

Storm Water Resource Plan Guidelines



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STATE WATER RESOURCES CONTROL BOARD
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY



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Note: Italicized text throughout this document is text that is directly referencing the California Water Code.

Foreword

Past approaches to storm water management have focused on limited treatment prior to conveyance off-site and ultimately into receiving waters. The municipal separate storm sewer systems (MS4s) and flood control infrastructure used for this purpose may have been successful in terms of flood control and some degree of treatment; however many past approaches have not been adequate to fully address the water quality impacts from storm water discharges while providing multiple benefits such as water supply augmentation and ecological enhancement of the local watershed. In general, the transport of storm water from the location of rainfall via constructed municipal storm drain systems (pipelines, reinforced channels, outfalls, etc.) has caused downstream hydromodification and destabilization of water bodies, and impacted beneficial uses of those receiving surface water bodies.

More recent approaches to storm water management seek to replicate natural hydrology and watershed processes by managing storm water and dry weather runoff onsite or within the watershed where rainfall occurs. These approaches yield multiple water quality benefits by reducing the volume of runoff – and the pollutants it contains – delivered to receiving waters. Such approaches are in accordance with the State Water Resources Control Board's (State Water Board's) guiding principles that view storm water and dry weather runoff as a resource, potentially contributing to the following benefits in addition to flood control:

- Supply of fresh water to surface water bodies to enhance stream flows (that are hydrologically-connected to ground water aquifers) and to sustain aquatic life and wildlife habitats;
- Recharge of groundwater aquifers under developed impervious areas to support sustainable groundwater levels and increase local water supplies;
- Supply of fresh water to increase recreational uses including hunting, swimming, fishing, and boating;
- Augmentation of drinking water supplies through rainwater harvesting and/or recharge;
- Elimination or minimization of erosion and/or destabilized land; and
- Minimization of hydromodification (unnatural alteration of natural drainage features) of streams, rivers, wetlands and lakes.

The nature and water quality impacts of storm water discharges vary from region to region; therefore, municipalities may identify ways to tailor their watershed storm water management measures to best address their watershed conditions while complying with regulatory requirements to control storm water discharges. The State Water Board's objective for the adoption of these Guidelines is to provide baseline requirements for watershed-based (or sub-watershed-based) storm water resource plans to be used for funding of storm water and dry weather runoff capture projects funded partially or entirely with State funds. It is not intended that the guidance provided in these Guidelines be applied to individual projects.

Acronyms and Key Words

CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
GAMA	Groundwater Ambient Monitoring and Assessment
Guidelines	Storm Water Resource Plan Guidelines
HU	Hydrologic unit
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan
LID	Low impact development
MS4	Municipal separate storm sewer system
NPDES	National Pollutant Discharge Elimination System
Plan	Storm Water Resource Plan
Regional Water Board	Regional Water Quality Control Board
SB	Senate Bill
State Water Board	State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
USGS	United State Geological Survey
WDRs	Waste discharge requirements

Definitions

303(d) List – refers to section 303(d) of the Clean Water Act that requires each state to periodically submit a list of impaired water to the U.S. EPA. Impaired waters are identified and listed surface water bodies that do not comply with established water quality standards for one or more constituent/parameter. Once the impaired waters are identified and placed on the adopted 303(d) list, section 303(d) requires that the State establish total maximum daily loads that provide waste load allocations and load allocations for the listed water body's compliance with water quality standards.

85th Percentile 24-hour Storm Event - The 85th percentile rainfall event is the event whose precipitation total is greater than or equal to 85 percent of all 24-hour storms on an annual basis. The 85th percentile 24-hour storm measure is based on local precipitation data within the watershed and differs geographically.

Basin Plan – a Water Quality Control Plan adopted by a State or Regional Water Board that identifies: 1) beneficial uses to be protected; 2) water quality objectives for the reasonable protection of beneficial uses; and 3) a program of implementation for achieving the water quality objectives as established by the State or Regional Water Boards.

Beneficial Uses - the uses of a water body (streams, lakes, rivers, and other water bodies) that support human health, aquatic life and wildlife. Beneficial uses of a water body are identified in a Basin Plan. The applicable Basin Plan and/or water quality control plans set forth narrative and numeric water quality objectives to protect the beneficial uses. Example of common beneficial uses include: domestic use, municipal use, fish and wildlife preservation and enhancement, aquaculture, recreational use, water quality use, stockwatering, irrigation, frost protection, heat control, power use, mining use, and industrial use.

Best Management Practices (BMPs) – practices that have been proven to manage storm water and dry weather runoff. Guidance for design, construction and implementation of best management practices is available through guidance documents provided by municipalities and/or professional associations such as the California Stormwater Quality Association (CASQA) BMP Handbooks (Industrial & Commercial BMP Handbook, Municipal BMP Handbook, New Development & Redevelopment BMP Handbook, and BMP Handbook Training) located at <https://www.casqa.org/resources/bmp-handbooks>. Additional information and guidance is available on the International Stormwater BMP Database website at: <http://www.bmpdatabase.org/>.

Community – a population of persons residing in the same locality under the same local governance.

Disadvantaged Community – a community with a median household income less than 80 percent of the statewide average (PRC § 75005[g]).

Dry Weather Runoff - surface runoff flow produced by non-storm water resulting from irrigation and other residential, commercial, and industrial activities.

Geographic Information System (GIS) – a database system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographic data.

Green Infrastructure - site-specific practices and infrastructure that mimic storm water management from natural hydrology and reduces effective imperviousness. Examples of green infrastructure include green street medians, green roofs, and porous pavement.

Groundwater - subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs may be defined as an aquifer. A groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers.

Groundwater Recharge - the augmentation of groundwater by natural or artificial means.

Impaired Water Body – surface waters identified and assessed by a State and Regional Water Board as impaired due to non-compliance with water quality objectives and potential impact on designated beneficial uses after application of technology-based controls. Further information on the 303(d) list of impaired water bodies compiled by the State Water Resources Control Board pursuant to section 303(d) of the Clean Water Act (CWA) is located at the following website:
http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/.

Integrated Regional Water Management Plan – an integrated regional water management plan is a plan that describes the major water-related objectives and conflicts within a region. The plan: (1) considers a broad variety of water management strategies, (2) identifies water demand and supply management alternatives, water quality protections, and environmental stewardship actions to provide long-term, reliable, and high-quality water supply while protecting the environment. An integrated regional water management plan identifies disadvantaged communities in the region and takes the water-related needs of those communities into consideration.

Low Impact Development (LID) – a storm water management strategy aimed at maintaining or restoring the natural hydrologic functions of a site or project to achieve natural resource protection objectives and fulfill environmental regulatory requirements; LID employs a variety of natural and constructed features that reduce the rate of runoff, filter pollutants out of runoff, facilitate the infiltration of water into the ground and replenishment of local natural surface water systems, and/or allow for on-site storage of water for a beneficial use.

Multi-Benefit / Multiple Benefit Projects – storm water and dry weather runoff capture projects that provide more than one of the following benefits or meet more than one of the following objectives:

- a. Wetland creation and restoration (Wat. Code, § 10561(g))
- b. Riverside [riparian] habitats (Wat. Code, § 10561(g))
- c. Instream flows (Wat. Code, § 10561(g))
- d. Increase in park and recreation lands (Wat. Code, § 10561(g))
- e. Urban green space (Wat. Code, § 10561(g))
- f. Augmenting recreation opportunities for communities (Wat. Code, § 10561(h))
- g. Increased tree canopy (Wat. Code, § 10561(h))
- h. Reduced heat island effect (Wat. Code, § 10561(h))
- i. Improved air quality (Wat. Code, § 10561(h))
- j. Maximizes:
 - i. Water quality (Wat. Code, § 10562(b)(2))
 - ii. Water supply (Wat. Code, § 10562(b)(2))
 - iii. Flood management (Wat. Code, § 10562(b)(2))
 - iv. Environmental benefits (Wat. Code, § 10562(b)(2))
 - v. Other community benefits (Wat. Code, § 10562(b)(2))

National Pollutant Discharge Elimination System (NPDES) Permit Program – A federal regulatory permitting program administered to control water pollution from regulated point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. The United States Environmental Protection Agency has authorized the State and Regional Water Boards to administer the federal NPDES permit program in California.

Public Agency – a state agency or department, special district, joint powers authority, city, county, city and county, or other political subdivision of the state. An entity or entities that act on behalf of a public agency is considered a public agency for the purpose of these Guidelines.

Rain Water – precipitation on any public or private parcel that has not entered an offsite storm drain system or channel, a flood control channel, or any other stream channel, and has not previously been placed to beneficial use.

Small Disadvantaged Community – a community with a population of 20,000 persons or less with a median household income (MHI) less than 80% (80 percent) of the statewide average (PRC § 75005[g]).

Stakeholder – an individual, group, coalition, agency, or other entity that is involved in, affected by, or has an interest in the implementation of a specific program or project.

Storm Water – temporary surface water runoff and drainage generated by immediately preceding storms.

Storm Water and Dry Weather Runoff Capture – to intercept, store, manage, and use storm water and dry weather runoff, thereby reducing the volume of runoff exiting a site.

Structural Control - often associated with low impact development (LID), structural control measures are designed and sized to achieve a specific numeric storm water control performance (e.g., storm water capture, water quality treatment, etc.). Examples include, but are not limited to: bioretention areas, pervious pavements, green roofs, cisterns, and storm water infiltration basins.

Sustainable - resources used at a rate at which they can be replenished naturally.

Total Maximum Daily Load (TMDL) – a written plan that describes how an impaired water body will meet water quality standards. A TMDL contains: (1) a measurable feature to describe attainment of the water quality standard(s); (2) a description of required actions to remove the impairment; and, (3) an allocation of responsibility among dischargers to act, either in the form of actions or through the establishment of water quality conditions for which each discharger is responsible. A TMDL must be adopted by both the applicable Regional Water Board and the State Water Board, and approved by the Office of Administrative Law. TMDLs developed by and subsequently adopted by the USEPA shall be considered as an adopted and approved TMDL for purposes of these Guidelines.

Waste Discharge Requirements (WDRs) – requirements that are adopted by the Regional Water Boards to protect the waters of the state for the use and enjoyment by the people of California.

Water Supply – Supply of water for beneficial uses that include, but are not limited to, municipal and domestic supply, aquatic life and wildlife, agricultural irrigation and non-potable water uses.

Water Quality Objectives – State-adopted regulatory limits or levels of water quality elements or biological characteristics to reasonably protect the beneficial uses of water or to prevent problems within a specific area. Water quality objectives may be numeric or narrative. Under the Porter-Cologne Water Quality Control Act, the State Water Board and Regional Water Boards have primary responsibility for the coordination and control of water quality, including the authority to implement the Clean Water Act. Porter-Cologne (§ 13240) directs the Water Boards to set water quality objectives via adoption of Basin Plans that conform to all state policies for water quality control.

Water Quality Standards - State-adopted and USEPA-approved ambient standards for water bodies that prescribe the use of the water body and establish the water quality criteria that must be met to protect these uses. The three components of water quality standards include: the beneficial designated use or uses of a water body (for example, drinking water supply, contact recreation (swimming), and aquatic life support), the numerical and narrative water-quality criteria that are necessary to protect the use or uses of that particular water body, and antidegradation provisions. The federal Clean Water Act (CWA) is the primary federal water pollution control regulation. The State

Water Board is designated as the State Water Pollution Control Agency for all purposes under the CWA.

Wetlands - areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. For further detail see the State Water Board's Water Quality Control Policy for Wetland Area Protection and Dredged or Fill Permitting.

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Section I: Purpose

The purpose of the Storm Water Resource Plan Guidelines (Guidelines) is to establish guidance for the development of Storm Water Resource Plans in accordance with Water Code section 10565 (as amended by Senate Bill 985, Stats. 2014, ch. 555, § 5). Water Code section 10563, subdivision (c)(1), requires a Storm Water Resource Plan (Plan) as a condition of receiving funds for storm water and dry weather runoff capture projects from any bond approved by voters after January 2014. This requirement applies to Proposition 1, the water bond measure approved by voters in November 2014, which authorized \$200 million in grants for multi-benefit storm water management projects. Water Code section 10565 requires the State Water Board to establish guidance for entities to develop Storm Water Resource Plans.

These Guidelines apply to public agencies that receive grant funds for storm water and dry weather runoff capture projects, as further described in Section III of these Guidelines. Each entity should develop a watershed-based Storm Water Resource Plan consistent with these Guidelines and compliant with the Water Code, prior to applying for bond funds associated with individual storm water and dry weather runoff capture projects. A Plan meeting the provisions of the Water Code need not be referred to as a “Storm Water Resource Plan.” Existing planning documents and local ordinances may be utilized as a functionally equivalent Plan, including but not limited to: watershed management plans¹, integrated resource plans, urban water management plans, or similar plans that include storm water and dry weather runoff capture and use as a component of their goals and objectives. The watershed approach is essential to integrate storm water management with other basic aspects of aquatic resource protection and overall water management including flood control, water supply, and habitat conservation. If a planning document does not meet the standards of Water Code section 10560 et seq., a collection of local plans and ordinances and regional plans may constitute a functional equivalent, if the plans and ordinances collectively meet all of the requirements of Water Code section 10560 et seq.

These Guidelines serve as a guide for the State Water Board and other bond fund-dispensing agencies to use in administering funds. These Guidelines will not result in a direct or indirect physical change in the environment, and do not serve as a commitment to any specific project (Cal. Code of Regs, tit. 14, § 15378(b)(4)).

Section II: Introduction and Background

The State Water Board and Regional Water Quality Control Board (Regional Water Board) National Pollutant Discharge Elimination System (NPDES) permitting program for municipal separate storm sewer systems (MS4s) has historically focused requirements for storm water and dry weather runoff capture and use on new development and significant redevelopment, and not on modifying existing landscapes to increase storm water and dry weather runoff capture and use. Watershed-based planning and implementation efforts to retrofit the existing developed landscapes with green infrastructure are needed to restore storm water and dry weather runoff infiltration capacity that was previously overlooked in existing traditional storm water management infrastructure and practices. Existing technologies and engineering approaches, coupled with the use of the natural physical and biological functions of soils and plants, allow concurrent capture, treatment and reuse of storm water and dry weather runoff, and provide cost-effective approaches to achieving healthy watersheds and other positive environmental outcomes. Individual projects within a watershed can range from small retrofits

¹ This also encompasses Watershed Management Programs and Enhanced Watershed Management Programs as set forth in the LA County and City of Long Beach MS4 Permits (Order Nos. R4-21012-0175 and R4-2014-0024).

such as standardized parkway curb cuts and tree wells in public rights-of-way, to creation of constructed natural wetlands and/or installation of underground vaults that store and infiltrate or reuse the captured runoff. Increasing storm water and dry weather runoff capture and infiltration in developed areas restores lost watershed processes and provides multiple benefits, including but not limited to: improved water supply sustainability, increased groundwater supplies, increased base-flow in creeks, increased riparian tree canopy providing a cooling effect on the earth's surface, reduced greenhouse gas emissions inherent in water transport and treatment, reduced local flooding, reduced pollutant loads discharged to surface waters, restored native habitat, and increased recreational and green space.

Many MS4 permits include requirements for low impact development (LID) implementation and green infrastructure. In many cases, however, watershed-based implementation of structural measures associated with LID and green infrastructure is either not considered at all or is not required to contribute to storm water and dry weather runoff capture and infiltration of drainage areas beyond the site where development is occurring. Watershed-based storm water management offers an effective approach to complying with MS4 permit requirements. Regional Water Boards are starting to allow alternative permit compliance pathways that emphasize more wide-scale storm water and dry weather runoff capture planning, analysis, and implementation on a watershed or regional basis.² The Los Angeles Regional Water Board is among the first of the Regional Water Boards to incorporate a watershed storm water management approach that provides strong incentives for storm water and dry weather runoff capture across the watershed in its Los Angeles County MS4 permit. (Order R4-2012-0175, NPDES Permit No. CAS004001).

Storm water planning and management on a watershed basis involves collaboration of local governments, utilities, and other stakeholder groups to analyze the hydrology, storm drain/runoff conveyances systems, opportunity sites, and other habitat or community needs within sub-watersheds. Design of green infrastructure to capture dry weather runoff should correspond to a watershed-based plan to achieve multiple benefits that supports water quality protection of surface and ground waters within the watershed. Coordinated storm water management, monitoring, and evaluation on a watershed basis minimizes monitoring costs and maximizes the value of monitoring results across programs intended to protect beneficial uses.

In the 1990s, local storm water agencies and professional associations began to develop guidance documents for the design and implementation of storm water capture for specified percentiles of rainfall frequencies (e.g., the volume associated with the 85th percentile 24-hour rain event); however, there have been many challenges associated with compliance with storm water waste load allocations established in existing Total Maximum Daily Loads (TMDLs). In the early 2000s, literature and guidance documents based on extensive research and produced by MS4 permittees, Regional Water Boards, academia and other stakeholders, recommended the establishment of a water quality design storm for water quality protection on a watershed basis.

The Stormwater Management Planning Act implemented through Water Code section 10563 substantively focuses on diverting runoff from existing storm drains, channels, or conveyance structures to sites (particularly publicly owned sites) that can clean, store, infiltrate and/or use the runoff. As with the development and adoption of recent Regional Water Board storm water permits (such as in Los Angeles and San Francisco Bay Area regions), the need for analysis during the watershed management planning stage is necessary to demonstrate a reasonable

² E.g., Central Coast Water Board Resolution R3-2013-0032 (post-construction storm water management requirements) allows municipal storm water permittees to use Watershed Plans to justify alternative compliance for site-based runoff retention and peak management requirements.

assurance that proposed storm water management plan elements will successfully achieve required water quality outcomes when implemented. Stakeholders, the Water Boards, and USEPA staff are working collaboratively to conduct appropriate assurance analyses, and compile findings, conclusions, and recommendations in publicly available guidance manuals.

Section III: Applicability of Guidelines per Water Code section 10563

(Note - Italicized text throughout this document is text that is directly referencing the California Water Code.)

The development of a stormwater resource plan and compliance with this part in accordance with Section 10565 shall be required to receive grants for stormwater and dry weather runoff capture projects from a bond act approved by the voters after January 1, 2014 (Wat. Code, § 10563 (c)(1)).

These Guidelines [and the associated Water Code provisions] do not apply to:

- a) Funds provided for the purpose of developing a [Storm Water Resource Plan; or]*
- b) A grant for a disadvantaged community as defined in Section 79505.5, with a population of 20,000 or less, and that is not a co-permittee for [an MS4] National Pollutant Discharge Elimination System (NPDES) permit issued to a municipality with a population greater than 20,000. (Wat. Code, § 10563(c) et seq.)*

Implementation of Plans prepared per these Guidelines shall not interfere with or prevent the exercise of authority by a public agency to carry out its programs, projects, or responsibilities...[nor shall these Guidelines] affect requirements imposed under any other law (Wat. Code, § 10563(a) & (b)).

Section IV: Water Code Requirements for Storm Water Resource Plans

To be deemed consistent with requirements in section 10560 et seq. of the Water Code, Plans should be developed and implemented consistent with the guidance provided in Sections V through VI of these Guidelines. If certain guidance is not relevant on a watershed-specific and/or site-specific basis, the Plan should clearly state the rationale for such determination. Storm Water Resource Plans must address all mandatory elements in these Guidelines to be deemed consistent with Water Code section 10560 et seq. See Appendix A for a checklist of Water Code requirements and State Water Board guidance for Storm Water Resource Plans.

Section V: Standard Provisions

Each Storm Water Resource Plan should include or provide formal reference to the following provisions.

A. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) COMPLIANCE

Implementation of activities and individual projects per the Storm Water Resource Plan must be in compliance with the California Environmental Quality Act (CEQA) (Public Resources Code § 21000 et seq.).

B. CONSISTENCY WITH WATER QUALITY CONTROL PLANS AND APPLICABLE WATER QUALITY CONTROL POLICIES

The Storm Water Resource Plan must be consistent with, and assist in compliance with, applicable federal and state regulations and policies, including State Water Board plans and policies, and Regional Water Board water quality control plans (Basin Plans), including TMDLs adopted by the Regional Water Board. (Wat. Code, § 10562, subd. (b)(5)). See Appendix B for web links to the State Water Board plans and policies and the Regional Water Board Basin Plans.

C. SUBMISSION TO ENTITIES OVERSEEING INTEGRATED REGIONAL WATER MANAGEMENT PLANS AND OTHER LOCAL PLANS

Upon development, [a Storm Water Resource Plan must] be submitted to any applicable integrated regional water management group. Upon receipt, the Integrated Regional Water Management group shall incorporate the [Storm Water Resource Plan] into its integrated regional water management plan (Wat. Code, § 10562, subd. (b)(7)).

The Plan should identify the existing integrated regional water management plan (IRWMP) into which the Plan will be incorporated, along with identification of other local plans that could be affected by or could affect the Plan (e.g., local watershed plans, groundwater management plans, salinity and nitrate management plans), as applicable.

Storm water management on a watershed basis provides for a combination of storm water management objectives and multiple benefits throughout the watershed or sub-watershed. Therefore, the Plan should discuss how the various storm water management objectives within the watershed will protect or improve water quality, water supply reliability, and/or achieve other objectives. The Plan should include a discussion of the added benefits to integration of multiple storm water management strategies, as compared to stand-alone projects. The Plan should also discuss how its objectives and projects fit into the broader water management goals of the applicable IRWMP.

D. CONSISTENCY WITH APPLICABLE NPDES AND WASTE DISCHARGE PERMITS

All Storm Water Resource Plans must be implemented in accordance with applicable National Pollutant Discharge Elimination System (NPDES) permits, waste discharge requirements (WDRs), Areas of Special Biological Significance (ASBS) Compliance Plans (State Water Board Resolution No. 2012-0012), and/or conditional waivers issued by the State and/or Regional Water Boards. (Wat. Code, § 10562, subds. (b)(5) & (6))

E. MODIFICATION OF A RIVER OR STREAM CHANNEL

Projects within the Plan that include substantial change or use of any material from a river, stream, or lake should avoid and minimize erosion, sediment transport, and hydromodification, and fully mitigate environmental impacts resulting from the project (for example, California Fish and Game Code § 1600 et seq.).

F. MONITORING

To assess the effectiveness of Plan implementation on a watershed basis, Storm Water Resource Plans should include a monitoring component to collect statistically meaningful data. Monitoring requirements associated with applicable MS4 permit(s) and/or funding contracts should be included in the Plan. For individual projects within a watershed that may impact or have a potential to impact water quality, a monitoring component that

ensures the integration of existing local, regional, or statewide monitoring efforts should be included.³ Watershed-wide and individual project data should be stored in centralized local, regional, or statewide water quality data collection systems.

Section VI: Storm Water Resource Plan Guidance

A. DESCRIPTION OF WATERSHED AND SUB-WATERSHEDS

The [State Water Board] shall establish guidance...[to define]...the appropriate geographic scale of watersheds for storm water resource planning (Wat. Code, § 10565, subd. (c)). The following constitutes such guidance.

A watershed is defined as the region draining into a river, river system, or other body of water above a particular point. The United States Geological Survey (USGS) designates watershed hydrologic units (HU) at six levels (see **Table 1**).

Watershed Level	Square miles (average)	Acres (average)
Region	177,560	113,638,400
Subregion	16,800	10,752,000
Basin	10,596	6,781,440
Subbasin	700	448,000
Watershed	227	40,000-250,000
Subwatershed	40	10,000-40,000

CalWater⁴ (CalWater version 2.2.1) delineates California watershed boundaries at several smaller scales in between the “Watershed” and “Subwatershed” levels delineated by the USGS. The CalWater hierarchy of watershed designations consists of the following six levels of increasing specificity: Hydrologic Region (HR), Hydrologic Unit (HU), Hydrologic Area (HA), Hydrologic Sub-Area (HSA), Super Planning Watershed (SPWS), and Planning Watershed (PWS) (see **Table 2** below).

Watershed Level	Square miles (average)	Acres (average)
Hydrologic Region (HR)	12,735	8,150,000
Hydrologic Unit (HU)	672	430,000
Hydrologic Area (HA)	244	156,000
Hydrologic Sub-Area (HSA)	195	125,000
Super Planning Watershed (SPWS)	78	50,000
Planning Watershed (PWS)	5-16	3,000-10,000

³ See “Urban Stormwater Best Management Practice Performance Monitoring” developed by USEPA at http://water.epa.gov/scitech/wastetech/guide/stormwater/upload/2006_10_31_guide_stormwater_monttoc.pdf

⁴ CalWater version 2.2.1 also cross-references watershed codes implemented by the California Department of Water Resources, the California State Water Resources Control Board and Regional Water Quality Control Boards, as well as Hydrologic Unit Codes published by USGS for California and the nation. Standardized watershed delineations, codes, and names from both State and federal systems are used primarily to map, analyze, and document water resources and water quality information and regulations.

In general, the boundary of each watershed area identified in a Storm Water Resource Plan should not be based on political boundaries, county lines, property boundaries, vegetation-type edges, highways, fences, federal reserves, or any other non-watershed boundary. However, as necessary, political boundaries may be used to describe smaller watersheds, flat areas that encompass multiple small watersheds, or watersheds without distinct boundaries within the identified storm water management area. The applicable watersheds and sub-watersheds should not be split or divided.

In general, entities preparing a Storm Water Resource Plan should use the CalWater watershed designations, the USGS Hydrologic Unit (HU) designations, or an equivalent system such as defined by an applicable Integrated Regional Watershed Management (IRWM) Group, to determine and identify their watershed scale and boundaries, with the following caveats:

1. The scale of the watershed selected should allow for quantitative analyses of storm water and dry weather runoff patterns;
2. The watershed should be the largest practicable to allow for comprehensive and integrated storm water management across multiple jurisdictional boundaries;
3. Plans should include multiple projects within the watershed to achieve watershed-based storm water management objectives, and should not be developed on a scale for the sole purpose of funding a single project;
4. Watersheds smaller than the CalWater “Planning Watershed” size should not be used (smaller than 5 square miles in size); and
5. Plans based on the IRWM group watershed boundary are preferred.

Each Storm Water Resource Plan should include a description and boundary map of each watershed and sub-watershed applicable to the Plan. The Plan should specifically provide the following:

- i. An explanation of why the watershed(s) and sub-watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach;
- ii. A description of the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.; preferably provided in a geographic information system (GIS) file);
- iii. A description of the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body-pollutant combinations listed on the State’s Clean Water Act (CWA) Section 303(d) list of water quality limited segments (i.e., impaired waters list);
- iv. The general quality and identification of surface and ground water resources within the watershed (preferably provided in a GIS file);
- v. A description of the local entity or entities that provide potable water supplies, and the estimated volume of potable water provided by the water suppliers;

- vi. A description of native habitats, creeks, lakes, rivers, parks, and other natural or open space within the sub-watershed boundaries; and
- vii. An identification (quantitative, if possible) of the natural watershed processes that occur within the sub-watershed and a description of how those natural watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).

B. ORGANIZATION, COORDINATION, AND COLLABORATION

The [State Water Board] shall establish guidance... [in]... identifying types of local agencies and nongovernmental organizations that need to be consulted in developing a [Storm Water Resource Plan] (Wat. Code, § 10565, subd. (a)). The following constitutes such guidance.

Many local agencies, especially water supply agencies, can directly benefit from projects that use storm water and dry weather runoff as a resource; these beneficiaries have the potential to be important partners and/or serve crucial inter-agency coordination roles. Local municipalities, school districts, universities, conservancies, and other public agencies that have public lands and easements for multiple benefit projects are also potentially valuable partners. Consistent with the requirement to prioritize use of lands or easements in public ownership for storm water and dry weather runoff protects (Wat. Code, § 10562, subd. (b)(8)), State, regional, and local government agencies, public and private utilities, and nongovernmental organizations should collaborate to address local, regional, and watershed-wide obstacles by working together to maximize environmental outcomes that result from joint government/organizational efforts.

Nongovernmental organizations and state conservancies can provide essential leadership, innovation, and expertise in planning and conducting project design; assistance in developing effective collaborative approaches and engaging communities; and in-kind support and private funding. The State Water Board encourages these collaborative efforts to build strong working partnerships between public agencies, nongovernmental organizations, and the communities served.

In addition to collaboration with public agencies, utilities, conservancies, and nongovernmental organizations, entities developing Storm Water Resource Plans shall provide opportunities for community participation in Plan development and implementation. (Wat. Code, §10562, subd. (b)(4).) Accordingly, the following coordination and collaboration components should be addressed in a Storm Water Resource Plan:

- i. Description of existing regional water management group(s) implementing an existing Integrated Regional Water Management Plan (IRWMP);
- ii. Identification of and coordination with all agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed;

- iii. Identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed;
- iv. Identification and discussion of public engagement efforts and community participation in Plan development;
- v. Identification of required decisions that must be made by local, State or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization;
- vi. Planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for Plan implementation;
- vii. Description of the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies; and
- viii. Explanation of why individual agency participation in various isolated efforts is appropriate (if applicable).

C. QUANTITATIVE METHODS FOR IDENTIFICATION AND PRIORITIZATION OF STORM WATER AND DRY WEATHER RUNOFF CAPTURE PROJECTS

The [State Water Board] shall establish guidance...[to define]...appropriate quantitative methods for identifying and prioritizing opportunities for storm water and dry weather runoff capture projects (Wat. Code, § 10565, subd. (b)). The following constitutes such guidance.

1. Identification of Projects Using Quantitative Measures

To be consistent with Water Code requirements, Plans *shall include a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed (Wat. Code, § 10562, subd.(b)(2)).* **Table 3** below lists and defines appropriate metrics for each benefit type. Other metrics and methodologies for integrated evaluation and analysis of multiple benefits may be considered, as appropriate.

TABLE 3. BENEFIT METRICS		
Benefit	Example	Metric(s)
Water Quality	Increased filtration and/or treatment of runoff	Pollutant Load Reduction pounds (lbs)/day kilograms (kg)/day lbs/day
	Contribution to compliance with applicable permit and/or TMDL requirements	
	Nonpoint source pollution control	Volume million gallons per day (mgd) acre-feet per year (afy)
	Reestablished natural water drainage and treatment	
	Conjunctive use	
Water Supply	Water supply reliability	Volume million gallons per day (mgd) acre-feet per year (afy)
	Groundwater management	
	Runoff capture and reuse	
	Augmentation or replacement of water supply	
	Reduced dependence on imported water	
Water conservation		
Flood Management	Decreased flood risk by reducing runoff rate and/or volume	Rate and/or Volume cubic feet per second (cfs) acre-feet (af) and/or cubic feet
	Reduced sanitary sewer overflows	
Environmental	Environmental and habitat protection and improvement	Size and/or Rate acres cubic feet per second (cfs) carbon sequestration
	Wetland enhancement and/or creation	
	Stream/riparian enhancement and/or instream flow augmentation	
	Increased urban green space	
	Reduced energy use, greenhouse gas emissions, or provides a carbon sink	
	Reestablishment of the natural hydrograph	
Water temperature improvements		
Community	Increased urban green space	Size and/or Economics size of population served acres cost savings
	Enhanced and/or created recreational and public use areas	
	Reduced energy use	
	Community involvement	

2. Integrated Metrics-Based Analysis

The Storm Water Resource Plan should include an integrated watershed metrics-based analysis demonstrating that the proposed storm water and dry weather runoff capture projects and programs within the watershed will collectively address the Plan's storm water management objectives and produce the proposed multiple benefits identified per the guidance in Section VI.D. The following guidance provides the minimum level of information to be included in an integrated metrics-based analysis for different types of projects within the watershed.

a. *Water Quality Projects Analysis*

The Storm Water Resource Plan should include a watershed-based analysis of how existing and proposed projects/programs comply with an applicable NPDES permit. The analysis for water quality projects should simulate the proposed watershed-based outcomes using modeling, calculations, pollutant mass balances, water volume balances and/or other methods of analysis that provide the following, as applicable:

- i. Estimates of expected watershed-wide pollutant load reductions expressed as concentration-based or mass-based in consideration of critical conditions; and
- ii. Estimates of the difference between the current and future pollutant discharge/loading in the receiving water/watershed once the Plan is implemented.

Estimated pollutant reductions should generally be expressed on a pollutant-by-pollutant basis and should be consistent with the relevant averaging period(s)/duration (including the selected critical condition), if any, in the applicable NPDES permit. Pollutant reductions may also be estimated using relationships between volume reduction and pollutant reduction, or by identifying a limiting pollutant that if addressed will ensure that all other pollutants are sufficiently reduced.

In addition to the above, to the extent possible, the narrative should describe in a quantitative manner using the metrics in **Table 3** (or other more appropriate metrics) how the project and programs in the watershed will contribute to the preservation, restoration, or enhancement of the following watershed processes, as applicable:

- i. **Overland Flow:** Precipitation reaching the ground surface that does not immediately infiltrate must run over the land surface (thus, "overland" flow). Most un-compacted vegetated soils have infiltration capacities of one to several inches per hour at the ground surface, which exceeds the rainfall intensity of even unusually intense storms. In contrast, pavement and hard surfaces reduce the effective infiltration capacity of the ground surface to zero, ensuring overland flow regardless of the meteorological attributes of a storm.
- ii. **Groundwater Recharge and Infiltration:** Groundwater recharge and infiltration are closely-linked hydrologic processes that are dominant across much of California's intact landscapes. Groundwater recharge

and infiltration can be thought of as the inverse of overland flow - precipitation that reaches the ground surface and does not immediately run off has most likely infiltrated. Thus, on virtually any geologic material on all but the steepest slopes (or bare rock), infiltration of rainfall into the soil is inferred to be widespread, if not ubiquitous. With urbanization, changes to the process of infiltration are also quite simple to characterize: some (typically large) fraction of that once-infiltrating water is now converted to overland flow.

- iii. **Interflow:** Interflow takes place following storm events as shallow subsurface flow (usually within three to six feet of the surface) occurring in a more permeable soil layer above a less permeable substrate. In the storm response of a stream, interflow provides a transition between the rapid response from surface runoff and much slower stream discharge from deeper groundwater. In some geologic settings, the distinction between “interflow” and “deep groundwater” is artificial and largely meaningless; in others, however, there is a strong physical discrimination between “shallow” and “deep” groundwater movement. Urban development reduces infiltration and thus interflow, as well as reducing the footprint of the area supporting interflow volume.
- iv. **Evapotranspiration:** In undisturbed humid-region watersheds, the process of returning water to the atmosphere by direct evaporation from soil and vegetation surfaces, and by the active transpiration by plants, can account for nearly one-half of the total annual water balance; in more arid regions, this fraction can be even higher. Land development covers soils with impervious surfaces and usually results in the compaction of soils when grading occurs. Native plants are often replaced with turf, which typically has lower rates of evapotranspiration unless irrigated throughout the summer months.
- v. **Delivery of Sediment to Receiving Waters:** Sediment delivery into the channel network is a critical process for the maintenance of various habitat features in fluvial systems (although excessive sediment loading from watershed disturbance can instead be a significant source of degradation, and excessive fine sediment particles in substrate composition can inhibit salmonid spawning). Quantifying this rate can be difficult; however, the overriding influence of slope gradient is widely documented. Maintenance of sediment delivery is essential to the health of certain receiving-water types (as is organic matter delivery). Development and non-native vegetation may also prevent the natural supply of sediment from reaching the stream.
- vi. **Delivery of Organic Matter to Receiving Waters:** The delivery of organic matter is critical to receiving water health as it forms the basis for the aquatic food web. Delivery of organic matter follows similar pathways as inorganic matter (e.g., sediment). However, the dominant amount and timing of delivery is often associated with the presence, width, and composition of the vegetative riparian zone.
- vii. **Chemical and Biological Transformation:** Chemical and biological transformation encompasses the suite of watershed processes that alter the chemical composition of water as it passes through the soil column

on its path to, and after entry into, a receiving water. The conversion of subsurface flow to overland flow in a developed landscape eliminates much of the opportunity for attenuation and transformations within the soil column, and this is commonly expressed as degraded water quality. The dependency of these processes on watershed conditions is complex in detail, but in general a greater residence time of storm water in the soil should be correlated with greater activity for this group of processes.

b. Storm Water Capture and Use Projects Analysis

The Plan should include an analysis of how collectively the projects and programs in the watershed will capture and use the proposed amount of storm water and dry weather runoff. The analysis for storm water capture and use projects should simulate the proposed watershed-based outcomes using modeling, calculations, water balances and/or other methods of analysis that provide the following, as applicable:

- i. A demonstration that the collective performance of individual projects (within the project areas of the watershed) captures the dry weather runoff and, at minimum, the first flush from an 85th-percentile 24-hour storm event based on available watershed-specific rainfall data for beneficial use and proposed multiple benefits. The volumetric threshold feasibly achievable may vary based on watershed characteristics and other water quality consideration; in such a case, the Plan must include discussion of the crucial multiple benefits resulting from the capture and use projects that do not meet the 85th percentile, 24-hour storm threshold.
- ii. A current assessment of storm water capture opportunities (preferably provided in a GIS file). The assessment must include:
 - a. Watershed map;
 - b. All waterbodies (natural and manmade) within the watershed;
 - c. List of known and suspected storm water and non-storm water pollutant sources in each storm water management area addressed by the Plan;
 - d. Major existing storm water outfalls, major existing structural controls of storm and non-storm water (including, but not limited to, storm water pump stations, low-flow diversions, urban runoff treatment facilities, LIDs, detention basins used for storm water treatment, and other catch basin inserts/screens) that discharge to receiving waters; and
 - e. Opportunity sites and/or drainage areas, and the corresponding volume of storm water and dry weather runoff that can be captured at the sites or within the drainage areas.

c. Water Supply and Flood Control Projects Analysis

The Plan should include an analysis of how the projects and programs in the watershed will collectively result in the proposed water supply augmentation and flood management objectives. The analysis for water supply and flood control projects should simulate the proposed watershed-based outcomes

using modeling, calculations, water balances and/or other methods of analysis that provide the following, as applicable:

- i. Estimated volume of storm water and/or dry weather runoff capture, as percentage of total volume of storm water and dry weather runoff;
 - a. Estimated volume of storm water and/or dry weather runoff infiltration into groundwater basin/aquifer; and/or
 - b. Estimated volume of storm water and/or dry weather runoff onsite storage and reuse.
- ii. Estimate of volume of potable water offset as a result of storm water and dry weather runoff capture.

d. Environmental and Community Benefits Analysis

In addition to benefits such as water quality, water supply, and flood control, the Plan should include a narrative analysis of how the projects and programs within the watershed will collectively benefit the environment and community. As applicable, the narrative analysis should describe in a quantitative manner using the metrics in **Table 3** how proposed projects and programs within the watershed will collectively contribute to the following elements:

- i. Water quality, environmental, and habitat protection, such as wetland enhancement and/or creation, and stream/riparian enhancement and/or in-stream flow augmentation;
- ii. Increased urban green space and connectivity;
- iii. Enhancement and/or creation of recreational and public use areas; and
- iv. Reduced energy use reducing greenhouse gas emissions, reduced urban heat island effects (for example, as a result from increased tree canopy), improving air quality, and/or providing a carbon sink.

3. Information and Data Management

The Storm Water Resource Plan should include a discussion addressing data collection and management including, but not limited to the following:

- a. Mechanisms by which data will be managed and stored;
- b. How data will be accessed by stakeholders and the public;;
- c. How existing water quality and water quantity monitoring will be assessed;
- d. Frequency at which data will be updated; and
- e. How data gaps (for which additional monitoring is needed) will be identified.

All monitoring results conducted in the watershed should be provided (preferably in a GIS file) to the appropriate local, regional and/or State data collection systems applicable to corresponding individual-project funding and regulatory requirements. If the Plan includes a surface water or groundwater quality monitoring component, include a discussion of the integration of ambient data into the State Water Board's California Environmental Data Exchange Network (CEDEN), Surface Water Ambient

Monitoring Program (SWAMP), and Groundwater Ambient Monitoring and Assessment (GAMA) Program. Appendix B provides a listing of web links for accessing information on the State Water Board's statewide data management strategies.

If the Storm Water Resource Plan consists of, or incorporates existing plans that include storm water monitoring and reporting, the Plan should not duplicate monitoring/reporting efforts. In this case, this section of the Plan should include a narrative summary of the existing monitoring efforts and/or requirements of other incorporated plans and the associated reporting mechanism(s). The narrative summary must also include detailed reference to other plans, including document title, general page locations of monitoring and reporting requirements, and internet address where document is located.

D. IDENTIFICATION AND PRIORITIZATION OF MULTIPLE BENEFIT PROJECTS

[A Storm Water Resource Plan] shall use measurable factors to identify, quantify, and prioritize potential storm water and dry weather runoff capture projects (Wat. Code, § 10562, subd. (e)). In accordance with Water Code section 10562, subd. (d), a Storm Water Resource Plan shall identify in the Plan all of the following:

- (1) Opportunities to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.*
- (2) Opportunities for source control of pollutants due to storm water and dry weather runoff, onsite and local infiltration, and use of storm water and dry weather runoff.*
- (3) Projects to reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.*
- (4) Opportunities to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, [streams,] riverside habitats, parkways, and parks.*
- (5) Opportunities to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite.*
- (6) Design criteria and best management practices to prevent storm water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development. These design criteria and best management practices shall accomplish all of the following:*
 - (A) Reduce effective impermeability within a watershed by creating permeable surfaces, retention basins, cisterns, and other storage for beneficial use.*
 - (B) Increase water storage for beneficial use through a variety of onsite storage techniques.*

- (C) Increase groundwater supplies through infiltration, where appropriate and feasible.*
- (D) Support low-impact development for new and upgraded infrastructure and development using low-impact techniques.*

(7) Activities generating or contributing to the pollution of storm water or dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff.

1. Guidance for Prioritizing Storm Water and Dry Weather Runoff Capture Projects within a Watershed

The intention of the Water Code requirements is to encourage storm water and dry weather runoff projects that provide multiple public water quality and supply benefits, and have been identified, prioritized, and selected based on a metrics-driven analysis. Therefore, the Plan should prioritize individual projects and programs for implementation based on an integration of quantitative factors to assure the greatest water quality, water supply, conservation, and community needs are addressed. Accordingly, Plans should prioritize individual projects or programs according to the following elements:

- a. Projects or programs supported by entities that have created permanent, local, or regional funding (i.e., entities who have established a new, multi-year local or regional source of funding dedicated to storm water and/or dry weather runoff capture projects, and who provide funds for both capital and operations and maintenance).
- b. Projects or programs that use a metric-driven approach and an appropriately detailed geospatial analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed.
- c. Projects located on lands in public ownership.
- d. Projects that augment local water supplies such as:
 - 1. Projects that use captured storm water and dry weather runoff to recharge groundwater; and
 - 2. Projects that store and use captured storm water and dry weather runoff for irrigation or other permitted uses.
- e. Projects and programs that preserve, restore, or enhance watershed processes that yield a broad suite of water quality benefits and support beneficial uses.
- f. Projects and programs that create or restore habitat, open space, parks, recreation, or green open space in disadvantaged communities with a high deficit of tree canopy, parks and open space.

2. Multiple Benefits

The Storm Water Management Plan should include a high-level general discussion of the overall benefits and impacts of Plan implementation. Each project and program implemented in accordance with the Plan should at

minimum, address: (1) at least two or more **Main Benefits** listed in **Table 4** within the watershed or sub-watershed, and (2) as many as feasible **Additional Benefits** for the same project/program.

TABLE 4. STORM WATER MANAGEMENT BENEFITS		
Benefit Category	Main Benefit	Additional Benefit
Water Quality	Conjunctive use	Nonpoint source pollution control
	Water quality protection and improvement	Contribution to compliance with applicable permit and/or TMDL requirements
	Increased filtration and/or treatment of runoff	Reestablished natural water drainage and treatment
Water Supply	Water supply reliability	Reduced dependence on imported water
	Groundwater management	
	Runoff capture and reuse	Water conservation
	Augmentation or replacement of water supply	
Flood Management	Decreased flood risk by reducing runoff rate and/or volume	Reduced sanitary sewer overflows
Environmental	Environmental and habitat protection and improvement	Reduced energy use, greenhouse gas emissions, or provides a carbon sink
	Wetland enhancement and/or creation	
	Stream enhancement and/or instream flow augmentation	Reestablishment of the natural hydrograph
	Increased urban green space	Water temperature improvements
Community	Increased urban green space	Community involvement
		Enhance and/or create recreational and public use areas
	Community participation and other community benefits	Conjunctive use
		Reduced energy use

E. IMPLEMENTATION STRATEGY AND SCHEDULE

1. Resources for Plan Implementation

A Storm Water Resource Plan should identify the resources that the participating entities are committing for implementation of the Plan. The Plan should include the following items to ensure its effective implementation (Wat. Code, Wat. Code, § 10562, subd. (d)(8)):

- a. Projection of additional funding needs and sources for administration and implementation needs, above and beyond the needs of the existing storm

water management plans and/or integrated regional water management plans; and

- b. Schedule for arranging and securing Plan implementation financing, including identification of phased Plan implementation.

2. Plan Implementation

An entity developing a storm water resource plan shall identify in the plan: *[p]rojects and programs to ensure the effective implementation of the [Storm Water Resource Plan]...to achieve multiple benefits. These projects and programs shall include the development of appropriate decision support tools and the data necessary to use the decision support tools. The Plan shall identify ...[o]rdinances or other mechanisms necessary to ensure the effective implementation of the [Storm Water Resource Plan] (Wat. Code, § 10562, subds. (d)(8) & (9)).*

The Storm Water Resource Plan should identify the following implementation and scheduling components:

- a. Timeline for incorporating the Storm Water Resource Plan into an existing Integrated Regional Water Management Plan (IRWMP), and/or other existing watershed water resource management plans;
- b. Specific actions, projects, and studies, ongoing or planned, by which the Plan will be implemented;
- c. Agency(ies) responsible for project implementation, with clearly identified linkages or interdependence between projects;
- d. Description of the community participation strategy for Plan implementation;
- e. A procedure to track the status of each element of the Plan, such as existing infrastructure, feasibility studies, pilot or demonstration projects, design efforts;
- f. Timelines for all active or planned project components and identification of the institutional structure that will ensure Plan implementation;
- g. A procedure for ongoing review, updates, and adaptive management of the Plan; and
- h. A strategy and timeline for obtaining necessary federal, state, and local permits.

3. Implementation Performance Measures

The Storm Water Resource Plan should explain how the identified projects and programs within the watershed will achieve the multiple-benefit goals and assure that each implemented project is consistent with the Plan's objectives and goals. The Plan should include a discussion of existing and necessary data, the technical analysis, and the performance measures corresponding to the following elements:

- a. Evaluation of the expected and actual outcomes of the Plan (i.e., water quality, water supply augmentation, other benefits);
- b. Quantification of the storm water management objectives, multiple benefits, and environmental outcomes;
- c. The monitoring and information-management systems that will be used to gather performance data;
- d. Mechanisms to adapt project operations and Plan implementation based on performance data collected; and
- e. Mechanisms to share performance data with stakeholders.

See sections VI.C.1 and VI.C.2 for guidance on **quantification** of implementation performance measures.

F. EDUCATION, OUTREACH AND PUBLIC PARTICIPATION

(Note - Italicized text throughout this document is text that is directly referencing the California Water Code.)

A stormwater resource plan shall...[p]rovide for community participation in plan development and implementation (Wat. Code, § 10562, subd. (b)(4)).

To maximize community-based benefits, key stakeholders and the public should be involved in all appropriate implementation steps of the Storm Water Resource Plan. Public education and opportunities for public participation in actions, decisions, and projects implemented through watershed-based storm water management should be provided. The Plan should include public education and public participation goals addressing the following elements:

- i. Public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation of the Plan;
- ii. Mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan;
- iii. Mechanisms to engage communities in project design and implementation;
- iv. Identification of specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public;

- v. Strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process;
- vi. Efforts to identify and address environmental injustice within the watershed; and
- vii. A schedule for initial public engagement and education.

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Appendix A

STORM WATER RESOURCE PLAN CHECKLIST <u>MANDATORY REQUIRED ELEMENTS</u> PER CALIFORNIA WATER CODE			
	Water Code Section	Guidelines Section	
PLAN DEVELOPMENT			
<input type="checkbox"/> Local agencies and nongovernmental organizations were consulted in Plan development.	10565(a)	VI.B	
<input type="checkbox"/> Community participation was provided for in Plan development.	10562(b)(4)	VI.B	
<input type="checkbox"/> Plan identifies watershed and subwatershed(s) for storm water resource planning.	10565(c) 10562(b)(1) 10565(c)	VI.A	
IDENTIFICATION OF PROJECTS			
<input type="checkbox"/> Opportunities are identified to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.	10562(d)(1)	VI.C	
<input type="checkbox"/> Opportunities are identified for source control for both pollution and storm water and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff.	10562(d)(2)	VI.C	
<input type="checkbox"/> Projects are identified that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.	10562(d)(3)	VI.C	
<input type="checkbox"/> Opportunities are identified to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks.	10562(d)(4)	VI.C	
<input type="checkbox"/> Opportunities are identified to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite.	10562(d)(5)	VI.C	
PRIORITIZATION OF PROJECTS			
<input type="checkbox"/> Appropriate quantitative methods are used for prioritization of projects. (This should be accomplished by using a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed.)	10562(b)(2)	VI.D	
<input type="checkbox"/> The use of lands or easements in public ownership for storm water and dry weather runoff projects are prioritized.	10562(b)(8)	VI.D	
<input type="checkbox"/> <i>For new development and redevelopments (if applicable):</i> Design criteria and best management practices to prevent storm	10562(d)(6)	VI.D	

water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development are identified.

PLAN IMPLEMENTATION

<input type="checkbox"/>	Projects and programs are identified to ensure the effective implementation of the storm water resource plan pursuant to this part and achieve multiple benefits.	10562(d)(8)	VI.G
<input type="checkbox"/>	The development of appropriate decision support tools and the data necessary to use the decision support tools is identified.	10562(d)(8)	VI.G
<input type="checkbox"/>	<i>Outreach and Scoping:</i> Community participation is provided for in Plan implementation.	10562(b)(4)	VI.G
<input type="checkbox"/>	<i>Plan Incorporation:</i> Upon development, the Plan will be submitted to the applicable integrated regional water management (IRWM) group for incorporation into the IRWM plan.	10562(b)(7)	VI.E

WATER QUALITY COMPLIANCE

<input type="checkbox"/>	Activities are identified that generate or contribute to the pollution of storm water or dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff.	10562(d)(7)	V
<input type="checkbox"/>	A description of how the Plan is consistent with and assist in, compliance with total maximum daily load (TMDL) implementation plans and applicable NPDES permits is provided.	10562(b)(5)	V
<input type="checkbox"/>	A description of how the Plan is consistent with all applicable waste discharge permits is provided.	10562(b)(6)	V

STORM WATER RESOURCE PLAN CHECKLIST

RECOMMENDATIONS PER THE STORM WATER RESOURCE PLAN GUIDELINES

WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)

- Is developed on a watershed basis, using boundaries as delineated by USGS, CalWater, or an applicable integrated regional water management (IRWM) group, and includes a description and boundary map of each watershed and sub-watershed applicable to the Plan.
- Includes multiple projects and is not developed on a scale for the sole purpose of funding a single project.
- Explains why the watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach.
- Describes the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.).
- Describes the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body pollutant combinations listed on the State's Clean Water Act (CWA) Section 303(d) list of water quality limited segments (i.e., impaired waters list).
- Describes the general quality and identification of surface and ground water resources within the watershed.
- Identifies the potable water suppliers and the volume of potable water provided by water suppliers.
- Describes native habitats, creeks, lakes and rivers, parks and other natural or open space within the sub-watershed boundaries.
- Identifies the watershed processes that occur within the sub-watershed and a description of how those watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).

ORGANIZATION, COORDINATION, COLLABORATION (GUIDELINES SECTION VI.B)

- Describes the existing integrated regional water management group(s) implementing an IRWM plan.
- Includes identification of and coordination with all agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed.
- Identifies nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.
- Identifies and discusses public engagement efforts and community participation in Plan development.
- Identifies required decisions that must be made by local, State or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization
- Discusses planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for plan implementation.
- Describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.
- (If applicable) Includes a thorough explanation of why individual agency participation in various isolated efforts is appropriate.

QUANTITATIVE METHODS (GUIDELINES SECTION VI.C)

- For all analyses:*
Uses an integrated metrics-based analysis to demonstrate that the Plan's proposed storm water and dry weather capture projects and programs will satisfy the Plan's identified water management objectives and multiple benefits.
- For water quality project analysis:*
Includes an analysis of how each project and program is related to compliance with any applicable NPDES permit. The analysis should provide:
 - i. Estimates of expected watershed-wide pollutant load reductions expressed as concentration-based or mass-based in consideration of critical conditions.
 - ii. Estimates of the difference between the current and future pollutant discharge/loading in the receiving water/watershed once the Plan is implemented.
- Describes how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes (as described in Guidelines section VI.C.2.a)
- For storm water capture and use project analysis:*
Includes a demonstration that individual projects or a combination of projects within a sub-watershed maximize capture of storm water and dry weather runoff from areas tributary to the projects using a quantitative analysis.
- For water supply and flood management project analysis:*
Includes an analysis of how each project and program will maximize and/or augment water supply.
- For environmental and community benefit analysis:*
Includes a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.
- Data management:*
Describes data collection and management, including: a) mechanisms by which data will be managed and stored; b) how data will be accessed by stakeholders and the public; c) how data collection will support statewide data needs; d) how existing water quality and water quality monitoring will be assessed; e) frequency at which data will be updated; and f) how data gaps will be identified.

PRIORITIZATION OF PROJECTS (GUIDELINES SECTION VI.D)

- Overall:*
Prioritizes projects using a metric-driven approach and a geospatial analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and community benefits within the watershed.
- Management strategies:*
Includes discussion of: 1) short-term and long-term priorities for Plan implementation; 2) process used to determine the priorities; and 3) process for modifying priorities in response to watershed and regional changes.
- Multiple benefits:*
Ensures each project in accordance with the Plan contributes to at least two or more **Main Benefits** and the maximum number of Additional Benefits as listed in Guidelines Table 4.

IMPLEMENTATION STRATEGY AND SCHEDULE (GUIDELINES SECTION VI.E)

- Identifies resources for Plan implementation, including: 1) projection of additional funding needs and sources for administration and implementation needs; and 2) schedule for arranging and securing Plan implementation financing.
- Describes Plan implementation strategy, including: 1) timeline for incorporating Plan into existing plans, as applicable; 2) specific actions by which Plan will be implemented; 3) agencies responsible for project implementation; 4) description of community participation strategy; 5) procedures to track status of each project; 6) timelines for all active or planned projects; 7) procedures for ongoing review, updates, and adaptive management of the Plan; and 8) a strategy and timeline for obtaining necessary federal, state, and local permits.
- Describes how Plan implementation performance measures will be tracked.

EDUCATION, OUTREACH, PUBLIC PARTICIPATION (GUIDELINES SECTION VI.F)

- Describes public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation of the Plan.
- Describes mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan.
- Describes mechanisms to engage communities in project design and implementation.
- Identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.
- Describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.
- Describes efforts to identify and address environmental injustice needs and issues within the watershed.
- Includes a schedule for initial public engagement and education.

APPENDIX B: USEFUL WEB LINKS

Storm water and dry weather runoff capture and use activities must be consistent with applicable federal and state regulations and policies, include State Water Resource Control Board (State Water Board) plans and policies, and Regional Water Board water quality control plans (Basin Plans), including TMDLs adopted by the Regional Water Boards. The list below includes, but is not limited to, links to the above referenced plans and policies.

Ahwahnee Principles	www.lgc.org/water-guidebook
American Society of Civil Engineers (ASCE)	www.asce.org
California Environmental Quality Act (CEQA) Information	
Environmental Information:	resources.ca.gov/ceqa
California State Clearinghouse Handbook:	opr.ca.gov/docs/SCH_Handbook_2012.pdf
CEQA Guidelines:	resources.ca.gov/ceqa/docs/2014_CEQA_Statutes_and_Guidelines.pdf
California Law	www.leginfo.ca.gov
California Labor Code	www.leginfo.ca.gov/cgi-bin/calawquery?codesection=lab&codebody=&hits=20
California Water Code	www.leginfo.ca.gov/cgi-bin/calawquery?codesection=wat&codebody=&hits=20
Public Resources Code	www.leginfo.ca.gov/cgi-bin/calawquery?codesection=prc
California Office of Administrative Law	www.oal.ca.gov
California Native American Heritage Commission	www.nahc.ca.gov
California Watershed Portal	cares.ucdavis.edu/resource/california-watershed-portal
Department of Industrial Relations	www.dir.ca.gov
Environmental Justice	www.waterboards.ca.gov/water_issues/programs/outreach/education/justice.shtml
Environmental Justice Coalition for Water	www.ejcw.org
Environmental Justice Program (USEPA's)	www.epa.gov/compliance/environmentaljustice/index.html
Green Infrastructure	water.epa.gov/infrastructure/greeninfrastructure/index.cfm
International Storm Water BMP Database	www.bmpdatabase.org
Integrated Regional Water Management (IRWM) Plans	www.grantsloans.water.ca.gov/grants/implementation/prop84/integregio_fundingarea.cfm
Local Government Commission	www.lgc.org
Commission	
Low Impact Development (LID)	
USEPA	www.epa.gov/nps/lid
State Water Resources Control Board	www.waterboards.ca.gov/water_issues/programs/low_impact_development/index.shtml
A Review of Low Impact Development Policies: Removing Institutional Barriers to Adoption	www.waterboards.ca.gov/water_issues/programs/low_impact_development/docs/ca_lid_policy_review.pdf

APPENDIX B: USEFUL WEB LINKS

Performance Assessment and Evaluation Plan (PAEP) Websites

Project Planning, Research, Monitoring, and Assessment (many of these resources also apply to BMP implementation or habitat restoration effectiveness monitoring)

cwam.ucdavis.edu

www.waterboards.ca.gov/water_issues/programs/swamp/cwt_volunteer.shtml

cfpub.epa.gov/watertrain/index.cfm

www.epa.gov/region09/qa/pdfs/csbp_2003.pdf

www.cramwetlands.org

www.calfish.org/DesktopDefault.aspx?tabId=112

www.cnr.berkeley.edu/forestry/comp_proj/DFG/Monitoring%20the%20Implementation%20and%20Effectiveness%20of%20Fisheries.pdf

Education and Outreach

www.michigan.gov/deq/0,1607,%207-135-3313_3682_3714-75944--,00.html

learningstore.uwex.edu/pdf/G3658-10.PDF

Pollutant Load Reduction Activities

www.sfei.org/sites/default/files/564_RMP_GuadWSmodelYr1_final_web.pdf

Habitat Restoration

www.dfg.ca.gov/nafwb/manual.html

www.dfg.ca.gov/nafwb/pubs.html

water.usgs.gov/nawqa/protocols/OFR-93-408/habit1.html

PAEP Tools and Project Performance Measures Tables

www.waterboards.ca.gov/water_issues/programs/grants_loans/paep/index.shtml

Regional Water Boards Watershed Management Initiative Chapters

Region 1: www.waterboards.ca.gov/northcoast/water_issues/programs/watershed_management_initiative.shtml

Region 2: www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/watershed/WMI/watershedmanagement.shtml

Region 3: www.waterboards.ca.gov/centralcoast/water_issues/programs/wmi/index.shtml

Region 4: www.waterboards.ca.gov/losangeles/water_issues/programs/regional_program/index.shtml#Watershed

Region 5: www.waterboards.ca.gov/centralvalley/water_issues/watershed_management/r5_wmi_chapter.shtml

Region 6: www.waterboards.ca.gov/lahontan/water_issues/programs/watershed_management/index.shtml

Region 7: www.waterboards.ca.gov/coloradoriver/water_issues/programs/wmi/wmi_chapter.shtml

Region 8: www.waterboards.ca.gov/santaana/water_issues/programs/wmi/index.shtml

Region 9: www.waterboards.ca.gov/sandiego/water_issues/programs/wmc/index.shtml

Regional Water Quality Control Plans (Basin Plans)

Region 1: www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan

Region 2: www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml

Region 3: www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/index.shtml

Region 4: www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan

Region 5: www.waterboards.ca.gov/centralvalley/water_issues/basin_plans

Region 6: www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/index.shtml

Region 7: www.waterboards.ca.gov/coloradoriver/water_issues/programs/basin_planning

Region 8: www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.shtml

Region 9: www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

State Water Board Program Information

303d List: www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

Division of Financial Assistance: www.waterboards.ca.gov/water_issues/programs/grants_loans

Groundwater Monitoring: www.waterboards.ca.gov/gama

National Pollutant Discharge Elimination System (NPDES)

Permit Program

NPS Program:

www.waterboards.ca.gov/water_issues/programs/nps/

Proposition 1 Grant Program: www.waterboards.ca.gov/water_issues/programs/grants_loans/proposition1.shtml

Storm Water Regulatory Program: www.waterboards.ca.gov/water_issues/programs/stormwater

Strategic Plan: www.waterboards.ca.gov/water_issues/hot_topics/strategic_plan/2007update.shtml

Ocean Plan: www.swrcb.ca.gov/water_issues/programs/ocean/

Areas of Special Biological

Significance (ASBS): www.swrcb.ca.gov/water_issues/programs/ocean/asbs.shtml

APPENDIX B: USEFUL WEB LINKS

State Water Board Statewide Data Management Programs

California Integrated Water Quality System (CIWQS)

www.waterboards.ca.gov/water_issues/programs/ciwqs/index.shtml

Surface Water Ambient Monitoring Program (SWAMP):

www.waterboards.ca.gov/water_issues/programs/swamp

SWAMP Quality Assurance Project Plan (QAPP):

www.waterboards.ca.gov/water_issues/programs/quality_assurance/index.shtml

US Census 2000

www.census.gov/main/www/cen2000.html

USEPA's NPS Program

water.epa.gov/polwaste/nps/

USEPA's Storm Water Program

www.epa.gov/npdes/stormwater