Contents

5.0 MUNICIPAL ACTIVITIES 5-1

5.1 Program Summary 5-1

5.1.1 Program Overview 5-1

5.1.2 Program Commitments 5-2

5.1.3 Regulatory Requirements 5-3

5.2 Model Municipal Activities Program Details 5-3

5.2.1 Municipal Inventories 5-4

5.2.2 Prioritization 5-16

5.2.3 Model Maintenance Procedures 5-17

5.2.4 Municipal Inspection and Requirements 5-22

5.3 Model Integrated Pest Management, Pesticides and Fertilizer Guidelines 5-26

5.3.1 Introduction 5-26

5.3.2 Integrated Pest Management (update to be provided by OC) 5-27

5.3.3 Pesticide Management – Planning 5-34

5.3.4 Application of Pesticides 5-43

5.3.5 Fertilizer Management 5-46

5.3.6 References 5-54

5.4 Performance Reporting 5-56

5.5 Training and Education 5-57

5.6 Definitions 5-58

5.0 MUNICIPAL ACTIVITIES

5.1 Program Summary

5.1.1 Program Overview

Permittees own and operate public facilities and, as a consequence, perform municipal activities including pest management over a large portion of their respective jurisdictions, which may constitute up to 20% to 30% of the land area. These activities represent both potential sources of pollutants (examples include public facilities landscape maintenance waste, materials resulting from street and road maintenance, litter and debris from solid waste collection activities, and petroleum hydrocarbons and metals resulting from equipment maintenance and repair; as well as activities to reduce pollutants generated by others (such as street sweeping and drain system cleaning). Under their Local Implementation Programs, Permittees will continue to implement BMPs in conjunction with municipal activities that can significantly contribute to the control of urban stormwater pollution. The DAMP provides Model Programs that Permittees use to formulate their local programs. In order to manage these activities and monitor progress, the Permittees will document and evaluate such activities as part of a Continuous Improvement Process.

Model programs are contained in the DAMP for both Municipal Activities and Integrated Pest Management as defined below:

Model Municipal Activities Program - The Municipal Activities Program provides the framework and a process for conducting the following NPDES permit compliance activities at municipal fixed facilities, field programs and drainage facilities.

Model Integrated Pest Management, Pesticides and Fertilizer Guidelines **-** The overall purpose of the Integrated Pest Management Program is to provide the permittees with general guidelines for the management activities associated with integrated pest management, pesticide and fertilizer applications. If desired, the guidelines may also be used to develop a comprehensive Integrated Pest Management (IPM) Program.

Performance Reporting of Existing BMPs **-** Performance indicators for certain existing BMPs have been tracked since the inception of the Program. These BMPs are Street Sweeping, Solid Waste Collection, Catch Basin Stenciling, Drainage Facility Maintenance, Trash & Debris Control (formerly Litter Control), Household Hazardous Waste Collection, and Used Oil Grant Participation. This is from the ROWD, see Richard's comments.

The objectives of these model programs are to provide the Permittees with:

- A program framework for reducing the adverse impacts that municipal activities may have on water quality;
- An iterative process by which they can effectively monitor and respond to problems as they are discovered; and
- Methodologies to meet NPDES permit requirements.

The Model Program is intended to be implemented as described in Section A-5 of each Permittee's Local Implementation Plan (LIP). In developing its LIP, the Permittee may modify the Model Program in response to local conditions. It is not the intent for this Model Program to restrict city or county governing bodies from imposing additional stormwater management requirements on their municipal activities, facilities, lessors and contracts.

5.1.2 Program Commitments

Although the Municipal Activities Program provides the framework and approach for complying with the NPDES permit requirements, the program is structured to assist the Permittees in the development of their LIPs (**Appendix A-5**).

The major program commitments and the subsections in which they are described in detail include:

- Maintain/update inventories of Fixed Facilities, Field Programs and Drainage Facilities that exist within the jurisdiction, including the watershed in which the facility is located, whether the facility/program activity is located adjacent to an ESA, the potential of the facility or activity to generate pollutants and whether the watershed is listed for any of the pollutants of concern generated by the facility or activity (5.2.1).
- Prioritize fixed facilities, for the purposes of determining the frequency of inspections (high – annually, medium – bi-annually, low – once/permit term). Field Programs and Drainage Facilities are all considered high priority and require annual inspections (5.2.2).
- Perform maintenance at all Fixed Facilities, Field Activities and Drainage Facilities in accordance with Model Maintenance Procedures and as determined by inspections. These include common baseline procedures and Best Management Practices as well as optional enhanced BMPs if operational history, inspection findings, or other special situations warrant implementation (5.2.3).
- Enforce the maintenance requirements through internal procedures and external contract language (5.2.4).
- Apply Integrated Pest Management activities to the maximum extent possible (5.3).
- Educate and train municipal staff as one of the keys to a successful stormwater program. To assist the responsible municipal and contract/lease staff in understanding the Municipal Activities Program Manual and the Model Maintenance Procedures, several different annual training sessions have been developed. Each municipality should have the appropriate number and type of personnel at each of the training sessions (5.4).
- Perform Environmental Performance Reports for Street Sweeping, Solid Waste Collection, Catch Basin Stenciling, Drainage Facility Maintenance, Trash & Debris Control (formerly Litter Control), Household Hazardous Waste Collection, and Used Oil Grant Participation BMPs annually and provide to the Principal Permittee and Water Board as part of the annual report (5. 5).

Definitions associated with the programs are included in Section 5.6.

5.1.3 Regulatory Requirements

Federal regulations require, as part of the DAMP, a description of municipal maintenance activities and schedules for structural controls, practices for operating and maintaining public streets, and programs to reduce to the maximum extent practicable (MEP) pollutants in discharges from Municipal Separate Storm Sewer Systems (MS4s) associated with the application of fertilizers, herbicides and pesticides.

The Model Municipal Activities Program and the Model Integrated Pest Management, Pesticide and Fertilizer Guidelines were developed in order to fulfill the municipal activity commitments and requirements of:

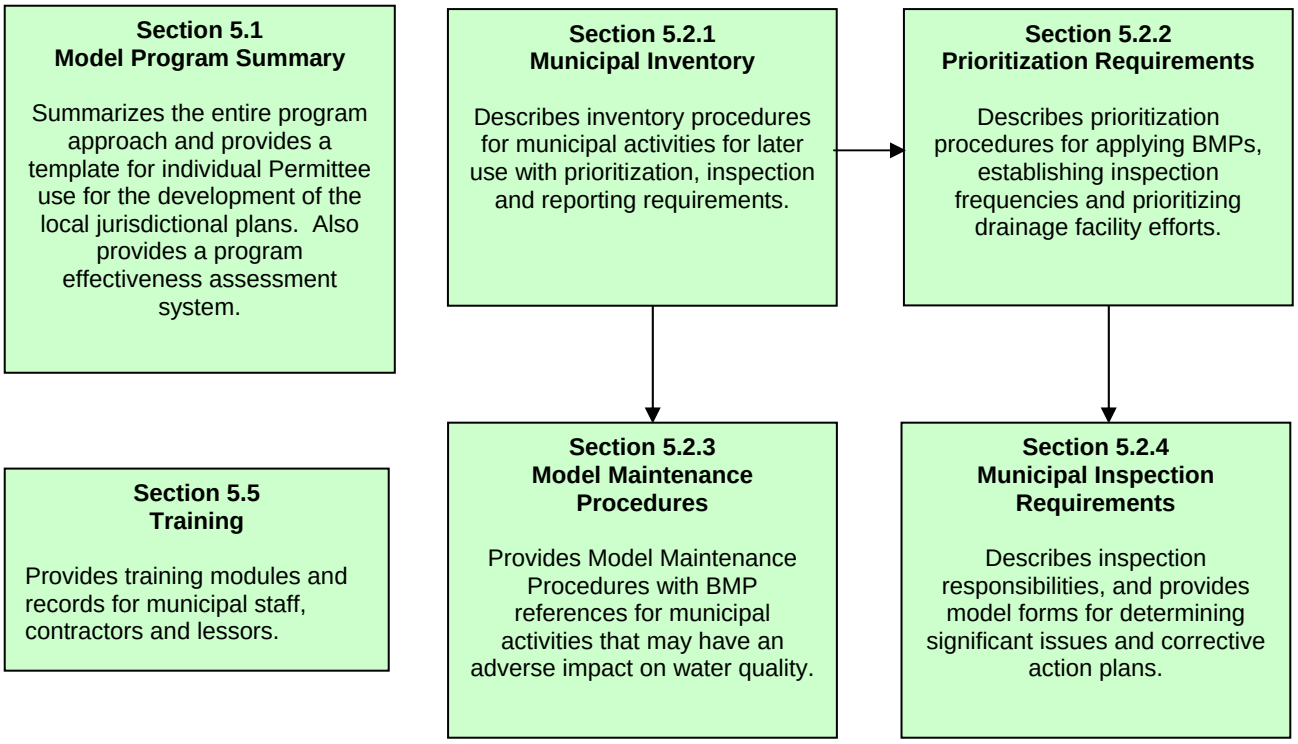
- Section XIV of the Santa Ana Regional Water Quality Control Board Municipal NPDES Stormwater permit, Order No. R8-2002-0010; and
- Section F.3.a of the San Diego Regional Water Quality Control Board Municipal NPDES Stormwater permit, Order No. R9-2002-0001.

5.2 Model Municipal Activities Program Details

The use of programs as presented below promotes countywide consistency among the Permittees, which provides for uniform receiving water quality protection and program effectiveness assessment. This section is structured to assist the Permittees with the development of jurisdictional implementation plans.

Figure 5-1 represents the flow of the program with a brief description of each section. Information gathered for each section of the program supports subsequent sections. The flow of the sections eliminates duplication and improves the efficiency of overall program efforts. Arrows represent the flow of information from each section.

Figure 5-1 – Model Program Structure



5.2.1 Municipal Inventories

This section describes the procedures to generate and maintain comprehensive inventories of the following three elements that a city owns, operates, leases and/or contracts within its jurisdiction:

- Fixed Facilities
- Field Programs
- Drainage Facilities

The inventories serve as the basis for the prioritization, inspection, enforcement, and reporting elements of the program, and assist the municipalities in identifying which model procedures and strategies should be implemented in order to reduce the discharge of pollutants to the storm drain system. Inventory procedures for Fixed Facilities and Field Programs are similar, and are therefore presented together in Section 5.2.1.1. Inventory procedures for Drainage Facilities are presented in Section 5.2.1.2. All municipalities should already have and be maintaining inventories of fixed facility and field programs. Permittees should review their inventories on an annual basis and update the inventories as appropriate to add new facilities or activities that have been added during the past year and/or deleted facilities or activities that the municipality no longer owns or conducts using the procedures noted below.

5.2.1.1 Fixed Facility and Field Program Inventory Procedures

The five steps involved in compiling the necessary inventory information on new facilities or updating the inventory information for previously listed Fixed Facilities and Field Programs includes:

- Identify all Fixed Facilities that exist within the jurisdiction.
- Identify the watershed where the Fixed Facilities/Field Programs are located.
- Determine whether the Fixed Facilities/Field Programs are adjacent to or discharge into an Environmentally Sensitive Area.
- Identify all activities with the potential to generate pollutants and identify all potential pollutants.
- Determine if any discharges into 303(d) listed water bodies include associated 303(d) pollutants of concern.

Details and references for each of these five steps are provided below:

Step 1 - Fixed Facilities and Field Programs Type Identification

The first step in the inventory process is to identify those Field Programs conducted by the municipality and those Fixed Facilities that are owned and operated or owned and leased by the municipality. Once those are identified, baseline information about each Fixed Facility or Field Program needs to be entered into the inventory, including the name, address and type of facility or program.

Each Fixed Facility and Field Program will be identified with a main and sub-category type within the inventory. **Table 5.1** below lists the main and sub-categories of Fixed Facilities that have the greatest potential for generating pollutants that may be discharged into receiving waters. **Table 5.2** below lists the main and sub-category Field Program types that have the greatest potential for discharging pollutants into receiving waters. The list of Fixed Facilities must include those facilities owned by a city and leased to another party. The list of Field Programs must include those that are contracted out by a city.

Table 5.1 Types of Municipal Fixed Facilities

Main Facility Types	Sub-Category Facility Types
Municipal Waste Facilities	Active or Closed Municipal Landfills
	Publicly Owned Treatment Facilities
	Incinerators
	Solid Waste Transfer Facilities
	Land Application Sites
	Sites for Disposing and Treating Sewage Sludge
	Hazardous Waste Treatment, Disposal, and Recovery Facilities
	Uncontrolled Sanitary Landfills
Corporation Yards	Corporation Yards
	Maintenance Yards
	Storage Yards for Materials
Other Municipal Owned and/or Operated Facilities	Airfields (Landside Operations)
	Parks and Cemeteries
	Public Buildings (Police, Fire, Libraries, etc.)
	Stadiums
	Stables
	Boat/Shipping Yards
	Animal Shelters/Services
	Public Parking Facilities
	Fire Stations
	Other Facilities Identified by the Municipality

Table 5.2 Field Program Activities

Main Field Program Types	Sub-Category Types/Activities
Lake Management	Fertilizer & Pesticide Management
	Mowing, Trimming, Weeding, and Planting
	Managing Landscape Waste
	Controlling Litter
	Erosion Control
	Controlling Illegal Dumping
	Bacteria Control
	Monitoring

Table 5.2 Field Program Activities (continued)

Main Field Program Types	Sub-Category Types/Activities
Landscape Maintenance	Mowing, Trimming, Weeding, and Planting
	Irrigation
	Fertilizer and Pesticide Management
	Managing Landscape Waste
	Erosion Control
Roads, Streets, and Highways Operations and Maintenance	Sweeping and Cleaning
	Street Repair and Maintenance
	Bridge and Structure Maintenance
Fountains, Plazas, and Sidewalk Maintenance and Cleaning	Surface Cleaning
	Graffiti Cleaning
	Sidewalk Repair
	Controlling Litter
	Fountain Maintenance
Solid Waste Handling	Solid Waste Collection
	Waste Reduction & Recycling
	Hazardous Waste Collection
	Litter Control
Water and Sewer Utility O&M	Water Line Maintenance
	Sanitary Sewer Maintenance
	Spill/Leak/Overflow Control
Fire Department Activities	Emergency/Post-Emergency Fire Fighting Activities
	Fire Fighting Training
	Fire Station Activities

Step 2 – Watershed Identification

For each new or modified Fixed Facility and Field Program identified above, the watershed(s) in which the Fixed Facility or Field Program is located is determined and included in the inventory. It should be noted that since most Field Programs are conducted throughout a Permittee's jurisdiction, the inventory will likely reflect those watersheds in which the city is located and be the same for all types of field programs.

Orange County contains thirteen watersheds, which are summarized in **Table 5.3** and provided in maps available from the County. It should also be noted that ocean sections along the shore of a watershed are still considered a part of that watershed.

Table 5.3 Orange County Watersheds

Region	Watershed	Identifier
Region 8 Santa Ana	San Gabriel/Coyote Creek	A
	Anaheim Bay/Huntington Harbour	B
	Santa Ana River	C
	Newport Bay	D
	Newport Coastal Streams	
Region 9 San Diego	Laguna Coastal Streams	H
	Aliso Creek	I
	Dana Point Coastal Streams	J
	San Juan Creek	K
	San Clemente Coastal Streams	L
	San Mateo Creek	M

Step 3 - Environmentally Sensitive Area (ESA) Impacts

The next step in updating the inventory is to determine if the Fixed Facilities may potentially impact a water body considered to be an ESA by determining if they are either:

- Within or adjacent to, or
- Discharge pollutants directly to an ESA.

For the purposes of these procedures, the following terms are defined:

Adjacent - located within 200 feet of the listed water body

Discharging directly to - discharge from a drainage system that is composed entirely of flows from the subject facility or activity, i.e., discharge from an urban area that co-mingles with downstream flows prior to an ESA is not subject to this requirement.

An ESA exists if any of the following designations have been applied to the water body of concern:

- Clean Water Act 303(d) listed impaired water body (current list approved on July 25, 2003)
- A TMDL exists for the waterbody
- Areas designated as Areas of Special Biological Significance by the SWRCB in the Water Quality Control Plan for Ocean Waters of California (California Ocean Plan)

- Water bodies designated with the RARE beneficial use by the SWRCB in the Water Quality Control Plans for the Santa Ana River and San Diego Basins (Region 8 and Region 9 Basin Plans)
- Water bodies located within areas designated under the California Department of Fish and Game's Natural Community Conservation Planning (NCCP) Program as preserves or equivalent in subregional plans (http://www.dfg.ca.gov/nccp/status.htm)
- Areas designated as Critical Aquatic Resources in the Orange County Drainage Area Management Plan (DAMP)
- Any other equivalent Environmentally Sensitive Areas that contain water bodies that have been identified by the local jurisdiction to be of local concern

Table 5-4 below provides a summary of the 303(d) listed water bodies and associated pollutants of concern for Orange County. The maps in **Exhibit 5-I** may be used to assist in the identification and classification of Fixed Facilities and Field Programs in order to determine if they potentially impact an ESA.

Table 5.4 Summary of the 2002 303(d) List of Impaired Water Bodies for Orange County

Region	Water Body	Pollutant								
		Bacteria Indicators	Pathogens	Metals	Nutrients	Pesticides	Toxicity	Trash	Salinity/TDS/ Chlorides	Turbidity
Region 8 Santa Ana	Buck Gully Creek	X								
	Huntington Beach State Park	X								
	Huntington Harbour		X							
	Los Trancos Creek (Crystal Cove Creek)	X								
	Newport Bay, Lower			X		X				
	Newport Bay, Upper (Ecological Reserve)			X		X				
	Orange County Beaches							X		
	San Diego Creek, Reach 1	X				X				
	San Diego Creek, Reach 2			X			X			
	Seal Beach	X								
	Silverado Creek		X						X	
Region 9 San Diego	Aliso Creek (Mouth)	X								
	Aliso Creek (20 Miles)	X			X		X			
	Dana Point Harbor	X		X						
	Pacific Ocean Shoreline, Aliso Beach HSA	X								
	Pacific Ocean Shoreline, Dana Point HSA	X								
	Pacific Ocean Shoreline, Laguna Beach and San Joaquin Hills HSAs	X								
	Pacific Ocean Shoreline, Lowe San Juan HSA	X								
	Pacific Ocean Shoreline, San Clemente, San Mateo, and San Onofre HSAs	X								
	Prima Deshecha Creek				X					X
	San Juan Creek	X								
	San Juan Creek (Mouth)	X								
	Segunda Deshecha Creek				X					X

Step 4 - Potential Pollutant Generating Activities

In addition to the identification of the main and sub-categories of new or modified Fixed Facility types and Field Programs as described above, the potential pollutant generating activities and/or potential pollutants for each Fixed Facility or Field Program will be identified and included in the inventory. **Table 5.5** lists municipal activities that may occur at each Fixed Facility and the potential pollutants that may be associated with those activities.

The potential pollutant generating activities and/or potential pollutants for each Field Program will be identified and included in the inventory. **Table 5.6** lists municipal activities that may occur at each Field Program and the potential pollutants that may be associated with those activities.

Step 5 - Determination of Impaired Water Body Impacts

In order to complete the inventory for new or modified Fixed Facilities or Field Programs, it must be determined if any Fixed Facility or Field Program activities have the potential for discharging pollutants of concern to a water body with a TMDL or a 303(d) listed water body for which the water body is impaired. For example, does the activity discharge nutrients into a nutrient impaired water body?

In Step 3, 303(d) listed water bodies impacted by activities performed at Fixed Facilities or Field Programs were identified. In Step 4, potential pollutants associated with performed activities are identified. Refer to **Tables 5.5 and 5.6** to determine if pollutants associated with identified activities have the potential to discharge directly to water bodies with TMDLs or 303(d) listed water bodies for which the pollutant is listed and indicate as such in the inventory**.**

Table 5.5 Potential Pollutants from Fixed Facility Activities

Fixed Facility Activity	Sub-Activities	Potential Pollutants							
		Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides
Bay / Harbor Activities	On Board Maintenance Disposal of Wastewater and Ballast Water Cleaning, Chipping, and Painting			X	X	X	X	X	X
Building Maintenance and Repair	Building Maintenance Material Storage Building Cleaning Graffiti Cleaning Painting	X		X	X			X	
Equipment Maintenance and Repair	General Maintenance and Repair Vehicle and Machine Repair Waste Handling/Disposal				X		X	X	
Fueling							X	X	
Landscape Maintenance	Mowing, Trimming, and Planting Irrigation Fertilizer and Pesticide Management Managing Landscape Waste Erosion Control	X	X	X		X			X
Material Loading & Unloading			X	X	X		X	X	X
Material Storage, Handling and Disposal	Materials Storage Chemical Material Handling and Disposal Hazardous Material Handling and Disposal	X		X	X		X	X	X
Minor Construction	General Construction Activities Interim Material Storage Concrete Work Building Work	X		X					
Parking Lot Maintenance	Sweeping and Cleaning Surface Repair	X		X	X		X		
Spill Prevention Control	Preparation and Prevention Spill Response Reporting Training		X	X			X	X	X
Vehicle and Equipment Cleaning		X	X	X	X		X	X	
Vehicle and Equipment Storage	Storing Vehicles and Equipment Wrecked Vehicle Storage Cleaning Storage Areas				X		X	X	
Waste Handling and Disposal	Litter Control Waste Collection Spill/Leak Control Run-on/Runoff Prevention		X	X	X	X	X	X	

Table 5.6 Field Program Activities and Associated Potential Pollutants

Field Programs	Activities	Potential Pollutants							
		Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides
Lake Management	Fertilizer and Pesticide Management	X	X						X
	Mowing, Trimming, Weeding and Planting	X	X	X		X			X
	Managing Landscape Waste			X					X
	Controlling Litter	X		X		X	X		
	Erosion Control	X	X						
	Controlling Illegal Dumping		X	X			X	X	X
	Bacteria Control					X			
	Monitoring	X	X		X	X	X	X	X
Landscape Maintenance	Mowing, Trimming and Planting	X	X	X		X			X
	Irrigation	X	X			X	X	X	X
	Fertilizer and Pesticide Management	X	X						X
	Managing Landscape Wastes			X					X
	Erosion Control	X	X						
Roads, Streets, and Highways Operations and Maintenance	Sweeping and Cleaning	X		X	X		X		
	Street Repair and Maintenance	X		X	X		X	X	
	Bridge and Structure Maintenance	X		X	X		X	X	
Fountains, Plazas, and Sidewalk Maintenance and Cleaning	Surface Cleaning	X				X	X		
	Graffiti Cleaning	X			X			X	
	Sidewalk Repair	X		X					
	Controlling Litter	X		X		X	X		
	Fountain Maintenance	X		X		X			
Solid Waste Handling	Solid Waste Collection			X	X	X			
	Waste Reduction and Recycling			X	X				
	Household Hazardous Waste Collection			X	X			X	X
	Litter Control			X	X	X		X	
Water and Sewer Utility O&M	Water Line Maintenance	X							
	Sanitary Sewer Maintenance	X				X			
	Spill/Leak/Overflow Control, Response, and Containment	X	X			X		X	
Fire Department Activities	Emergency/Post-Emergency Fire Fighting Activities			X	X		X	X	
	Fire Fighting Training Activities			X				X	
	Fire Station Activities				X		X		

5.2.1.2 Drainage Facility Inventory Procedures

The three steps involved in compiling necessary inventory information for Drainage Facilities include:

- Identify and locate all Drainage Facilities within the jurisdiction.
- Identify the watershed where Drainage Facility discharges are located.
- Determine whether the Drainage Facility discharges into a 303(d) listed water body and/or an Environmentally Sensitive Area. A TMDL may also exist causing the water body to be impaired.

It is anticipated that all Permittees currently maintain an inventory of existing drainage facilities. Annually, Permittees should update the inventory if there have been any significant modifications/additions to the drainage facilities using the following procedures.

Step 1 - Drainage Facilities Type Identification

The first step in the inventory process will be to identify all those Drainage Facilities that are owned and operated by the municipality that have been added or modified since the last inventory (excluding storm drains). Once they are identified, baseline information needs to be entered into the inventory such as the identification, specifications, location and type of facility (**Appendix A-5**).

Each Drainage Facility will be identified with a main and sub-category type within the inventory. **Table 5.7** below lists the main and sub-categories that have the greatest potential for discharging pollutants into receiving waters. The list of Drainage Facilities must also include those within facilities owned by a city but leased to another party. Drainage Facilities owned by another party within a jurisdiction should only be included within the owner's inventory. For example, an open channel that is owned by the county but flows through a city's jurisdiction should only be included within the county's inventory.

Table 5.7 Types of Drainage Facilities

Main Drainage Facility Types	Sub-Category Drainage Facility Types
Flood Management Projects and Flood Control Devices	Detention/Infiltration Basins
	Sedimentation Basins
Drainage System	Catch Basins
	Other Inlet Structures
	Open Channels
	Pump Stations
	Dry Weather Diversions

The number of catch basins, detention basins, retention basins, sediment basins, lift stations, etc. will be identified, including the length or magnitude of open channels.

A basic inventory of Drainage Facilities, including number or magnitude, is included in **Exhibit A-5-I**.

Step 2 – Watershed Identification

For each Drainage Facility identified above, the watershed(s) in which the Drainage Facility is located will be determined and included in the inventory.

Orange County contains thirteen watersheds, which are summarized above in **Table 5.3** and provided in maps available from the County. It should also be noted that ocean sections along the shore of a watershed are still considered a part of that watershed.

Step 3 - Environmentally Sensitive Area (ESA) Impacts

The next step in conducting the inventory is to determine if the Drainage Facilities may potentially impact a water body considered to be an ESA by determining if:

- They are within or adjacent to, or
- They discharge pollutants directly to an ESA.

For the purposes of these procedures, the following terms are defined:

Adjacent - located within 200 feet of the listed water body

Discharging directly to - discharge from a drainage system that is composed entirely of flows from the subject facility or activity (i.e. discharge from an urban area that co-mingles with downstream flows prior to an ESA is not subject to this requirement).

An ESA exists if any of the following designations have been applied to the water body of concern:

- Clean Water Act 303(d) listed impaired water body;
- A TMDL has been developed;
- Areas designated as Areas of Special Biological Significance by the SWRCB in the Water Quality Control Plan for Ocean Waters of California (California Ocean Plan);
- Water bodies designated with the RARE beneficial use by the SWRCB in the Water Quality Control Plans for the Santa Ana River and San Diego Basins (Region 8 and Region 9 Basin Plans);
- Water bodies located within areas designated under the California Department of Fish and Game's Natural Community Conservation Planning (NCCP) Program as preserves or equivalent in sub-regional plans (http://www.dfg.ca.gov/nccp/status.htm);
- Areas designated as Critical Aquatic Resources within this Orange County DAMP;

- Any other equivalent Environmentally Sensitive Areas that contain water bodies which have been identified by the local jurisdiction to be of local concern.

The maps in **Exhibit 5-I** may be used to assist in the identification and classification of Fixed Facilities in order to determine if they potentially impact an ESA.

5.2.2 Prioritization

This section outlines the procedures for prioritizing the Fixed Facilities, Field Programs, and Drainage Facilities for the inspection frequency, based upon the threat to water quality. The prioritization will result in a high, medium or low threat categorization and corresponding inspection frequency. Inspections will occur within every permit term, or as needed if changes occur on-site within the permit term. Prioritization Checklists and Ranking Worksheets are provided as part of the LIP (**Appendix A-5**).

5.2.2.1 Prioritizing Fixed Facilities

The following Fixed Facility categories are automatically high priority:

- Active or closed municipal landfills
- Publicly owned treatment works (including water and wastewater treatment plants) and sanitary sewage collection systems
- Incinerators
- Solid waste transfer facilities
- Land application sites
- Uncontrolled sanitary landfills
- Corporate yards including maintenance and storage yards for materials, waste, equipment and vehicles
- Sites for disposing and treating sewage sludge (city owned sludge storage facilities, land application sites, incinerators, etc.)
- Hazardous waste treatment, disposal, and recovery facilities.
- Municipal airfields (landside operations only – parking garages, terminals, landscaping, etc.)
- Fixed Facilities that lie within, discharge directly to or adjacent to an ESA 303(d) listed impaired water body or a water body for which a TMDL has been established, and discharge the listed pollutant of concern (see **Tables 5-4 and 5-5** above**)**
- Other municipal areas and activities that a municipality determines may contribute a significant pollutant load to the MS4

For Fixed Facilities that are not identified as high priority as described above, a medium or low priority will be determined using a ranking system. The criteria include:

- Type of municipal area/activity

- Material(s) used
- Wastes generated
- Pollutant discharge potential
- Non-stormwater discharges
- Size of facility or area (impervious)
- Proximity to receiving water bodies

The ranking criteria and scores have been provided in **Table 5.8** below. The total from each line item is the total ranking for a specific Fixed Facility. If the Total Ranking is greater than 30, then a medium priority is assigned. Medium priority Fixed Facilities must be inspected bi-annually beginning with the first year of program implementation following approval of the fourth term Santa Ana Board permit or the third term San Diego Board permit. If the Total Ranking is less than 30, then a low priority is assigned. Low priority Fixed Facilities should be inspected at a minimum of once during the first year of program implementation following approval of the fourth term Santa Ana Board permit or the third term San Diego Board permit.

5.2.2.2 Prioritizing Field Programs

Since Field Programs that are conducted by a city occur jurisdiction-wide and it would be impractical to conduct field activities differently based upon location, all Field Programs are prioritized as high priority and should be inspected once per year. Prioritization Checklists and Ranking Worksheets are provided as part of the LIP (**Appendix A-5**).

5.2.2.3 Prioritizing Drainage Facilities

Drainage Facilities are defined in Section 5.1, and include such structures as catch basins (storm drain inlets), detention basins, retention basins, sediment basins, and lift stations. The resulting maintenance of the facilities that may be conducted based upon the results of the inspections includes cleaning and removing accumulated waste materials.

All Drainage Facilities (excluding storm drains), by Orange County definition, are categorized as high priority. These facilities will receive annual inspection and maintenance once per year prior to the wet season (between May 1 and September 30), and as often as necessary throughout the wet season. Prioritization Checklists and Ranking Worksheets are provided as part of the LIP (**Appendix A-5**).

5.2.3 Model Maintenance Procedures

5.2.3.1 Municipal Staff

Staff performing activities at municipal Fixed Facilities (including non-fire fighting activities at fire stations), during Field Programs, and at Drainage Facilities will follow the Model Maintenance Procedures that have been developed and are included in **Appendix A-5**. Available Model Maintenance Procedure Facts Sheets are listed below in **Tables 5.9** through **5.11** and contain procedures designed to reduce the potential impact of these activities on water

quality. Fertilizer and Pesticide guidance to help prevent misuse of fertilizers and pesticides and to assist in the handling of these materials is discussed below in Section 5.3

Staff performing operations at Fixed Facilities (including non-fire fighting activities at fire stations), within Field Programs, and at Drainage Facilities will implement the baseline procedures and Best Management Practices (BMPs) as described within the Model Maintenance Procedures. Optional enhanced BMPs described within the Model Maintenance Procedures will be implemented at high priority Fixed Facilities, Field Programs, and Drainage Facilities if operational history, inspection findings, or other special situations warrant implementation.

Table 5.8 Ranking System for Prioritization of Fixed Facilities

Category	0	1	2	3	4	5	Score
Area/Activity	Pollutant Generation Unlikely - 0% activities outdoors		Pollutant Generation Possible - 0-25% activities outdoors	Pollutant Generation Likely - 25-75% activities outdoors		Pollutant Generation Highly Likely - >75% activities outdoors	
Raw Materials Used	No raw materials used		Minimal used, not likely to generate pollutants	Some used, possible to generate pollutants		Significant amount used, highly likely to generate pollutants	
303(d) listed water body pollutants Generated	None identified					Wastes generated include 303(d) listed water pollutants	
Pollutant Discharge Potential			All identified BMPs are fully implemented	All identified BMPs are partially implemented		None of the identified BMPs are implemented, or unknown	
Non-Stormwater Discharges			No known non-stormwater discharges, all programs implemented	Suspected non-stormwater discharges may be occurring, but not observed		Non-stormwater discharges have been observed and/or verified	
Size of Facility			Small (<5,000 square feet)	Medium (>5,000 - <100,000 square feet)		Large (>100,000 square feet)	
Proximity to Receiving Water Body (303(d) water bodies or ESA)			Low (>200 feet)	Medium (< 200 feet)		High (direct discharge or adjacent)	

Table 5.9 Model Maintenance Procedure Fact sheets for Fixed Facilities	
Fixed Facility Fact sheets	
Bay / Harbor Activities	Minor Construction
Building Maintenance and Repair	Parking Lot Maintenance
Equipment Maintenance and Repair	Spill Prevention Control
Fueling	Vehicle and Equipment Cleaning
Landscape Maintenance	Vehicle and Equipment Storage
Material Loading and Unloading	Waste Handling and Disposal
Material Storage, Handling and Disposal	

Table 5.10 Model Maintenance Procedure Fact sheets for Field Programs
Field Program Fact sheets
Lake Management
Landscape Maintenance
Roads, Streets, and Highways Operations and Maintenance
Sidewalk, Plaza, and Fountain Maintenance and Cleaning
Solid Waste Handling
Water and Sewer Utility O&M
Fire Department Activities

Table 5.11 Model Maintenance Procedure Fact sheets for Drainage Facilities
Drainage Facility Fact sheets
Drainage Facility Operations and Maintenance

Although some of the model maintenance procedures refer to the disposal of certain types of wastewater to the sanitary sewer system, it should be noted that disposal to these systems should only be done in accordance with district policies and procedures which may include the following:

- No person shall discharge groundwater, surface or subsurface runoff directly or indirectly into the sewer without the expressed written authorization of the district for such an activity;

- Discharges shall only be authorized if no alternate method for disposal is reasonably available or to mitigate an environmental or health hazard;
- Any connections or discharges to the sanitary sewer system without specific authorization and permit are subject to administrative penalties;
- No connection for rainwater/stormwater is allowed to the sanitary sewer system; and
- Discharges to the sanitary sewer system may have to meet pre-established limits.

5.2.3.2 Implementation by Contract Staff

It is important that the leased facilities and contracted services are also included within the context of the program. Although municipal employees typically perform most maintenance activities, some cities (especially smaller ones) contract out these activities to other parties. For example, many smaller municipalities contract out services such as street sweeping and road maintenance.

Since measures should be taken to protect water quality while performing such activities, regardless of whether the activity is being performed by a municipality, contractor, or lessor, example contract and lease language is provided below for contractor/lessor responsibility.

Example Lease Language for Fixed Facilities

The following is example language that can be inserted into municipal leases:

The Santa Ana and San Diego Regional Water Quality Control Boards (RWQCB) have issued permits which govern stormwater and non-stormwater discharges resulting from municipal activities performed by or for the County of Orange, Orange County Flood Control District and incorporated cities of Orange County (collectively referred to as Permittees). The RWQCB Permits are National Pollutant Discharge Elimination System (NPDES) Permits No. R8-2002-0010 and R9-2002-0001 (to be updated), respectively. Copies of the RWQCB Permits are available for review.

In order to comply with the Permit requirements, the Permittees have developed a Drainage Area Management Plan (DAMP) which contains Model Maintenance Procedures with Best Management Practices (BMPs) that parties leasing municipal owned properties must adhere to. These Model Maintenance Procedures contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Activities performed at the facility leased under this agreement shall conform to the Permits, the DAMP, and the Model Maintenance Procedures, and must be performed as described within all applicable Model Maintenance Procedures. The holder of this agreement shall fully understand the Model Maintenance Procedures applicable to activities conducted at the facility leased under this agreement prior to conducting them and maintain copies of the Model Maintenance Procedures at the leased facility throughout the agreement duration. The applicable Model Maintenance Procedures are included as Exhibit ___ of this agreement.

Evaluation of activities subject to DAMP requirements performed at the facility leased under this agreement will be conducted by the city to verify compliance with DAMP requirements and may be required through lessor self-evaluation as determined by the city.

Example Contract Language for Field Programs

The following is example language that can be inserted into municipal field program contracts:

The Santa Ana and San Diego Regional Water Quality Control Boards (RWQCB) have issued permits which govern stormwater and non-stormwater discharges resulting from areas owned and operated by the County of Orange, Orange County Flood Control District and incorporated cities of Orange County (collectively referred to as Permittees). The RWQCB Permits are National Pollutant Discharge Elimination System (NPDES) Permits No. R8-2002-0010 and R9-2002-0001 (to be updated), respectively. Copies of the RWQCB Permits are available for review.

In order to comply with the Permit requirements, the Permittees have developed a Drainage Area Management Plan (DAMP) which contains Model Maintenance Procedures with Best Management Practices (BMPs) that parties conducting the municipal activities must adhere to. These Model Maintenance Procedures apply to any party conducting municipal activities and contain pollution prevention and source control techniques to minimize the impact of those activities upon dry-weather urban runoff, stormwater runoff, and receiving water quality.

Work performed under this CONTRACT shall conform to the Permit requirements, the DAMP, and the Model Maintenance Procedures and must be performed as described within all applicable Model Maintenance Procedures. The CONTRACTOR shall fully understand the Model Maintenance Procedures applicable to activities that are being conducted under this CONTRACT prior to conducting them and maintain copies of the Model Maintenance Procedures throughout the CONTRACT duration. The applicable Model Maintenance Procedures are included as Exhibit ___ of this CONTRACT.

Evaluation of activities subject to DAMP requirements performed under this CONTRACT will be conducted to verify compliance with DAMP requirements and may be required through CONTRACTOR self-evaluation as determined by the city.

5.2.4 Municipal Inspection and Requirements

Inspections of municipal Fixed Facilities, Field Programs, and Drainage Facilities will be performed in order to verify that the Model Maintenance Procedures are being implemented, that they are appropriate for that facility or program, and that they continue to be protective of water quality.

Inspections generally consist of the following:

- Fixed Facilities – inspections are typically performed by a combination of stormwater program staff and on-site Fixed Facility managers. The inspection of a Fixed Facility may include spot checks of the facility and activities being performed at the facility, or interviews with key line staff.
- Field Programs – inspections are typically performed by a combination of stormwater program staff and Field Program supervisors. The inspection of a Field Program may include spot checks of activities being performed, or interviews with key line staff.
- Drainage Facilities – inspections are typically performed by a combination of stormwater program staff and Drainage Facility maintenance supervisors. Inspections of Drainage Facilities may include routine annual inspections plus spot checks during the wet season.

- Contracted Activities – inspections are typically performed by a combination of municipal staff as well as self-inspections and reporting by the management staff of the contract firm performing the activity. See model contract language in Section 5.4.
- Leased Facilities – inspections are typically performed by a combination of municipal staff as well as self-inspections and reporting by the management staff of the lessor. See model lease language in Section 5.4.4.1.

5.2.4.1 Inspection Frequencies

Inspections are based upon the priority of the Fixed Facility or Field Program and its threat to water quality (see Section 5.4). All Drainage Facilities are considered high priority and will be inspected as shown in **Table 5.12**. The inspection frequency is consistent whether a facility or program is operated and maintained by municipal staff, contracted staff, or lessors.

Inspection frequencies will be as follows:

Table 5.12 Inspection Frequencies

Facility/Program	Inspection Frequency
Fixed Facilities	
Municipal Corporation Yards	Annually
High Priority Fixed Facility	Annually
Medium Priority Fixed Facility	Biannually During First Year of Program Implementation
Low Priority Fixed Facility	Once During First Year of Program Implementation
Field Programs	
High Priority Field Programs	Annually
Drainage Facilities	
Drainage Facilities (San Diego Permittees)	Annually Before the Wet Season, with Additional Inspections as Needed During the Wet Season
Drainage Facilities (Santa Ana Permittees)	Annually (see specific indications below)

Municipal corporation yards are inspected annually. For drainage facilities located in the Santa Ana Region, at least 80 percent of drainage facilities are inspected, cleaned, and maintained on an annual basis, with 100 percent of the facilities included in a two-year period. Fixed Facilities and Field Programs will be inspected as indicated above, however in the event of an observed problem, such as ineffective maintenance procedures or detected non-stormwater discharges, the inspection frequency will be increased as appropriate to facilitate correction of the problem.

5.2.4.2 Inspection Documentation Procedures

In order to properly document all inspections and gather the necessary information for the Program Effectiveness Assessment, model inspection forms for Fixed Facilities, Field Programs, and Drainage Facilities have been developed (see **Appendix A-5**)

The inspection forms to be used during inspection consist of the following:

General Inspection Forms – This primary form provides for a general characterization of the Fixed Facility, Field Program, or Drainage Facility being inspected, including the type of facility or program, the reason for inspection, and activities that may take place. A general cover sheet inspection form is required for all inspections.

Activity Specific Inspection Forms – These secondary forms provide a series of questions about specific activities taking place at a Fixed Facility, Field Program or Drainage Facility, as well as a list of suggested corrective action plans that can be implemented should a problem be found. Available Model Activity Specific Inspection Forms are listed below in Tables 5-13, 5-14, and 5-15. One activity specific form should be filled out for each activity at each Fixed Facility, Field Program, or Drainage Facility.

Table 5.13 Model Activity Specific Inspection Forms for Fixed Facilities

Fixed Facility Fact sheets	
Bay / Harbor Activities	Minor Construction
Building Maintenance and Repair	Parking Lot Maintenance
Equipment Maintenance and Repair	Spill Prevention Control
Fueling	Vehicle and Equipment Cleaning
Landscape Maintenance	Vehicle and Equipment Storage
Material Loading and Unloading	Waste Handling and Disposal
Material Storage, Handling and Disposal	

Table 5.14 Model Activity Specific Inspection Forms for Field Programs
Field Program Fact sheets
Lake Management
Landscape Maintenance
Roads, Streets, and Highways Operations and Maintenance
Sidewalk, Plaza, and Fountain Maintenance and Cleaning
Solid Waste Handling
Water and Sewer Utility O&M
Fire Department Activities

Table 5.15 Model Activity Specific Inspection Form for Drainage Facilities
Drainage Facility Fact sheets
Drainage Facility Operations and Maintenance

5.2.4.3 Enforcement

In order to ensure compliance, in addition to the routine education and training that will take place, enforcement procedures and mechanisms must be established and implemented by each City for the municipal activities program. The City has many options in developing its policies and procedures and may choose its own disciplinary resources to implement and enforce its program.

Enforcement actions may occur as a result of a problem found during an inspection or in response to a complaint that is received. As such, there are several different types of enforcement mechanisms and penalties that the City may utilize in order to ensure compliance. For example, the City may choose to give a verbal warning as a method of requesting corrective action. If a deficiency that was noted in a prior verbal warning is not corrected, a written warning may be issued and enforcement will continue until the problem is solved. External enforcement action could range from the issuance of a notice of noncompliance to the loss of a contract or lease to a fine, as determined by each City on a case-by-case basis.

5.3 Model Integrated Pest Management, Pesticides and Fertilizer Guidelines

5.3.1 Introduction

Fertilizers and pesticides are a common tool for plant health and pest management. Used properly, fertilizers provide important nutrients for plants, and pesticides help to protect plants from potential harm due to insects, mites, plant diseases, nematodes, vertebrates (such as gophers and rats) and weeds.

Used improperly, fertilizers and pesticides may, among other things, impair surface and groundwater supplies. Careless management activities such as application, mixing, transportation, storage and disposal can allow these chemicals to enter surface and groundwater through runoff and infiltration. These practices may also endanger human and/or environmental health through exposure to these potentially toxic chemicals.

Due to these inherent risks that exist even under ideal conditions, and the importance of professional planning and management, the Management Guidelines for the Use of Fertilizers and Pesticides that were originally developed in 1993 were re-evaluated and significantly revised to provide the public agencies in Orange County with:

- A process by which they can effectively re-evaluate their approach to using fertilizers and pesticides as needed and begin to move toward reducing their dependence on them by developing a comprehensive Integrated Pest Management Program;
- A program framework for reducing the adverse impacts that the use of fertilizers and pesticides may have on water quality; and
- General guidelines that can be used in conjunction with the Landscape Model Maintenance Procedures (Municipal Activities Program Manual) in order to minimize the potential threat to human health and environmental resources.

Ultimately, the guidelines may be used and encouraged on a broader scale. They are based on the laws, management guidelines, research-based recommendations and "management measures and practices" established by other federal, state and local agencies and universities and they recognize that the safe management of fertilizers and pesticides is a shared responsibility between applicators, handlers and management.

In addition, general training for this program element will be conducted annually as a part of the overall Municipal Activities Program Manual. The Management Guidelines for Integrated Pest Management, Pesticides, and Fertilizers training module is generally targeted for stormwater program managers and addresses the overall program framework, objectives and approach so that they may gain a broader understanding of how the program was developed and should be implemented at a local level.

The training generally focuses on the proper application and handling of fertilizers and pesticides and the implementation of integrated pest management practices for management and municipal staff performing these activities. The training will be in a classroom setting, provided annually and approximately 2-3 hours in length. Additional training modules will be developed as needed. Additional details on the overall framework and approach of the training modules are included in the Municipal Activities Program Manual.

For the purpose of these guidelines:

- Fertilizers may be referred to as "nutrients" or "soil nutrients";
- "Pesticides" will encompass all herbicides, insecticides, fungicides and rodenticides;
- The California Food and Agricultural Code (FAC) and the California Code of Regulations, Title 3 (3 CCR), constitute the laws and regulations referred to in these guidelines. They are referenced often and usually referred to as the "State Laws";
- The Permittees are referred to as "public agencies", and employees working for these public agencies and responsible for the handling and/or application of fertilizers and pesticides will be referred to as "public employees".

5.3.2 Integrated Pest Management

5.3.2.1 Background on Pesticide Use and Integrated Pest Management

For most of the last 55 years, the trend in pest management has been toward a greater reliance on chemical pesticides. The result has been not only a tremendous increase in the use of many dangerous chemicals, but also an increase in the number of pests that are resistant to the pesticides or new organisms becoming pests. Additionally, some pesticides used for terrestrial pest management have been found in waterways causing additional problems in the environment.

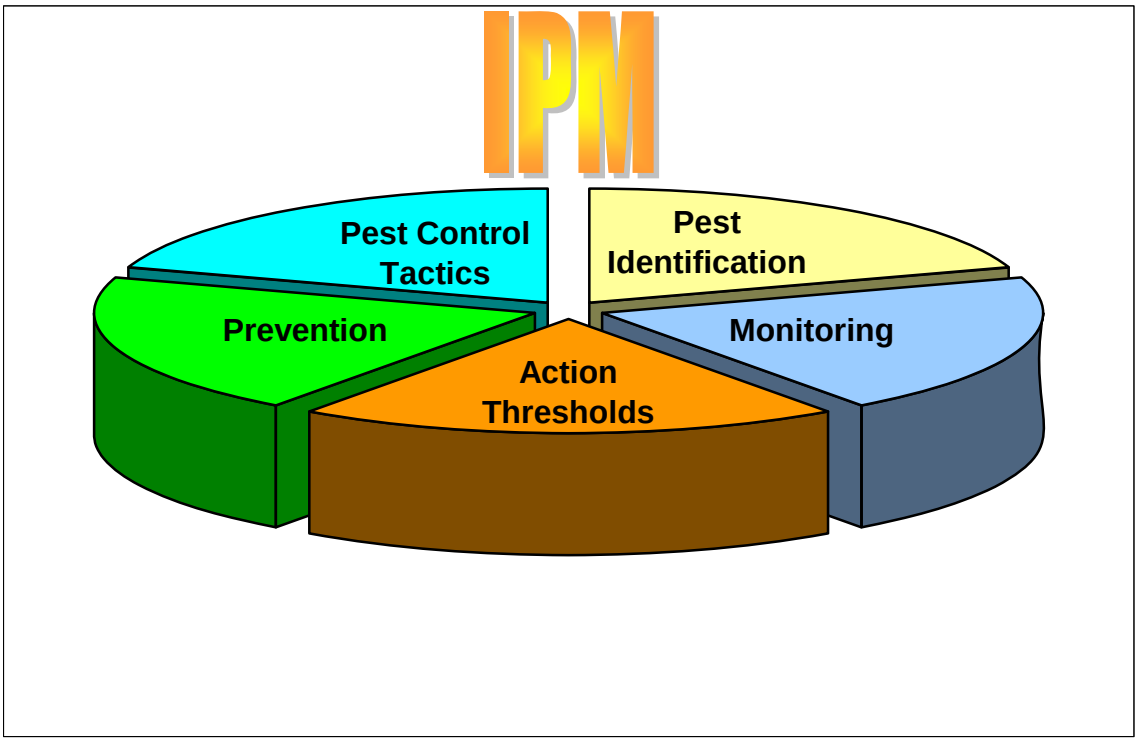
Pest control managers are now moving away from their reliance on pesticides alone toward an integrated approach that combines limited pesticide use with more environmentally friendly pest control techniques. This system is know as integrated pest management (IPM), a strategy that focuses on the long-term prevention of pests or their damage through a combination of techniques, including preventative, cultural, mechanical, environmental, biological, and chemical control tactics (**Figure 5.7**). The techniques are utilized simultaneously to control pest populations in the most effective manner possible.

Developing a comprehensive Integrated Pest Management (IPM) Program and Approach allows the primary efforts to focus on pollution prevention by monitoring and preventing pests as well as minimizing heavy pest infestations, which reduces the need for chemicals and/or multiple applications.

IPM programs utilize monitoring techniques and economic thresholds to determine when to implement control strategies, which are then used according to established guidelines only after monitoring indicates that such treatment is appropriate. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms and the environment.

The use of pesticides is often a last resort measure. Because of this, the management guidelines for pesticide use are presented in a separate section immediately following the IPM guidelines.

Figure 5.7
Components of an Integrated Pest Management Program



5.3.2.2 Scope of IPM Guidelines

IPM practices are encouraged over the sole use of pesticides as the primary means of pest management (**Table 5.16**). As a part of the Municipal Activities Program Manual, the public agencies and their contractors should evaluate the non-chemical components of IPM before intensive use of pesticides.

The goal of IPM is not to eliminate all pests, but to keep their populations at tolerable levels. Pesticides may be part of an IPM program, but they should only be used after the pests exceed established thresholds and only applied in the affected area. In general, pest control strategies should be those that are least disruptive to biological control organisms (natural enemies), least hazardous to humans and the environment (including non-target organisms), and have the best likelihood of long-term effectiveness.

Pesticides should not be applied until pests are approaching damaging levels. Because this requires early detection of the pests, monitoring on a regular basis is extremely important and should be used to determine if natural enemies are present and adequately controlling the pest. If possible, a person should be trained and designated to scout the sites on a regular basis.

Table 5.16 Advantages and Disadvantages of a Pesticide-Based Program Versus An IPM-Based Pest Control Program.

Pesticide Based Pest Control		IPM Based Pest Control	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Quick suppression of pests.	Loss of natural controls.	Long-term control.	Training is required to identify pests and natural enemies.
Labor is only for spraying.	Not long-term.	Safer to the environment.	Must have knowledge of pesticides and their effects on other organisms.
Not much preparation or follow-up needed.	More pesticides in environment.	Pesticides can be used (only used as last resort).	Must maintain a record-keeping system.
	Contamination of water bodies from runoff.	Reduces disruption of natural enemies.	Must scout regularly.
	Pesticide safety for applicators, public, animals.	Reduces contamination from runoff.	Labor is required for monitoring.
	Often get outbreaks of other pests.	Less exposure to pesticides.	
		Can be proactive in pest control actions.	

5.3.2.3 Components of an IPM Program

An IPM program is a long-term, multi-faceted system to manage pests (**Figure 5.7**). Use of pesticides is a short-term solution to pest problems and should be used only when the other components fail to maintain the pests or their damage below an acceptable level. Successful IPM practitioners are knowledgeable about the biology of the plants and

pests and successful IPM programs primarily use combinations of cultural practices as well as a combination of physical, mechanical and biological controls.

5.3.2.4 Pest Identification

It is important to learn to identify all stages of common pests at each site. For example, if you can identify weed seedlings, you can control them before they become larger and more difficult to control and before they flower, disseminating seeds throughout the site. It is also important to be sure that a pest is actually causing the problem. Often damage such as wilting is attributed to root disease but may actually be caused by under watering or wind damage.

5.3.2.5 Prevention

Good pest prevention practices are critical to any IPM program, and can be very effective in reducing pest incidence. Numerous practices can be used to prevent pest incidence and reduce pest population buildup such as the use of resistant varieties, good sanitary practices and proper plant culture. Examples of prevention include choosing an appropriate location for planting, making sure the root system is able to grow adequately and selecting plants that are compatible with the site's environment.

5.3.2.6 Monitoring

The basis of IPM is the development and use of a regular monitoring or scouting program. Monitoring involves examining plants and surrounding areas for pests, examining tools such as sticky traps for insect pests and quantitatively or qualitatively measuring the pest population size or injury. This information can be used to determine if pest populations are increasing, decreasing, or staying the same and to determine when to use a control tactic.

It is important to use a systematic approach. For example you should examine the same section of a plant each time you check for pests, rather than looking at the lower leaves on some plants and the upper ones on others. Otherwise, randomly looking at a plant or a section of a growing area does not allow you to track changes in pest population or damage over time. **Figure 5.8** illustrates an example of a form used to record monitoring or scouting information collected in the field.

It is important to establish and maintain a record-keeping system to evaluate and improve your IPM program. Records should include information such as date of examination, pests found, size and extent of the infestation, location of the infestation, control options utilized, effectiveness of the control options, labor and material costs.

Figure 5.8
Example of a Scouting Form for Monitoring Pests and Control Activities.

City: _____

Reported by: _____ Date: _____

Location: _____

_____ Initial Report _____ Follow-up Report _____ 2nd Follow-up Report

Date reported to IPM Coordinator or Supervisor: _____

Arthropods

Pest name	Growth stages	Host	Count or estimate	Damage	Recommended Action

Weeds

Pest name	Growth stages		Count or estimate	Damage	Recommended Action

Diseases

Pest name	Growth stages	Host	Count or estimate	Damage	Recommended Action

Comments (include labor and materials cost or used):

5.3.2.6 Injury Levels and Action Thresholds

In order to have a way to determine when a control measure should be taken, injury levels and action thresholds must be set for each pest. An injury level is the pest population size where unacceptable damage occurs. Action thresholds are the set of conditions required to trigger a control action.

5.3.2.7 Pest Control Tactics

Integrated pest management programs use a variety of pest control tactics in a compatible manner that minimizes adverse effects to the environment. A combination of several control tactics is usually more effective in minimizing pest damage than any single control method. The type of control that an agency selects will likely vary on a case-by-case basis due to varying site conditions.

The primary pest control tactics to choose from include:

- Cultural
- Mechanical
- Environmental/Physical
- Biological
- Pesticide

5.3.2.8 Cultural Controls

Cultural controls are modifications of normal plant care activities that reduce or prevent pests. In addition to those methods used in the pest preventions, other cultural control methods include adjusting the frequency and amount of irrigation, fertilization, and mowing height. For example, spider mite infestations are worse on water-stressed plants, over-fertilization may cause succulent growth which then encourages aphids, too low of a mowing height may thin turf and allow weeds to become established.

5.3.2.9 Mechanical Controls

Mechanical control tactics involve the use of manual labor and machinery to reduce or eliminate pest problems using methods such as handpicking, physical barriers, or machinery to reduce pest abundance indirectly. Examples include hand-pulling or hoeing and applying mulch to control weeds, using trap boards for snails and slugs, and the use of traps for gophers.

5.3.2.10 Environmental/Physical Controls

The use of environmental manipulations that indirectly control or prevent pests by altering temperature, light, and humidity can be effective in controlling pests. Although in outdoor situations these tactics are difficult to use for most pests, they can be effective in controlling birds and mammals if their habitat can be modified such that they do not choose to live or roost

in the area. Examples include removing garbage in a timely manner and using netting or wire to prevent bird from roosting.

5.3.2.11 Biological Controls

Biological control practices use living organisms to reduce pest populations. These organisms are often also referred to as beneficials, natural enemies or biocontrols. They act to keep pest populations low enough to prevent significant economic damage. Biocontrols include pathogens, parasites, predators, competitive species, and antagonistic organisms. Beneficial organisms can occur naturally or can be purchased and released.

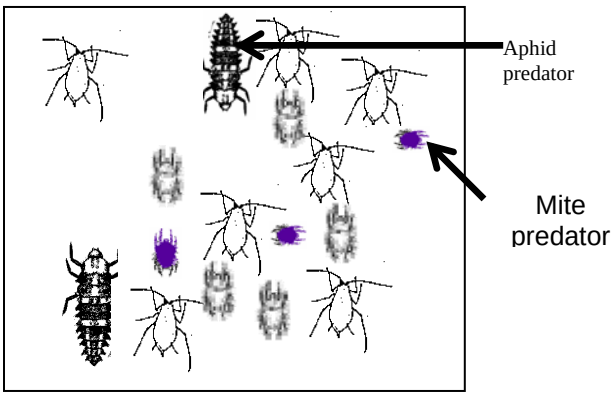
The most common organisms used for biological control in landscapes are predators, parasites, pathogens and herbivores.

- Predators are organisms that eat their prey (e.g. Ladybugs).
- Parasites spend part or all of their life cycle associated with their host. Common parasites lay their eggs in or on their host and then the eggs hatch, the larvae feed on the host, killing it (e.g. tiny stingless wasps for aphids and whiteflies).
- Pathogens are microscopic organisms, such as bacteria, viruses, and fungi that cause diseases in pest insects, mites, nematodes, or weeds (e.g. Bacillus thuringiensis or BT).
- Herbivores are insects or animals that feed on plants. These are effective for weed control. Biocontrols for weeds eat seeds, leaves, or tunnel into plant stems (e.g. goats and some seed and stem borers).

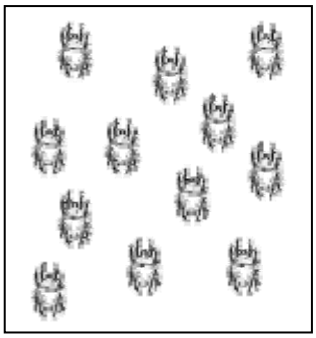
In order to conserve naturally occurring beneficials, broad-spectrum pesticides should not be used since the use of these types of pesticides may result in a secondary pest outbreak due to the mortality of natural enemies that may be keeping other pests under control (**Figure 5.9**).

Figure 5.9
Example of Secondary Pest Outbreak
Caused By Use of a Broad Spectrum Insecticide

A. Aphids and mites controlled by predators



B. After a broad spectrum spray for aphids, predators for mites and aphids are also killed, resulting in an outbreak of mites



5.3.2.12 Pesticide Controls

Any substance used for defoliating plants, regulating plant growth or preventing, destroying, repelling or mitigating any pest, is a pesticide. Insecticides, herbicides, fungicides, and rodenticides are all pesticides.

Pesticides should only be used when other methods fail to provide adequate control of pests and just before pest populations cause unacceptable damage, since the overuse of pesticides can cause beneficial organisms to be killed and pest resistance to develop. When pesticides must be used, considerations should be made for how to use them most successfully. Avoid pesticides that are broad-spectrum and relatively persistent since these are the ones that can cause the most environmental damage and increase the likelihood of pesticide resistance. Always choose the least toxic but effective method.

In addition, considerations should be given to the proximity to water bodies, irrigation schedules, weather (rain or wind), the loss of use of an area (application in a park may result in the area being sectioned off), etc. that are all secondary factors that may result in the pesticide being moved off-site into the environment.

5.3.3 Pesticide Management - Planning

Pesticides are defined as any substance or mixture of substances designed to prevent, destroy, repel, or mitigate any pest. Used incorrectly or carelessly they are potentially dangerous. A heightened public awareness about pesticides and their use has created an increased concern that they be used according to the directions on the label. This ensures that the pesticides are

used correctly and safely. When products are used illegally, i.e. against label directions, it is more likely that regulatory activity on a federal and state level will increase.

Although safety concerns and the cost of complying with new regulations have encouraged some public agencies to reduce the use of pesticides, they are still used in certain situations, therefore guidelines for their proper use, handling, and storage are essential. In certain situations pesticides may be the most appropriate method. For example, pesticide use by public agencies often involves herbicide applications to keep flood control channels and roadways clear or to minimize health and safety hazards of disease-bearing rodents and insects. In landscape and turf maintenance, pesticides may be used to control pests that can reduce the aesthetic value of the site.

5.3.3.1 General Considerations

There are extensive federal and state laws and regulations that all public agencies must be in compliance with at all times.

The California Food and Agricultural Code (FAC) and the California Code of Regulations, Title 3 (3CCR), constitute the laws and regulations referred to in these guidelines. They are referenced often and usually referred to as the "State Laws".

5.3.3.2 Pesticide Labels and Material Safety Data Sheets (MSDS)

Pesticide Labels

Without exception, pesticide labels provided by the manufacturer of each pesticide are the first source of recommendations and instructions for chemical use. The label is the law. Whenever a pesticide is to be used by a worker or a contractor of a public agency, the user must read the label instructions and requirements. If the worker does not understand the label, they cannot handle or apply the pesticide until the information is explained.

As described in the 3CCR, section 6242, the label must appear on the immediate container of the pesticide and include, in prominent, bold type, the appropriate statement according to its toxicity classification: **Danger**, **Poison**, **Warning**, or **Caution**. If a chemical is transferred to another container, a copy of the label must be transferred with it. **Figure 5.10** depicts a portion of a typical pesticide label.

The section of the label entitled 'Precautionary Statements' contains information on the environmental hazards associated with use of the pesticide, such as toxicity to wildlife and aquatic organisms. Particular attention should be given to the application of pesticides near surface waters or inlets to surface waters, especially if a hazard is listed on the label.

Workers should never handle a container that does <u>not</u> have a label attached, and the supervisor in charge should be immediately advised of the situation. If a label is badly damaged and cannot be read, the supervisor must replace it.

Figure 5.10
Sample Pesticide Label

Specimen Label

Dow AgroSciences

Turflon* Ester

Specialty Herbicide

*Trademark of Dow AgroSciences LLC

For the control of annual and perennial broadleaf weeds and kikuyugrass in ornamental turf.

Active Ingredient:
triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester 61.6%
Inert Ingredients 38.4%
Total 100.0%

Contains petroleum distillates

Acid equivalent:
triclopyr - 44.3% - 4 lb/gal

EPA Reg. No. 62719-258

Precautionary Statements

Hazards to Humans and Domestic Animals

Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Harmful If Swallowed, Inhaled, Or Absorbed Through The Skin

Avoid contact with eyes, skin, or clothing. Avoid breathing mists or vapors. Avoid contamination of food.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

Applicators and other handlers must wear:
- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

In case of skin contact: Flush skin with plenty of water. Get medical attention if irritation persists.
If swallowed: Do not induce vomiting. **Call a physician.**

Environmental Hazards

This pesticide is toxic to fish. Keep out of lakes, streams, or ponds. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Combustible - Do not use or store near heat or open flame. Do not cut or weld container.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notifiction, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do no enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:
- Coveralls
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Specimen label formatted for electronic distribution by CDMS

Material Data Safety Sheets (MSDS)

Workers using pesticides must have the Material Safety Data Sheets (MSDSs) for each chemical they are using readily available. Although the MSDS is a form that may vary in appearance for different chemicals, the information is the same, as required by law. Similar to the chemical labels, these sheets contain information necessary to handle each chemical safely, and all workers should be familiar with the information.

MSDS sheets include chemical identifications, hazardous ingredients, physical data, fire and explosion data, health hazards, reactivity data, spill or leak cleanup procedures, special protection and special precautions. The MSDS also contains information on the toxicity (LD_{50} and LC_{50}) of the pesticide to various test animals, providing the user with the pesticide's toxicity to off-target organisms, especially those in aquatic environments. It is recommended that MSDSs be kept in a notebook or file in a location readily accessible.

General Requirements

Following is a list of general requirements that should be followed when storing, using and transporting pesticides.

- Thoroughly investigate and consider all least toxic pest management practices.
- Maintain a complete list of all pesticides used and the use sites. (3CCR, section 6624 – unless exempt under FAC, section 11408).
- Use pesticides only according to label instructions. (FAC, section 12973).
- Consider weather conditions that could affect application. For example, wind conditions affect spray drift; rain may wash pesticide off of leaves. (3CCR, section 6614)
- Do not apply pesticides where there is a high chance of movement into water bodies; for example, they should not be applied near wetlands, streams, lakes, ponds or storm drains unless it is for an approved maintenance activity. (3CCR, section 6614).
- In most cases, triple-rinse empty pesticide containers before disposal. Particular information on the proper disposal of the pesticide and its container can be found on the label. For specific requirements see 3CCR, section 6684.
- Never clean or rinse pesticide equipment and containers in the vicinity of storm drains or other open water areas.
- Store pesticides in areas with cement floors and in areas insulated from temperature extremes.
- Secure chemicals and equipment during transportation to prevent tipping or excess jarring. (3CCR, section 6682).
- Pesticides must be transported completely isolated from people, food and clothing, for example, in the bed of the truck rather than in the passenger compartment. (3CCR, section 6682).

- Inspect pesticide equipment, storage containers and transportation vehicles frequently. (3CCR, sections 6702 & 6742).
- Develop a plan for dealing with pesticide spills and accidents.
- Unless their safety is compromised, workers must immediately clean up any chemical spills according to label instructions and notify the appropriate supervisors and agencies.
- Pesticide applications on public property, which take place on school grounds, parks, or other public rights-of-way where public exposure is possible, shall be posted with warning signs. The specific criteria for the signage can be found in FAC, section 12978. Pesticide applications by the Department of Transportation on public highway rights-of-way are exempt.

5.3.3.3 Selection of Appropriate Pesticides

When selecting pesticides, public agencies should rely on recommendations from a state-licensed pest control advisor (PCA) in order to ensure that the most appropriate pesticide is selected. Additional advice for pest identification and control strategies are also available from the Orange County Agricultural Commissioner (714) 447-7100, University of California Cooperative Extension (714) 708-1606 from other professionals and/or through professional publications.

Restricted pesticides and all other Category I pesticides should only be used under special circumstances and where other treatment options did not or could not work well.

5.3.3.4 Certification, Licensing and Permitting

Restricted use pesticides should only be applied by or under the direct supervision of an individual with a qualified applicators certificate (QAC). To receive a QAC, a person must take a test administered by Department of Pesticide Regulation (DPR). To obtain test materials, test schedules, and an application, see http://www.cdpr.ca.gov/docs/license/liccert.htm.

Pesticides listed as "restricted" in the State of California may be used only under a restricted materials permit (3CCR, section 6142) issued by the Orange County Agricultural Commissioner. The permit must be renewed annually for continued use. For more information, contact the Commissioner's office at (714) 447-7100.

All other guidelines concerning permits, licensing and certification requirements to be followed before pesticide application are detailed in FAC, sections 12971-12988 and 3CCR, sections 6500-6636.

5.3.3.5 Employee Training

Employees must know the information on the chemical label and the MSDS before using or handling pesticides. In addition, they should be trained annually or whenever a new pesticide is to be used.

The applicators should know:

- The immediate and long-term health hazards posed by chemicals to be used, the common symptoms of chemical poisoning and the ways poisoning could occur; and
- The safe work practices to be followed, including the appropriate protective clothing, equipment, mixing, transportation, storage, disposal and spill cleanup procedures that apply to the specific chemicals being used.

In addition to the training and annual continuing education required for licensing and certification as specified in 3CCR, section 6511, public employees are encouraged to participate in the annual Municipal Activities Program training (see Municipal Activities Program Manual) and continuing pesticide education programs whenever the programs are available. Supervisors are encouraged to conduct or schedule pesticide education programs for their workers more frequently than required by law.

5.3.3.6 Accident and Spill Mitigation

Public agencies using pesticides should have plans for dealing with potential accidents before they happen. These plans should consider:

- Labels and MSDS Sheets -- All workers handling pesticides must be familiar with these instructions. The steps for accident mitigation are spelled out on chemical labels and MSDS sheets.
- Spill Cleanup Kits -- Any time pesticides are being handled, there must be a cleanup kit on hand in case of an accident. This means there should always be a cleanup kit located in pesticide storage areas, on vehicles used to transport pesticides and on location where the chemicals are being applied.

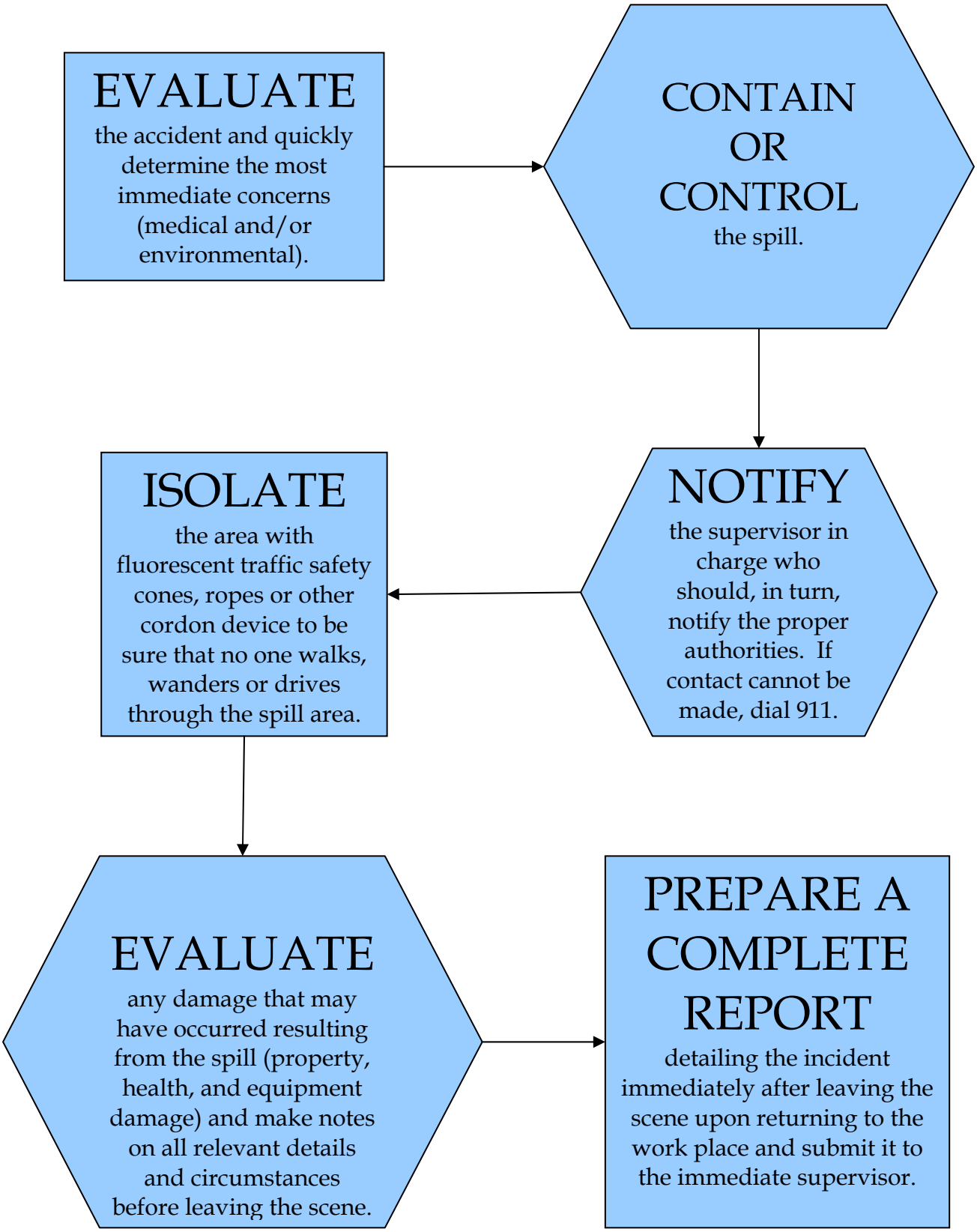
  Although these kits may vary in what they contain, depending on the chemical type and the situation, at a minimum they should include:

  - Written spill-control procedures
  - A five gallon drum with seal-able lid
  - A dust pan and broom
  - A squeegee
  - A shovel
  - Protective goggles, gloves, boots, coveralls
  - A tarp (for covering dry spills)
  - Detergent and water (check label or MSDS for proper use)
  - Barricade tape, florescent traffic safety cones or string to cordon off an area
  - Large sponges, containment booms or other absorbent material

- Cleanup Procedures -- Spilled pesticides must be prevented from entering the local surface and/or groundwater supplies. Specific recommendations for spill cleanup should be available on the pesticide label or MSDS. Specific recommendations for the sequence of procedures may also vary depending on the situation. **Figure 5.11** provides a flowchart of the general steps that a worker should follow in case of a spill. A good overview of spill containment procedures can be found in the book "The Safe and Effective Use of Pesticides" (see Reference section).

Figure 5.11

General Steps to Follow in Case of a Spill



5.3.3.7 Emergency Medical Care

Accident situations requiring emergency medical care are likely to involve acute exposure to potentially toxic chemicals. Instructions for handling these exposures appear on the pesticide label.

Workers should:

- Be aware of the symptoms of acute exposures for each pesticide being used.
- Have a predetermined strategy for dealing with exposure scenarios, including knowing the label recommendations for dealing with acute exposures and the nearest medical facility where emergency care is available.

5.3.3.8 Equipment and Equipment Maintenance

All equipment for the handling of pesticides should be inspected and cleaned by workers each day before use, to ensure that there are no problems that could lead to chemical leaks, spills or accidents during the day's work (3CCR, section 6742).

The calibration of equipment should be done routinely to ensure that the proper amount of pesticide is applied. The maintenance of application rates within label recommendations also reduces the risk of surface and ground water contamination.

5.3.3.9 Groundwater and Surface Water Protection

The main factors determining the rate at which pesticides enter groundwater and surface water systems are chemical mobility, solubility, persistence and soil type. For example, potentially dangerous chemicals are likely to have a high solubility and an extremely long half-life, and they are not likely to be easily absorbed into the soil. Therefore, pesticides that decompose rapidly may be preferred under certain conditions.

However, it should be noted that if a less dangerous pesticide is chosen, but then applied two or three times as often, it may not make sense from a transportation and application risk standpoint to choose the pesticide. Therefore, because of these factors, regardless of the category of pesticides being used, pesticide advisors should always be aware of the compatibility of the pesticide with the characteristics of the site of application (soil type, slope, proximity to a water body, vegetation) before recommending pesticides for a specific area. For example, recommended surflan rates vary according to the amount of organic matter in the soil.

Furthermore, because the effect of these uses is not always immediately apparent, public agencies should periodically test areas where frequent pesticide applications occur and the area is identified as particularly vulnerable to contamination or deterioration.

PesticideWise (http://www.pw.ucr.edu/WQ_Homep.asp) is an informational database that public agencies can utilize to determine various properties of pesticides and their potential risk to water quality.

5.3.3.10 Pesticide Use in Aquatic Environments

The application of pesticides to aquatic environments for the control of pests requires coverage under the NPDES permit program. A General Permit, with January 31, 2004 expiration, was issued by the State Water Resources Control Board to authorize the application of pesticides directly to waters. The permit allows the application of aquatic pesticides by public entities as long as certain requirements are meet. These requirements state that dischargers must:

- Comply with all pesticide label instructions, DPR and Department of Health and Safety regulations, and any Use Permits issued by the local Agricultural Commissioner;
- Identify and implement BMPs to minimize adverse effects to the environment;
- Submit technical and monitoring reports as required by the local RWQCB.

Specific details of these requirements can be found in the General Permit available at the following link:

http://www.swrcb.ca.gov/resdec/wqorders/2001/wqo/wqo2001-12.doc

Further information on the direct application of pesticides to aquatic environments can be found in the University of California Division of Agriculture and Natural Resources publication titled 'Aquatic Pest Control' (see the References section). In addition, the publication entitled 'Pesticides and Aquatic Animals: A Guide to Reducing Impacts on Aquatic Systems' provides a review of aquatic pesticide management practices.

5.3.4 Application of Pesticides

In cases where State Laws require supervision of pesticide applications, supervision must be handled by a state-licensed or certified pesticide applicator. For all other pesticide applications, workers with equivalent training may handle supervision.

Public agencies that contract for pest control should periodically inspect contracted work crews to be certain that contractors are following the same or more stringent pesticide management guidelines as required by the County agencies. Public agencies handling their own applications should likewise inspect their work crews on a regular basis to ensure that safety standards are being met.

5.3.4.1 Proper Techniques

The pesticide label must be attached to the container and available on site. The label contains information regarding how to safely use the product. It is important that the applicator and handlers read the label carefully and follow application instructions exactly. Special attention should be paid to the list of pests that the pesticide will control to ensure that the right chemical is being used for the right job.

When a range of rates is given on the pesticide label, the applicator should use the lowest rate unless there are circumstances that warrant using a higher rate. These circumstances are provided on the label.

State regulations mandate that no pesticide application shall be made or continued when:

- There is a reasonable possibility of the pesticide contacting the body or clothing of persons not involved in the application process;
- There is a reasonable possibility of damage to non-target crops or animals; and
- There is a reasonable possibility of contamination of non-target public or private property. (3CCR, section 6614).

Weather conditions are a major factor in determining the likelihood of offsite movement from the application target (i.e. drift), and therefore must be incorporated into the planning of pesticide applications. This information can be found on the product label or supplemental labeling.

5.3.4.2 User Safety and Protection

The following is a list of suggestions for user safety and protection:

- Have personal protective equipment (PPE) available for application of pesticides. This includes eye protection, gloves, respiratory gear and impervious full-body, chemical resistant clothing when called for by the chemical label.
- Workers should avoid inhaling pesticide spray and dust at all times.
- Avoid working alone, especially at night. If it is necessary to work alone at night, the worker should be in contact with a supervisor via a phone or radio.
- Equipment should be cleaned at least at the end of the day's applications. The equipment should not be rinsed in an area where the wash water can contaminate surface or ground water. Workers doing the cleaning must wear the same safety equipment as required on the pesticide label, e.g., eye protection, gloves.
- Use of removable coveralls, gloves and shoes/boots is required when stated on the label, under PPE, when applying certain pesticides. Use of these protections is recommended for most applications, especially if the applicator does not have the opportunity to change clothes prior to driving or riding in a vehicle or eating or drinking. In this way, the applicator's clothing is less likely to become contaminated. The applicator should also wash his or her hands thoroughly after each application even though gloves are worn (3CCR, sections 6736 and 6738).
- State laws regarding re-entry into areas that have recently been treated with pesticides should be followed (3CCR, section 6770). For the most part, pesticides used for landscape and turf pest control allow entry after the product has dried. Nevertheless, treated areas must be blocked off or otherwise isolated until re-entry is allowed in order to reduce human exposure to the pesticide.
- Before workers come into contact with pesticides they need to be trained about the specific pesticides being used, including how to properly handle them, the dangers involved in their use, and proper training and safety procedures of the pesticides.

- Keep current records including a complete list of pesticides being used in the jurisdiction. This should include the pesticide name, amount in storage, dates, use site, rates of application and pests controlled with each application.
- Keep all relevant label and MSDS information for each pesticide updated and readily available at all times to workers handling the materials.

5.3.4.3 Storage, Disposal and Transportation

Storage of pesticides should be away from living areas and in a covered area that is well-insulated from temperature extremes; storage areas should have a cement floor and good ventilation. Also, storage areas should be clearly marked according to state standards and be securely locked at all times when not in use.

Signs, visible from any direction of probable approach, must be posted around all storage areas for containers that hold, or have held pesticides, that are required to be labeled with the signal words "warning" or "danger".

Each sign should be of such size that it is readable at a distance of 25 feet and contain the following statements:

DANGER

POISON STORAGE AREA

ALL UNAUTHORIZED PERSONS KEEP OUT
KEEP DOOR LOCKED WHEN NOT IN USE

The notice shall be repeated in an appropriate language other than English when it may reasonably be anticipated that persons who do not understand the English language will come to the enclosure (3CCR, section 6674).

Pesticide labels on pesticides being stored or used should be kept in good condition and attached to all containers holding pesticides (3CCR, section 6676 and 6678) and storage equipment and containers should be inspected frequently for leaks or defects before being taken on the job. Containers should also be inspected before storing at the end of the day.

Proper Disposal

Following are recommendations that should be followed in order to ensure the proper disposal the pesticide containers:

- Pesticide containers should be triple-rinsed before disposal (3CCR, section 6684).
- Cleaned containers should be sent back to the manufacturer for recycling whenever possible. However, once triple-rinsed most haulers will take them to most landfills.
- Leftover rinse water should be used as spray.
- Surplus or out-of-date pesticides should be given to a licensed hazardous waste hauler for disposal.

Safe Transportation Methods

The following is a list of recommendations that should be followed to ensure that workers utilize safe transportation methods when traveling to and from worksites:

- Pesticide containers should be tightly sealed and secured from tipping or excess jarring (3CCR, section 6682).
- Pesticide transportation compartments on vehicles should be isolated from the compartment carrying people, food and clothing (3CCR, section 6682) and should be securely locked.
- Only the amount of pesticide needed for the day should be transported to the site. If the pesticide is transferred to another container, a copy of the label or a service label must be attached. (3CCR, sections 6676 and 6678).
- *In no case shall a pesticide be placed or kept in any container of a type commonly used for food, drink or household products.* (3CCR, section 6680).
- Appropriate pesticide labels and MSDS sheets, a spill cleanup kit, and a first aid kit should always be brought along when transporting pesticides. Additionally, the location of an emergency medical care center should be known.
- All vehicles used for pesticide transportation should include radio or cellular communications for contacting help in case of a spill or some other emergency.

5.3.5 Fertilizer Management

Fertilizers are nutrients applied to soil or plants to promote plant growth or health. Fertilizers commonly used in landscapes contain both:

- Nitrogen (N); and
- Phosphorus (P)

Soluble forms of nitrogen and phosphorus can leach through soils or move off-site in surface runoff causing algal blooms or eutrophication within the local waterways.

Fertilizers also play an important role in promoting plant growth that protects soil from erosion and enhances landscape aesthetics. Because of the necessity for soil nutrients and the potential for adverse effects on local waterways due to the loss of these nutrients through runoff and leaching management guidelines are necessary as a means of reducing the loss of fertilizers into water bodies.

5.3.5.1 State and Federal Law

Fertilizer use is not regulated under state and federal law, as its use does not pose an immediate danger to public health and safety. However, it is well known that the misuse of fertilizers poses risks to the environment. As a result, various organizations have developed management guidelines for fertilizer use on specific crops. The California Plant Health Association (http://www.cpha.net) maintains a listing of fertilizer manufacturers, distributors, and associations that provide technical information on the proper use of fertilizer on their web site.

5.3.5.2 General Recommendations

The following is a list of general recommendations that should be followed when storing, applying and transporting fertilizers:

- Whenever possible use foliar and/or soil nutrient testing before applying fertilizers to verify application timing and rate.
- Use a higher percentage of fertilizers containing slow-release N, such as IBDU and sulfur-coated urea. Be aware that organics (i.e. bone meal) and some slow-release fertilizers are dependent on microbial activity for the release of nitrogen; therefore low soil temperature will decrease the release of nitrogen available for plant uptake.
- If highly soluble-N fertilizers are used, apply smaller amounts on a more frequent basis.
- Incorporate fertilizer directly into the soil around the plant, where possible, to minimize potential surface runoff.
- Although fertilizers must be watered in the soil in order to work, watering should occur with light irrigation just after the application. Due to the unpredictability of rain events, it is recommended that fertilizers not be applied in the rain or on the same day that rain is expected.
- Irrigation application rates and schedules should be adjusted to minimize surface runoff, especially immediately following the application of a fertilizer.
- Immediately clean up any spill of fertilizers using dry methods of cleanup such as by sweeping or scooping up the material.
- Fertilizer storage facilities should be covered and have an impermeable foundation so that potential spills cannot runoff into surface water or leach into groundwater systems.
- Fertilizers must be securely covered in the vehicle before being transported to application sites to avoid spillage or loss during transport.

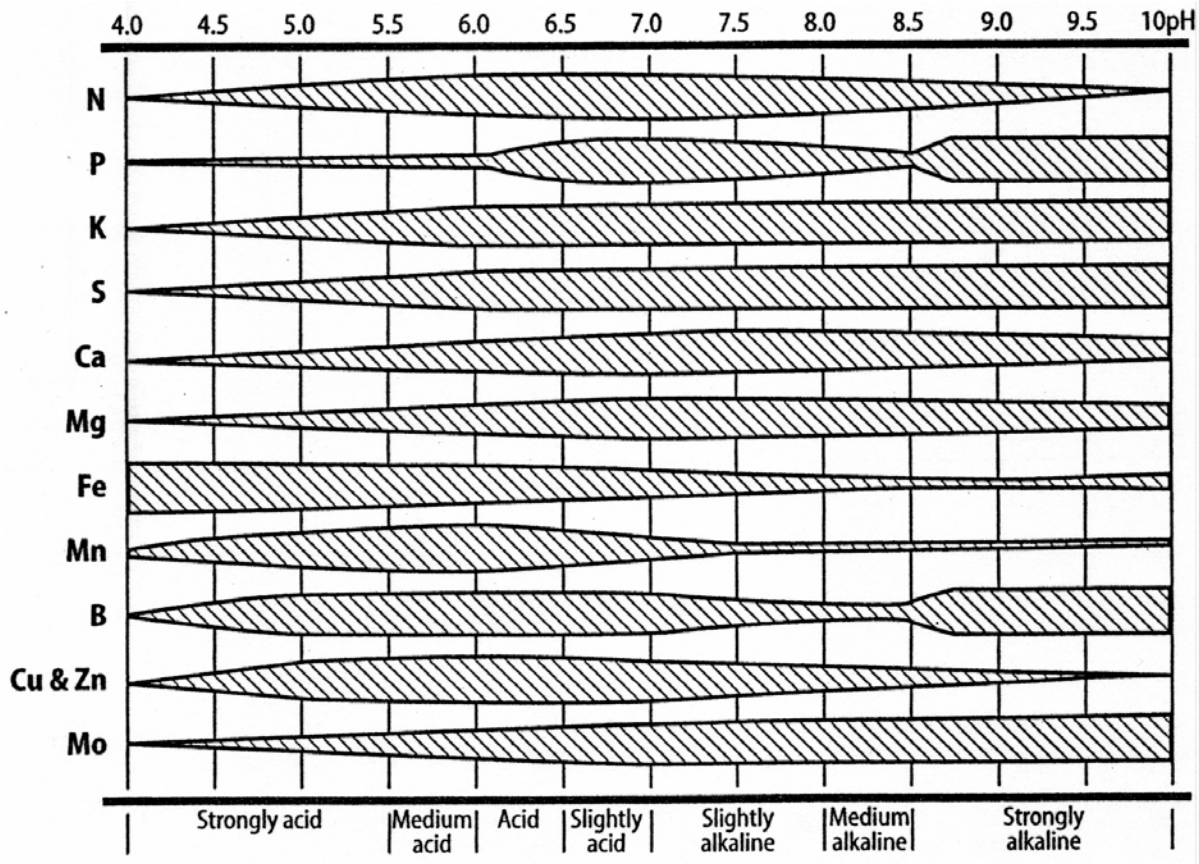
5.3.5.3 Nutrient and Soil Assessment

Soluble fertilizers can easily leach through soil and potentially contaminate groundwater following excess irrigation, after heavy rains and where the water table is high. Generally, the most significant loss of fertilizer is from nitrate-nitrogen, but there is some evidence that phosphorus leaching can be significant in soils that have received regular applications of soluble phosphorus.

Foliar and soil analysis should be utilized whenever possible to assist in the determination of the nutrient status of plants and the soil where they are growing. Nutrient testing can be an important management tool for determining baseline nutrient levels in order to adjust application rates appropriately. Generally, soil testing is done only for newly developed sites, but valuable information can be obtained on established sites as well. For example, the chemical and physical properties of the soil affect the availability of nutrients. **Figure 5.12** illustrates the range of nutrient availability as the pH of the soil increases or decreases.

Nutrient analyses are often accompanied with an interpretation and recommendation from the testing laboratory in order to assist the applicator in choosing the proper type and rate of fertilizer. Fertilizer recommendations should be based on the type of plant material (i.e. mature tree versus groundcover), the growth stage, overall health of the plant, and the current nutrient status of the soil. If a public employee with expertise in plant nutrition is not available, the testing laboratory or a Certified Crop Advisor (CCA) with expertise in urban horticulture should be able to provide a useful interpretation of a foliar or soil analysis.

Figure 5.12
The Effect of pH on Plant Nutrient Availability



Source: California Master Gardener Handbook 2002, p. 54 (Dennis Pittenger, Editor)

5.3.5.4 Fertilizer Types

- Inorganic and Synthetic Fertilizers

The most widely used fertilizers are inorganics characterized as being relatively low in cost, easy to apply, and quick releasing. However, overuse of inorganic fertilizers can result in increased soil salinity and the need to leach soils to avoid salt damage to plants (i.e. leaf burn). Inorganic fertilizers are also available as slow-release fertilizers, but at a much higher cost.

The main advantage in using slow-release fertilizers is their ability to provide nitrogen to the root zone at rates that more closely match the growth of the plant, thereby minimizing the amount of nitrogen available for leaching below the root zone. One disadvantage is their use on steep slopes, where broadcast fertilizer prills (capsules) may easily become mobile during irrigation and storm events.

- Organic Fertilizers

  Manures and organic concentrates such as blood and fish meal are considered organic fertilizers and offer the advantage of releasing nitrogen at a slower rate. A significant advantage to the use of organic fertilizers is that many of them are also classified as soil amendments due to their effect on the soil's physical properties. Disadvantages include high salt content, presence of weed seeds, varying nutrient content, and a higher cost per pound than inorganic fertilizers rendering them cost ineffective for municipal use.

  It should also be noted that recent studies have indicated that organic fertilizers and amendments may be significant sources of fecal coliform in irrigation and storm water runoff. In contrast to the traditional assumption that fecal bacteria only multiply within the digestive tracts of warm-blooded animals, recent research suggests that fertilizers may contribute to the propagation of fecal bacteria in the warm, moist and dark environment of the storm drain infrastructure.

  Although State regulations require commercial composters to reduce fecal bacteria in manure-composted materials, green waste materials are not currently regulated for fecal bacteria and may contain incidental amounts of animal waste, such as from pets or wild birds. In addition, uncomposted animal manures and yard trimmings can have fecal coliform concentrations as high as Class B sewage biosolids.

Prior to choosing the type of fertilizer, the following should be taken into consideration:

- Ability of the plant material to uptake and utilize nitrogen (soil temperature, species, growth rate).
- Leaching requirements due to soil salinity.
- Severity of slope and potential for runoff to carry fertilizer.
- Proximity to storm drains or hard surfaces.
- Receiving water impairments (such as bacteriological impairments).
- Type of irrigation and scheduling.

5.3.5.3 Application Rates and Timing

The amount of fertilizer needed for different applications depends on a number of factors. The following factors should be considered prior to the application:

- Rooting characteristics of the vegetation (turf, shrubs, and trees).
- The growth stage of the plant.
- The ability of the plant to uptake the nutrients from the soil (temperature, water status, pH of the soil, salinity, etc.).
- The current nutrient content of the soil.
- Additional sources of nutrients (i.e. composts, reclaimed water, atmospheric deposition).
- Potential for loss of nutrients by leaching.
- Method of irrigation.
- Chemical properties of fertilizer being applied.

The application of fertilizers should coincide with the growth stage requirements of the plant. For mixed plantings having different growth stages, fertilizer applications should be divided into several applications targeting each of the growth stages.

The vegetation being managed should be researched and fertilizers applied only according to the amounts and at the time intervals recommended by the manufacturer or a public employee qualified to make fertilizer recommendations. This should minimize the waste of fertilizer and reduce the risk of water contamination. Although recommendations for the application of fertilizers to turf are well researched, there is more uncertainty in the rate and timing of the application of fertilizer to landscapes consisting of a mixture of trees, shrubs, turf, and groundcovers. As a result, foliar and soil nutrient testing should be used as a tool to assist in the determination of application rates and timing until more information is available.

5.3.5.6 Application Methods of Fertilizers

This section details the most common methods for application of fertilizers, however, these are not the only acceptable methods of fertilizer application since every application has its own circumstances and variables to consider. **Table 5.17** provides a summary of the major advantages and disadvantages of each application method.

The types of application methods included in this section are:

- Banding
- Sidedressing
- Foliar Fertilization
- Broadcast Application

Regardless of what type of application method is chosen, the method should strive to deliver nutrients to the location where maximum plant uptake and utilization occurs and the chosen

method should take into account the potential for surface runoff, dust, leaching into groundwater and the volatilization of materials. Proper calibration of application equipment insures that fertilizer is delivered at the recommended rate and record keeping for the amount applied, the location of the application, and the frequency of the application will assist in tracking fertilizer use and refining application timing and rates

- Banding of Fertilizer

  This method involves physically working small amounts of fertilizer into the soil in a band beneath and/or around the sides of a plant. It allows new roots to efficiently use the nutrients and minimizes potential nutrient loss to surface runoff. Banding is particularly useful for new plantings, however, given the labor involved, banding may not be practical for some fertilizer applications.

- Sidedressing

  Similar to the banding method of fertilizer application, sidedressing involves the placement of dry fertilizer in a band directly next to actively growing plants. Sidedressing is particularly effective for applying fertilizer to established plantings during critical growth stages. Although this method is labor intensive, it delivers nutrients directly to growing roots and minimizes the potential for fertilizer movement in surface runoff.

- Foliar Fertilization

  This type of application refers to fertilizer that is applied in liquid form directly to the leaves and stems. However, runoff problems may occur where the spray is allowed to drip off the leaves onto the ground or irrigation and rainfall occur immediately after the application.

  This method can reduce nutrient leaching into the soil when applied correctly and can often be performed at the same time as pesticide applications to avoid spraying twice (if this is done, it is important to check that the materials are compatible for spraying). In this case, the guidelines for pesticide applications must also apply and the pesticide label checked for appropriateness of this method.

- Broadcast Application

  The most common method utilized by public agencies is the application of dry or liquid fertilizer uniformly spread over the soil surface. This is often done mechanically with a:

  - Drop Spreader;
  - Rotary Spreader and Belly-Grinder;
  - Spray Booms; or
  - Spinning Disks.

    Drop Spreader - The simplest of mechanical applicators, the drop spreader is commonly mounted on wheels and pushed by hand or pulled by vehicle to drop

granular fertilizer out of the hopper. The use of a drop spreader in this way reduces the potential for off-target application of fertilizers.

Rotary Spreaders and Belly Grinders - These generally operate by "throwing" fertilizer in front of the spreader. These types of spreaders should not be utilized to fertilize vegetation adjacent to hardscapes, such as streets and sidewalks.

Spray Booms – Spray booms are for liquid fertilization. As with the use a rotary spreader, this method does not offer much control over fertilizer drift in adverse weather conditions and care should be taken to avoid spreading fertilizer onto impermeable surfaces such as sidewalks and driveways. If fertilizer lands on these types of surfaces, sweep or blow the material onto the vegetation or into a container for later use.

Spinning Disks – Spinning disks are mounted on a moving vehicle in a manner allowing for the throwing of dry fertilizer into the air. As with the use a rotary spreader, this method does not offer much control over fertilizer drift in adverse weather conditions and care should be taken to avoid spreading fertilizer onto impermeable surfaces such as sidewalks and driveways. If fertilizer lands on these types of surfaces, sweep or blow the material onto the vegetation or into a container for later use.

Table 5.17 Advantages and Disadvantages of Common Fertilizer Application Methods

Fertilizer Application Methods	Advantages	Disadvantages
Banding	Nutrients placed directly near roots. Minimizes nutrient loss in surface runoff.	Labor intensive. Generally only utilized for new plantings.
Sidedressing	Efficient application of nutrients to growing roots in established plantings.	Labor intensive
Foliar	Reduces leaching potential of nutrients below the rootzone. May be applied with pesticides under certain circumstances.	High potential for nutrients to be washed from plant surfaces during irrigation. Adverse conditions such as wind may cause drift on to hard surfaces.
Broadcast		

Table 5.17 Advantages and Disadvantages of Common Fertilizer Application Methods (continued)

Fertilizer Application Methods	Advantages	Disadvantages
Drop Spreader	Off-target application is minimized.	Coverage of large areas is time consuming.
Rotary Spreader or Belly Grinder	Ease of application. Covers large areas quickly and provides access to difficult areas.	Off-target application of fertilizers to hard surfaces is common.
Spray Booms	Useful for foliar applications over large areas.	Potential for drift under adverse weather conditions.
Spinning Disks	Allows for fertilizer applications over large areas quickly and easily.	Off-target application to hard surfaces is common.

5.3.5.7 Storage and Handling of Fertilizers

Although fertilizers present no hazard to the user's health when stored and handled properly, employees responsible for the storage and handling of fertilizers should be aware that some fertilizers have properties that can result in dangerous chemical reactions if mixed with other substances or under unusual circumstances.

Therefore, a dehumidifier may be necessary for storage areas where sensitive fertilizers are stored such as ammonium nitrate. In addition, since most fertilizers tend to be corrosive to metals, concrete structures are preferred for fertilizer storage facilities. These problems can be minimized by only purchasing those quantities that will be used in the immediate future instead of storing materials for long periods.

- Dry Fertilizer

  In most cases, dry fertilizers are safe to store, transport and handle. However, because some fertilizers have unique, potentially dangerous properties, it is advisable for public agencies to consult a qualified individual having knowledge of the safest storage and handling procedures for specific fertilizers. Fertilizer supplies are an excellent source of information on the proper handling and storage of fertilizers. In general, the following precautions should be taken when storing and handling fertilizers:

  - Keep away from open flame.
  - Keep chemicals separate from each other to avoid cross contamination.
  - Properly dispose of empty fertilizer bags.
  - Sweep up and dispose of all contaminated material (Do not wash with water).

- Store in a cool dry facility.

- Liquid Fertilizer

  Since fertilizers in liquid form are potentially more hazardous than dry fertilizers, employees responsible for storage and handling need to be aware of the specific properties of each liquid fertilizer in use, including corrosiveness and tolerable temperature and pressure ranges. In addition, protective equipment may be necessary for workers handling fertilizers such as sulfuric or phosphoric acid.

  Fertilizer suppliers should be consulted for recommendation on the safest handling and storage procedures for specific liquid fertilizers.

5.3.6 References

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Websites

California Department of Pesticide Regulation – www.cdpr.ca.gov

California Fertilizer Foundation (CFF) - http://www.calfertilizer.org/
The mission of the foundation is to enhance awareness of plant nutrients and agriculture in California through educational outreach such as a school garden grants program. .

The California Plant Health Association (CPHA) - http://www.cpha.net/
An organization represents the interests of the fertilizer and crop protection manufacturers, distributors, formulators and retailers in California, Arizona and Hawaii. CPHA members market commercial fertilizers, soil amendments, agricultural minerals and crop protection products. The purpose of the organization is to promote the environmentally sound use and handling of plant health products and services for the production of safe and high quality food, fiber and horticultural products.

The California Department of Food and Agriculture Fertilizer Research and Education Program (CDFA-FREP) - http://www.cdfa.ca.gov/is/frep/index.htm
Group created to advance the environmentally safe and agronomically sound use and handling of fertilizer materials. Most of FREP's current work is concerned specifically with nitrate contamination of groundwater. FREP facilitates and coordinates research and demonstration projects by providing funding, developing and disseminating information, and serving as a clearinghouse on information on this topic. FREP serves growers, agricultural supply and service professionals, extension personnel, public agencies, consultants, and other interested parties

University of California Statewide IPM Program – http://www.ipm.ucdavis.edu

The Fertilizer Institute - http://www.tfi.org/
An organization that provides educational information on fertilizers and a reference guide on public policy issues affecting the use of fertilizers.

PesticideWise - **http://www.pw.ucr.edu/**
Searches a comprehensive EPA-USDA database and presents critical information on a pesticide's properties and water quality risks.

5.4 Performance Reporting

Performance indicators for certain Established BMPs have been tracked since the inception of the Model Municipal Activities Program. These BMPs are street sweeping, solid waste collection, catch basin stenciling, drainage facility maintenance, trash & debris control (formerly litter control), household hazardous waste collection, and used oil grant participation. Annual evaluation of the routine preventive maintenance activities is conducted and, where appropriate, improvements or new practices are implemented to further reduce the amount of pollutants discharged into the storm drain system. An important component of this evaluation process is the documentation and collection of data related to these selected activities. Using the forms and procedures provided in Appendix A-5, reports regarding the performance of these activities must be provided to the Principal Permittee and ultimately the Water Board as part of the annual progress report:

- Street Sweeping: All Permittees maintain street sweeping programs in residential, commercial and/or industrial areas. In 1993 the Permittees compiled information regarding their existing street sweeping schedules and practices and have subsequently changed elements of their programs such as the types of sweepers purchased, the frequency of sweeping, and the use of parking restrictions in order for the street sweeping program to aid in water quality improvements.
- Solid Waste Collection: The Permittees have solid waste collection programs for public, residential, commercial and industrial areas.
- Catch basin Stenciling: Over 37,000 storm drain inlets have been stenciled. Each year 6,000 – 9,000 inlets are re-stenciled.
- Drainage Facility Maintenance: The Permittees inspect the drainage system within their jurisdictions annually and clean out accumulated debris on an as needed basis. Removal of accumulated debris and sediment is carried out either manually or by mechanical methods using flushing – in emergency situations only – in accordance with established maintenance procedures (Model Maintenance Procedure DF-1). By removing this material from the catch basin inlets and storm drain system, the Permittees make a significant contribution in preventing the passage of these materials in downstream receiving waters.
- Trash & Debris Control: Trash and debris control is an important element in the diversion of litter and other solid materials from the storm drain system. Although most

Permittees historically viewed litter control as a public service program (i.e., preventing visual blight, etc.), rather than as a pollution control problem, it is now considered important as a visual indicator of water quality and an aspect of the recreational use of a waterbody.

- Household Hazardous Waste Collection: Orange County has a household hazardous waste collection program administered by the Integrated Waste Management Department (IWMD). The program comprises four sites (Anaheim, Huntington Beach, San Juan Capistrano, and Irvine).
- Used Oil Grant Participation: Most of the Permittees, as well as the County's Health Care Agency, currently implement used oil recycling programs. These programs involve comprehensive public outreach including television and newspaper advertising, displays at community events, and the distribution of used oil containers at no cost to residents.

5.5 Training and Education

Education and training of municipal staff is one of the keys to a successful stormwater program. To assist the responsible municipal and contract/lease staff in understanding the Municipal Activities Program Manual and the Model Maintenance Procedures, several different annual training sessions have been or are being developed.

In order to adequately address the different areas of the Municipal Activities Program element, four training modules have been developed and are included in the Final Model Municipal Activities Program Manual (**Appendix B-5**).

In order to ensure that the program is being implemented properly, each municipality should have the appropriate number and type of personnel at each of the training sessions. In addition to Permittee sponsored training, staff is also encouraged to attend training seminars or workshops related to stormwater management and water quality conducted by other organizations.

Model Municipal Program Training Modules

In order to adequately address the different areas of the Municipal Activities Program element, five training modules have been developed and are included in **Appendix B-5.**

The following sections describe the five modules.

- The General Program Management training module is targeted towards stormwater program managers and addresses the overall program framework, objectives and approach so that they may gain a broad understanding of how the program is developed and implemented at a local level. The training will be in a classroom setting, provided annually, and approximately 2-3 hours in length.
- The Fixed Facility training module is targeted towards facility managers and field level staff and addresses the implementation and inspection of the actual procedures. This training is tailored to municipal staff supervising the performance of municipal activities, in a "train the trainer" style format for formal or tailgate-style use. The

training will be both classroom and field settings, provided annually, and approximately 2-3 hours in length.

- The Field Program training module is targeted towards facility managers and field level staff and addresses the general techniques municipal staff may implement to prevent pollution problems, how to respond to spills once they have occurred and how to recognize potential problems. The training will be in a classroom setting, provided annually, and approximately 2-3 hours in length.
- The Municipal IPM Fertilizer/Pesticide Guidelines training module is targeted towards stormwater program managers and addresses the overall program framework, objectives and approach so that they may gain a broader understanding of how the program was developed and should be implemented at a local level. The training generally focuses on the proper application and handling of fertilizers and pesticides for management and municipal staff performing application activities. The training will be in a classroom setting, provided annually, and approximately 2-3 hours in length.
- The Municipal IPM Approaches training module is targeted toward Permittee field staff and applicators. The training is specific regarding the different types of techniques and technologies that are available for municipal staff to implement while managing and applying pesticides and fertilizers.

5.6 Definitions

For the purposes of the program, the following definitions are provided:

California Code of Regulations, Title 3, Division 6 (3CCR) - California State Code regulating pesticides and pest control operations. **http://www.calregs.com**

Catch Basin – a box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavements; may also be referred to as a drain inlet.

Detention Basin – an excavated basin used for the temporary detention of stormwater and/or urban dry weather runoff, to delay and attenuate flow, with release usually by a measured but uncontrolled outlet.

Drainage Facility – structure that is designed to collect or temporarily store or convey urban dry weather and/or stormwater runoff which may or may not include catch basins (storm drain inlets), detention basins, retention basins, sediment basins, open drainage channels, and lift stations. Although street curbs, gutters and underground channels and piping are not included within the definition, they are addressed within the Program though the field program Model Maintenance Procedures. For example, the maintenance of street curbs and gutters is addressed through the Model Maintenance Procedure for street maintenance.

Equivalent Training - term referring to municipal employees dealing with the application of pesticides who have not received a qualified applicator's license or certificate (QAL or QAC) from the State of California, but who have completed a training course in pesticide application offered by the County of Orange.

Eutrophication - A response to an increase in the nutrient status (nitrogen and phosphorus) of a water body. The result is an increase in the growth of vegetation (usually algae), a decrease in dissolved oxygen, increased turbidity, and a general degradation in water quality.

Field Program - a set of related municipally performed activities that take place throughout the municipality instead of at stationary locations. These types of activities may also be privately contracted. Examples of municipal field programs include road, street and highway maintenance, as well as drainage system maintenance.

Fixed Facility - a stationary site that is municipally owned and operated and at which municipal activities may occur. These types of facilities may also be municipally owned but privately leased. Examples of fixed facility types include municipal waste facilities and corporation yards.

Food and Agricultural Code, Divisions 6, 7 & 13 (FAC) - California state statutes relating to pesticides. Laws passed by the California Legislature. Provides the authority for the Department of Pesticide Regulation (DPR) and 3CCR.

Integrated Pest Management (IPM) - A sustainable approach to pest management that combines the use of prevention, avoidance, monitoring and suppression strategies in a way that minimizes economic, health, and environmental risks.

Lift Station – a below grade structure and equipment designed to collect, store, and periodically transfer stormwater and/or urban dry weather runoff to flood control channels.

Materials Data Safety Sheet (MSDS) – sheets that contain all information necessary for the safe handling of pesticides. They include chemical identifications, hazardous ingredients, physical data, fire and explosion data, health hazards, reactivity data, spill or leak cleanup procedures, special protection and special precautions. Federal law requires them to be kept on file for every pesticide or other hazardous material stored or used.

Maximum Extent Practicable (MEP) - taking into account equitable considerations of competing factors, including, but not limited to, the gravity of the problem, fiscal feasibility, public health risks, societal concern and social benefit.

Open Drainage Channel – an above ground channel used for collecting and conveying stormwater and/or urban dry weather runoff.

Pest Control Advisor (PCA) - a person who offers a recommendation on any agricultural use (includes landscape and turf maintenance), who holds him or herself forth as an authority on any agricultural use, or who solicits services or sales for any agricultural use A PCA must possess a valid Agricultural Pest Control Adviser License. To obtain a license the applicant must meet certain educational requirements and successfully complete examinations relating to knowledge of pests, pesticides and laws and regulations concerning pesticide use. Officials of federal, state, and county departments of agriculture, and University of California personnel engaged in duties relating to agricultural use are not required to be licensed. A PCA must also register with the County Agricultural Commissioner (CAC).

Pesticide Labels - In California, all pesticide use is regulated through federal and state laws and regulations. Food and Agricultural Code (FAC), section 12973, states: 'the use of any pesticide shall not conflict with the registered label'. In other words "the label is the law". No pesticide

can be used in California until the Department of Pesticide Regulation (DPR) has registered it. The approved pesticide label contains all the regulations regarding the use of the particular product. This includes the EPA registration number, the active ingredient and percentage of inert ingredients, the allowed use sites, the solution and dilution rates, the personal protection equipment (PPE) needed, as well as precautionary statements, environmental hazards, use requirements and directions for use. To use a product in a manner inconsistent with its label is against the law. As required by federal law, manufacturers of pesticides must provide labels on the containers of all pesticides intended for sale and distribution.

Pollution Prevention - any practice that reduces or eliminates the creation of pollutants. One example would be reducing the amount of litter originally generated by training public employees to not create litter while performing tasks.

Qualified Applicator's Certificate (QAC) - a certificate obtained from the State of California after demonstrating adequate knowledge of the proper techniques for handling, storing, transporting and applying pesticides. Any person who uses or supervises the use of federally restricted use pesticides or state restricted materials for any purpose or on any property other than that provided by the definition of "private applicator" must have a QAC. A QAC is obtained by passing the Laws, Regulations, and Basic Principles examination and at least one pest control category examination.

Qualified Applicator's License (QAL) – a license required for any person who supervises pesticide applications made by a licensed Pest Control Business and who is responsible for the safe and legal operation of the pest control business. Those persons who supervise the use of federal or state restricted materials for any purpose (and on any property) other than that provided by the definition provided under "private applicator" must also obtain a QAL.

Restricted Materials Permit - a permit that must be acquired by any public agency before application of the pesticides listed as restricted in 3CCR, section 6000. In Orange County, this permit must be obtained from the County Agricultural Commissioner. A list of restricted materials can be found at **http://www.cdpr.ca.gov/docs/license/pr-pml-013a.pdf** or at the Agricultural Commissioner's Office.

Retention Basin – a basin or depression designed to provide storage of stormwater and/or urban dry weather runoff without a positive outlet, or with a specially regulated outlet, where all or a portion of the inflow is stored for a prolonged period.

Sediment Basin – a basin with controlled a stormwater release structure, formed by constructing an embankment across a drainage way that temporarily retains stormwater and/or urban dry weather runoff in order to allow sediment to settle out.

Source Controls – any practice that prevents pollution by reducing pollutants at their source. Street sweeping is an example of litter source control. Litter is removed from the street, which reduces the amount of litter that enters the storm water conveyance system.

State Laws - The California Food and Agricultural Code (FAC) and the California Code of Regulations, Title 3 (3CCR), constitute the laws and regulations referenced in these guidelines. They are referenced often and usually are referred to as "State Laws".

Treatment Controls – any practice that removes pollutants from water. Trash booms that remove litter from the water as it flows within a flood control channel is an example of a treatment control.

Toxicity Classification – categories by which the Environmental Protection Agency (EPA) groups pesticides according to their toxicity or potential to cause injury to people. Category I pesticides are often the most hazardous because they are the most toxic and their use is normally restricted; they will carry the word "danger" or "danger-poison" with the skull and crossbones on the label. Category II pesticides are moderately toxic and carry the word "warning" on the label. The least hazardous pesticides are Category III and IV pesticides. These are slightly toxic or relatively nontoxic but basic safety precautions should still be taken. These carry the word "caution" on the label.