observed flow from storm drains	None	Ponded	Trickle	Steady	High	Please specify location(s) (Examples: Basin__, Dock number, Fisherman's Village, Burton Chase Park, etc.) or provide any further comments or observations.	I have not observed floatables near storm drains	None	Oil	Garbage	Suds	Scum	Please specify location(s) (Examples: Basin__, Dock number, Fisherman's Village, Burton Chase Park, etc.) or provide any additional comments/observations.	I have not observed odors near storm drains	None	Chemical	Rotten eggs	Earthy	Fishy	Please specify location(s) (Examples: Basin__, Dock number, Fisherman's Village, Burton Chase Park, etc.) or provide any additional comments/observations	Open-Ended Response
36	1/29/2006 13:29				Trickle								Suds							Rotten eggs				
37	1/29/2006 19:05	I have not observed flow from storm drains																						
38	1/31/2006 15:21																							
39	1/31/2006 17:52		None												STYRO CUPS	I have not observed odors near storm drains								
40	2/1/2006 12:09		None							None									Rotten eggs				
41	2/1/2006 14:00																							
42	2/9/2006 0:44	I have not observed flow from storm drains											Suds	Scum	Basin E near E-3400				Rotten eggs			E-Basin along boardwalk inside and outside of MCC		
43	2/9/2006 11:18																							
44	2/9/2006 21:55	I have not observed flow from storm drains									Oil	Garbage		Scum	It is worst afer a rain. No any one specific drain, but appears worst over near the Playa Vista area and the launch ramp on H basin.	I have not observed odors near storm drains							See previous comments about conditions at the Boatyard do it yourself area.
45	2/11/2006 9:33					Steady					Oil		Suds						Rotten eggs					
46	2/12/2006 18:32	I have not observed flow from storm drains							I have not observed floatables near storm drains							I have not observed odors near storm drains								
47	2/13/2006 17:38			Ponded							Oil	Garbage	Suds	Scum	North of Jerry's Deli at 90 freeway. On street on fiji behind California Pizza Kitchen. Archstone apartments on Fiji way and Lincoln Blvd. El Torito and other restaurants in Fisherman's Village.				Rotten eggs	Earthy	Fishy		There appears to be very little filtering, to no filtering of tainted water entering the marina.
48	2/15/2006 12:36			Ponded	Trickle						Oil							Chemical	Rotten eggs	Earthy	Fishy			
49	2/16/2006 13:32																							
50	2/22/2006 17:35	I have not observed flow from storm drains										Garbage		Scum		I have not observed odors near storm drains								
51	2/23/2006 16:07																							
52	3/8/2006 16:15	I have not observed flow from storm drains							I have not observed floatables near storm drains							I have not observed odors near storm drains								
53	3/8/2006 16:40																							
54	3/8/2006 17:02	I have not observed flow from storm drains							I have not observed floatables near storm drains							I have not observed odors near storm drains								
55	3/9/2006 8:18			Ponded					I have not observed floatables near storm drains										Rotten eggs					
56	3/9/2006 19:02			Ponded								Garbage		Scum									How about a trash scoop where the wash enters the ocean. After it rains the trash line out at sea is clearly seen.
57	3/10/2006 10:46																							
58	3/10/2006 10:59																							
59	3/10/2006 12:27																							
60	Mailed in																							
Total Number of Responses	**59**	**16**	**5**	**5**	**7**	**2**	**1**	**3**	**7**	**2**	**12**	**15**	**9**	**12**	**10**	**15**	**1**	**2**	**13**	**5**	**4**	**3**	**8**	

Response Number	StartDate	GENERAL HARBOR MAINTENANCE PRACTICES PAGE 1																	
		How often have you observed over-irrigation (water from irrigation pooling in the landscaped areas)?					Is the irrigation system properly maintained (no broken or free-flowing sprinkler heads, etc.)?				How often have you seen water entering/running off restroom areas?					Please indicate your observations of the trashcans/dumpsters at Marina del Rey Harbor:				
		I have not noticed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I don't know	Yes	No	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) where you have noticed problems or provide any further comments or observations.	I have not noticed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I have not observed	Covered	Partially covered	Uncovered	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.
1	11/8/2005 15:10																		
2	12/23/2005 18:12																		
3	12/23/2005 22:55		Less than twice a month			In the park area across from the MDR Library & at condos in the areas West to the beach at Washington.	I don't know				I have not noticed							Partially covered		I don't remember where I have seen them. I have seen overfull and banged up dumpsters as well as properly covered ones. I have observed trashcans also overfull. I don't remember the locations (LA and Santa Monica have such a problem with dumpsters being overfull that it's become part of the landscape unfortunately).
4	12/28/2005 23:32																		
5	12/31/2005 11:26		Less than twice a month				I don't know						1-2 times per week				Covered			
6	1/9/2006 20:08			1-2 times per week			I don't know				I have not noticed							Partially covered		
7	1/9/2006 22:54	I have not noticed						Yes			I have not noticed						Covered			
8	1/10/2006 7:37				Daily	I've seen the pools at the marina condos get dumped directly into the marina many times...evry start and end of the season.	I don't know				I have not noticed								Uncovered	public dock 52 needs covers as do most and they need recycling cannisters.
9	1/10/2006 10:07		Less than twice a month				I don't know				I have not noticed						Covered	Partially covered		
10	1/10/2006 10:08																			
11	1/10/2006 10:10																		
12	1/10/2006 12:12	I have not noticed					I don't know				I have not noticed							Partially covered		They're covered in some basins, but not in others, but many are overflowing - covered or not
13	1/10/2006 12:39	I have not noticed					I don't know				I have not noticed						Covered			I forget the basin number it is the south side of Panay.
14	1/10/2006 16:18		Less than twice a month							Admiralty Way near the Waterside Shopping Center	I have not noticed							Partially covered		
15	1/10/2006 16:48	I have not noticed					I don't know				I have not noticed							Partially covered		

Response Number	StartDate	GENERAL HARBOR MAINTENANCE PRACTICES PAGE 1																	
		How often have you observed over-irrigation (water from irrigation pooling in the landscaped areas)?					Is the irrigation system properly maintained (no broken or free-flowing sprinkler heads, etc.)?				How often have you seen water entering/running off restroom areas?					Please indicate your observations of the trashcans/dumpsters at Marina del Rey Harbor:				
		I have not noticed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I don't know	Yes	No	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) where you have noticed problems or provide any further comments or observations.	I have not noticed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I have not observed	Covered	Partially covered	Uncovered	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.
16	1/10/2006 17:25	I have not noticed						Yes			I have not noticed								Trash cans are generally uncovered throughout the Park
17	1/11/2006 9:50		Less than twice a month			MDR library garden run-off while watering	I don't know				I have not noticed					I have not observed				
18	1/11/2006 20:12			1-2 times per week				Yes				Less than twice a month					Covered			
19	1/12/2006 7:58				Daily	it is ubiquitous.	I don't know	Yes		most of them appear to be functioning progpery, except for the runoff.	I have not noticed								Uncovered	
20	1/12/2006 8:46	I have not noticed					I don't know				I have not noticed					I have not observed				
21	1/13/2006 17:12																			
22	1/13/2006 17:33			1-2 times per week		I saw this more in the summer at Tahiti Marina apartments	I don't know				I have not noticed					I have not observed				I don't ever recall seeing any trash cans along the Marina everywhere from Panay way to Fisherman's Village..
23	1/17/2006 16:29				Daily	Burton Chace Park		Yes		Broken sprinkler heads usually fixed in 1/2 days				Daily	over-irrigation at Chace Park			Partially covered	Uncovered	Shanghai reds - often left open with birds digging in them Dock 52 - sometimes trash around the dumpsters
24	1/17/2006 16:55	I have not noticed							No	Around Sheriff Bldg.	I have not noticed							Partially covered		
25	1/18/2006 10:17				Daily		I don't know					Less than twice a month					Covered			
26	1/18/2006 11:52		Less than twice a month				I don't know				I have not noticed						Covered			
27	1/18/2006 15:27																			
28	1/19/2006 11:40	I have not noticed										Less than twice a month						Partially covered		
29	1/20/2006 8:12				Daily	apartments and condos around marina, mostly near cheesecake factory	I don't know					Less than twice a month			near mothers beach	I have not observed				
30	1/20/2006 10:28	I have not noticed					I don't know				I have not noticed									
31	1/21/2006 6:50				Daily	along Lincoln Ave, at CYC, at corner of Lincoln/Fiji, along Fiji Way, at The Boatyard	I don't know						1-2 times per week		The porta-john at the Boatyard				Uncovered	The large dumpster bins at The Boatyard are always uncovered, full, and the birds drag out the garbage all over the parking lot. Also, people dig through the garbage for cans/bottle and make a mess
32	1/21/2006 13:14																Covered	Partially covered	Uncovered	public walkway along Marina City Club are plastic-lined but uncovered; most of the other basins have covered cans either on the docks or on the walkway near the dock gates which are covered except when they are too full, when they are partially covered.
33	1/21/2006 15:39																			
34	1/25/2006 21:01	I have not noticed						Yes			I have not noticed								Uncovered	trash cans are not covered on b basin off of tahiti way.
35	1/26/2006 16:50	I have not noticed						Yes			I have not noticed						Covered			ALONG PALAWAN WAY...TRASH PICKED UP ON A REGULAR BASIS
36	1/29/2006 13:29		Less than twice a month					Yes			I have not noticed						Covered			
37	1/29/2006 19:05	I have not noticed																Partially covered		
38	1/31/2006 15:21																			
39	1/31/2006 17:52		Less than twice a month			THE PLANTERS ON ADMIRALTY WAY SEEM TO OVERFLOW FROM TIME TO TIME		Yes							NO		Covered			

Response Number	StartDate	GENERAL HARBOR MAINTENANCE PRACTICES PAGE 1																		
		How often have you observed over-irrigation (water from irrigation pooling in the landscaped areas)?					Is the irrigation system properly maintained (no broken or free-flowing sprinkler heads, etc.)?				How often have you seen water entering/running off restroom areas?					Please indicate your observations of the trashcans/dumpsters at Marina del Rey Harbor:				
		I have not noticed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I don't know	Yes	No	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) where you have noticed problems or provide any further comments or observations.	I have not noticed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I have not observed	Covered	Partially covered	Uncovered	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.
40	2/1/2006 12:09		Less than twice a month					Yes			I have not noticed						Covered			
41	2/1/2006 14:00	I have not noticed					I don't know				I have not noticed					I have not observed				
42	2/9/2006 0:44	I have not noticed					I don't know				I have not noticed						Covered			always covered and meticulously emptied at Marina City Club
43	2/9/2006 11:18																			
44	2/9/2006 21:55				Daily	Our sprinklers run way too much in the mornings. they appear to be on a timer and not based on need. Even when it rains, they come on.		Yes				Less than twice a month			The Marina Harbor boater pavilion has some type of water that discharges on the side of the building. It may be airconditioning condensation or leakage from showers/washers. The shower floor in the womens shower fiberglass stall has a large crack in the the floor of the handicapped stall. It obviously must leak somewhere. It has been reported for over two years. No repair done by Bellport Management.			Partially covered		I commend Bellport for recently covering the cans at the entrance to each of the slips gates. I kayak on weekends and can fill a 30 gallon bag in our basin alone. Frito-lay packages and foam cups are my most frequent waste items. It pools in the basin near our gym.
45	2/11/2006 9:33	I have not noticed						Yes			I have not noticed							Partially covered		
46	2/12/2006 18:32	I have not noticed					I don't know				I have not noticed								Uncovered	Marina del Rey Hotel Marina
47	2/13/2006 17:38			1-2 times per week		Burton Chase Park. Planters along bike path. Lawn areas near Fiji and Admiralty ways.	I don't know					Less than twice a month			Cheesecake Factory				Uncovered	Public Boat Launch
48	2/15/2006 12:36				Daily				No					Daily					Uncovered	
49	2/16/2006 13:32																			
50	2/22/2006 17:35	I have not noticed					I don't know				I have not noticed						Covered			
51	2/23/2006 16:07																			
52	3/8/2006 16:15		Less than twice a month				I don't know					Less than twice a month				I have not observed				
53	3/8/2006 16:40																			
54	3/8/2006 17:02			1-2 times per week		mariners bay apts, oakwook apts and the refurbished apts across from the cheesecake factory	I don't know					Less than twice a month			at mothers beach			Partially covered		mothers beach & MDR beach
55	3/9/2006 8:18		Less than twice a month									Less than twice a month							Uncovered	
56	3/9/2006 19:02	I have not noticed						Yes		Villa del Mar	I have not noticed						Covered			
57	3/10/2006 10:46					Clean up Manhattan Beach !!!				Clean up Manhattan Beach !!!					Clean up Manhattan Beach !!!					Clean up Manhattan Beach !!!
58	3/10/2006 10:59				Daily				No		I have not noticed					I have not observed				
59	3/10/2006 12:27																			
60	Mailed in	I have not noticed						Yes			I have not noticed						Covered			
Total Number of Responses	**60**	**19**	**11**	**5**	**9**	**13**	**24**	**14**	**3**	**6**	**29**	**9**	**2**	**2**	**8**	**7**	**16**	**14**	**11**	**17**

Response Number	StartDate	GENERAL HARBOR MAINTENANCE PRACTICES PAGE 2																		
		How would you describe the condition of the trashcans/dumpsters at Marina del Rey Harbor ?				Have you observed irrigation water hitting dumpster areas?				Does runoff from the parking lot/landscaped areas enter the Harbor?				How often are trash pick-ups?						Please add any additional information pertaining to your observations/knowledge of general Harbor maintenance practices around Marina del Rey Harbor here.
		Don't know	Emptied regularly	Overflowing	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	Have not observed	Yes	No	If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I do not know	Yes	No	If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I do not know	Less than once a week	Once per week	Twice per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	Open-Ended Response
1	11/8/2005 15:10																			
2	12/23/2005 18:12																			
3	12/23/2005 22:55		Emptied regularly		MDR is much better than average for street, lawn and trash maintenance than LA City or Santa Monica. It's (MDR) far from optimum. Parts of West LA and Santa Monica are awful considering the locations.	Have not observed				I do not know				I do not know						
4	12/28/2005 23:32																			
5	12/31/2005 11:26		Emptied regularly			Have not observed				I do not know				I do not know						
6	1/9/2006 20:08			Overflowing		Have not observed				I do not know				I do not know						
7	1/9/2006 22:54		Emptied regularly			Have not observed				I do not know				I do not know						
8	1/10/2006 7:37		Emptied regularly		however on holidays and weekends the trash is doubled and left until normal business hours of cleanup operations	Have not observed					Yes		look at the public docsk and parking lots around: the boat yard, windward, mariners village, mothers beach, eddies restaurant, the other seafood restaurant on the corner of eddies...sewage smells all of the time, the pond across the stret from eddies diner dumps into the marina killing many fish from oxygen depletion in their water,...etc...	I do not know					depends on the marina maintenance and beaches and harbors	when it rains the marina fills up with trash from Bollona creek....so bad that there is a plastic line of floating debris located 1 mile outside the breakwater and extends up and down the coast for dozens of miles...I will take you out and show you. Plus the plastics in the marina are so bad you can take your dinghy out and drive in a 10n foot diameter circle and pick up and fill garbage bags because the debris is in the water column so deep the trash is unending.
9	1/10/2006 10:07	Don't know				Have not observed				I do not know				I do not know						
10	1/10/2006 10:08																			
11	1/10/2006 10:10																			
12	1/10/2006 12:12			Overflowing	E Basin for sure, but I have noticed the condition in other basins too.	Have not observed				I do not know								Daily	E Basin- I think it's more like 4 times a week	
13	1/10/2006 12:39		Emptied regularly	Overflowing	Overflowing on summer weekends at burton chase park. They could use more cans there. Also, RECYCLE CANS EVERY WHERE.	Have not observed				I do not know				I do not know						ALL BOATS IN MARINA DEL REY: MUST HAVE BLUE DYE IN THEIR HEADS. I SEE POOP FLOATING BY FROM TIME TO TIME. You are asking about boat washing like it contributes to the pollution. We wash off the salt water after boating. That is not contributing to the problem. The sewer(Ballona Creek) drains into MDR, there is no circulation, gas bubbles up from below the marina near BCP - east of Santa Monica Windjammers Y. C. near S. C. Corinthian Y.C. You must do a comprehensive test of all the factore, the sewer system - does it leak?, why is there no circulation for the water? Look at all the things the party boats - where are they dumping their grey water? Let all the yacht clubs know how we can help. We are your best friends in this area of interest. The entire Santa Monica Bay is suffering from contamination. I think letting the sewer water enter the bay without treatment is a serious issue. Thanks for listening. Carole Walsh - email - americawest2@sbcglobal.net
14	1/10/2006 16:18		Emptied regularly			Have not observed					Yes		Mother's Beach					Daily		
15	1/10/2006 16:48			Overflowing		Have not observed					Yes		from virtually every marina berm.					Daily		

Response Number	StartDate	GENERAL HARBOR MAINTENANCE PRACTICES PAGE 2																		
		How would you describe the condition of the trashcans/dumpsters at Marina del Rey Harbor ?				Have you observed irrigation water hitting dumpster areas?				Does runoff from the parking lot/landscaped areas enter the Harbor?				How often are trash pick-ups?						Please add any additional information pertaining to your observations/knowledge of general Harbor maintenance practices around Marina del Rey Harbor here.
		Don't know	Emptied regularly	Overflowing	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	Have not observed	Yes	No	If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I do not know	Yes	No	If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I do not know	Less than once a week	Once per week	Twice per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	Open-Ended Response
16	1/10/2006 17:25		Emptied regularly			Have not observed					Yes		Burton Chace Park					Daily		The White Seabass Growout Facility moored at the end of Burton Chace Park, has the best health record of the entire program which has comparable facilities in 15 other locations up and down the coast.
17	1/11/2006 9:50		Emptied regularly			Have not observed					Yes		Park lot next to MDR Library			Once per week				
18	1/11/2006 20:12		Emptied regularly			Have not observed					Yes							Daily		
19	1/12/2006 7:58			Overflowing			Yes				Yes			I do not know						
20	1/12/2006 8:46		Emptied regularly			Have not observed				I do not know				I do not know						
21	1/13/2006 17:12																			
22	1/13/2006 17:33					Have not observed				I do not know			I don't know, but I would imagine there is some drainage system here to the harbor.	I do not know						There is trash in the water all of the time, it is aweful. And the water looks murkey. There is a lot of construction that is ongoing here, either on land or new docks.
23	1/17/2006 16:29			Overflowing	Dock 52 - people leave chairs and big bags of trash	Have not observed					Yes		Dock 52 Fisherman's Village where Shanghai Red's meets the brick walkway - always muddy and dirty	I do not know						
24	1/17/2006 16:55		Emptied regularly				Yes				Yes						Twice per week			
25	1/18/2006 10:17		Emptied regularly			Have not observed				I do not know						Once per week				
26	1/18/2006 11:52	Don't know				Have not observed				I do not know				I do not know						
27	1/18/2006 15:27																			
28	1/19/2006 11:40		Emptied regularly			Have not observed				I do not know				I do not know						
29	1/20/2006 8:12		Emptied regularly			Have not observed				I do not know						Once per week				
30	1/20/2006 10:28																			
31	1/21/2006 6:50			Overflowing	The Boatyard in the public parking lot	Have not observed				I do not know				I do not know						
32	1/21/2006 13:14				Marina City Club & RitzCarlton dock trashcans are emptied daily; other E basin, D and C basin dumpsters/trashcans are usually full-to-overflowing on summer weekends, especially holiday weekends.	Have not observed					Yes		Mothers beach runoff during rains; also, the picnic area is hosed down frequently (daily during the warm weather but I haven't walked there in a few months), and that runs off into the beach			Once per week				Maintenance people use leaf blowers in the parking lots, usually about once a week; I see street sweepers doing the public parking lots from time to time but have not noted frequency.
33	1/21/2006 15:39																			
34	1/25/2006 21:01		Emptied regularly			Have not observed				I do not know				I do not know						
35	1/26/2006 16:50		Emptied regularly			Have not observed				I do not know				I do not know						
36	1/29/2006 13:29		Emptied regularly			Have not observed				I do not know							Twice per week			
37	1/29/2006 19:05					Have not observed				I do not know				I do not know						
38	1/31/2006 15:21																			
39	1/31/2006 17:52		Emptied regularly			Have not observed					Yes		ALL FLOOR DRAINS EMPTY INTO THE HARBOR					Daily		

Response Number	StartDate	GENERAL HARBOR MAINTENANCE PRACTICES PAGE 2																		
		How would you describe the condition of the trashcans/dumpsters at Marina del Rey Harbor ?				Have you observed irrigation water hitting dumpster areas?				Does runoff from the parking lot/landscaped areas enter the Harbor?				How often are trash pick-ups?						Please add any additional information pertaining to your observations/knowledge of general Harbor maintenance practices around Marina del Rey Harbor here.
		Don't know	Emptied regularly	Overflowing	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	Have not observed	Yes	No	If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I do not know	Yes	No	If you answered yes, please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	I do not know	Less than once a week	Once per week	Twice per week	Daily	Please specify location(s) (Examples: Condo Name, Apartment Complex, Burton Chase Park, Parking Lot, Dock Number, etc.) or provide any further comments or observations.	Open-Ended Response
40	2/1/2006 12:09		Emptied regularly			Have not observed				I do not know								Daily		
41	2/1/2006 14:00		Emptied regularly			Have not observed				I do not know				I do not know						
42	2/9/2006 0:44		Emptied regularly		at Marina City Club	Have not observed				I do not know				I do not know					but trash cans at MCC are never full	n/a
43	2/9/2006 11:18																			
44	2/9/2006 21:55			Overflowing	The common areas at the end of the buildings on Tahiti, Marina Harbor are often overfilled. Our dockmaster regularly empties the cans on the dock, but the apartments adjacent to us are often overflowing.	Have not observed					Yes		We have neighbors who grill out with very greasy food. The area is adjacent to the seawall, so the runoff will always flow to the basin.	I do not know					Our dockmaster picks up trash well. That is the one thing they are attentive to. We live aboard, are very frugal with packaging and trash, and many of our neighbors are too. I commend Bellport for that.	I have often noticed serious pollution at the Boatyard do it yourself yard. I repeatedly spoke to Heike, the dockmaster, to no avail. If someone is sanding their botton, rest assured that the refuse runs into the harbor, right at the gate from the Dock 52 parking area. Whe I lived ther, I often had to clean it myself, as the drain would be blocked with debris and residue, and then the water would pool at the locked entrance. That Marina is in constant violation, and we were very happy to relocate to a cleaner area. Our neighbors sanded, painted, discharged, and nothing was ever done. We had constant dist on our canvas, deck and interior. It was sad.
45	2/11/2006 9:33		Emptied regularly			Have not observed				I do not know				I do not know						
46	2/12/2006 18:32		Emptied regularly			Have not observed				I do not know								Daily		
47	2/13/2006 17:38		Emptied regularly		Many citizens pull food out of the cans and throw it on the ground for the birds to eat (seagulls). This creates a lot of extra bird droppings that flow into the water.	Have not observed					Yes		Fishermans Villiage	I do not know						People living in Motor Homes in free parking Lot 52 on Fiji Way feed the birds (pigeons, ducks, seagulls) bread crumbs and an abundance of bird seed on a daily basis. These birds create an awful amount of droppings that gets washed down into Basin G.
48	2/15/2006 12:36			Overflowing			Yes				Yes				Less than once a week				pick up more trash, my trash is always overflowing , then going off into thr street	
49	2/16/2006 13:32																			
50	2/22/2006 17:35		Emptied regularly			Have not observed				I do not know				I do not know						
51	2/23/2006 16:07																			
52	3/8/2006 16:15	Don't know				Have not observed				I do not know				I do not know						
53	3/8/2006 16:40																			
54	3/8/2006 17:02		Emptied regularly		usually overflowing on monday mornings - in the summer - but they are good at emptying them.	Have not observed				I do not know						Once per week			stop the dog poo on the beach	
55	3/9/2006 8:18		Emptied regularly			Have not observed				I do not know				I do not know						
56	3/9/2006 19:02		Emptied regularly			Have not observed				I do not know								Daily		I think it is a small number of boats making the majority of the mess. You can usually tell by looking at them or smelling the water around them.
57	3/10/2006 10:46				Clean up Manhattan Beach !!!				Clean up Manhattan Beach !!!				Clean up Manhattan Beach !!!						Clean up Manhattan Beach !!!	Clean up Manhattan Beach !!!
58	3/10/2006 10:59	Don't know				Have not observed				I do not know				I do not know						
59	3/10/2006 12:27																			
60	Mailed in		Emptied regularly					No				No							Three times	
Total Number of Responses	**60**	**4**	**29**	**9**	**12**	**40**	**3**	**1**	**1**	**29**	**14**	**1**	**12**	**26**	**1**	**5**	**2**	**9**	**7**	**11**

Response Number	Start Date	PUMP-OUT STATION PRACTICES PAGE 1																	
		How often have you noticed use of pump-out station/equipment in a week?						How often have you noticed malfunction of pump-out station equipment in a week?						How often have you noticed sewage/runoff originating from the pump-out station in a week?					
		I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.	I have not noticed	Never	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.	I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.
1	11/8/2005 15:10																		
2	12/23/2005 18:12		<2 times						Never						I have not noticed					
3	12/23/2005 22:55	I have not noticed						I have not noticed							I have not noticed					
4	12/28/2005 23:32																		
5	12/31/2005 11:26			3-5 times				I have not noticed								<2 times				
6	1/9/2006 20:08	I have not noticed						I have not noticed							I have not noticed					
7	1/9/2006 22:54	I have not noticed						I have not noticed							I have not noticed					
8	1/10/2006 7:37			3-5 times			burton chace never works 1 out of 10 h basin works half the time but the poop is really bad from the seagulls that hang there waiting for the fishing boats which clean their fish guts and and heads and tails into the surrounding waters.						>11 times	it's a fifty fifty chance with H basin - public docks, 10% chance to work with burton chace and 90% chance of success with A basin - way down at the end		<2 times				
9	1/10/2006 10:07		<2 times					I have not noticed							I have not noticed					
10	1/10/2006 10:08																		
11	1/10/2006 10:10																		
12	1/10/2006 12:12		<2 times					I have not noticed							I have not noticed					
13	1/10/2006 12:39		<2 times				The new pump out station in A basin is working. Maintenance of the pump out stations is KEY to their use			<2 times										
14	1/10/2006 16:18						Burton Chace Park	I have not noticed							I have not noticed					
15	1/10/2006 16:48		<2 times				bc park, a basin			<2 times				bc park, a-basin	I have not noticed					
16	1/10/2006 17:25				6-10 times		Burton Chace Park			<2 times				Burton Chace Park		<2 times				Burton Chace Park The County maintenance people are quick to respond when a pump-out malfunctions
17	1/11/2006 9:50			3-5 times						<2 times					I have not noticed					
18	1/11/2006 20:12	I have not noticed						I have not noticed							I have not noticed					
19	1/12/2006 7:58									<2 times					I have not noticed					
20	1/12/2006 8:46	I have not noticed						I have not noticed							I have not noticed					
21	1/13/2006 17:12																		
22	1/13/2006 17:33	I have not noticed						I have not noticed							I have not noticed					
23	1/17/2006 16:29	I have not noticed						I have not noticed							I have not noticed					
24	1/17/2006 16:55			3-5 times			Public Launch Ramp, Fuel Dock, Burton Chace Park			<2 times					I have not noticed					
25	1/18/2006 10:17			3-5 times						<2 times					I have not noticed					
26	1/18/2006 11:52		<2 times					I have not noticed							I have not noticed					
27	1/18/2006 15:27																		
28	1/19/2006 11:40	I have not noticed						I have not noticed							I have not noticed					
29	1/20/2006 8:12	I have not noticed						I have not noticed							I have not noticed					
30	1/20/2006 10:28	I have not noticed						I have not noticed							I have not noticed					
31	1/21/2006 6:50			3-5 times			Public launch ramp, basin A, fuel dock	I have not noticed							I have not noticed					
32	1/21/2006 13:14	I have not noticed						I have not noticed							I have not noticed					
33	1/21/2006 15:39																		
34	1/25/2006 21:01		<2 times								3-5 times				I have not noticed					
35	1/26/2006 16:50					>11 times	BURTON CHASE, FUEL DOCK		Never						I have not noticed					

Response Number	Start Date	PUMP-OUT STATION PRACTICES PAGE 1																	
		How often have you noticed use of pump-out station/equipment in a week?						How often have you noticed malfunction of pump-out station equipment in a week?							How often have you noticed sewage/runoff originating from the pump-out station in a week?					
		I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.	I have not noticed	Never	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.	I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.
36	1/29/2006 13:29			3-5 times			fuel dock	I have not noticed							I have not noticed					
37	1/29/2006 19:05			3-5 times			we need more pumpouts - there should be redudndant systems at the bast known location - on the main channel in front of Burton Chace Park							pumpouts are frequently broken for weeks - pumpout on main channel in front of Chace Park has reputation for being out of service thereby discouraging skippers from stopping by it - others are in obscure locations - or cost $$$						on rare occasion
38	1/31/2006 15:21	I have not noticed																	
39	1/31/2006 17:52					>11 times	THE THREE PUMP OUT SERVICES ALL HAVE CUSTOMERS HERE.	I have not noticed							I have not noticed					
40	2/1/2006 12:09					>11 times	Both at the launch and the fuel dock.		Never					The pumpouts are always working when I use them, which is twice weekly.	I have not noticed					I have never seen sewage come from the pumpout, only from the duckpond at the end of basin E.
41	2/1/2006 14:00			3-5 times				I have not noticed							I have not noticed					
42	2/9/2006 0:44	I have not noticed						I have not noticed							I have not noticed					
43	2/9/2006 11:18	I have not noticed						I have not noticed							I have not noticed					
44	2/9/2006 21:55				6-10 times		I live adjacent to the Marina Harbor pumpout and use it weekly myself. I also observe the Chace Park pump out when I kayak.			<2 times				we had a worn nozzle for over a year at A basin, and finally purchased our own fitting. The managment of Marina Harbor finally replaced it. Currently it is functioning well.	I have not noticed					Our hosing does not appear to have any leaks.
45	2/11/2006 9:33	I have not noticed						I have not noticed									3-5 times			
46	2/12/2006 18:32			3-5 times						<2 times					I have not noticed					
47	2/13/2006 17:38			3-5 times			Public Launch Ramp and at Burton Chase Park.			<2 times					I have not noticed					
48	2/15/2006 12:36					>11 times							>11 times						>11 times	
49	2/16/2006 13:32																			
50	2/22/2006 17:35	I have not noticed						I have not noticed							I have not noticed					
51	2/23/2006 16:07																			
52	3/8/2006 16:15	I have not noticed						I have not noticed							I have not noticed					
53	3/8/2006 16:40																			
54	3/8/2006 17:02	I have not noticed						I have not noticed							I have not noticed					
55	3/9/2006 8:18		<2 times					I have not noticed							I have not noticed					
56	3/9/2006 19:02		<2 times						Never					I use the full service one on the fuel dock and at least one of the two are always working.	I have not noticed					
57	3/10/2006 10:46						Clean up Manhattan Beach !!!							Clean up Manhattan Beach !!!						Clean up Manhattan Beach !!!
58	3/10/2006 10:59	I have not noticed						I have not noticed							I have not noticed					
59	3/10/2006 12:27	I have not noticed						I have not noticed							I have not noticed					
60	Mailed in	I have not noticed					Pump out location not in our marina	I have not noticed							I have not noticed					
Total Number of Responses	**60**	**21**	**9**	**11**	**2**	**4**	**16**	**30**	**4**	**10**	**1**	**0**	**2**	**8**	**41**	**3**	**1**	**0**	**1**	**5**

Response Number	Start Date	PUMP-OUT STATION PRACTICES PAGE 2						
		How often have you seen the ground get hosed off near pump-stations?						Please add any additional information pertaining to your observations/knowledge of pump-out station practices around Marina del Rey Harbor here.
		I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.	Open-Ended Response
1	11/8/2005 15:10							
2	12/23/2005 18:12	I have not noticed						
3	12/23/2005 22:55		<2 times				I don't remember. I have noticed it a few times in the past. I think it was at a fuel dock.	None
4	12/28/2005 23:32							
5	12/31/2005 11:26		<2 times					
6	1/9/2006 20:08		<2 times					
7	1/9/2006 22:54	I have not noticed						
8	1/10/2006 7:37						only one has a working hose - A basin way down by the clean - new docks	most do not know where they are. half of them do not know how to use them. the rest that do make it through the first two hurdles find that the stations are broken, the hose attachment is missing or the space to get to them are gone.
9	1/10/2006 10:07	I have not noticed						
10	1/10/2006 10:08							
11	1/10/2006 10:10							
12	1/10/2006 12:12	I have not noticed						
13	1/10/2006 12:39							
14	1/10/2006 16:18	I have not noticed						
15	1/10/2006 16:48	I have not noticed					the docks around the stations at launch ramp, park are generally covered with bird droppings.	
16	1/10/2006 17:25	I have not noticed						We are aware of the Burton Chace Park pump out. It has malfunctioned no more than twice in the last year. Pump out machinery should be attached to the sewer with flexible hose so that the machinery vibration does not break the line.
17	1/11/2006 9:50	I have not noticed						We need more stations in mdr
18	1/11/2006 20:12	I have not noticed						
19	1/12/2006 7:58				6-10 times			
20	1/12/2006 8:46	I have not noticed						Where are the pumping stations?????
21	1/13/2006 17:12							
22	1/13/2006 17:33	I have not noticed						
23	1/17/2006 16:29			3-5 times			public launch ramp	
24	1/17/2006 16:55			3-5 times				
25	1/18/2006 10:17	I have not noticed						
26	1/18/2006 11:52	I have not noticed						I'm only at MDR one day a week for a few hours, so don't see much of the activity.
27	1/18/2006 15:27							
28	1/19/2006 11:40	I have not noticed						
29	1/20/2006 8:12			3-5 times			public launch ramp, and burton chase park	
30	1/20/2006 10:28	I have not noticed						
31	1/21/2006 6:50			3-5 times			after every pump out. public launch ramp, basin A	
32	1/21/2006 13:14	I have not noticed						
33	1/21/2006 15:39							
34	1/25/2006 21:01	I have not noticed						
35	1/26/2006 16:50	I have not noticed						BURTON CHASE COULD USE BETTER SIGNAGE

Response Number	Start Date	PUMP-OUT STATION PRACTICES PAGE 2						
		How often have you seen the ground get hosed off near pump-stations?						Please add any additional information pertaining to your observations/knowledge of pump-out station practices around Marina del Rey Harbor here.
		I have not noticed	<2 times	3-5 times	6-10 times	>11 times	Please specify location(s) (Examples: Public Launch Ramp, Fuel Dock, Basin A, And/Or Burton Chase Park) or provide any further comments or observations.	Open-Ended Response
36	1/29/2006 13:29		<2 times					
37	1/29/2006 19:05		<2 times					we need more pumpouts - we need redudnant seperate systems in a central location as well as in each marina - we need public education campaign, on site asistance/training especially on warm months weekends - we need enforcement program such as Avalon Harbor - and we need a regular equipment inspection/repair program - pumpouts should be inspected daily during warm months and three times a week on cold months - we need a dumpstation for boaters with port a potties - we need a bilge pumpout especially for oily bilge water - we need a hazardous/oil waste disposal site on the water - best location would be at fuel docks which are staffed - should be free
38	1/31/2006 15:21							
39	1/31/2006 17:52	I have not noticed						
40	2/1/2006 12:09	I have not noticed						The pumps work and they are used by the boaters.
41	2/1/2006 14:00	I have not noticed						
42	2/9/2006 0:44	I have not noticed						
43	2/9/2006 11:18	I have not noticed						
44	2/9/2006 21:55		<2 times				As I observe users, they appear very conscientious at our location. Many suction the nozzle into a bucket of clean water to clean the tip off.	I also see Popeye's Pumpout and Royal Flush servicing vessels in our basin. I have not noticed and violations, and I am very aware of my 'home waters' I am appalled by the coliform bacteria in our harbor. I would also hope you survey the pet exercise problem. Our marina seems to be the only one that does not provide some type of waste removal bag mounted on the fences. People seem to think that if their dog is small, they do not have to clean up. I would hope to have the pet walkers ticketed somehow by the private security guards. A few early morning and dinnertime rounds would help remind people that this is our home. Several years ago we lived in a complex in another region, and there were enzymatic systems called 'Doggy Dooley' into which the pet waste could be placed, and it was biodegraded and then wicked into the soil with rain fall. I have not seen such a thing since moving to California.
45	2/11/2006 9:33	I have not noticed						
46	2/12/2006 18:32	I have not noticed						
47	2/13/2006 17:38			3-5 times			Public Boat Launch	
48	2/15/2006 12:36					>11 times		
49	2/16/2006 13:32							
50	2/22/2006 17:35	I have not noticed						
51	2/23/2006 16:07							
52	3/8/2006 16:15		<2 times					
53	3/8/2006 16:40							
54	3/8/2006 17:02	I have not noticed						
55	3/9/2006 8:18	I have not noticed						
56	3/9/2006 19:02	I have not noticed					Just my oppion but pump out stations are not the problem. It is liveaboard and sneakaboard dumping holding tanks.	Avalon puts a die in your holding tanks to be sure you are not leaking or dumping into the harbor. There should be someone to call when you suspect someone of dumping who will come out ask for proff of pump out or a log book showing travel outside the three mile line. They should then follow the visit by tabing the holding tanks. I live in this water and hate when people are too lazy or too cheap to get pumpouts.
57	3/10/2006 10:46						Clean up Manhattan Beach !!!	Clean up Manhattan Beach !!!
58	3/10/2006 10:59		<2 times					
59	3/10/2006 12:27	I have not noticed						
60	Mailed in							
Total Number of Responses	**60**	**30**	**8**	**5**	**1**	**1**	**10**	**12**

Response Number	Start Date	SEWAGE INFRASTRUCTURE												
		Do you know of any leaking sewage pipelines around Marina del Rey Harbor?				Do local restaurants properly dispose of oil and grease?				Do you know if sewage line leaks or sewage spills impact the water at Marina del Rey Harbor?				Please add any additional information pertaining to your observations/ knowledge of the sewage infrastructure around Marina del Rey Harbor here.
		I don't know	Yes	No	Please specify location(s) (Examples: Condo Name, Apartment Complex, Restaurant Name, Parking Lot, Dock Number, etc.) or provide any additional comments/observations.	I don't know	Yes	No	If possible, please provide any additional information, such as location of restaurant, time of disposal, etc.	I don't know	Yes	No	If you answered yes, please provide any further comments or observations here (location, time of occurrence, etc.).	Open-Ended Response
1	11/8/2005 15:10													
2	12/23/2005 18:12													
3	12/23/2005 22:55	I don't know				I don't know				I don't know				
4	12/28/2005 23:32													
5	12/31/2005 11:26	I don't know				I don't know				I don't know				
6	1/9/2006 20:08	I don't know				I don't know				I don't know				
7	1/9/2006 22:54			No		I don't know				I don't know				
8	1/10/2006 7:37		Yes		harbor house/eddies diner - that corner of the marina basin E - smells like poop	I don't know			I've seen fantasea charters install a large pipe that runs from their boats to a hole in the concrete near the entrance way to their gangway and docks...		Yes		harbor house/eddies diner - that corner of the marina basin E - smells like poop I've seen fantasea charters install a large pipe that runs from their boats to a hole in the concrete near the entrance way to their gangway and docks...	I've seen fantasea charters install a large pipe that runs from their boats to a hole in the concrete near the entrance way to their gangway and docks...
9	1/10/2006 10:07			No		I don't know				I don't know				
10	1/10/2006 10:08													
11	1/10/2006 10:10													
12	1/10/2006 12:12	I don't know				I don't know				I don't know				
13	1/10/2006 12:39	I don't know			You need to check out what is under Marina del Rey.	I don't know					Yes		Ballona sewer 'Creek' dumps right into Marina del Rey and the Santa Monica Bay without proper treatment.	
14	1/10/2006 16:18	I don't know				I don't know					Yes		The leak behind the Harbor House Restaurant about a year ago	Unsealed sewers add an odiferous quality in MdR
15	1/10/2006 16:48	I don't know				I don't know					Yes		from ballona creek often during rains.	
16	1/10/2006 17:25													
17	1/11/2006 9:50	I don't know				I don't know							the water at the end of F-Basin is perty bad..	
18	1/11/2006 20:12	I don't know				I don't know					Yes			
19	1/12/2006 7:58					I don't know								
20	1/12/2006 8:46	I don't know				I don't know				I don't know			I am sure there are some, I just haven't 'observed' them myself	
21	1/13/2006 17:12													
22	1/13/2006 17:33	I don't know				I don't know				I don't know				
23	1/17/2006 16:29	I don't know					Yes			I don't know				
24	1/17/2006 16:55													
25	1/18/2006 10:17													
26	1/18/2006 11:52			No		I don't know				I don't know				
27	1/18/2006 15:27													
28	1/19/2006 11:40													
29	1/20/2006 8:12	I don't know				I don't know				I don't know				
30	1/20/2006 10:28													
31	1/21/2006 6:50	I don't know				I don't know				I don't know				
32	1/21/2006 13:14	I don't know				I don't know				I don't know				
33	1/21/2006 15:39													
34	1/25/2006 21:01													
35	1/26/2006 16:50	I don't know				I don't know				I don't know				

Response Number	Start Date	SEWAGE INFRASTRUCTURE												
		Do you know of any leaking sewage pipelines around Marina del Rey Harbor?				Do local restaurants properly dispose of oil and grease?				Do you know if sewage line leaks or sewage spills impact the water at Marina del Rey Harbor?				Please add any additional information pertaining to your observations/ knowledge of the sewage infrastructure around Marina del Rey Harbor here.
		I don't know	Yes	No	Please specify location(s) (Examples: Condo Name, Apartment Complex, Restaurant Name, Parking Lot, Dock Number, etc.) or provide any additional comments/observations.	I don't know	Yes	No	If possible, please provide any additional information, such as location of restaurant, time of disposal, etc.	I don't know	Yes	No	If you answered yes, please provide any further comments or observations here (location, time of occurrence, etc.).	Open-Ended Response
36	1/29/2006 13:29			No		I don't know				I don't know				
37	1/29/2006 19:05	I don't know				I don't know				I don't know				
38	1/31/2006 15:21													
39	1/31/2006 17:52			No		I don't know				I don't know				
40	2/1/2006 12:09			No		I don't know				I don't know				
41	2/1/2006 14:00													
42	2/9/2006 0:44	I don't know				I don't know				I don't know				
43	2/9/2006 11:18													
44	2/9/2006 21:55			No		I don't know					Yes		I think every vessel should be boarded to check holding tanks at least once per year. I know that one of my neighbors had a problem with their 3 way valve, and discharged sewage several times before they got it repaired. They no longer dock here.	
45	2/11/2006 9:33		Yes			I don't know				I don't know				
46	2/12/2006 18:32	I don't know				I don't know				I don't know				
47	2/13/2006 17:38			No				No	Jerrys Deli California Pizza Kitchen			No		Rotten Egg sewer gas smell is often abundant on the north west corner of Fiji and Lincoln, near West Marine store.
48	2/15/2006 12:36	I don't know						No			Yes			
49	2/16/2006 13:32													
50	2/22/2006 17:35	I don't know				I don't know				I don't know				
51	2/23/2006 16:07													
52	3/8/2006 16:15	I don't know				I don't know				I don't know				
53	3/8/2006 16:40													
54	3/8/2006 17:02	I don't know				I don't know				I don't know				I've lived in the marina off and on for 15 years - it seems to be getting dirtier as more and more people move in. I guess people aren't taught to respect the environment any more.
55	3/9/2006 8:18	I don't know				I don't know				I don't know				
56	3/9/2006 19:02			No		I don't know					Yes		I would imagine the 20 thousand plus gallons of partially treated waste dumped into Santa Monica bay each day has some effect.	
57	3/10/2006 10:46													
58	3/10/2006 10:59													
59	3/10/2006 12:27													
60	Mailed in													
Total Number of Responses	**59**	**24**	**2**	**9**	**2**	**33**	**1**	**2**	**2**	**25**	**8**	**1**	**8**	**4**

Response Number	Start Date	VISITOR BEHAVIOR AROUND MARINA DEL REY HARBOR PAGE 1																					
		How often have you observed visitors feeding the birds?					How many people do you observe walk dogs at the Harbor per day?						Out of the individuals you observe walking dogs, what percentage would you estimate properly dispose of pet waste (pick it up with a plastic bag or pooper scooper, and throw away into the trash)?							Please comment on your observations of pet waste (give locations where you have seen pet waste, how often it is present).	Please indicate where you have observed swimming, numbers of individuals there, and number of toddlers naked/without diapers observed swimming there.			
		I have not observed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	I have not observed	1-5	6-10	11-15	Over 15	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	I don't know	0	25	50	75	100	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	Open-Ended Response	Mother's Beach - Number of swimmers	Mother's Beach - Number of toddlers naked/without diapers	Other - Number of swimmers	Other - Number of toddlers naked/without diapers
1	11/8/2005 15:10																						
2	12/23/2005 18:12																						
3	12/23/2005 22:55	I have not observed									Over 15	On weekends I see them all the time in every area.	I don't know								6-9	1-2		
4	12/28/2005 23:32																						
5	12/31/2005 11:26		Less than twice a month						6-10								75				Less than 5	None		
6	1/9/2006 20:08	I have not observed						1-5					I don't know											
7	1/9/2006 22:54		Less than twice a month			Burton Chase park	I have not observed										75		Along the bike path.		10-20	1-2		
8	1/10/2006 7:37																						
9	1/10/2006 10:07		Less than twice a month					1-5					I don't know											
10	1/10/2006 10:08																						
11	1/10/2006 10:10																						
12	1/10/2006 12:12			1-2 times per week		Public parking lot across Mother's Beach				11-15		Burton chace - C,D, & E Basin					100	Maybe closer to 90%, but you didn't have that choice		21-50	None		
13	1/10/2006 12:39		Less than twice a month			A few times in BCP.		1-5										100						
14	1/10/2006 16:18		Less than twice a month							11-15						50					Less than 5	None		
15	1/10/2006 16:48	I have not observed						1-5									75				10-20			
16	1/10/2006 17:25																						
17	1/11/2006 9:50		Less than twice a month					1-5										100			Less than 5	None	Less than 5	None
18	1/11/2006 20:12	I have not observed							6-10									100						
19	1/12/2006 7:58	I have not observed						1-5									75							
20	1/12/2006 8:46	I have not observed									Over 15					50				From what we observe at Mothers Beach - most of the homeowners dispose of waste only when someone else is around - I think they feel that if no one else sees it, it is ok.	10-20	1-2		
21	1/13/2006 17:12																						
22	1/13/2006 17:33	I have not observed									Over 15	Everyone walks their dogs all the time near Basic A - Tahiti Marina/Marian Harbor.	I don't know							I see dogs urinating all of the time 3+ per day - on the median divider in the middle of the road all along Tahiti Way.	Less than 5	None		
23	1/17/2006 16:29				Daily	Fisherman's Village		1-5				Fisherman's Village			25				Fisherman's Village - there is always dog poop on the brick walkway	Fisherman's Village - always dog poop so unattractive for visitors	10-20	>6		
24	1/17/2006 16:55																						
25	1/18/2006 10:17																						
26	1/18/2006 11:52	I have not observed						1-5				North side of C basin	I don't know							Rarely have I encountered pet waste on sidewalks or parking areas.				
27	1/18/2006 15:27																						
28	1/19/2006 11:40																						
29	1/20/2006 8:12	I have not observed								11-15	Over 15	all around	I don't know						most do pick up - but I've seen seceral who don't	I've seen it all over the marina, mostly around the park and mothers beach	6-9	None	Less than 5	None
30	1/20/2006 10:28																						
31	1/21/2006 6:50				Daily	at The Boatyard - the man who lives in a motorhome and guards the H&S boats at night feeds the pigeons daily.			6-10				I don't know								10-20	None	Less than 5	None
32	1/21/2006 13:14			1-2 times per week		near the tidal basin and near and on Mothers Beach (D basin). I ask them to stop when I see them. Usually I don't see them but I see crumbs and/or seeds and lots of birds (usually pigeons, sparrows and sometimes gulls)					Over 15	E Basin, D Basin, C Basin, B Basin and A Basin					75		If someone is watching, usually 100% will use a plastic bag (however, often there is a great deal of 'smear'). I walk in the Marina nearly every day, however, and not one day goes by that I don't see someone's pet droppings (never the pet or its owner, however)	Almost anywhere I walk in the Marina, I have learned to keep one eye on the ground in front of me for 'hazards'.	10-20	None		
33	1/21/2006 15:39																						
34	1/25/2006 21:01																						
35	1/26/2006 16:50				Daily	THE JETTY ALONG VIA MARINA					Over 15								MOST EVERYONE AS WE ALL WATCHOUT FOR EACH OTHER AND REMIND ALL DOG OWNERS	ON THE GRASS AREAS ALONG THE JETTY				
36	1/29/2006 13:29	I have not observed						1-5									75				10-20	None	10-20	
37	1/29/2006 19:05			1-2 times per week				1-5					I don't know								10-20			
38	1/31/2006 15:21																						

Response Number	Start Date	VISITOR BEHAVIOR AROUND MARINA DEL REY HARBOR PAGE 1																					
		How often have you observed visitors feeding the birds?					How many people do you observe walk dogs at the Harbor per day?						Out of the individuals you observe walking dogs, what percentage would you estimate properly dispose of pet waste (pick it up with a plastic bag or pooper scooper, and throw away into the trash)?							Please comment on your observations of pet waste (give locations where you have seen pet waste, how often it is present).	Please indicate where you have observed swimming, numbers of individuals there, and number of toddlers naked/without diapers observed swimming there.			
		I have not observed	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	I have not observed	1-5	6-10	11-15	Over 15	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	I don't know	0	25	50	75	100	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	Open-Ended Response	Mother's Beach - Number of swimmers	Mother's Beach - Number of toddlers naked/without diapers	Other - Number of swimmers	Other - Number of toddlers naked/without diapers
39	1/31/2006 17:52		Less than twice a month								Over 15					75			PET WASTE IS A HUGE PROBLEM THAT IS NOT ADDRESSED BECAUSE THERE ARE LOTS OF PET OWNERS AND THEY ALL THINK THEIR PET IS SACRED AND THE OWNERS VOTE.	Greater than 50	None		
40	2/1/2006 12:09	I have not observed						1-5									100			Less than 5	None		
41	2/1/2006 14:00																						
42	2/9/2006 0:44					occasionally at various locations		1-5					I don't know						Most people walking their dogs pick up after them, occasionally there's evidence of someone not having done so.	Occasionally on the public board walk along Marina City Club, hardly never inside the MCC.				
43	2/9/2006 11:18																						
44	2/9/2006 21:55	I have not observed									Over 15	Serious offenders on the median of Tahiti each morning and evening. No place to dispose of waste. Many bring bags, and many do not! Our neighbors pets think the light posts are here to be 'marked' with urine. The sidewalks are often soiled.			25					See comments in previous section. This is a serious concern on A basin, since there are no pet waste disposal stations around our entire basin which is owned by Bellport. Other marinas on the open water channel have pet waste stations. Not marina Harbor.	Less than 5	None		
45	2/11/2006 9:33			1-2 times per week		CHASE PARK			6-10			PROMENADE WALKWAY			25						10-20	1-2		
46	2/12/2006 18:32			1-2 times per week				1-5									75							
47	2/13/2006 17:38				Daily	Large spreads of bird seed is often seen near many motor homes in public launch area and free parking lot 52. Bread crubms and bird seed has also been seen in the public launch entrance road, adjacent to the Sherrif car repair facility.					Over 15						75			Daily on the sidewalk on Fiji Way between Lot 52 and Fisherman's Village.				
48	2/15/2006 12:36			1-2 times per week				1-5										100						
49	2/16/2006 13:32																						
50	2/22/2006 17:35	I have not observed									Over 15		I don't know										
51	2/23/2006 16:07																						
52	3/8/2006 16:15		Less than twice a month						6-10				I don't know										
53	3/8/2006 16:40																						
54	3/8/2006 17:02	I have not observed								11-15		mothers beach to the MDR beach			25								
55	3/9/2006 8:18			1-2 times per week					6-10							50							
56	3/9/2006 19:02		Less than twice a month					1-5									75		It seems that most do but I have seen piles around.	I have seen people lift their dogs into the planters to allow them to deficate.				
57	3/10/2006 10:46					Clean up Manhattan Beach !!!						Clean up Manhattan Beach !!!							Clean up Manhattan Beach !!!	Clean up Manhattan Beach !!!				
58	3/10/2006 10:59																						
59	3/10/2006 12:27																						
60	Mailed in	I have not observed						1-5					I don't know										
Total number of responses	**59**	**14**	**9**	**7**	**4**	**11**	**1**	**15**	**6**	**4**	**10**	**11**	**11**	**0**	**4**	**3**	**10**	**6**	**9**	**13**	**19**	**17**	**4**	**3**

Response Number	Start Date	VISITOR BEHAVIOR AROUND MARINA DEL REY HARBOR PAGE 2										
		Please indicate any areas at Marina del Rey Harbor other than Mother's Beach where you have observed swimming.	Please describe your observations of visitor's most common food disposal habits:					Are there homeless encampments anywhere around Marina del Rey Harbor?				Please add any additional information pertaining to your observations/ knowledge of visitor behavior around Marina del Rey Harbor here.
		Open-Ended Response	I have not observed food disposal habits	Food waste on ground	Food waste in water	Food waste in trash	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	I don't know	Yes	No	Please specify location (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	Open-Ended Response
1	11/8/2005 15:10											
2	12/23/2005 18:12											
3	12/23/2005 22:55					Food waste in trash			Yes		I on and off see them in and around park areas and the library (where they use the bathroom and hang out). Mostly in the Summer but really all year long except when the weather is bad.	
4	12/28/2005 23:32											
5	12/31/2005 11:26					Food waste in trash		I don't know				
6	1/9/2006 20:08				Food waste in water			I don't know				
7	1/9/2006 22:54	none				Food waste in trash	Burton Chase park and Fisherman's village seem relatively free of food waste.	I don't know				
8	1/10/2006 7:37											
9	1/10/2006 10:07							I don't know				
10	1/10/2006 10:08											
11	1/10/2006 10:10											
12	1/10/2006 12:12	Diving, not swimming		Food waste on ground			There is often food waste outside the mariner's Bay apartments. People chuck there scraps out of their windows		Yes		Burton chace, the mother's beach barbeque area.	
13	1/10/2006 12:39	You can't swim! You'll get deathly ill!!!				Food waste in trash	BCP and Mother's Beach. People try to comply but during the summer the barrels overflow. Need more barrels or less people	I don't know				
14	1/10/2006 16:18					Food waste in trash			Yes			
15	1/10/2006 16:48			Food waste on ground	Food waste in water	Food waste in trash			Yes		mother's beach, bc park	
16	1/10/2006 17:25											
17	1/11/2006 9:50		I have not observed food disposal habits						Yes		Trees and bushes around achorages on Bali way	
18	1/11/2006 20:12		I have not observed food disposal habits							No		
19	1/12/2006 7:58		I have not observed food disposal habits									
20	1/12/2006 8:46			Food waste on ground		Food waste in trash	MOthers Beach area; picnic benches		Yes		Mothers beach area - picnic tables	
21	1/13/2006 17:12											
22	1/13/2006 17:33	no where, people know water is dirty		Food waste on ground	Food waste in water				Yes		I often saw homeless on Panay Way near Mother's Beach and going in the dumpsters on Panay Way.	Please clean up the harbor and do a better job to make sure that boats don't dump.
23	1/17/2006 16:29			Food waste on ground			Chace Park, Mother's Beach		Yes		Playa Vista Area A - where Admiralty deadends at Fiji Way, I have seen people going through the fence into Playa Vista 'Area A'. There are also lots of motorhomes illegally parked in Dock 52. I have heard of homeless people sleeping on the decks of boats for sale while the boats were on land.	Bathrooms at Fisherman's Village are often dirty and out of toilet paper, yet this is a stop for nearly every tour bus. At the parking lot at the north end of Fisherman's Village, people fish and leave lots of hooks, plastic line, fish parts. The wind blows this into the harbor.
24	1/17/2006 16:55											
25	1/18/2006 10:17											
26	1/18/2006 11:52	none				Food waste in trash		I don't know				
27	1/18/2006 15:27											
28	1/19/2006 11:40											
29	1/20/2006 8:12					Food waste in trash	i think most people throw their food waste away, and when they dont - the gulls take it away	I don't know				
30	1/20/2006 10:28											
31	1/21/2006 6:50	riding jet skis at public boat launch				Food waste in trash			Yes		public parking lot at The Boatyard/public boat launch.	
32	1/21/2006 13:14	Once, in D basin, I saw 3 or 4 people swimming off of one of the docks.		Food waste on ground	Food waste in water	Food waste in trash	Again, I usually don't observe visitors doing anything, but I see the results. Several years ago a friend got a dog which ate anything in sight, so I began to notice all the catsup packs, candy wrappers, fast food containers, cigarette butts, bottle tops and even chicken bones on the walkways around the basins but particularly in the county parking lots; there were also many peculiar items left around the walkways the morning after a cruise party (E basin), such as martini glasses, swizzle stick fruit, cloth napkins and shoes, to name some. I often see food wrappers or containers floating in the main channel, but I couldn't say if they got there from visitors tossing them overboard, blowing out of a trash can or blowing away from a picnic site, or a gull stealing them from a picnic site or trash can and dropping them in the water.				For several years, I used to see homeless people nearly every day near Mothers Beach. Every few months, they would disappear, then after a few weeks a new group of homeless would begin to build (usually between 3-5 people per group, sometimes there would be a couple of groups at opposite ends of the picnic area. Mostly they didn't sleep there; they just came in the mornings and hung out. One time in 2005 there was a homeless encampment at the beach parking lot near Jamaica Bay Inn, but only for a few days.I haven't seen any homeless there for many months lately.	
33	1/21/2006 15:39											
34	1/25/2006 21:01											
35	1/26/2006 16:50			Food waste on ground			THE JETTY ON VIA MARINA		Yes		ON WASHINGTON BLVD JUST EAST OF PALAWAN, SOUTH SIDE OF STREET...ALSO, A CAMPER PARKS AT THE JETTY EVERY DAY AND AS LATE AS POSSIBLE AT NIGHT	PEOPLE FISHING ON THE ROCKS AT THE JETTY WHO DON'T PICK UP THEIR MESS AND LEFT OVER FOOD...THIS CAUSES RATS WHICH CAN ALSO BE OBSERVED
36	1/29/2006 13:29					Food waste in trash						
37	1/29/2006 19:05								Yes		along Washington Blvd on MdR side adjacent to reservoir	
38	1/31/2006 15:21											

Response Number	Start Date	VISITOR BEHAVIOR AROUND MARINA DEL REY HARBOR PAGE 2										
		Please indicate any areas at Marina del Rey Harbor other than Mother's Beach where you have observed swimming.	Please describe your observations of visitor's most common food disposal habits:					Are there homeless encampments anywhere around Marina del Rey Harbor?				Please add any additional information pertaining to your observations/ knowledge of visitor behavior around Marina del Rey Harbor here.
		Open-Ended Response	I have not observed food disposal habits	Food waste on ground	Food waste in water	Food waste in trash	Please specify location(s) (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	I don't know	Yes	No	Please specify location (Examples: Burton Chase park, North or South Jetty, Mother's Beach, Admiralty Park, Parking lot, etc.) or provide any further comments or observations.	Open-Ended Response
39	1/31/2006 17:52					Food waste in trash			Yes		BETWEEN THE BOAT YARD AND THE COUNTY MAINTENANCE FACILITY, ADMIRALTY PARK, BEHIND THE BREAKWATER IN 'I' BASIN	
40	2/1/2006 12:09					Food waste in trash			Yes			
41	2/1/2006 14:00											
42	2/9/2006 0:44			Food waste on ground		Food waste in trash	Burton Chase Park, occasionally along the public board walk outside MCC	I don't know				
43	2/9/2006 11:18											
44	2/9/2006 21:55	Sadly, no one here will go in the water. Our diver takes antibiotics so he doen't get ill from the harbor.		Food waste on ground	Food waste in water	Food waste in trash	Picnickers often leave much food waste. I see remnants as I walk the harbor in the evening near the jetty at the inlet, and near the parking areas there too.		Yes		They are mobile and dynamic. One lady has two cats in kennels and prefers the par cours park opposite the fire station on Admiralty. Two others camp in a car near our marina. They sneak into our bathhouse, and our lockers were opened and all contents stolen. It was reported to our marina security, but even changing codes monthly, we have vagrants. I speak to them and let them know where help is available. Daybreak Shelter, St. Joseph Center etc. One man told me he is JUST FINE where he is. When we lived at Boatyard, we had 5-6 people who lived in cars in the Dock 52 parking lot. We knew them by name and considered them part of the neighborhood. I don't see the same ones anymore, but one gentleman, Ray, in a motor home at the entrance, also provides security to H & S Yachts at night. He and his dog are a fixture, yet they are 'homeless' There is a difference between the free spirits, and the mentally ill and drug users. I am a nurse and am quite able to differentiate.	We have had property stolen from our 'locked community' and it is my impression that it has be taken by the 'yachters', as it disappears about the same time a vessel has 'sailed on'. Our classic lapstrake dinghy was stolen from the rack, and several people on our dock had electronics stolen within the same week. I don't think it was the homeless, but people who had legitimate access to our dock.
45	2/11/2006 9:33			Food waste on ground					Yes		CHASE PARK, ACROSS FROM TONY P'S	
46	2/12/2006 18:32		I have not observed food disposal habits					I don't know				
47	2/13/2006 17:38			Food waste on ground	Food waste in water	Food waste in trash			Yes		Wetlands areas on both sides of Licoln Blvd., at Fiji way. Under the Culver Blvd. overpass over Lincoln. field on the north side of the Culver Blvd. overpass at Lincoln, just south of the overpass.	Too many people are riding bicycles on public sidewalks and not leaving room for or yielding to pedestrians.
48	2/15/2006 12:36			Food waste on ground			its so sad, people are so ooo lazy			No		
49	2/16/2006 13:32											
50	2/22/2006 17:35		I have not observed food disposal habits									
51	2/23/2006 16:07											
52	3/8/2006 16:15		I have not observed food disposal habits			Food waste in trash		I don't know				
53	3/8/2006 16:40											
54	3/8/2006 17:02			Food waste on ground		Food waste in trash	mothers beach on summer weekends - people are typically very piggy. Not everyone - but mostly people leave trash everywhere.		Yes		Mothers beach - on the picnic tables and on the grassy areas surrounding the north end of the parking lot.	There is a need for more trash cans on the beach and around the basins. They get full on summer weekends and so visitors leave trash in piles on the ground. Gulls get into it - very messy.
55	3/9/2006 8:18		I have not observed food disposal habits						Yes			
56	3/9/2006 19:02					Food waste in trash				No	Not around c basin	I have seen smokers put butts in the water more then a few times
57	3/10/2006 10:46						Clean up Manhattan Beach !!!				Clean up Manhattan Beach !!!	Clean up Manhattan Beach !!!
58	3/10/2006 10:59											
59	3/10/2006 12:27											
60	Mailed in		I have not observed food disposal habits							No		
Total number of responses	**59**	**8**	**7**	**13**	**6**	**20**	**13**	**10**	**18**	**3**	**18**	**8**

Response Number	Start Date	MARINA DEL REY HARBOR WILDLIFE PAGE 1																							
		Please provide your best estimates on the types, numbers, and activities of the birds present at Marina del Rey Harbor.																							
		Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period
1	11/8/2005 15:10				Basin F																				
2	12/23/2005 18:12																								
3	12/23/2005 22:55	Pigeons	>101	Picking through trashcans/litter	Other	July-Sept	Ducks	11-50	Feeding in the water	Fisherman's Village	July-Sept	Pelicans	>101	Picking through trashcans/litter	Other	July-Sept									
4	12/28/2005 23:32																								
5	12/31/2005 11:26	Gulls	11-50	Flying	Basin E	Oct-Dec	Pigeons	11-50	Picking through trashcans/litter	Basin E	Oct-Dec														
6	1/9/2006 20:08	Gulls	11-50	Shore feeding			Pigeons	>101	Other																
7	1/9/2006 22:54	Pigeons	11-50	Shore feeding	Fisherman's Village	July-Sept	Gulls	<10	Flying	Fisherman's Village	July-Sept	Pelicans	<10	Feeding in the water	Fisherman's Village	July-Sept									
8	1/10/2006 7:37	Gulls	>101	Picking through trashcans/litter			Shorebirds	>101	Nesting			Pelicans	11-50	Flying											
9	1/10/2006 10:07	Gulls	51-100	In a flock	Other	Apr-Jun																			
10	1/10/2006 10:08																								
11	1/10/2006 10:10																								
12	1/10/2006 12:12	Ducks	11-50	Feeding in the water	Basin E	July-Sept	Gulls	>101	Flying	Basin E	July-Sept	Pelicans	<10	Feeding in the water	Basin E	Jan-Mar	Shorebirds	11-50	Swimming	Basin E	Jan-Mar	Pigeons	<10	Picking through trashcans/litter	Fisherman's Village	Jan-Mar
13	1/10/2006 12:39	Gulls	11-50	Flying	Basin F	Jan-Mar	Ducks	11-50	Feeding in the water	Basin A	Apr-Jun	Pelicans	51-100	Nesting	Other	Jan-Mar	Pigeons	11-50	Picking through trashcans/litter	Burton/Chac e Park	Jan-Mar	Other	<10	Nesting	Other	Jan-Mar
14	1/10/2006 16:18	Ducks	<10	Swimming	Basin E	Apr-Jun	Gulls	>101	Nesting	Public Launch Ramp	July-Sept	Pigeons	<10	Picking through trashcans/litter	Other	July-Sept	Pelicans	<10	Flying	Fisherman's Village	July-Sept	Other	11-50	In a flock	Other	Apr-Jun
15	1/10/2006 16:48	Gulls	>101	Flying	Other	July-Sept	Ducks	11-50	Feeding in the water	Other	Apr-Jun	Other	<10	Solitary	Basin D	July-Sept									
16	1/10/2006 17:25	Pelicans	51-100	Flying	Other	July-Sept	Gulls	>101	Feeding in the water	Burton/Chac e Park	July-Sept	Ducks	11-50	Feeding in the water	Basin F	Oct-Dec	Pigeons	51-100	Shore feeding	Burton/Chac e Park	Apr-Jun	Other	>101	Feeding in the water	Burton/Chac e Park	Apr-Jun
17	1/11/2006 9:50	Other	<10	Feeding in the water	Basin F	Jan-Mar	Gulls	11-50	Flying	Basin F	Jan-Mar	Ducks	11-50	Swimming	Basin F	Jan-Mar	Pelicans	11-50	Flying	Fisherman's Village	Jan-Mar	Shorebirds	<10	Shore feeding	Basin F	Jan-Mar
18	1/11/2006 20:12	Ducks	11-50	Swimming	Basin B	Apr-Jun	Shorebirds	<10	Feeding in the water	Basin B		Gulls	11-50	Flying	Basin B		Shorebirds	11-50	Flying							
19	1/12/2006 7:58																								
20	1/12/2006 8:46	Ducks	11-50	Feeding in the water	Basin D	July-Sept	Gulls	51-100	Shore feeding	Other	July-Sept	Pigeons	51-100	Picking through trashcans/litter	Basin D	July-Sept	Pelicans	11-50	Feeding in the water	Other	July-Sept	Shorebirds	51-100	Shore feeding	Basin D	July-Sept
21	1/13/2006 17:12																								
22	1/13/2006 17:33	Ducks	11-50	Swimming	Basin A	July-Sept	Gulls	>101	Flying	Basin A	July-Sept	Pelicans	11-50	Feeding in the water	Fisherman's Village	Apr-Jun	Shorebirds	11-50	Feeding in the water	Basin A	July-Sept	Other	>101	Nesting	Basin A	Oct-Dec
23	1/17/2006 16:29	Pelicans	<10	Shore feeding	Fisherman's Village	Jan-Mar	Gulls	11-50	Shore feeding	Fisherman's Village	Jan-Mar	Shorebirds	11-50	Shore feeding	Fisherman's Village	Jan-Mar									
24	1/17/2006 16:55																								
25	1/18/2006 10:17																								
26	1/18/2006 11:52																								
27	1/18/2006 15:27																								
28	1/19/2006 11:40																								
29	1/20/2006 8:12	Ducks	11-50	Swimming	Other	Apr-Jun	Gulls	>101	Picking through trashcans/litter	Fisherman's Village	Jan-Mar	Pigeons	11-50	Other	Burton/Chac e Park	Jan-Mar	Pelicans	51-100	Feeding in the water	Public Launch Ramp	Jan-Mar	Shorebirds	11-50	Shore feeding	Other	Jan-Mar
30	1/20/2006 10:28																								
31	1/21/2006 6:50	Pigeons	11-50	Picking through trashcans/litter	Basin H	July-Sept	Shorebirds	>101	Flying	Burton/Chac e Park	July-Sept	Gulls	>101	Nesting	Public Launch Ramp	July-Sept	Pelicans	<10	Flying	Other	July-Sept	Gulls	51-100	Picking through trashcans/litter	Public Launch Ramp	July-Sept
32	1/21/2006 13:14	Pelicans	<10	Feeding in the water	Basin E	Oct-Dec	Gulls	11-50	Picking through trashcans/litter	Basin D	Oct-Dec	Shorebirds	<10	Feeding in the water	Basin E	Oct-Dec	Shorebirds	<10	Swimming	Basin D	Oct-Dec	Pigeons	11-50	Other	Basin D	Oct-Dec

Response Number	Start Date	MARINA DEL REY HARBOR WILDLIFE PAGE 1																								
		Please provide your best estimates on the types, numbers, and activities of the birds present at Marina del Rey Harbor.																								
		Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period	Bird type - Bird type	Bird type - Abundance	Bird type - Behavior	Bird type - Location	Bird type - Time period
33	1/21/2006 15:39																									
34	1/25/2006 21:01																									
35	1/26/2006 16:50																									
36	1/29/2006 13:29	Pelicans	11-50	Feeding in the water	Basin E	July-Sept	Gulls	11-50	Feeding in the water	Basin D	Jan-Mar															
37	1/29/2006 19:05																									
38	1/31/2006 15:21																									
39	1/31/2006 17:52	Ducks	11-50	Swimming	Basin E	Oct-Dec	Gulls	>101	Flying	Basin E		Pigeons	>101		Fisherman's Village		Pelicans	51-100		Basin E		Other	51-100		Basin E	Jan-Mar
40	2/1/2006 12:09	Ducks	11-50	Swimming	Basin G	Jan-Mar	Gulls	>101	Flying	Other	Jan-Mar	Gulls	>101	Flying	Other	Apr-Jun	Gulls	>101	Flying	Other	July-Sept	Gulls	>101	Flying	Other	Oct-Dec
41	2/1/2006 14:00																									
42	2/9/2006 0:44	Ducks	<10	Swimming	Basin E	Apr-Jun	Gulls	11-50	Flying	Fisherman's Village	July-Sept															
43	2/9/2006 11:18																									
44	2/9/2006 21:55	Shorebirds	<10	Swimming	Basin A	Jan-Mar	Pelicans	11-50	Feeding in the water	Fisherman's Village	July-Sept	Ducks	<10	In a flock	Basin A	Apr-Jun	Gulls	11-50	Flying	Basin A	Apr-Jun	Other	<10	Feeding in the water	Basin A	Jan-Mar
45	2/11/2006 9:33	Gulls	<10	Picking through trashcans/litter	Dock number	Oct-Dec	Pigeons	11-50	Flying	Other	July-Sept															
46	2/12/2006 18:32	Ducks	51-100				Gulls	11-50				Pigeons	11-50				Pelicans	11-50								
47	2/13/2006 17:38	Pigeons	>101	Picking through trashcans/litter	Basin G		Gulls	51-100	Picking through trashcans/litter	Public Launch Ramp		Pelicans	<10	Swimming	Basin G		Ducks	11-50	Swimming	Burton/Chace Park		Other	>101	In a flock	Fisherman's Village	
48	2/15/2006 12:36																									
49	2/16/2006 13:32	Ducks	<10	Flying			Gulls					Pigeons					Pelicans					Shorebirds				
50	2/22/2006 17:35	Ducks	11-50	Swimming			Pelicans	>101	Feeding in the water	Other		Pelicans	>101	Feeding in the water	Other		Shorebirds	>101	Flying	Other						
51	2/23/2006 16:07																									
52	3/8/2006 16:15	Ducks	<10	Nesting			Pigeons	Nov-50	Other																	
53	3/8/2006 16:40																									
54	3/8/2006 17:02	Pelicans	<10	Flying	Fisherman's Village	Jan-Mar	Gulls	Nov-50	Picking through trashcans/litter	Burton/Chace Park	July-Sept															
55	3/9/2006 8:18	Gulls	>101	Shore feeding	Basin B	Oct-Dec	Pelicans	Nov-50	Flying	Basin B	Oct-Dec															
56	3/9/2006 19:02	Ducks	11-50	Feeding in the water	Basin C	Jan-Mar	Gulls	<10	Flying	Basin C	Jan-Mar	Other	<10	Feeding in the water	Basin C	Jan-Mar										
57	3/10/2006 10:46																									
58	3/10/2006 10:59																									
59	3/10/2006 12:27																									
60	Mailed in																									
Total number of responses	**60**	**33**	**33**	**32**	**28**	**26**	**32**	**31**	**30**	**27**	**23**	**24**	**23**	**21**	**21**	**17**	**18**	**17**	**15**	**15**	**12**	**15**	**14**	**13**	**14**	**13**

Response Number	Start Date	MARINA DEL REY HARBOR WILDLIFE PAGE 2											
		How often have you noticed birds congregating around trash dumpsters?					How often have you observed birds bathing in standing water on landscaped areas?					Please list other animals present other than birds. Please indicate abundance and behavior observed.	Please add any additional information pertaining to your observations/ knowledge of wildlife around Marina del Rey Harbor here.
		Never	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Basin__, Dock Number, Fisherman's Village, Public Launch Ramp, Burton Chase Park, etc.) or provide any further comments or observations.	Never	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Basin__, Dock Number, Fisherman's Village, Public Launch Ramp, Burton Chase Park, etc.) or provide any further comments or observations.	Open-Ended Response	Open-Ended Response
1	11/8/2005 15:10												
2	12/23/2005 18:12												
3	12/23/2005 22:55			1-2 times per week			Never						
4	12/28/2005 23:32												
5	12/31/2005 11:26			1-2 times per week			Never						
6	1/9/2006 20:08		Less than twice a month					Less than twice a month				dogs, being 'walked'.	
7	1/9/2006 22:54	Never					Never	Less than twice a month					
8	1/10/2006 7:37				Daily					Daily		dogs and other pets are usually looked after by their owners and some marina's have well marked plastic bags for the owers to use....fines should be issued if not on leash and plastic bags not in tow.	sealions and gulls will follow the fishing boats in because the fising boats wash off their bloddy decks in the marina nad specifically by the public docks...they should be ordered to clean out at sea and fined if they do not.
9	1/10/2006 10:07		Less than twice a month					Less than twice a month					
10	1/10/2006 10:08												
11	1/10/2006 10:10												
12	1/10/2006 12:12		Less than twice a month					Less than twice a month					
13	1/10/2006 12:39	Never					Never					I forget what they are called, like a weasel or racoon. There are a few around.	
14	1/10/2006 16:18		Less than twice a month					Less than twice a month					
15	1/10/2006 16:48		Less than twice a month					Less than twice a month			crows		cormorants and gulls sitting on boats, covering them with droppings.
16	1/10/2006 17:25	Never						Less than twice a month				squirel in and around the trees in the Park	
17	1/11/2006 9:50		Less than twice a month						1-2 times per week		Burton Chase Park	cats	
18	1/11/2006 20:12	Never						Less than twice a month					
19	1/12/2006 7:58												
20	1/12/2006 8:46				Daily	Basin D - MOthers Beach area	Never					Jelly Fish - Basin D - cyclical Sting Rays - Basin D - summer time	
21	1/13/2006 17:12												
22	1/13/2006 17:33		Less than twice a month			Seagulls/crows at Bar Harbor trash dumpsters every now and then.			1-2 times per week		Song birds, finches and crows bathing in water at Tahiti Marina.	Squirrels = 2 or 3 seen per month, burrying nuts, climbing trees. Occassionally I'll see cats or dogs roaming. Mice, I'll see 1 every six months running from bush to bush.	Please note, all of the birds in question 18 I see year round. I see lots of birds of prey feeding in the water. One evening at dusk in August I saw about 20 black crowned night herons perched on the roof at Tahiti Marina. There are lots of blue herons and snowy white herons and comerants as well as pelicans that feed here and nest in the trees here. Basin A and Fisherman's Village area.
23	1/17/2006 16:29				Daily				1-2 times per week				Many birds congregate at the Fisherman's Village bait dock. The seals are also often near there. They all want part of the fish leftovers from the fishing boats.
24	1/17/2006 16:55												
25	1/18/2006 10:17												
26	1/18/2006 11:52	Never					Never						
27	1/18/2006 15:27												
28	1/19/2006 11:40												
29	1/20/2006 8:12			1-2 times per week		all around marina		Less than twice a month			near mothers beach	I've noticed several dogs being walked by their owners who sometimes don't pick up after their pets.	
30	1/20/2006 10:28												
31	1/21/2006 6:50				Daily	everywhere along the marina				Daily		rats at public boat launch and around The Boatyard in Basin H and down the breakwater jetty. Also have seen stray gods/cats along Lincoln and at the public boat launch.	
32	1/21/2006 13:14					Gulls and pigeons congregate nearby beachgoers and picnickers, and when county workers are cleaning up the picnic area at Mothers Beach, then check out the area when the people walk away from the table, blanket or trash cans.							Great blue herons, snowy egrets and migrating birds (ducks, scaups, widgeons, etc) use the tidal basin between E basin and Washington Blvd. Egrets and herons nest there, others forage. The numbers have been dwindling in past years as the water in the tidal basin gets worse. Every winter/spring there is a massive 'swamp scum' that forms and takes several weeks to burn off.

Response Number	Start Date	MARINA DEL REY HARBOR WILDLIFE PAGE 2											
		How often have you noticed birds congregating around trash dumpsters?					How often have you observed birds bathing in standing water on landscaped areas?					Please list other animals present other than birds. Please indicate abundance and behavior observed.	Please add any additional information pertaining to your observations/ knowledge of wildlife around Marina del Rey Harbor here.
		Never	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Basin__, Dock Number, Fisherman's Village, Public Launch Ramp, Burton Chase Park, etc.) or provide any further comments or observations.	Never	Less than twice a month	1-2 times per week	Daily	Please specify location(s) (Examples: Basin__, Dock Number, Fisherman's Village, Public Launch Ramp, Burton Chase Park, etc.) or provide any further comments or observations.	Open-Ended Response	Open-Ended Response
33	1/21/2006 15:39												
34	1/25/2006 21:01												
35	1/26/2006 16:50				Daily		Never						
36	1/29/2006 13:29		Less than twice a month				Never						
37	1/29/2006 19:05												
38	1/31/2006 15:21												
39	1/31/2006 17:52		Less than twice a month					Less than twice a month				SEA LIONS, POSSUM, SQUIRRELS, RATS,	GREBES, NIGHT HERRONS, CROWS, FINCHES, SWALLOWS, CORMORANTS, SNOWY EGRETS, COOTS, RAPTORS, ALL VISIT HERE.
40	2/1/2006 12:09	Never					Never						
41	2/1/2006 14:00												
42	2/9/2006 0:44	Never					Never						
43	2/9/2006 11:18												
44	2/9/2006 21:55				Daily	Dock 52 near Boatyard gate. The lids on dumpsters are open. I closed them daily and the fishing boats opened them when they docked and debarked passengers in the evening.		Less than twice a month			On the median on Via Marina		We have a heron that walks on our dock daily. He peaks in the windows of our boat. Very socialized unfortunately. He does not appear to have a mate. We also have ducks who walk on our dock and attempt to nest each spring. They laid eggs two years ago then the docks were torn out. We had several sick sea lion pups two years ago and I reported them to San Pedro. They were so responsive to let us know what the results were. We just observed the baby until he slipped into the water, and they ultimately picked him up when he was in danger of death.
45	2/11/2006 9:33		Less than twice a month				I have not seen birds bathing in standing water on landscaped areas					RACOONS AND RATS,	
46	2/12/2006 18:32	I have not seen birds around trash dumpsters					Never						
47	2/13/2006 17:38				Daily	Fishermans Villiage Burton Chase Park Public Boat Launch Following private and commercial fishing boats.				Daily		Two foxes running around on jettys of main channel. Gophers in the planters at Fisherman's Village. 5 Sea Lions swimming near Fisherman's Village. 10 Sea Lions on breakwater at end of the marina. 8 Dophin swimming in the main channel. Dozens of cormorants perched/sleeping in a tree at the Coast Guard station.	From what I have seen, the largest food supply for the local pigeons and Western Gulls is human's trash, litter, and intentional feeding of these birds.
48	2/15/2006 12:36				Daily					Daily			
49	2/16/2006 13:32												
50	2/22/2006 17:35	Never						Less than twice a month					
51	2/23/2006 16:07												
52	3/8/2006 16:15		Less than twice a month					Less than twice a month					
53	3/8/2006 16:40												
54	3/8/2006 17:02			1-2 times per week		mothers beach	Never						
55	3/9/2006 8:18				Daily				1-2 times per week				
56	3/9/2006 19:02	Never					Never					In two years as a liveaboard I have seen one dead rat by the dock gate and know of two cats that freakent the area. I have seen bat rays, crabs near the sea wall and of course the moon jelly fish when in season.	
57	3/10/2006 10:46					Clean up Manhattan Beach !!!					Clean up Manhattan Beach !!!	Clean up Manhattan Beach !!!	Clean up Manhattan Beach !!!
58	3/10/2006 10:59												
59	3/10/2006 12:27												
60	Mailed in												
Total number of responses	**60**	**10**	**11**	**4**	**9**	**9**	**14**	**13**	**4**	**4**	**6**	**14**	**9**