

FOR DISCUSSION PURPOSES ONLY

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

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DRAFT TENTATIVE ORDER NO. R9-2015-0003

**GENERAL WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES
FROM COMMERCIAL AGRICULTURAL AND NURSERY OPERATIONS
WITHIN THE SAN DIEGO REGION**

Discharges from Agricultural Operations, including storm water runoff and irrigation runoff, to surface waters and groundwaters of the State in the San Diego Region are subject to waste discharge requirements (WDRs), as set forth in this General Order, and as authorized by a Notice of Applicability (NOA) issued by the California Regional Water Quality Control Board, San Diego Region's (San Diego Water Board) Executive Officer. Definitions of terms used in this General Order are contained in Attachment A.

The following provide summary information regarding the applicability of this General Order:

Table 1. General Information

Agricultural Operation	For the purposes of this General Order, an Agricultural Operation is any irrigated agricultural or nursery operation (Agricultural Operation) that generates, or is expected to generate, \$10,000 or greater of annual gross sales; or that is located immediately adjacent to a surface water body; or that is otherwise determined to pose a significant threat to water quality by the San Diego Water Board, and that is not otherwise excluded under section I.B of this General Order.
Discharger	For the purposes of this General Order, a Discharger is any owner and/or operator of an Agricultural Operation.

Table 2. Administrative Information

This General Order was adopted by the California Regional Water Quality Control Board, San Diego Region on:	November 18, 2015
This General Order became effective on:	November 18, 2015

I, David W. Gibson, Executive Officer, do hereby certify that this General Order with all attachments is a full, true, and correct copy of a General Order adopted by the California Regional Water Quality Control Board, San Diego Region on November 18, 2015.

TENTATIVE
David W. Gibson, Executive Officer

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I. SCOPE OF COVERAGE

This General Order establishes waste discharge requirements (WDRs) for waste discharges to the waters of the State within the San Diego Region from agriculture and nursery facilities and activities, including land or appurtenances thereto, producing crops for sale (collectively referred to as Agricultural Operations). Storm water runoff, non-storm water runoff, irrigation runoff, and other discharges of water and wastewater from Agricultural Operations can transport pollutants such as sediment, fertilizers, pesticides, herbicides, pathogens, and nutrients directly or indirectly to surface water and groundwater within the San Diego Region.

A. Discharges Regulated Under this General Order

1. For the purposes of this General Order, a Discharger is any owner and/or operator of an Agricultural Operation.
2. For the purposes of this General Order, an Agricultural Operation is any irrigated agricultural or nursery operation that meets at least one of the following criteria and is not otherwise excluded under section I.B of this General Order:
 - a. The Agricultural Operation generates, or is expected to generate, annual gross sales of \$10,000 or greater;
 - b. The Agricultural Operation is located immediately adjacent to a surface water body; or
 - c. The Agricultural Operation is otherwise determined to pose a significant threat to water quality by the San Diego Water Board.
3. Discharges from Agricultural Operations must be authorized by a Notice of Applicability (NOA) issued by the San Diego Water Board Executive Officer, as described in section III.B and IV.B of this General Order.

B. Dischargers Not Regulated under this General Order

This General Order does not provide regulatory coverage for any of the following discharges:

1. Discharges from Agricultural Operations that are not within the scope of this General Order or that are not authorized by a NOA issued by the San Diego Water Board Executive Officer;
2. Discharges from non-irrigated Agricultural Operations, unless determined to pose a significant threat to water quality by the San Diego Water Board;
3. Discharges from Agricultural Operations into areas designated by the State Water Resources Control Board (State Water Board) as Areas of Biological Significance (ASBS);
4. Discharges from Agricultural Operations that are comingled with other non-agricultural wastewater;
5. Discharges from Animal Operations including but not limited to animal feeding operations, or facilities where animals are corralled, penned, tethered, or otherwise enclosed or held;
6. Any point source discharge subject to National Pollutant Discharge Elimination System (NPDES) permit requirements as provided Clean Water Act (CWA) section 402 and regulations and guidelines adopted thereunder;
7. Any discharges resulting from dredge and fill activities subject to CWA section 404;
8. Discharges from the Agricultural Operations are covered under separate individual waste discharge requirements (WDRs); and
9. Any discharges that are determined by the San Diego Water Board to be adequately regulated by another General Order prescribing waste discharge requirements, a waiver of

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waste discharge requirements or an NPDES permit, including but not limited to the following:

- a. General Order No. R9-2008-0130, *Waste Discharge Requirements for Existing Dairy Animal Feeding Operations in the San Diego Region*, and any reissuance;
- b. General Order No. R9-2014-0041, *Conditional Waivers of Waste Discharge Requirements of Low Threat Discharges in the San Diego Region*, and any reissuance;
- c. Water Quality General Order No. 2011-0003 - DWQ, NPDES No. CAG 990006, *Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Residual Pesticide Discharges to Waters of the United States From Aquatic Animal Invasive Species Control Applications*, and any reissuance;
- d. Water Quality General Order No. 2011-0004 - DWQ, NPDES No. CAG 990007, *Statewide General National Pollutant Discharge Elimination System (NPDES) Permit For Biological and Residual Pesticide Discharges to Waters of the United States From Spray Applications*, and any reissuance;
- e. Water Quality General Order No. 2011-0002 - DWQ, General Permit No. CAG 990004, *Statewide General National Pollutant Discharge Elimination System (NPDES) Permit For Biological and Residual Pesticide Discharges to Waters of the United States From Vector Control Applications*; and any reissuance; and
- f. Water Quality General Order No. 2013-0002 - DWQ, NPDES No. CAG 990005, *Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Residual Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Applications*; and any reissuance.

II. APPLICATION FOR COVERAGE UNDER THIS GENERAL ORDER

A. Duty to Apply

1. Dischargers meeting the conditions outlined in section I.A. of this General Order must submit a complete Notice of Intent (NOI) to the San Diego Water Board in accordance with section III.A of this General Order, if enrolling as an Individual Discharger, or with section IV.E of this General Order, if enrolling as a member of a Coalition Group.
2. Either the owner or the operator of the Agricultural Operation may submit an NOI for coverage under this General Order. However, both the owner and operator are Dischargers. The San Diego Water Board may hold any Discharger responsible for noncompliance with this General Order.

B. Time to Apply

1. A Discharger, or an approved Coalition Group acting on behalf of the Discharger, must submit an NOI according to the following timeframes:
 - a. An Agricultural Operation in existence on the adoption date of this General Order (November 18, 2015) must file an NOI no later than the 180 days following the effective date of this General Order; and
 - b. An Agricultural Operation that was not existence on the adoption date of this General Order (November 18, 2015) must file an NOI at least 30 days prior to initiating discharges from the Agricultural Operation.
2. Coverage will not become effective until the San Diego Water Board reviews and approves an NOI signed by an authorized individual as specified in sections III.B and IV.E.

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III. ENROLLMENT PROCEDURE FOR INDIVIDUAL DISCHARGERS

A. Obtaining Coverage as an Individual Discharger

A Discharger enrolling under this General Order as an Individual Discharger must submit an application including all of the following:

1. A completed Notice of Intent (NOI) Form (Attachment G);
2. A Water Quality Protection Plan (WQPP), as specified in MRP sections II.B and III.C;
3. An application fee, as specified in sections III.G and III.J.

B. Effective Date of Coverage

Coverage is effective on the date when the San Diego Water Board issues an NOA to the Discharger approving coverage under the General Order. The NOA may include additional requirements, including additional monitoring requirements, due to site-specific circumstances.

C. Notice of Applicability (NOA) Modification

The Discharger may submit a written request for modification of a NOA to the San Diego Water Board by submitting a Request for NOA Amendment. The Request for NOA Amendment shall include the following:

1. "Request for NOA Amendment" in the subject line;
2. The Waste Discharge Identification Number (WDID) assigned to the Discharger in the original NOA;
3. The name and address of the Discharger;
4. The name and address of the Agricultural Operation(s);
5. The requested modification(s);
6. The reason and rationale for the requested modification(s); and
7. All supporting documentation to support the requested modification(s).

The Request for NOA Amendment shall be signed and certified by the Discharger in accordance with the signatory requirements in Attachment D.

The submittal of a Request for NOA Amendment does not stay any condition of this General Order and the Discharger shall continue to comply with this General Order and the NOA until further notice from the San Diego Water Board.

D. Termination of Coverage by Discharger

To terminate coverage under this General Order, an Individual Discharger must submit a completed Notice of Termination (NOT) to the San Diego Water Board. The NOT provides notice that the Discharger meets one or more of the following conditions:

1. A new owner or operator has taken over responsibility for the Agricultural Operation, and coverage under this General Order is not requested to be transferred;
2. The Discharger no longer operates an Agricultural Operation that meets the enrollment criteria (see section I.A); or
3. The Discharger has been issued individual WDRs for the Agricultural Operation.

The Discharger must continue to comply with the requirements of this General Order until the San Diego Water Board notifies the Discharger in writing that the NOT has been approved.

The Discharger's coverage under this General Order will terminate on the date specified in the termination notice issued by the San Diego Water Board. Approval of the NOT does not

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relieve the Discharger's responsibility for paying any outstanding annual fees, submitting any outstanding reports as specified in this General Order, or responding to other enforcement actions. The San Diego Water Board's termination notice in no way prevents the Board from taking enforcement action for any violations of this General Order by the Discharger. Upon termination, the Discharger will no longer be authorized to discharge under this General Order.

E. Termination of Coverage by the San Diego Water Board

Enrollment in this General Order may be terminated for cause including, but not limited to, the following:

1. Violating of any terms or conditions of this General Order;
2. Obtaining enrollment under this General Order by misrepresentation or failure to disclose all relevant facts; or
3. Determination by the San Diego Water Board that an individual WDR would be more appropriate for the Agricultural Operation.

F. Transfer of Enrollment

Enrollment in this General Order is transferable. Dischargers enrolled in the General Order must submit an NOI indicating the change of information, as specified in section III.C, to the San Diego Water Board.

G. Fees

1. Dischargers are required to pay a one-time application fee, pursuant to the California Code of Regulations (CCR), title 23, section 2200.6(b) and in accordance with the California Water Code (Water Code) section 13260.
2. Dischargers are required to pay an annual fee, pursuant to CCR, title 23, section 2200.6(a) and in accordance with Water Code section 13260.

IV. ENROLLMENT PROCEDURES FOR MEMBERS OF COALITION GROUPS

To achieve maximum efficiency and economy of resources, Dischargers may enroll for coverage under this General Order as a Member of a third-party representative or organization, known as a Coalition Group. Dischargers wanting to enroll as part of a Coalition Group must contact the Coalition Group prior to submitting an NOI. As described in section IV, below, the Coalition Group will submit an NOI on behalf of the Member.

A. Services Provided to Coalition Group Members

1. Coalition Groups are responsible for providing Members with the following minimum services:
 - a. Submitting a NOIs (including a certification that the WQPP has been amended to include site-specific information and adjustments to monitoring provisions, as appropriate) and application fees on behalf of Members, as specified in section IV.J;
 - b. Submitting annual fees on behalf of itself and Members, as specified in section IV.J;
 - c. Submitting NOTs on behalf of Members, as specified in section IV.F;
 - d. Providing the San Diego Water Board on a quarterly basis of a list of Members (MRP section III.E);
 - e. Providing education and outreach activities, as specified in section VII.B;
 - f. Updating the Coalition Group's WQPP to include information specific to each enrolled Agricultural Operation;

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- g. Conducting monitoring and reporting activities, as specified in the Monitoring and Reporting Program (MRP; Attachment E) and in accordance with the approved WQPP;
- h. Providing timely and complete submittal of all plans and reports required by this General Order;
- i. Providing Members with copies of all correspondence to and from the San Diego Water Board, within 30 days of postmark; and
- j. Providing Members with basic information regarding this General Order, including a link to the San Diego Water Board's Irrigated Land Regulatory Program website.

B. Coalition Group Certification

- 1. At any time, a third-party representative or organization may submit a letter to the San Diego Water Board requesting certification as a Coalition Group. The San Diego Water Board will consider the following factors when considering whether or not certify the Coalition Group:
 - a. The Coalition Group must be managed by a third-party (i.e., not a Discharger);
 - b. The Coalition Group must be willing and able to carry out the responsibilities identified in section IV.A; and
 - c. The Coalition Group must have a legally-binding mechanism in place to ensure accountability and transparency to Members.
- 2. A request for certification as a Coalition Group must include the following information:
 - a. A membership list, in an Excel format, that provides the following information:
 - 1. Address and Assessor's Parcel Number of the Agricultural Operation;
 - 2. Name, address, phone number, and email of the Discharger;
 - 3. Name, address, phone number, and email of the property owner (if different from Agricultural Operation owner and/or operator);
 - 4. Size, in acres, of the Agricultural Operation; and
 - 5. List of crops grown and acres dedicated for each crop grown at the Agricultural Operation.
 - b. WQPP (MRP section III.C); and
 - c. Copies of the NOIs submitted by the Dischargers to the Coalition Group for enrollment; and
- 3. Documentation of the Coalition Group's organizational structure and the legal means by which the Coalition Group is formed and maintained.

C. Dissolution of a Coalition Group

- 1. Any Coalition Group wishing to dissolve must notify all Members in writing at least 90 days prior to dissolution of its intent to dissolve the Coalition Group. The notice of dissolution must include the following information:
 - a. The anticipated date of dissolution;
 - b. Documentation that the annual fees for the current fiscal year have been paid; and
 - c. Notification that the members must join another Coalition Group, enroll in the General Order as an Individual Discharger, apply for individual WDRs, or cease all discharges to Waters of the State before the dissolution of the Coalition Group.

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2. Any Coalition Group wishing to dissolve must notify the San Diego Water Board in writing at least 90 days prior to the dissolution, of the intent to dissolve the Coalition Group. The notification to dissolve the Coalition Group and the Members' enrollment in this General Order, must include the following:
 - a. The reason for dissolution;
 - b. A list of all active members including contact information;
 - c. The proposed date of dissolution; and
 - d. A copy of documentation provided to the Members noticing the dissolution.

D. Obtaining Coverage as a Member of a Coalition Group

For each Discharger enrolling under this General Order as a Member of a Coalition Group, the Coalition Group must submit an application including all of the following:

1. A completed Notice of Intent (NOI) Form (Attachment G) for each Member of the Coalition Group;
2. A Water Quality Protection Plan (WQPP), as specified in Attachment E, section III.C; and
3. An application fee, as specified in section III.J.

E. Effective Date of Coverage

Coverage is effective on the date when the Coalition Group submits an application for coverage under the General Order.

F. Termination of Coverage by Member of Coalition Group

To terminate coverage under this General Order, a Discharger must submit a completed Notice of Termination (NOT) to the San Diego Water Board. The NOT provides notice that the Discharger meets one or more of the following conditions:

1. A new owner or operator has taken over responsibility for the Agricultural Operation, and coverage under this General Order is not requested to be transferred;
2. The Discharger no longer operates an Agricultural Operation that meets the enrollment criteria (see section I.A); or
3. The Discharger has been issued individual WDRs for the Agricultural Operation.

The Discharger must continue to comply with the requirements of this General Order until the San Diego Water Board notifies the Discharger in writing that the NOT has been approved.

The Discharger's coverage under this General Order will terminate on the date specified in the termination notice issued by the San Diego Water Board. Approval of the NOT does not relieve the Discharger's responsibility for paying any outstanding annual fees, submitting any outstanding reports as specified in this General Order, or responding to other enforcement actions. The San Diego Water Board's termination notice in no way prevents the Board from taking enforcement action for any violations of this General Order by the Discharger. Upon termination, the Discharger will no longer be authorized to discharge under this General Order.

G. Termination of Coverage by the San Diego Water Board

Enrollment in this General Order may be terminated for cause including, but not limited to, the following:

1. Violating of any terms or conditions of this General Order;
2. Obtaining enrollment under this General Order by misrepresentation or failure to disclose all relevant facts; or

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3. Determination by the San Diego Water Board that an individual WDR would be more appropriate for the Agricultural Operation.

H. Termination of Coverage due to Dissolution of Coalition Group

The Coalition Group must notify each Member in writing at least 90 days prior to dissolution. The notice of dissolution must include the following information:

1. The anticipated date of dissolution;
2. Documentation that the annual fees for the current fiscal year have been paid; and
3. Instructions for enrolling for coverage either as an Individual Discharger or as a Member of another Coalition Group.

I. Transfer of Enrollment

Enrollment in this General Order is transferable. Dischargers enrolled in the General Order must submit an NOI indicating the change of information, as specified in section III.D, to the San Diego Water Board.

J. Fees

1. On behalf of its Members, Coalition Groups are required to pay a one-time application fee, pursuant to the California Code of Regulations (CCR), title 23, section 2200.6(b) and in accordance with the California Water Code (Water Code) section 13260. Application fees are to be paid on the following schedule:
 - a. With the submittal of the request for certification for the Dischargers enrolled in the Coalition Group when the request is submitted (section IV.B.); and
 - b. With each quarterly membership update report to the Dischargers who became members of the Coalition Group during the reporting period (MRP section III.E).
2. On behalf of its Members, Coalition Groups are required to pay an annual fee, pursuant to CCR, title 23, section 2200.6(a) and in accordance with Water Code section 13260.

V. FINDINGS

The San Diego Water Board finds:

- A. Legal Authorities.** This General Order serves as WDRs pursuant to article 4, chapter 4, division 7 of the Water Code (commencing with section 13260).
- B. Background and Rationale for Requirements.** The Fact Sheet (Attachment F), which contains background information and rationale for the requirements of this General Order, is hereby incorporated into this General Order and constitutes part of the Findings of this General Order. Attachments A through E and G through J are also incorporated into this General Order.
- C. California Environmental Quality Act (CEQA).** In accordance with CCR title 14, section 15000 *et seq.*, the San Diego Water Board is the lead agency for this project and has adopted a negative declaration for the project. Details of CEQA are provided in the Fact Sheet (Attachment F).
- D. Notification of Interested Parties.** The San Diego Water Board notified interested agencies and persons of its intent to prescribe WDRs for these discharges and provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet (Attachment F).
- E. Consideration of Public Comment.** The San Diego Water Board, in a public meeting, heard and considered all comments pertaining to the discharge waste from Agricultural Operations. Details of the Public Hearing are provided in the Fact Sheet (Attachment F).

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- F.** Requirements of this General Order implement the Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed, Resolution No. R9-2005-0036 (Rainbow Creek TMDL), and the Revised TMDLs for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek), Resolution No. R9-2010-0001 (Bacteria TMDL). Compliance with this General Order is expected to reduce the discharge of pollutants into surface water and is a non-TMDL solution to water bodies on the Clean Water Act section 303 (d) list of Water Quality Limited Segments where agriculture is identified as a pollutant source.

THEREFORE, IT IS HEREBY ORDERED that in order to meet the provisions contained in division 7 of the Water Code (commencing with s 13000) and regulations adopted thereunder, Dischargers must comply with the following requirements of this General Order.

VI. DISCHARGE PROHIBITIONS

- A.** The Discharger must comply with Discharge Prohibitions contained in chapter 4 of the *Water Quality Control Plan for the San Diego Basin* (Basin Plan), incorporated into this General Order as if fully set forth herein and summarized in sections VI, and VIII.
- B.** The Discharge of waste in a manner or to a location which has not been specifically authorized by this General Order or an approved NOA and for which valid WDRs are not in force is prohibited.
- C.** The discharge of hazardous waste, as defined in Water Code section 13173 and CCR title 23, section 22521(a) is prohibited.
- D.** The discharge or deposition of oil, trash, rubbish, refuse, or other solid waste directly into surface waters, or in any manner which may permit it to be washed or transported into the surface waters, is prohibited.
- E.** The discharge of residual algaecides and aquatic herbicides in a manner not described in the General Order is prohibited.
- F.** The discharge of any waste (e.g., fertilizers, fumigants, pesticides) down a groundwater well casing is prohibited.
- G.** The discharge of waste must not cause or contribute to surface erosion or scouring of aquatic substrates.
- H.** The discharge of waste must not cause or contribute to the occurrence of coliform or pathogenic organisms in surface waters or groundwater.
- I.** The discharge of waste must not cause or contribute to the occurrence of objectionable tastes or odors in surface waters or groundwater.
- J.** The discharge of waste must not cause or contribute to foaming in surface waters or groundwater.
- K.** The discharge of waste must not cause or contribute to the presence of toxic materials in surface waters or groundwater.
- L.** The discharge of waste must not cause the pH to fall below 6.0 or rise above 9.0 in surface waters or groundwater.
- M.** The discharge of waste must not result in odors, vectors, and/or other nuisances in surface waters or groundwater.
- N.** The discharge of waste must not cause or threaten to cause pollution, contamination, or nuisance or adversely affect the beneficial uses of surface waters or groundwater.
- O.** The discharge of waste must not alter surface waters of the State, on or off a Discharger's property, unless the proposed alteration has received a CWA section 401 Water Quality

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Certification, individual WDRs, or an individual waiver of WDRs from the San Diego Water Board.

VII. WASTE DISCHARGE CONTROL REQUIREMENTS

A. Standard Provisions

1. The Discharger shall comply with the Monitoring and Reporting Requirements, and any future revisions, as specified in Attachment E.
2. The Discharger shall comply with all Standard Provisions included in Attachment D.
3. The discharge of waste must comply with applicable water quality standards, including all applicable provisions and prohibitions contained in the Basin Plan.
4. Waste discharged at any Agricultural Operation must not cause or contribute to conditions of pollution, contamination, or nuisance, as defined in Water Code section 13050.
5. This General Order does not preempt or supersede the authority of municipalities, flood control agencies, or other State or local agencies to prohibit, restrict, or control discharges of waste subject to their jurisdiction.
6. The Discharger shall comply with all applicable federal, State, and local laws and regulations for handling, transport, treatment, or disposal of waste or the discharge of waste to waters of the U.S. in a manner which causes or threatens to cause a condition of pollution, contamination or nuisance as those terms are defined in the Water Code section 13050.

B. Water Quality Education

Annually, the Discharger must complete appropriate farm water quality education and technical assistance necessary to achieve compliance with this General Order. Education should focus on meeting water quality standards by identifying water quality problems, implementing pollution prevention strategies and practices designed to protect water quality to resolve water quality problems, and to achieve compliance with this General Order. Water quality management training may include formal classroom training, individual meetings with a qualified trainer, and/or internet-based training with a Coalition Group, the local Farm Bureau, University of California Cooperative Extension (UCCE), Natural Resources Conservation Service (NRCS), and/or Resource Conservation Districts (RCDs), or comparable organization.

C. Management Measures (MMs) and Best Management Practices (BMPs)

1. The Discharger must Implement MMs and BMPs to achieve the following:
 - a. Minimize or prevent the discharge of waste to surface water; and
 - b. Minimize or prevent the percolation of waste to groundwater.
2. Discharges must review and consider the MMs/BMPs developed by the UCEE and presented in Attachment J.
3. The Discharge must apply soil amendments, such as a fertilizers, mulch, and compost as specified in the Discharger's WQPP required under sections III.A and IV.D of this General Order.
4. Soil amendments may not include any of the following additives unless previously approved in writing by the Executive Officer of the San Diego Water:
 - a. Municipal solid waste;
 - b. Sludges, including sewage sludge, water treatment sludge, and industrial sludge;
 - c. Septage, liquid waste, oil and grease; or,

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- d. Hazardous, designated, and any other waste determined by the San Diego Water Board to pose a potential threat to water quality.
5. Soil amendments may not be applied at any rate exceeding agronomic rates and must take into account storm events during the wet weather season (October 1 through April 30).
6. All chemicals used must be applied in accordance with manufacturer instructions and guidelines and may not have an adverse effect on the quality of any waters of the State.

D. Total Maximum Daily Load Requirements

1. The following TMDLs are applicable to discharges from Agricultural Operations in the San Diego Region:
 - a. *Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed*, Resolution No. R9-2005-0036 (Rainbow Creek TMDL), and
 - b. *Revised TMDLs for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)*, Resolution No. R9-2010-0001 (Bacteria TMDL).
2. Rainbow Creek TMDL
 - a. Dischargers discharging to surface waters in the Rainbow Creek Watershed must employ management measures (MMs) and best management practices (BMPs), as specified in Attachment C.
3. Bacteria TMDL
Dischargers discharging to surface waters in the San Joaquin Hills/Laguna Hills Hydrologic Sub Area, Aliso Hydrologic Sub Area, Lower San Juan Hydrologic Sub Area, San Clemente Hydrologic Area, San Luis Rey Hydrologic Unit, San Marcos Hydrologic Area, San Dieguito Hydrologic Unit, Mission San Diego/Santee Hydrologic Sub Area must employ MMs and BMPs, as specified in Attachment C.

E. Compost Production Requirements

1. Dischargers composting waste material generated from on-site material must do the following:
 - a. Return the resulting compost to the same Agricultural Operation or another Agriculture Operation owned or leased by the same owner, parent, or subsidiary;
 - b. Manage the compost piles to prevent water oversaturation and leachate generation;
 - c. Conduct all composting activities on a working surface that prevents ponding of water, infiltration of water and leachate to the underlying soil, and erosion;
 - d. Implement MMs and/or BMPs to eliminate the discharge of pollutants that may adversely impact the of waters of the State;
 - e. Maintain a minimum 100 foot buffer zone between compost piles and all surface water bodies; and
 - f. Maintain ponds used to manage leachate, process water, storm water, and wastewater to have a freeboard of at least two feet and prevent infiltration to the underlying soil.
2. Dischargers engaged in chipping and grinding operations, or otherwise engaged in the handling of green waste, must remove each load of green waste from the site within 48-hours of receipt, unless the Discharger has received written permission from the Local Enforcement Agency allowing the green waste to remain onsite for up to seven days.

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VIII. RECEIVING WATER LIMITATIONS

The receiving water limitations set forth below are based on applicable water quality standards contained in State water quality control plans and policies and are a required part of this General Order. The discharge of waste regulated under this General Order shall not cause or contribute to violations of receiving water limitations applicable to the authorized receiving water as set forth below.

A. Water Quality Objectives and Criteria

The discharge of waste shall not cause violations of water quality objectives, federal pollutant criteria or other provisions applicable to the authorized receiving water as contained in the State water quality control plans and policies and federal regulations set forth below:

1. The Water Quality Control Plan for the San Diego Basin (Basin Plan), including beneficial uses, water quality objectives, and implementation plans;
2. The Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries (Thermal Plan);
3. The Water Quality Control Plan for Ocean Waters of California (Ocean Plan);
4. The Water Quality Control Policy for the Enclosed Bays and Estuaries of California;
5. The Policy for Implementation of Toxics Standards for Inland Surface Waters, and Enclosed Bays, and Estuaries of California (SIP);
6. The Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality; and
7. The California Toxics Rule (CTR).

B. Receiving Water Limitations for Inland Surface Waters

1. Bacterial Characteristics
 - a. In waters designated for contact recreation (REC-1), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean 200/100 mL, nor shall more than 10 percent of the total samples during any 30-day period exceed 400/100 mL. [Basin Plan]
 - b. At all areas where shellfish may be harvested for human consumption, as determined by the San Diego Water Board, the median total coliform density shall not exceed 70 per 100 mL throughout the water column, and not more than 10 percent of the samples shall exceed 230 per 100 mL for a five-tube decimal dilution test or 330 organisms per 100 ml when a three-tube decimal dilution test is used. [Basin Plan]
 - c. In waters designated for non-contact recreation (REC-2) and not designated for contact recreation (REC-1), the average fecal coliform concentrations for any 30- day period, shall not exceed 2,000 organisms per 100 ml nor shall more than 10 percent of samples collected during any 30-day period exceed 4,000 organisms per 100 mL. [Basin Plan]
2. Physical Characteristics
 - a. Waters shall not contain oils, greases, waxes, or other materials in concentrations which result in a visible film or coating on the surface of the water or on objects in the water, or which cause nuisance or which otherwise adversely affect beneficial uses. [Basin Plan]
 - b. Waters shall not contain floating material, including solids, liquids, foams, and scum in concentrations which cause nuisance or adversely affect beneficial uses. [Basin Plan]

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- c. Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses. [Basin Plan]
 - d. The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. [Basin Plan]
 - e. Waters shall not contain suspended and settleable solids in concentrations of solids that cause nuisance or adversely affect beneficial uses. [Basin Plan]
 - f. Waters shall not contain taste or odor producing substances at concentrations which cause a nuisance or adversely affect beneficial uses. [Basin Plan]
 - g. Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Inland surface waters shall not contain turbidity in excess of the numerical objective described in Table 3-2 of the Basin Plan. [Basin Plan]
3. Chemical Characteristics
- a. The dissolved oxygen concentration shall not at any time be less than 5.0 mg/L. The annual mean dissolved oxygen concentration shall not be less than 7 mg/L more than 10% of the time. [Basin Plan]
 - b. The pH shall not be changed at any time more than 0.2 units from normal ambient pH. The pH shall not be depressed below 7.0 nor raised above 9.0. [Basin Plan]
 - c. Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses. [Basin Plan]
 - d. The discharge of wastes shall not cause concentrations of un-ionized ammonia (NH₃) to exceed 0.025 mg/L (as N). [Basin Plan]
 - e. No individual pesticide or combination of pesticides shall be present in the water column, sediments or biota at concentration(s) that adversely affect beneficial uses. Pesticides shall not be present at levels which will bioaccumulate in aquatic organisms to levels which are harmful to human health, wildlife or aquatic organisms. [Basin Plan]
 - f. The discharge of waste to inland surface waters designated for use as domestic or municipal supply (MUN) shall not contribute to concentrations of toxics in excess of the maximum contaminant levels (MCLs) for inorganic pollutants set forth in the CCR, title 22, division 4, chapter 15, article 4.1, section 64435 and organic pollutants set forth in title 22, division 4, chapter 15, article 5.5, section 64444A. [CCR title 22]
 - g. The discharge of waste to inland surface waters shall not contribute to concentrations in excess of the mineral objectives specified in Table 3-2 of the Basin Plan. [Basin Plan]
4. Radioactivity Characteristics
- a. Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life. [Basin Plan]
 - b. The radioactivity in the receiving waters shall not exceed limits specified in CCR title 17, division 1, chapter 5, subchapter 4, group 3, article 1, section 30253. [CCR title 17]
5. Toxicity Characteristics
- a. All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or

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aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration, or other appropriate methods as specified by the San Diego Water Board. [Basin Plan]

C. Receiving Water Limitations for Bays, Estuaries, and Coastal Lagoons

1. Bacterial Characteristics

- a. At all areas where shellfish may be harvested for human consumption, as determined by the San Diego Water Board, the median total coliform density shall not exceed 70 per 100 mL throughout the water column, and not more than 10 percent of the samples shall exceed 230 per 100 mL for a five-tube decimal dilution test or 330 organisms per 100 ml when a three-tube decimal dilution test is used. [Basin Plan]
- b. In bays and estuaries designated for contact recreation (REC-1), the most probable number of total coliform organisms in the upper 60 feet of the water column shall be less than 1,000 organisms per 100 mL (10 organisms per ml); provided that not more than 20 percent of the samples at any sampling station, in any 30-day period, may exceed 1,000 organisms per 100 mL (10 per mL); and provided further that no single sample as described below is exceeded. The most probable number of total coliform organisms in the upper 60 feet of the water column in no single sample when verified by a repeat sample taken within 48 hours shall exceed 10,000 organisms per 100 mL (100 organisms per mL). [Basin Plan]
- c. In waters designated for non-contact recreation (REC-2) and not designated for contact recreation (REC-1), the average fecal coliform concentrations for any 30- day period, shall not exceed 2,000 organisms per 100 ml nor shall more than 10 percent of samples collected during any 30-day period exceed 4,000 organisms per 100 mL. [Basin Plan]
- d. In San Diego Bay where bay waters are used for whole fish handling, the density of *E. coli* shall not exceed 7 organisms per mL in more than 20 percent of any 20 daily consecutive samples of bay water. [Basin Plan]

2. Physical Characteristics

- a. Waters shall not contain oils, greases, waxes, or other materials in concentrations which result in a visible film or coating on the surface of the water or on objects in the water, or which cause nuisance or which otherwise adversely affect beneficial uses. [Basin Plan]
- b. Waters shall not contain floating material, including solids, liquids, foams, and scum in concentrations which cause nuisance or adversely affect beneficial uses. [Basin Plan]
- c. Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses. [Basin Plan]
- d. The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. [Basin Plan]
- e. Waters shall not contain suspended and settleable solids in concentrations of solids that cause nuisance or adversely affect beneficial uses. [Basin Plan]
- f. Waters shall not contain taste or odor producing substances at concentrations which cause a nuisance or adversely affect beneficial uses. [Basin Plan]
- g. Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. The transparency of waters in lagoons and estuaries shall not be less

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than 50% of the depth at locations where measurement is made by means of a standard Secchi disk, except where lesser transparency is caused by rainfall runoff from undisturbed natural areas and dredging projects conducted in conformance with waste discharge requirements of the San Diego Water Board. With these two exceptions, increases in turbidity attributable to controllable water quality factors shall not exceed 20% over natural turbidity levels at locations with a natural turbidity of 0 to 50 NTU; 10 NTU at locations with a natural turbidity of 50 to 100 NTU; and 10% over the natural turbidity level in locations with a natural turbidity of greater than 100 NTU. [Basin Plan]

- h. Within San Diego Bay, the transparency of bay waters, insofar as it may be influenced by any controllable factor, either directly or through induced conditions, shall not be less than 8 feet in more than 20 percent of the readings in any zone, as measured by a standard Secchi disk. Wherever the water is less than 10 feet deep, the Secchi disk reading shall not be less than 80 percent of the depth in more than 20 percent of the readings in any zone. [Basin Plan]
3. Chemical Characteristics
- a. The dissolved oxygen concentration shall not at any time be less than 5.0 mg/L. The annual mean dissolved oxygen concentration shall not be less than 7 mg/L more than 10% of the time. [Basin Plan]
 - b. The pH shall not be changed at any time more than 0.2 units from normal ambient pH. The pH shall not be depressed below 7.0 nor raised above 9.0. [Basin Plan]
 - c. Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses. [Basin Plan]
 - d. The discharge of wastes shall not cause concentrations of un-ionized ammonia (NH₃) to exceed 0.025 mg/l (as N). [Basin Plan]
 - e. No individual pesticide or combination of pesticides shall be present in the water column, sediments or biota at concentration(s) that adversely affect beneficial uses. Pesticides shall not be present at levels which will bioaccumulate in aquatic organisms to levels which are harmful to human health, wildlife or aquatic organisms. [Basin Plan]
 - f. The discharge of waste to inland surface waters designated for use as domestic or municipal supply (MUN) shall not contribute to concentrations of toxics in excess of the maximum contaminant levels (MCLs) for inorganic pollutants set forth in the CCR, Title 22, Division 4, Chapter 15, Article 4.1, section 64435 and organic pollutants set forth in Title 22, Division 4, Chapter 15, Article 5.5, section 64444A. [CCR title 22]
4. Radioactivity Characteristics
- a. Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life. [Basin Plan]
 - b. The radioactivity in the receiving waters shall not exceed limits specified in CCR title 17, division 1, chapter 5, subchapter 4, group 3, article 1, section 30253. [CCR title 17]
5. Toxicity Characteristics
- a. All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies,

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bioassays of appropriate duration, or other appropriate methods as specified by the San Diego Water Board. [Basin Plan]

- b. Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities. [Bays and Estuaries Plan]
- c. Pollutants shall not be present in sediments at levels that will bioaccumulate in aquatic life to levels that are harmful to human health. [Bays and Estuaries Plan]

D. Receiving Water Limitations for Ocean Waters

1. Bacterial Characteristics

For discharges of waste to the Pacific Ocean, within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline, and in areas outside this zone used for water contact sports, as determined by the San Diego Water Board (waters designated as REC-1), the following bacterial objectives shall be maintained throughout the water column [Ocean Plan]:

- a. 30-day Geometric Mean – The following standards are based on the geometric mean of the five most recent samples from each site:
 - 1) Total coliform density shall not exceed 1,000 per 100 mL;
 - 2) Fecal coliform density shall not exceed 200 per 100 mL; and
 - 3) Enterococcus density shall not exceed 35 per 100 mL.
- b. Single Sample Maximum
 - 1) Total coliform density shall not exceed 10,000 per 100 mL;
 - 2) Fecal coliform density shall not exceed 400 per 100 mL;
 - 3) Enterococcus density shall not exceed 104 per 100 mL; and
 - 4) Total coliform density shall not exceed 1,000 per 100 mL when the fecal coliform/total coliform ratio exceeds 0.1.

2. Physical Characteristics

- a. Floating particulates and grease and oil shall not be visible. [Ocean Plan]
- b. The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface. [Ocean Plan]
- c. Natural light shall not be significantly reduced at any point. [Ocean Plan]
- d. The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded. [Ocean Plan]

3. Chemical Characteristics

- a. The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste materials. [Ocean Plan]
- b. The pH shall not be changed at any time more than 0.2 units which occur naturally. [Ocean Plan]
- c. The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above the present under natural conditions. [Ocean Plan]

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- d. The concentration of substances set forth in chapter II, table 1 of the Ocean Plan (2012), in marine sediments shall not be increased to levels which would degrade indigenous biota. [Ocean Plan]
- e. The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life. [Ocean Plan]
- f. Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota. [Ocean Plan]
- g. Numerical water quality objectives contained in chapter II, table 1 of the Ocean Plan. [Ocean Plan]
- 4. Biological Characteristics
 - a. Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded. [Ocean Plan]
 - b. The natural taste, odor, color of fish, shellfish, or other marine resources used for human consumption shall not be altered. [Ocean Plan]
 - c. The concentration of organic materials in fish, shellfish, or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health. [Ocean Plan]
- 5. Radioactivity Characteristics
 - a. The discharge of radioactive waste shall not degrade marine life. [Ocean Plan]

IX. REOPENER PROVISIONS

This General Order may be revised or terminated for one or more of the following reasons:

- A.** A finding based on data or other sources by the San Diego Water Board that continued discharges may cause unreasonable degradation of the aquatic environment;
- B.** A finding that modification is warranted to address an applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) promulgated under CWA section 307(a) for a toxic pollutant where that standard or prohibition is more stringent than any limitation on the pollutant in this General Order;
- C.** A finding that modification is warranted to incorporate additional effluent limitations, prohibitions, and requirements, based on the results of additional monitoring required by the MRP (Attachment E); and
- D.** A finding that modification is warranted to incorporate new or revised statutes, regulations, plans or policies that affect water quality objectives applicable to this General Order, including but not limited to a basin plan amendment or a TMDL.

ATTACHMENT A – ABBREVIATIONS AND DEFINITIONS

ABBREVIATIONS

Abbreviation	Definition
ASBS	Areas of Special Biological Significance
Basin Plan	Water Quality Control Plan for the San Diego Basin
BMP	Best Management Practice
CCR	California Code of Regulations
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CTR	California Toxics Rule
CWA	Clean Water Act
ELAP	Environmental Laboratory Accreditation Program
HA	Hydrologic Area
HAS	Hydrologic Subarea
HU	Hydrologic Unit
lbs/day	Pounds per Day
mg/l	Milligrams per Liter
MCL	Maximum Contaminant Level
MM	Management Measure
MUN	Municipal and Domestic Supply Beneficial Use
NRCS	National Resources Conservation Service
NOI	Notice of Intent
NOT	Notice of Termination
NTR	National Toxics Rule
Ocean Plan	California Ocean Plan, Water Quality Control Plan Ocean Waters of California
QAPP	Quality Assurance Project Plan
RCD	Resource Conservation District
REC-1	Contact Water Recreation Beneficial Use
REC-2	Non-contact Water Recreation Beneficial Use
ROWD	Report of Waste Discharge
San Diego Water Board	California Regional Water Quality Control Board, San Diego Region
SCCWRP	Southern California Coastal Waters Research Project
SHELL	Shellfish Harvesting Beneficial Use
State Water Board	State Water Resources Control Board
Thermal Plan	Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UCCE	University of California Cooperative Extension
µg/l	Micrograms per Liter
USEPA	United States Environmental Protection Agency
U.S.	United States
Water Code	California Water Code
WDID	Waste Discharge Identification
WDRs	Waste Discharge Requirements
WLA	Waste Load Allocation
WQO	Water Quality Objective
WQS	Water Quality Standard

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DEFINITIONS

Agricultural Operation

An entity, organized as a sole proprietorship, partnership, corporation, Limited Liability Company, cooperative, or other business entity that owns or engages in the growing of crops from soil and the raising of plants at wholesale nurseries with the purpose of selling the crops and plants and meets one of the following criteria:

1. Generates \$10,000 or greater of annual gross sales;
2. Located within 100 feet of a water body or that discharge storm water runoff or irrigation water into a water body; or,
3. Pose a significant threat to water quality, as determined by the San Diego Water Board.

Agronomic Rates

Application of amendments in amounts and at rates required to produce an expected yield. The agronomic rate is a function of the crop, rainfall and applied irrigation, soil type, soil fertility, and climate. The purpose of applying amendments at agronomic rates is to restrict the migration of amendments to the root zone for uptake by the crop, and not be available for offsite migration.

Antidegradation Policy

State Water Board Resolution 68-16, "*Statement of Policy with Respect to Maintaining High Quality Waters in California*," is a state policy that establishes the requirement that discharges to waters of the state shall be regulated to achieve the "highest water quality consistent with maximum benefit to the people of the State". Resolution No. 68-16 establishes essentially a two-step process to comply with the policy. The first step is if a discharge will degrade high quality water, the discharge may be allowed if any change in water quality (1) will be consistent with maximum benefit to the people of the State, (2) will not unreasonably affect present and anticipated beneficial use of such water, and (3) will not result in water quality less than that prescribed in state policies (e.g. water quality objectives in Water Quality Control Plans). The second step is that any activities that result in discharges to such high quality waters are required to use the best practicable treatment or control of the discharge necessary to avoid a pollution or nuisance and to maintain the highest water quality consistent with the maximum benefit to the people of the State.

Beneficial Uses

Uses of waters of the State that may be protected against quality degradation, which include, but are not limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves [Water Code section 13050(f)]. "Beneficial Uses" are equivalent to "Designated Uses" under federal law.

Best Management Practices (BMPs)

BMPS are methods, measures, or practices designed and selected to reduce or eliminate the discharge of pollutants to surface waters from point and nonpoint source discharges including storm water. BMPs include structural and non-structural controls, and operation and maintenance procedures, which can be applied before, during, and/or after pollution producing activities. [nonpoint sources Policy]

Coalition Group

A third-party organization that on behalf of its Members provides specific services to assist in the Dischargers efforts to comply with the General Order. Coalition Groups may be based on a specific geographic area, watershed area, water body, agricultural operation type or size, agriculture non-governmental organizations or any mix of similar cooperative efforts.

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Discharger

Any person or entity that owns or operates an Agricultural Operation and meets at least one of the following enrollment criteria:

1. Agricultural Operations that generate \$10,000 or greater of annual gross sales;
2. Agricultural Operations located within 100 feet of a water body or that discharge storm water runoff or irrigation water into a water body; or,
3. Other Agricultural Operations that pose a significant threat to water quality, as determined by the San Diego Water Board.

Groundwater

Water in the ground that is in the zone of saturation. The upper surface of the saturate zone is called the water table.

Individual Discharger

A Discharger who enrolls in the General Order as an individual.

Inland Surface Waters

All surface waters of the San Diego Region exclusive of the waters of the Pacific Ocean, enclosed bays and estuaries, coastal lagoons, and ground waters. Inland Surface Waters includes perennial and intermittent streams, reservoirs and lakes.

Management Measures

Management measures are generally groups of affordable management practices that are used together in a system to achieve more comprehensive goals such as minimizing the delivery of sediment from a farm to receiving waters or maximizing the efficiency with which nutrients are applied to croplands to achieve reasonable yields (see Chapter 2, USEPA National Management Measures for the Control of Nonpoint Pollution from Agriculture).

Member

A Discharger who enrolls in the General Order as a Member of a Coalition Group.

Notice of Applicability (NOA)

Written notice that the NOI submitted to the San Diego Water Board as an individual, or the request to form a Coalition Group has been approved by the San Diego Water Board. The San Diego Water Board may include additional prohibitions and requirements in the NOA based on information provided in the NOI or the request to form a Coalition Group.

Quality of Water

Chemical, physical, biological, bacteriological, radiological, and other properties and characteristics of water which affect its use (Water Code section 13050(f)).

Surface Water Body

Natural or constructed feature used for the transportation or storage of water. Surface water bodies include:

1. Rivers;
2. Perennial Streams;
3. Intermittent Streams;
4. Drainage Ditches;
5. Reservoirs;

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6. Ponds; and
7. Lakes.

Surface Water Bodies do not include tanks used store water or buried pipes.

Waste

Includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal [Water Code section 13050(d)].

Water of the State

Any surface water or groundwater, including saline waters, within the boundaries of the State (Water Code section 13050(e)).

Water Quality Control Plan

Consists of a designation or establishment for the waters within a specified area of all of the following:

1. Beneficial uses to be protected.
2. Water quality objectives.
3. A program of implementation needed for achieving water quality objectives [(Water Code section 13050(j))].

Water Quality Objectives

The limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area Water Code section 103050(h). (Water quality objectives referenced in this General Order are based on State policies and plans. "Water Quality Objectives" are equivalent to "Water Quality Criteria" under federal law.

Water Quality Protection Plan

A Water Quality Protection Plan (WQPP) is a planning document to be used by the grower to identify MMs/BMPs to be used to meet the requirements of this General Order.

Water Quality Standards

Water Quality Standards (WQSs) are provisions of state or federal law that consist of the designated beneficial uses of a waterbody, the numeric and narrative water quality criteria that are necessary to protect the uses of that particular waterbody, and an antidegradation statement. Water quality standards include water quality objectives in the Central Valley Water Board's two Basin Plans, water quality criteria in the California Toxics Rule and National Toxics Rule adopted by USEPA, and/or water quality objectives in other applicable State Water Board plans and policies. Under section 303 of the Clean Water Act, each state is required to adopt water quality standards.

Units

mS/cm: Micro siemens per cubic meter

mg/L: Milligrams per liter

mg/kg: Milligrams per kilogram

MPN: Most probable number of bacterial colonies

NTU: Nephelometric Turbidity Units

µg/L: Micrograms per liter

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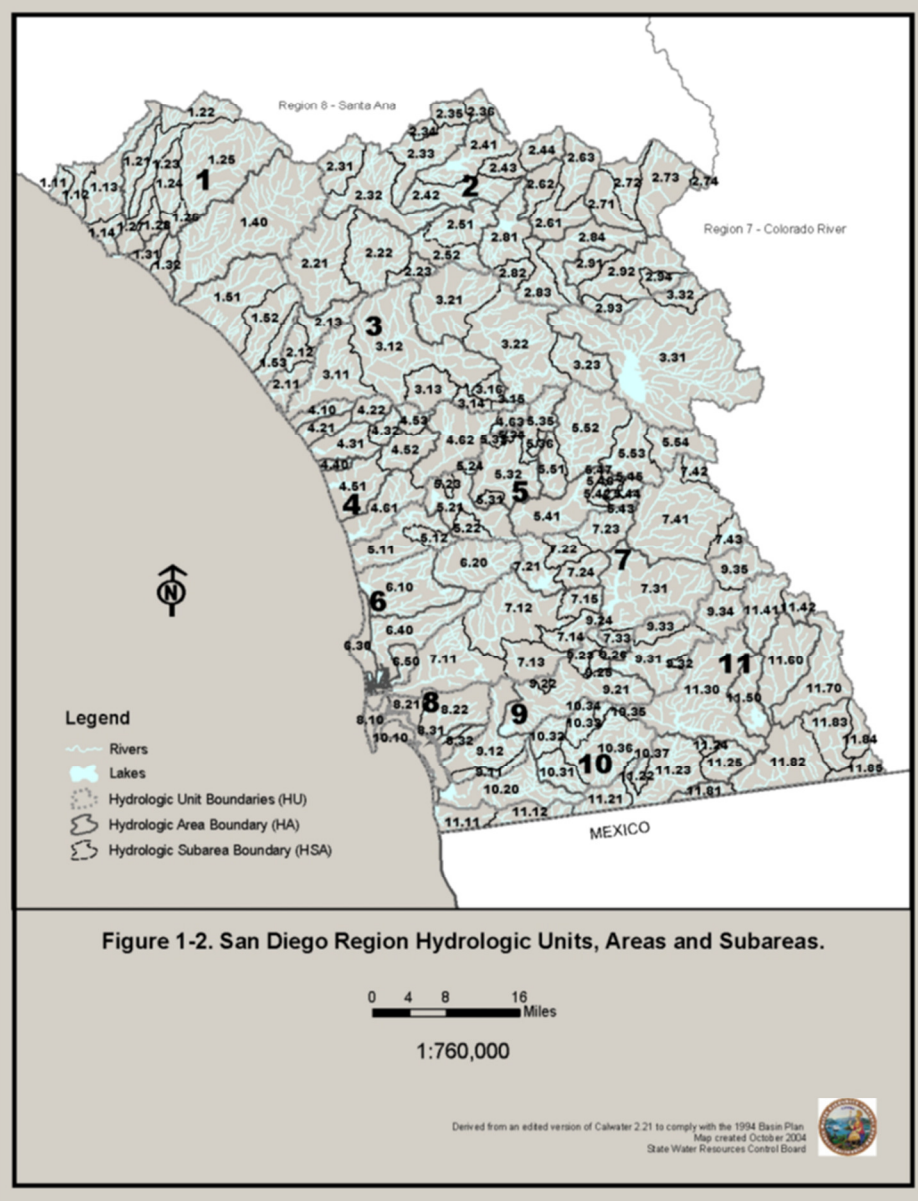
ATTACHMENT B – MAPS

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Figure B-1

Map Showing Location of Lower San Juan Hydrologic Subarea (1.27), San Luis Rey Hydrologic Unit (3.00), San Marcos Hydrologic Area (4.50), and San Dieguito Hydrologic Unit (5.00)



FOR DISCUSSION PURPOSES ONLY**ATTACHMENT C – APPLICABLE TOTAL MAXIMUM DAILY LOADS (TMDLs)**

A total maximum daily load (TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards (numeric targets), and an allocation of that load among the various sources of that pollutant. Pollutant sources are characterized as either point sources that receive a wasteload allocation (WLA) or nonpoint sources that receive a load allocation (LA). TMDLs must also account for seasonal variations in water quality, and include a margin of safety (MOS) to account for uncertainty in predicting how well pollutant reductions will result in meeting water quality standards.

The following TMDLs are applicable to discharges from Agricultural Operations in the San Diego Region:

- *Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus in Rainbow Creek Watershed*, Resolution No. R9-2005-0036 (Rainbow Creek TMDL), and
- *Revised TMDLs for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)*, Resolution No. R9-2010-0001 (Bacteria TMDL).

This attachment provides details concerning these TMDLs, including the applicable LAs and/or other applicable implementation requirements.

I. Rainbow Creek TMDL**A. Administrative Record**

The Rainbow Creek TMDL was adopted by the Regional Water Quality Control Board, San Diego Region (San Diego Water Board) on February 9, 2005, and approved by the State Water Resources Control Board (State Water Board) on November 16, 2005; the Office of Administrative Law (OAL) on February 1, 2006; the U.S. Environmental Protection Agency (USEPA) on March 22, 2006. The Rainbow Creek TMDL became effective on February 1, 2006.

B. Attainment Date

The attainment date contained in the Rainbow Creek TMDL is December 31, 2021.

C. Problem Statement

Nitrate concentrations in Rainbow Creek exceed the water quality objective for municipal supply (MUN), and total nitrogen and total phosphorus concentrations exceed the water quality objective for biostimulatory substances threatening to unreasonably impair the warm freshwater habitat (WARM), cold freshwater habitat (COLD), and wildlife habitat (WILD) beneficial uses of Rainbow Creek. Excessive nutrients in Rainbow Creek promote the growth of algae in localized areas, creating a nuisance condition that unreasonably interferes with aesthetics and water contact (REC-1) and non-water contact (REC-2) beneficial uses and threatens to impair WARM, COLD and WILD beneficial uses. Runoff from agriculture, nursery, and residential land uses contribute to increased pollutant nutrients in Rainbow Creek as a result of storm water runoff, irrigation return flows, and ground water contributions to the creek.

D. Numeric Targets

Numeric Targets interpret and implement water quality standards (i.e., numeric and narrative water quality objectives and beneficial uses). Numeric targets are established at levels that will ensure attainment of water quality objectives and the protection of beneficial uses. The numeric targets for nutrients are intended to achieve the numeric water quality objective for nitrates and the narrative water quality objective for stimulation of algal and emergent plant growth by nutrients. Water quality objectives are established for nitrates, total nitrogen, and

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total phosphorus to meet drinking water standards in the short-term, and to reduce existing periodic algal blooms and prevent future eutrophic conditions.

Table C-1 presents the applicable numeric targets.

Table C-1. Numeric Targets for Rainbow Creek watershed (in milligrams per liter (mg/l))

Constituent	Numeric Target
Nitrate (as N)	10
Total Nitrogen	1
Total Phosphorus	0.1

E. Source Assessment

A source assessment was conducted to identify all known sources of nutrients that contribute to the loading of nutrients into Rainbow Creek. As shown on Table C-2, the primary sources of nutrients into Rainbow Creek are Agricultural Operations.

Table C-2. Calculated Annual Total Nitrogen and Phosphorus Surface Water Loads to Rainbow Creek

Land Use	Nitrogen		Phosphorus	
	Calculated Load (kg/yr)	% of Total Calculated Load	Calculated Load (kg/yr)	% of Total Calculated Load
Agriculture	1,974	74%	126	48%
Park	7	>1%	0.2	>1%
Residential	650	24%	125	48%
Urban	53	2%	11.2	4%
Total	2,662	100%	262	100%

F. Load Allocations (LAs) Assigned to Agriculture

The LAs for total nitrogen and total phosphorus for Rainbow Creek are shown in Table C-3.

Table C-3. Load Allocations (LAs) for Total Nitrogen (TN) and Total Phosphorus (TP) (in kilograms per year (kg/yr))

Source	2009		2013		2017		2021	
	Load Allocation		Load Allocation		Load Allocation		Load Allocation	
	TN	TP	TN	TP	TN	TP	TN	TP
Commercial nurseries	390	20	299	16	196	10	116	3
Agricultural fields	504	28	386	21	253	14	151	4
Orchards	607	50	465	37	305	24	182	6

G. Implementation Plan

The Rainbow Creek TMDL includes an Implementation Plan for attainment of the required load allocations. Agricultural Operations within the Rainbow Creek Watershed must comply with the following requirements:

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1. Agricultural Operations in the Rainbow Creek Watershed must report annually, through the Annual Report, regarding the effectiveness of best management practice (BMP) planning, implementation, and effectiveness in reducing nutrient loading to surface waters and groundwater.

II. Bacteria TMDL**A. Administrative Record**

The Bacteria TMDL was adopted by the San Diego Water Board on February 10, 2010, and approved by the State Water Board on December 14, 2010; OAL on April 4, 2011; and USEPA on June 22, 2011. The Bacteria TMDL became Effective on April 4, 2011.

B. Attainment Date

1. Attain Dry Weather TMDL: April 4, 2021.
2. Attain Wet Weather TMDL: April 4, 2031.

C. Problem Statement

Bacteria in the waters of the beaches and creeks addressed by this TMDL have exceeded numeric water quality objectives for total, fecal, and/or enterococci bacteria (collectively referred to as indicator bacteria). These exceedances of water quality objectives for indicator bacteria are shown in the monitoring data for beach segments where such data exist. Other beaches were consistently posted with health advisories and/or closed. These exceedances and postings threaten and impair the REC-1 and REC-2 beneficial uses. All inland surface waters and coastal marine waters in the San Diego Region are designated with both REC-1 and REC-2 beneficial uses.

Although water quality objectives for REC-1 and REC-2 beneficial uses are written in terms of density of indicator bacteria colonies, the actual risk to human health is caused by the presence of disease-causing pathogens. When the risk to human health from pathogens in the water is so great that beaches are posted with health advisories or closure signs, the quality and beneficial use of the water are impaired.

D. Numeric Targets

Different REC-1 water quality objectives were used as the basis for wet weather and dry weather allowable load (i.e., TMDL) calculations because the bacteria transport mechanisms to receiving waters are different under wet and dry weather conditions. Because wet weather conditions, or storm flow, are episodic and short in duration, and characterized by rapid wash-off and transport of high bacteria loads, with short residence times, from all land use types to receiving waters, the single sample maximum water quality objectives were appropriate for use as wet weather numeric targets. For dry weather conditions, because dry weather runoff is not generated from storm flows, is not uniformly linked to every land use, and is more uniform than stormflow, with lower flows, lower loads, and slower transport, making die-off and/or amplification processes more important, the geometric mean water quality objectives were appropriate for use as dry weather numeric targets. Wet weather TMDL calculations were based on the REC-1 single sample maximum water quality objectives while dry weather TMDL calculations were based on REC-1 geometric mean water quality objectives. Table C-4 contains the wet weather numeric targets, and Table C-5 contains the dry weather numeric targets.

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Table C-4. Wet Weather Numeric Targets

Indicator Bacteria	Numeric Target (MPN/100ml)	Allowable Exceedance Frequency¹
Fecal coliform	400 ²	22%
Total coliform	10,000 ³	22%
Enterococci	104 ⁴ / 61 ⁵	22%

Notes:

1. Percent of wet days (i.e., rainfall events of 0.2 inches or greater and the following 72 hours) allowed to exceed the wet weather numeric targets. Exceedance frequency based on reference system in the Los Angeles Region.
2. Fecal coliform single sample maximum water quality objective for REC-1 use in creeks and at beaches.
3. Total coliform single sample maximum water quality objective for REC-1 use at beaches and the point in creeks that discharges to beaches.
4. Enterococci single sample maximum water quality objective for REC-1 use in creeks established and designated as “moderately or lightly used” in the Basin Plan and at beaches downstream of those creeks, as well as all other beaches.
5. Enterococci single sample maximum water quality objective for REC-1 use in creeks not established and designated as “moderately or lightly used” in the Basin Plan and at beaches downstream of those creeks (“designated beach” frequency of use; applicable to San Juan Creek and downstream beach, Aliso Creek and downstream beach, Tecolote Creek, Forrester Creek, San Diego River and downstream beach, and Chollas Creek).

Table C-5. Dry Weather Numeric Targets

Indicator Bacteria	Numeric Target (MPN/100ml)	Allowable Exceedance Frequency¹
Fecal coliform	200 ²	0%
Total coliform	1000 ³	0%
Enterococci	35 ⁴ / 33 ⁵	0%

Notes:

1. Percent of dry days (i.e., days with less than 0.2 inch of rainfall observed on each of the previous 3 days) allowed to exceed the dry weather numeric targets.
2. Fecal coliform 30-day geometric mean water quality objective for REC-1 use in creeks and at beaches.
3. Total coliform 30-day geometric mean water quality objective for REC-1 at beaches and the point in creeks that discharges to beaches.
4. Enterococci 30-day geometric mean water quality objective for REC-1 at beaches.
5. Enterococci 30-day geometric mean water quality objective for REC-1 use in impaired creeks and beaches downstream of those creeks (applicable to San Juan Creek and downstream beach, Aliso Creek and downstream beach, Tecolote Creek, Forrester Creek, San Diego River and downstream beach, and Chollas Creek).

E. Load Allocations (LAs) Assigned to Agricultural Operations

The LAs for identified watersheds are shown in Table C.6.

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Table C.6. Load Allocations (LAs) for Fecal Coliform, Total Coliform, and Enterococcus

Watershed	Indicator Bacteria	Wet Weather Bacteria Load (Billion MPN ¹ /year)		Dry Weather Bacteria Load (Billion MPN/month)	
		Existing	Load Allocation	Existing	Load Allocation
San Joaquin Hills/ Laguna Hills HSAs (901.11 and 901.12)	Fecal Coliform	7,346	7,346	0	0
	Total Coliform	50,774	50,774	0	0
	Enterococcus	3,201	3,201	0	0
Aliso HSA (901.13)	Fecal Coliform	26,508	26,508	0	0
	Total Coliform	179,828	179,828	0	0
	Enterococcus ²	3,201	3,201	0	0
Lower San Juan HSA (901.27)	Fecal Coliform	3,275,477	2,855,570	0	0
	Total Coliform	18,499,884	14,946,372	0	0
	Enterococcus ²	1,151,266	839,040	0	0
San Clemente HA (901.30)	Fecal Coliform	366	366	0	0
	Total Coliform	2,370	2,370	0	0
	Enterococcus	148	148	0	0
San Luis Rey HU (903.00)	Fecal Coliform	20,687,954	20,041,659	0	0
	Total Coliform	117,360,800	110,768,160	0	0
	Enterococcus	6,881,755	6,077,514	0	0
San Marcos HA (904.50)	Fecal Coliform	11,199	9,073	0	0
	Total Coliform	122,414	99,809	0	0
	Enterococcus	7,825	6,246	0	0
San Dieguito HU (905.00)	Fecal Coliform	11,872,240	11,698,811	0	0
	Total Coliform	69,551,416	66,570,499	0	0
	Enterococcus	4,423,566	4,082,010	0	0
Mission San Diego/ Santee HSAs (907.11 and 907.12)	Fecal Coliform	414,721	414,721	0	0
	Total Coliform	3,495,960	3,495,960	0	0
	Enterococcus ²	213,149	213,149	0	0

Notes:

1. MPN = Most probable number of bacteria colonies
2. See Table C.7 for Alternative Wet Weather Enterococcus Load Allocation for Agriculture

Table C.7 . Alternative Wet Weather Enterococcus Bacteria Load Allocation

Watershed	Existing Load (Billion MPN/year)	Load Allocation (Billion MPN/year)
Aliso HSA (901.13)	11,245	11,245
Lower San Juan HSA (901.27)	1,151,266	841,564
Mission San Diego/ Santee HSAs (907.11 and 907.12)	213,149	213,149

FOR DISCUSSION PURPOSES ONLY**F. Implementation Plan**

The Implementation Plan for the Bacteria TMDL specifies that when WDRs are adopted for nonpoint source discharges, such as discharges from Agricultural Operations, that they be consistent with the TMDLs and LAs. The following requirements apply to Agricultural Operations that are within the identified watersheds:

1. Agricultural Operations in the identified watersheds must report annually, through the Annual Report, regarding the effectiveness of BMP planning, implementation, and effectiveness in reducing bacteria loading to surface waters and groundwater.

FOR DISCUSSION PURPOSES ONLY**ATTACHMENT D – STANDARD PROVISIONS****STANDARD PROVISIONS****1. Duty to Comply**

The Discharger must comply with all of the conditions of this General Order. Any noncompliance with this General Order constitutes a violation of the Water Code and is grounds for the following:

- a. Enforcement action; or,
- b. Termination of enrollment in this General Order.

2. Duty to Mitigate

The Discharger must take all reasonable steps to minimize or prevent any discharge in violation of this General Order that has a reasonable likelihood of adversely affecting human health or the environment.

3. Proper Operation and Maintenance

The Discharger must at all times properly operate and maintain management measures (MMs) and best management practices (BMPs) which are installed or used by the Discharger to achieve compliance with the conditions of this General Order.

4. Property Rights

This General Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, do not protect the owner/operator from liability under federal, State, or local laws, nor create a vested right for the owner and operator to continue the regulated activity.

5. Inspection and Entry

Under the authority of Water Code section 13267(c), the Discharger must allow the San Diego Water Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to do the following:

- a. Enter the Discharger's premises where a regulated operation or activity is located or conducted, or where records are kept under the conditions of this General Order;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this General Order;
- c. Inspect at reasonable times any facilities, equipment, practices, or operations regulated or specified in this General Order;
- d. Sample or monitor, at reasonable times, for the purposes of assuring compliance with this General Order or as otherwise authorized by the Water Code, any substances or parameters at any location; and,
- e. Photograph or video record any structures, operations, activities, or other conditions that could result in adverse impacts to water quality and that are pertinent to compliance with this General Order.

6. Penalty of Perjury Statement/Certification Statement

All submittals required under the General Order must be signed by the Discharger or authorized agent of the Coalition Group, and must include the following statement under penalty of perjury, the following:

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"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Coalition Groups must include an additional statement by the Coalition Group's authorized agent certifying that, under penalty of perjury, the following:

"I certify under penalty of law that the information submitted to the San Diego Water Board has been prepared in accordance with the requirements of the General Order and the Coalition Group's governance structure, that sufficient inquiries were made to ensure that the information provided by others is true and correct, that the Members were provided a copy of the submittal, and that the Members were notified that they are responsible for all information provided by them to the Coalition Group and they are responsible complying with the requirements of the General Order."

7. Monitoring

- a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
- b. All analyses shall be performed in a laboratory certified to perform such analyses by the State Water Board's Division of Drinking (DDW) or by a laboratory approved by the San Diego Water Board. The laboratory must be accredited under the DDW Environmental Laboratory Accreditation Program (ELAP) to ensure the quality of analytical data used for regulatory purposes to meet the requirements of this Order. Additional information on ELAP can be accessed at:http://www.waterboards.ca.gov/drinking_water/certlic/labs/index.shtml.

8. Records

- a. The Discharger and/or Coalition Group shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this General Order, and records of all data used to complete the application for this General Order, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board Executive Officer at any time.
- b. Records of monitoring information shall include the following:
 1. The date, exact place, and time of sampling or measurements;
 2. The individual(s) who performed the sampling or measurements;
 3. The date(s) analyses were performed;
 4. The individual(s) who performed the analyses;
 5. The analytical techniques or methods used; and
 6. The results of such analyses.

FOR DISCUSSION PURPOSES ONLY**9. Monitoring Reports**

Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this General Order.

10. Enforcement

The San Diego Water Board is authorized to enforce the terms of this permit and individual Notices of Applicability under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

11. Document Submittal

All documents required the General Order and MRP shall be submitted electronically to the San Diego Water Board, in a searchable pdf format or as otherwise directed, to sandiego@waterboards.ca.gov. All documents submitted to the San Diego Water Board must include the reference code "<CW-803119:bpulver>" in the header or subject line, where "<bpulver>" is the first initial and last name of the San Diego Water Board case manager.

FOR DISCUSSION PURPOSES ONLY**ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)**

California Water Code (Water Code) sections 13267 and 13383 authorize the San Diego Water Board to establish monitoring, reporting, and recordkeeping requirements. Pursuant to this authority, this Monitoring and Reporting Program (MRP) establishes conditions for Dischargers and/or Coalition Groups to conduct routine monitoring activities and prepare and to submit technical and monitoring reports to the San Diego Water Board. The purposes of the MRP are to determine compliance with discharge specifications and other requirements established in this General Order, to assess effectiveness of management measures (MMs) and best management practices (BMPs) installed and maintained as required by this General Order, and to characterize the effects of discharges from Agricultural Operations on State waters.

Each monitoring section contains an introductory paragraph summarizing why the monitoring is needed and the key management questions the monitoring is designed to answer. In developing the list of key management questions, the San Diego Water Board considered four basic types of information for each question:

- Management Information Need – Why does the San Diego Water Board need to know the answer?
- Monitoring Criteria – What monitoring will be conducted for deriving an answer to the question?
- Expected Product – How should the answer be expressed and reported?
- Possible Management Actions – What actions will be potentially influenced by the answer?

The framework for this monitoring program has three components that comprise a range of spatial and temporal scales: 1) core monitoring, 2) regional monitoring, and 3) special studies.

1. Core Monitoring

Core monitoring consists of the basic site-specific monitoring necessary to measure compliance with the requirements of this General Order and/or impacts to receiving water quality. Core monitoring is typically conducted in the immediate vicinity of the discharge by examining local scale spatial effects.

2. Regional Monitoring

Regional monitoring provides information necessary to make assessments over large areas and serves to evaluate cumulative effects of all anthropogenic inputs. Regional monitoring data also assists in the interpretation of core monitoring studies. Regional Monitoring can include ambient monitoring.

3. Special Studies

Special studies are directed monitoring efforts designed in response to specific management or research questions identified through either core or regional monitoring programs. Oftentimes, special studies are used to help understand core or regional monitoring results, where a specific environmental process is not well understood, or to address unique issues of local importance.

I. GENERAL MONITORING AND REPORTING PROVISIONS

- A. Samples and measurements must meet be representative of the volume and nature of the discharge, and must be taken at the monitoring points approved by the San Diego Water Board.
- B. Monitoring points must not be changed without prior notification to and approval by the San Diego Water Board.

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- C. All monitoring instruments and devices shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices.
- D. Only flow measurement devices and methods consistent with accepted scientific practices may be used to ensure the accuracy and reliability of measurements of expected flows. The devices must be installed, calibrated, and maintained to ensure that the accuracy of the measurement is consistent with the accepted capability of that type of device. Devices selected must be capable of measuring flows with a maximum deviation of less than ± 5 percent from flow rate throughout the range of expected discharge volumes. All flow measurement devices must be calibrated at least once per year, or more frequently, to ensure continued accuracy of the devices.
- E. Monitoring must be conducted according to the U.S. Environmental Protection Agency (USEPA) test procedures in title 40 of the Code of Federal Regulations (40 CFR) part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act, as amended, unless otherwise specified in this General Order. The San Diego Water Board may approve equivalent test procedures at its discretion.
- F. All analyses shall be performed in a laboratory certified to perform such analyses by the State Water Board's Division of Drinking (DDW) or by a laboratory approved by the San Diego Water Board. The laboratory must be accredited under the DDW Environmental Laboratory Accreditation Program (ELAP) to ensure the quality of analytical data used for regulatory purposes to meet the requirements of this Order. Additional information on ELAP can be accessed at:
http://www.waterboards.ca.gov/drinking_water/certlic/labs/index.shtml.
- G. All plans and reports required under this MRP must be prepared by professionals qualified to prepare such plans and reports. Professionals should be qualified, licensed where applicable, and competent and proficient in the fields pertinent to the required activities. California Business and Professions Code sections 6735, 7835, and 7835.1 require that engineering and geologic evaluations and judgments be performed by or under the direction of registered professionals. A statement of qualifications of the responsible lead professionals shall be included in all plans and reports submitted by the Discharger.
- H. Monitoring results shall be reported at intervals and in a manner specified in this this MRP and the Notice of Applicability (NOA) pursuant to sections I.A.3, III.B, and IV.B of the General Order.
- I. A copy of the Water Quality Protection Plan (sections II.B and III.C), Annual Report (sections II.C and E) signed and certified as required by Attachment D, Standard Provisions section 6, shall be submitted to the San Diego Water Board at the address listed in section I.J of this MRP.
- J. The San Diego Water Board is implementing a Paperless Office system to reduce paper use, increase efficiency, and provide a more effective way for San Diego Water Board staff, the public and interested parties to view water quality documents in electronic form. Please convert all regulatory documents, submissions, materials, and correspondence that would normally be submitted as hard copies to a searchable Portable Document Format (PDF). Data may be submitted in Excel spreadsheets. Documents that are less than 50 MB should be emailed to SanDiego@waterboards.ca.gov. Documents that are 50MB or larger should be transferred to a disk and mailed to the San Diego Water Board's street address.
- K. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous

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monitoring, instrumentation, copies of all reports required by the General Order and this MRP, and records of all data used to complete the application for the General Order. Records of monitoring information shall include information required under Attachment D, Standard Provisions, section IV. Records shall be maintained for a minimum of three years from the date of sample, measurement, report, or application. This period may be extended by request of this San Diego Water Board at any time.

- L. This MRP may be modified by the San Diego Water Board, as appropriate.
- M. Dischargers enrolled in the General Order must implement a monitoring program as specified in the following Table (Table E-1):

Table E-1. Monitoring Tier Requirements

Monitoring Tier	MRP Section	Monitoring Requirements		
		Core Monitoring	Regional Monitoring	Special Studies
Individual Discharger	II	Yes	No	Not at this time
Coalition Group	III	Yes	Yes	Not at this time

II. INDIVIDUAL DISCHARGER MONITORING AND REPORTING REQUIREMENTS**A. Individual Discharger Core Monitoring**

1. Individual Core Monitoring Questions

The Core Monitoring required by this MRP is designed to answer the following questions:

- a. Did the Discharger employ MMs/BMPs as described in their Water Quality Protection Plan (WQPP)?
- b. How effective were the MMs/BMPs in reducing or eliminating the discharge from the Agricultural Operation to surface waters?
- c. Are the Individual Dischargers in the Rainbow Creek Watershed properly employing the MM/BMPs required by section VII.D.2 of the General Order?
- d. Are the waste load allocations (WLAs) in the Revised TMDLs for Indicator Bacteria, Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek), Resolution No. R9-2010-0001 (Bacteria TMDL) assigned to agriculture being met?

2. Individual Core Monitoring Requirements

Individual Dischargers are required to do the following:

- a. At least monthly, visually observe and document (with photographs and/or videos, as applicable) installed MMs/BMPs to assess their effectiveness at eliminating dry weather runoff;
- b. During at least three rain events per year, visually observe and document (with photographs and/or videos, as applicable) installed MMs/BMPs to assess their effectiveness at preventing storm water contact with possible pollutants;
- c. Beginning January 1, 2017, Individual Dischargers located adjacent to a surface water are required to conduct trend monitoring and frequency specified in Table E-2 at locations identified in an approved WQPP:

FOR DISCUSSION PURPOSES ONLY**Table E-2. Individual Discharger Trend Monitoring Requirements**

Monitoring Parameter	Units	Frequency
Temperature	°C	Quarterly
Dissolved Oxygen (DO)	mg/L	Quarterly
Conductivity	mS/cm	Quarterly
pH	Standard Units	Quarterly
Flow Velocity and Volume	ft/sec; ft ³ /day	Quarterly
Total Dissolved Solids (TDS)	mg/L	Quarterly
Total Nitrogen as N (TN)	mg/L	Quarterly
Total Phosphorus (TP)	mg/L	Quarterly

d. Individual Dischargers located adjacent to a waterbody and within the following watersheds are required to conduct trend monitoring and frequency specified in Table E-3 at locations identified in an approved WQPP:

- San Joaquin Hills/Laguna Hills Hydrologic Sub Areas (HSAs);
- Aliso HSA;
- Lower San Juan HSA;
- San Clemente Hydrologic Area (HA);
- San Luis Rey Hydrologic Unit (HU);
- San Marcos HA;
- San Dieguito HU; and
- Mission San Diego/ Santee HSAs.

Table E-3. Individual Discharger Bacteria TMDL Trend Monitoring Constituents

Constituent	Frequency	Test Method
Fecal Coliform	Quarterly During First Year Only	Standard Method 9222d
Total Coliform	Quarterly During First Year Only	Standard Method 9222b
Enterococci	Quarterly	EPA Method 1600

B. Individual Discharger Water Quality Protection Plan Requirements

A Water Quality Protection Plan (WQPP) describes the MMs/BMPs to be implemented protect water quality, and the activities (including applicable monitoring) that will be performed to ensure that the MMs/BMPs employed are effective and are being maintained. A WQPP must be submitted with the Notice of Intent (NOI), as specified in section III.A.2 of the General Order, for review and approval by the San Diego Water Board. The WQPP must contain the following minimum information:

1. General information regarding the Agricultural Operation including:
 - a. Address and Assessor's Parcel Number of the Agricultural Operation;
 - b. Name, address, phone number, and email of the Discharger;
 - c. Name, address, phone number, and email of the property owner (if different from Agricultural Operation owner);
 - d. Size, in acres, of the Agricultural Operation; and

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- e. List of crops grown and acres dedicated for each crop grown at the Agricultural Operation;
2. A map of the Agricultural Operation including the locations of:
 - a. Property boundaries, roads, structures, chemical storage areas, drainage structures;
 - b. MMs/BMPs;
 - c. Waterbodies;
 - d. Growing areas with names of crops grown in each area; and
 - e. Composting activities including compost and manure storage areas.
 3. A description, including a topographic map, of the general drainage area in which the enrolled property is located;
 4. A description of the MMs/BMPs to be used; and
 5. An inspection schedule of the MMs/BMPs to identify areas in need of repair. At a minimum, the inspections must be done quarterly. The inspection schedule must also include a description of how the inspections will be documented, including photo documentation.
 6. Individual Dischargers located adjacent to a water body must also include the following:
 1. A map showing proposed monitoring locations (primary and four alternate monitoring locations), the enrolled property. Proposed monitoring locations must meet the following minimum requirements:
 - a. One monitoring location must be established within 50 feet of the most upstream portion of the property;
 - b. One monitoring location must be established within 50 feet of the most downstream portion of the property;
 - c. Monitoring locations must be readily accessible during the dry and wet season; and
 - d. Monitoring locations must be known to, under normal conditions, have sufficient water to sample;
 2. The rationale for the selection of each monitoring location and alternative locations; including information to demonstrate that the proposed locations adequately documents and monitors waste discharges to waters of the State, the effects of those discharges, and the success of MMs/BMPs at minimizing or eliminating those effects;
 3. A table of the GPS coordinates for each primary and alternate monitoring location;
 4. Documentation showing that permission has been granted to access all primary and alternate sites, including fully executed access agreements to ensure that monitoring sites will be accessible for monitoring events;
 5. A list of the constituents to be monitored at each site, as specified in MRP section III.A;
 6. The frequency and approximate dates of monitoring, as specified in MRP section III.A;

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7. A description of the monitoring team, including names, titles, and contact information;
8. A description of the sampling design, including the following:
 - 1) Sampling methods,
 - 2) Sample handling and custody procedures;
 - 3) Analytical methods;
 - 4) Quality control measures;
 - 5) Instrument/equipment testing, inspection, and maintenance protocols;
 - 6) Instrument/equipment calibration frequency;
 - 7) Inspection/acceptance of supplies and consumables;
 - 8) Non-direct measurement; and
 - 9) Data Management.
9. A description of assessments, response actions and reporting protocols;
10. A description of data review, verification, and validation methods; and
11. A Quality Assurance Project Plan (QAPP) that meets the State Water Boards Surface Water Ambient Monitoring Program (SWAMP) requirements.¹

C. Individual Discharger Annual Report Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.
2. The Discharger shall submit an Annual Report by April 30 of each year, covering January 1 through December 31 of the prior year. The first Annual Report is due April 30, 2017. The Annual Report must include the following:
 - a. A copy of the completed Annual Self-Assessment;
 - b. Documentation that the educational requirement specified in section VII.B of the Order was met;
 - c. A copy of all results from monitoring activities conducted during the year, including:
 - 1) Description of the monitoring activities;
 - 2) Maps showing monitoring locations;
 - 3) Tables of all data collected,
 - 4) Laboratory test reports and completed chain of custodies for the samples analyzed; and
 - 5) Time concentration graphs of total nitrogen, total phosphorus, dissolved oxygen, and enterococci, if monitoring for these parameters is required.
 - d. A description of any instances of noncompliance that occurred during the reporting period, including the actions taken to address those instances.
3. All monitoring data must be submitted through the California Environmental Data Exchange Network (CEDEN).

¹ http://www.waterboards.ca.gov/water_issues/programs/swamp/tools.shtml

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4. At any time during the term of this General Order, the San Diego Water Board may notify the Discharger to electronically submit reports using the State Water Board's California Integrated Water Quality System (CIWQS) Program website http://www.waterboards.ca.gov/water_issues/programs/ciwqs/. Until such notification is given, the Discharger shall submit hard copy reports. The CIWQS website provides additional directions for report submittal in the event there will be service interruption for electronic submittal.

III. COALITION GROUP MONITORING REQUIREMENTS AND REPORTING REQUIREMENTS

A. Coalition Group Core Monitoring

1. Coalition Group Core Monitoring Questions

Core Monitoring required by this MRP is designed to answer the following questions:

- Did the Discharger employ MMs/BMPs as described in their Water Quality Protection Plan (WQPP)?
- How effective were the MMs/BMPs in reducing or eliminating the discharge from the Agricultural Operation to surface waters?
- Are the Individual Dischargers in the Rainbow Creek Watershed properly employing the MM/BMPs required by section VII.D.2 of the General Order?
- Are the waste load allocations (WLAs) in the Bacteria TMDL assigned to agriculture being met?

2. Coalition Group Core Monitoring Requirements

Coalition Groups are required to do the following:

- Visually observe and document (with photographs and/or videos, as applicable) installed MMs/BMPs to assess their effectiveness at eliminating dry weather runoff;
- During at least three rain events per year, visually observe and document (with photographs and/or videos, as applicable) installed MMs/BMPs to assess their effectiveness at preventing storm water contact with possible pollutants;
- Beginning January 1, 2017, Coalition Groups on behalf of its Members are required to conduct trend monitoring specified in Table E-4 at locations identified in the approved WQPP:

Table E-4. Coalition Group Trend Monitoring Requirements

Monitoring Parameter	Units	Frequency
Temperature	°C	Quarterly
Dissolved Oxygen (DO)	mg/L	Quarterly
Conductivity	mS/cm	Quarterly
pH	Standard Units	Quarterly
Flow Velocity and Volume	ft/sec; ft ³ /day	Quarterly
Total Dissolved Solids (TDS)	mg/L	Quarterly
Total Nitrogen as N (TN)	mg/L	Quarterly
Total Phosphorus (TP)	mg/L	Quarterly

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- d. Coalition Groups with Members located within the following watersheds are required to conduct monitoring to determine compliance with the load allocations for agriculture specified in the Bacteria TMDL:
- San Joaquin Hills/Laguna Hills Hydrologic Sub Areas (HSAs);
 - Aliso HSA;
 - Lower San Juan HSA;
 - San Clemente Hydrologic Area (HA);
 - San Luis Rey Hydrologic Unit (HU);
 - San Marcos HA;
 - San Dieguito HU; and
 - Mission San Diego/Santee HSAs.
- e. Beginning on January 1, 2017, Coalition Groups with Members located in these watersheds are required to conduct trend monitoring specified in Table E-5 at locations specified in an approved WQPP:

Table E-5. Coalition Group Bacteria TMDL Trend Monitoring Constituents

Constituent	Frequency	Test Method
Fecal Coliform	Quarterly During First Year Only	Standard Method 9222d
Total Coliform	Quarterly During First Year Only	Standard Method 9222b
Enterococci	Quarterly	EPA Method 1600

B. Regional Monitoring

1. Regional Monitoring is conducted on a watershed basis to assess the overall health of the watershed using of a monitoring program that not only looks at conventional and chemical water quality objectives, but also includes assessing biological indicators. The Regional Monitoring required by this MRP is designed to answer the following questions.
 - a. What is the condition of waterbodies in areas influenced by Agricultural Operations?
 - b. How effective were the MMs/BMPs in reducing or eliminating the discharge from the Agricultural Operation to surface waters?
2. Monitoring Parameters

Regional Monitoring parameters are listed on Table E-6

**Table E-6. Coalition Group Regional Monitoring Parameters
Monitoring Parameters to be Collected Once During the Dry Season and Once During the
Wet Season on Five Year Intervals**

Monitoring Parameter	Units
Temperature	°C
Dissolved Oxygen	mg/L
Conductivity	mS/cm
pH	standard units

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Monitoring Parameter	Units
Turbidity	NTU
Flow Velocity and Volume	ft/sec; ft ³ /day
Total Dissolved Solids (TDS)	mg/L
Total Suspended Solids (TSS)	mg/L
Nitrate as N (NO ₃)	mg/L
Nitrite as N (NO ₂)	mg/L
Total Nitrogen as N	mg/L
Chloride	mg/L
Sulfate	mg/L
Ammonium as N	mg/L
Particulate Nitrogen (PN)	mg/kg
Soluble reactive Phosphorus (SRP)	mg/L
Particulate Phosphorus (PP)	mg/kg
Total Phosphorus (TP)	mg/L
Particulate Organic Carbon (POC)	mg/L
Dissolved Organic Carbon	mg/L
Chlorophyll-A	µg/L
Algae Ash Free Dry Mass	g/m ²
Silica	mg/L
Soft Community Assessment	
Diatoms Community Assessment	
Macroinvertebrate Bioassessment	
Percent Algae Cover	%
Unshaded Solar Radiation	cal/(cm ² -day)
Flow Velocity and Volume	ft/sec; ft ³ /day
Stream Width and Depth	m
Percent Canopy Cover Over the Stream	%

C. Coalition Group Water Quality Protection Plan Requirements

A Water Quality Protection Plan (WQPP) describes the MMs/BMPs to be implemented protect water quality, and the activities (including applicable monitoring) that will be performed to ensure that the MMs/BMPs employed are effective and are being maintained. A WQPP must be submitted with the request to form a Coalition Group, as specified in section IV.B of the General Order, for approval by the San Diego Water Board. The WQPP must be amended each time a Member joins or leaves the Coalition Group to add/remove site-specific information for that member and to adjust monitoring locations, as appropriate. The WQPP must contain the following minimum information:

1. General information for each Member's Agricultural Operation including:
 - a. Address and Assessor's Parcel Number of the Agricultural Operation;
 - b. Name, address, phone number, and email of the Discharger;
 - c. Name, address, phone number, and email of the property owner (if different from Agricultural Operation owner);
 - d. Size, in acres, of the Agricultural Operation; and

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- e. List of crops grown and acres dedicated for each crop grown at the Agricultural Operation.
2. A map of each Member's Agricultural Operation including locations of:
 - a. Property boundaries, roads, structures, chemical storage areas, drainage structures;
 - b. MMs/BMPs;
 - c. Waterbodies;
 - d. Growing areas with names of crops grown in each area; and
 - e. Composting activities including compost and manure storage areas.
3. A description, including a topographic map, of the general drainage area in which the enrolled property is located;
4. A description of the MMs/BMPs to be used at each Member's Agricultural Operation; and
5. An inspection schedule for each of the MMs/BMPs at each Member's Agricultural Operation to identify areas in need of repair. At a minimum, the inspections must be done quarterly. The inspection schedule must also include a description of how the inspections will be documented, including photo documentation.
6. A map showing proposed monitoring locations (primary and alternate monitoring locations). Proposed monitoring locations must meet the following minimum requirements:
 - a. Be representative of areas influenced by agricultural activities;
 - b. Located in areas that will provide the information to answer the Monitoring Questions specified in section III.A.1;
 - c. Readily accessible during the dry and wet season;
 - d. Known to, under normal conditions, have sufficient water to sample;
 - e. Include existing monitoring locations used by the Southern California Storm Water Monitoring Coalition (SMC),² as presented on Table E-7.

Table E-7**Required Regional Monitoring Locations**

Monitoring Location Designation	Latitude	Longitude	Watershed
903S01717	33.233704	-117.093917	San Luis Rey
903S02457	33.296406	-117.085561	San Luis Rey
903S02933	33.340147	-117.132327	San Luis Rey
903S01909	33.311289	-117.138853	San Luis Rey
903S00693	33.269344	-117.031468	San Luis Rey
903S02145	33.255783	-117.250061	San Luis Rey
903S00457	33.319562	-117.165622	San Luis Rey
905S01174	33.016775	-117.01646	San Dieguito

² The Coalition Groups must work collaboratively to select monitoring locations based on the distribution and number of their respective Members. The initial selection of monitoring locations can be readjusted as the number of Coalition Groups changes.

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Monitoring Location Designation	Latitude	Longitude	Watershed
902S03401	33.487242	-117.255378	Santa Margarita
902S01161	33.446616	-117.255324	Santa Margarita
902S11593	33.450428	-117.311695	Santa Margarita
902S01097	33.464602	-117.277966	Santa Margarita
902E00888	33.45407	-117.30182	Santa Margarita

- f. Coalition Groups with Members located within the following watersheds are required to conduct monitoring at the monitoring locations within the watershed to determine compliance with the load allocations for agriculture specified in the Bacteria TMDL:

- San Joaquin Hills/Laguna Hills Hydrologic Sub Areas (HSAs);
- Aliso HSA;
- Lower San Juan HSA;
- San Clemente Hydrologic Area (HA);
- San Luis Rey Hydrologic Unit (HU);
- San Marcos HA;
- San Dieguito HU; and
- Mission San Diego/Santee HSAs;

Monitoring locations must be proposed for each watershed that meets the following conditions:

- 1) Representative of areas influenced by agricultural activities;
 - 2) Located in areas that will provide the information to answer the Monitoring Question in MRP section III.A.1.d;
 - 3) Readily accessible during the dry and wet season;
 - 4) Known to, under normal conditions, have sufficient water to sample;
7. A table of the GPS coordinates for each primary and alternate monitoring location;
 8. Documentation showing that permission has been granted to access all primary and alternate sites, including fully executed access agreements to ensure that monitoring sites will be accessible for monitoring events;
 9. A list of the constituents to be monitored at each site;
 10. The frequency and approximate dates of monitoring;
 11. The rationale for the selection of each monitoring location and alternative locations; including information to demonstrate that the proposed locations adequately documents and monitors waste discharges to waters of the State, the effects of those discharges, and the success of MMs/BMPs at minimizing or eliminating those effects;
 12. A description of the monitoring team, including names, titles, and contact information;
 13. A description of the sampling design, including the following:

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- a. Sampling methods,
 - b. Sample handling and custody procedures;
 - c. Analytical methods;
 - d. Quality control measures;
 - e. Instrument/equipment testing, inspection, and maintenance protocols;
 - f. Instrument/equipment calibration frequency;
 - g. Inspection/acceptance of supplies and consumables;
 - h. Non-direct measurement; and
 - i. Data Management;
14. A description of assessments, response actions and reporting protocols;
 15. A description of data review, verification, and validation methods; and
 16. A QAPP that meets SWAMP requirements.

D. Quarterly Membership Update Report

On a quarterly basis beginning April 30, 2016, each Coalition Group must submit a list, in Excel format, of the current Members, highlighting those Members who have joined the Coalition Group and those Members who have left the Coalition Group since the previous reporting period. The reporting periods for the Quarterly Membership Update Report are presented in Table E-8.

Table E-8. Coalition Group Quarterly Membership Update Report Schedule

Quarter	Reporting Period	Report Due Date
First Quarter	January 1 to March 30	April 30
Second Quarter	April 1 to June 30	July 30
Third Quarter	July 1 to September 30	October 30
Fourth Quarter	October 1 to December 30	January 30

E. Coalition Group Annual Report Reporting Requirements

1. The Coalition Group shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.
2. The Coalition Group shall submit an Annual Report by April 30 of each year, covering January 1 through December 31 of the prior year. The first Annual Report is due April 30, 2017. The Annual Report must include the following:
 - a. Certification that each Member completed the Annual Self-Assessment Summary;
 - b. Documentation that each Member completed the educational requirement specified in section VII.B of the General Order;
 - c. A copy of all results from monitoring activities conducted during the year, including;
 - d. Description of the monitoring activities;
 - e. Maps showing monitoring locations;
 - f. Tables of all data collected;

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- g. Laboratory test reports and completed chain of custodies for the samples analyzed;
 - h. Time concentration graphs of total nitrogen, total phosphorus, dissolved oxygen, and enterococci;
 - i. A description of any instances of noncompliance that occurred during the reporting period, including the actions taken to address those instances; and
 - j. A copy of the current WQPP, as amended to reflect changes in membership.
3. All monitoring data must be submitted through the California Environmental Data Exchange Network (CEDEN).
 4. At any time during the term of this General Order, the San Diego Water Board may notify the Discharger to electronically submit reports using the State Water Board's California Integrated Water Quality System (CIWQS) Program website http://www.waterboards.ca.gov/water_issues/programs/ciwqs/. Until such notification is given, the Discharger shall submit hard copy reports. The CIWQS website provides additional directions for report submittal in the event there will be service interruption for electronic submittal.
 5. Monitoring and reporting shall be completed according to the following schedule:

Table E-9. Coalition Group Report Due Dates

Report Type	MRP Section	Due Date
First Quarter Membership Update	III.D	Annually on April 30 of each year beginning in 2016
Second Quarter Membership Update		Annually on July 30 of each year beginning in 2016
Third Quarter Membership Update		Annually on October 30 of each year beginning in 2016
Fourth Quarter Membership Update		Annually on January 30 of each year beginning in 2017
Water Quality Protection Plan	III.C	Upon submittal of request to be certified as a Coalition Group and updated yearly.
Annual Report	III.E	Annually on April 30 beginning in 2017

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Attachment F

Not Included

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ATTACHMENT G – NOTICE OF INTENT
 CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
 SAN DIEGO REGION

NOTICE OF INTENT

TO COMPLY WITH GENERAL WASTE DISCHARGE REQUIREMENTS FOR
 DISCHARGES OF WASTE FROM COMMERCIAL AGRICULTURAL AND NURSERY OPERATIONS
 WITHIN THE SAN DIEGO REGION
 ORDER NO. R9-2015-0003

A. TYPE OF ENROLLMENT

Mark () the appropriate box indicating if the NOI is being submitted to enroll as an individual Discharger or a Coalition Group:

- Individual Discharger
- Coalition Group Member, Coalition Group Name: _____

A. AGRICULTURAL/NURSERY OPERATION:

Name:		
Site Address:	City:	Zip:
Phone:	Email:	Contact Person:
Hydrologic Area/Subarea ¹ :		No. of Irrigated Acres:
Assessor Parcel Number(s):		
Type of crops grown on each parcel (use additional sheets if needed):		

C. OWNER INFORMATION:

Name:		
Mailing Address:		
City:	State:	Zip:
Telephone:	Fax:	Email:
Authorized Representative(s):		

¹ [Water Quality Control Plan for the San Diego Basin, Chapter 1 – Introduction, Figure 1-2.](#)

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E. OPERATOR INFORMATION

Name:		
Mailing Address:		
City:	State:	Zip:
Telephone:	Fax:	Email:
Authorized Representative(s):		

E. ADDRESS WHERE LEGAL NOTICE MAY BE SERVED:

Address:		City:
County:	State:	Zip:
Contact Person:	Telephone:	

G. BILLING ADDRESS:

Name:		
Mailing Address:		
City:	State:	Zip:
Telephone:	Fax:	Email:

H. CERTIFICATION

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”

SIGNATURE
(OWNER/AUTHORIZED REPRESENTATIVE)

DATE

PRINT NAME

TITLE

TELEPHONE NUMBER

EMAIL

FOR DISCUSSION PURPOSES ONLY**ATTACHMENT H – ANNUAL SELF-ASSESSMENT SURVEY****ANNUAL SELF-ASSESSMENT SURVEY**

TO COMPLY WITH GENERAL WASTE DISCHARGE REQUIREMENTS FOR
DISCHARGES OF WASTE FROM COMMERCIAL AGRICULTURAL AND NURSERY OPERATIONS
WITHIN SAN DIEGO REGION
ORDER NO. R9-2015-0003

A. AGRICULTURAL/NURSERY OPERATION:

Name:		
Address:		City:
County:	Zip:	Contact Person:
Telephone:		No. of Irrigated Acres:
Assessor Parcel Number(s):		
Hydrologic Area/Subarea: ¹		Parcel Size(s):
Type of crops grown on each parcel:		

B. OWNER INFORMATION

Name:		
Mailing Address:		City:
County:	State:	Zip:
Physical Address:		City:
County	State:	Zip:
Telephone:	Fax:	Email:
Authorized Representative(s):		

C. OPERATOR INFORMATION

Name:		
Mailing Address:		City:
County:	State:	Zip:
Physical Address:		City:
County	State:	Zip:
Telephone:	Fax:	Email:

¹ [Water Quality Control Plan for the San Diego Basin, Chapter 1 – Introduction, Figure 1-2.](#)

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Authorized Representative(s):

D. ENROLLEMENT TYPE

Mark (☒) the appropriate box indicating if the owner identified above, is enrolled as an individual Discharger or member of a Coalition Group:

Individual Discharger or Coalition Group: _____

E. MANAGEMENT MEASURES AND BEST MANAGEMENT PRACTICES

If structural management measures (MMs) and/or best management practices (BMPS) are implemented to minimize or eliminate the discharge of pollutants to waters of the State, provide a thorough description of those MMs/BMPs. Use additional pages as needed. Provide a map of the property/Agricultural Operation showing locations of structural MMs/BMPs, and photographs to show the effectiveness of those structural MMs/BMPs.

F. EDUCATION SPECIFICATIONS

Identify whether the current years' annual water quality management training has been completed.

..... Yes No

Earned Certificate Identification No.: _____

If "yes", provide the unique certificate identification number, or attach a copy of the earned certificate. If "no" please provide a brief explanation/justification.

G. ASSOCIATION COMMUNICATION SPECIFICATION

- I. Is regular contact being made with the local Farm Bureau, University of California Cooperative Extension (UCCE), National Resources Conservation Service (NRCS), and/or regional Resource Conservation Districts (RCDs) to discuss the latest MMs/BMPs, and other water quality issues?

..... Yes No

If "yes", provide, as an attachment with this Annual Self-Assessment Survey proof (e.g., newsletters, NRCS conservation plan, UCCE self-assessment). If "no" please provide, as an attachment, a brief explanation.

H. RECORDS MANAGEMENT

Identify whether the following records are being maintained for the Agricultural Operation and are capable of being reviewed during an inspection by the San Diego Water Board. For any record marked "No" or "n/a", provide, as an attachment, a brief explanation/justification.

Pesticide use report	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
City/County agricultural inspection reports	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
National Organic Program certification inspection reports (if applicable)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Annual self-assessments ²	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Groundwater quality monitoring data (well data, if applicable)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

² Self-assessment questionnaires are available from the University of California Cooperative Extension (UCCE).
http://ucanr.edu/sites/agwaterquality/Grower_Resources/

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CERTIFICATION

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

SIGNATURE
(OWNER/AUTHORIZED REPRESENTATIVE)

DATE AND TIME OF INSPECTION

PRINT NAME

TITLE

TELEPHONE NUMBER

EMAIL

FOR DISCUSSION PURPOSES ONLY

ATTACHMENT I – RAINBOW CREEK NUTRIENT REDUCTION MANAGEMENT PLAN

Rainbow Creek Nutrient Reduction Management Plan



**University of California
Cooperative Extension**



County of San Diego

September 2007

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The total allowable daily loads for nitrogen and phosphorus are calculated based on these Basin Plan goals with the intent of restoring the contact and non-contact recreation, warm and cold freshwater, and wildlife habitat beneficial uses. Elevated nitrogen and phosphorus levels impair the REC-1 and REC-2 beneficial uses of Rainbow Creek by stimulating the growth of unsightly and potentially noxious algal blooms and mats. This condition normally occurs during warm periods when abundant nutrients (N and P) and sunlight stimulate photosynthesis and the over-production of algal biomass. Impairment of the WARM, COLD, and WILD beneficial uses result from the wide fluctuations in dissolved oxygen (O₂) associated with such algal blooms.

Chapter 1

Management Options for Nurseries

Introduction

The Rainbow Creek watershed is home to over 150 nurseries, covering approximately 5% of the watershed. These nurseries grow a wide variety of plant species, including palms and other tropicals, ornamental shrubs, flowers, cacti, herbs, mushrooms, and many more. While the warm climate is suited to many native species, as well as non-natives such as South African protea, Rainbow and Fallbrook nurseries are most always obligated to use irrigation and/or fertilization to produce sufficient yields. Unfortunately, these practices contribute significantly to the problem of nutrient pollution in Rainbow Creek.

The Rainbow Creek TMDL estimates the nutrient load from commercial nurseries by multiplying established loads from nurseries in comparable regions by the area of land used for nurseries in Rainbow Creek. According to the TMDL commercial nurseries contribute 15% of the annual nitrogen load in Rainbow Creek and 7% of the annual phosphorus load. In order to comply with the TMDL, commercial nurseries in Rainbow Creek are required to make a 77% reduction in their nitrogen contribution, from 507 to 116 kg N/yr, and a 90% reduction in their phosphorus contribution, from 27.4 to 3 kg P/yr.

What follows is a list of the diverse management options nursery operators can choose from to help reduce their nitrogen and phosphorus contributions. We will begin by listing those practices we recommend as priorities based on effectiveness, ease of implementation and cost. Full descriptions of these priority practices can be found below, along with all other management options.

Top priority irrigation management options:

- pressure regulators (MG 1.5)
- pressure minimizing emitters (1.6)
- group flow rates (1.9)
- group plants by need (1.10)
- uniform sprinkler heads (1.13)
- inspect/repair leaks (2.1)
- maintain filters (2.3)
- maintain appropriate pressure (2.4)
- replace parts (2.5)
- keep emitters in plants (3.2)
- turn off irrig. in unused areas and backfill (3.3)
- use on/off valves (3.5)
- check overhead emitters for direction (3.6)
- base irrigation schedule on plant water needs (4.1)
- adjust to weather (4.2)
- group plants by needs (4.3)
- avoid irrigating when windy (4.4)
- check automatic clocks (4.6)

Top priority nutrient management options:

- keep records of water quality (1.3)
- use crop recommendations (1.8)
- test fertigation water (1.9)
- distribute solid fert. evenly (2.1)
- use injected fertilizer carefully (2.4)
- calibrate fertilizer injectors (2.5)
- time fertilizer use with growth (2.7)
- use EC for leaching (2.9)
- use compliant storage of fertilizers (3.1)
- use secondary containment (3.4)
- mix and load on impermeable surface (3.5)
- inspect equipment (3.6)
- cover and avoid overfilling liquid fertilizers (3.7)
- avoid spilling in transfer (3.8)
- clean spills immediately (3.9)
- check valves (3.10)

high or variable. (Photo #3, p.42)

- 1.9 Each watering zone should have spray stake/emitters with similar flow rates to maintain good uniformity; do not combine emitters with different flow rates in the same watering zone.
- 1.10 Place plant types and pot sizes with similar water needs in the same watering zone.
- 1.11 Correlate emitter flow rates for spray stakes and drippers with plant types, media infiltration rates, and pot sizes in each watering zone; emitters with flow rates that are too high will apply water faster than plants can absorb and runoff will result.
- 1.12 Use appropriate and uniform nozzle sizes.
- 1.13 Use sprinkler heads with a high uniformity rating.

MG 2 Regularly maintain your irrigation system so that it continues to operate efficiently.

- 2.1 Regularly inspect for leaks in mains and laterals, in irrigation connections, or at the ends of drip tape and feeder lines. Repair any found leaks. (Photo, #4, p.42)
- 2.2 Regularly flush and unclog lines and emitters, keeping them free of mineral deposits and biological contaminants such as algae and bacterial slimes.
- 2.3 Ensure that appropriate filtration is used and regularly clean filters.
- 2.4 Maintain appropriate pressure throughout the system.
- 2.5 Regularly replace worn, outdated or inefficient irrigation system components and equipment.

MG 3 Regularly manage crops, crop areas, and irrigation systems to avoid applying water to non-cropped areas or applying irrigation when not needed.

- 3.1 When using overhead or impact systems, regularly space pots or plants as closely together as is possible without compromising plant quality due to reduced light. This will minimize runoff from spaces between pots and plants. (Photo #5, p.42)
- 3.2 Manage spray stake and dripper systems to ensure every emitter is located in a plant or pot; manage harvest operations and retail areas to avoid creating watering zones with emitters located outside of pots. (Photo #6, p.42)
- 3.3 Consolidate plants and shut off irrigation in unused portions, including spray stakes and other emitters that can be "turned off" when not in use. Backfill plants into areas where plants have been sold.
- 3.4 Consider using overhead emitters with check-valves to prevent line drainage and drip damage. (Photo #7, p.43)
- 3.5 Use an on/off valve in hand watering systems to prevent runoff. (Photo #8, p.43)
- 3.6 Check regularly to ensure that spray patterns of overhead irrigation systems are managed to uniformly deliver water only to plants, without creating overspray in walkways and edges.

- 1.2 If well water is used on-site for human consumption, have the well water tested regularly for contamination from fertilizers.
- 1.3 Maintain records of irrigation source water quality, especially if of variable quality.
- 1.4 Consider nutrients already present in your irrigation water, recovered runoff, composts, manures, and previous fertilizer applications in fertilizer management decision-making. Over-fertilization can result if nutrients already present in the growing environment are not taken into account.
- 1.5 Regularly test soil/growing media for nutrients, soluble salts, and pH. Along with plant tissue analysis, soil tests are your best guide to effective use of fertilizers. (Photo #12, p.43)
- 1.6 Test plant tissue to determine concentrations of macro- and micro-nutrients.
- 1.7 Use information and recommendations from soil, growing media, and plant tissue analyses in fertilization management.
- 1.8 When available, use nutrient recommendations for your specific crop. Use the most up-to-date recommendations from farm advisors and publications.
- 1.9 Periodically test fertigation water to monitor fertilizer levels and ensure injectors are properly operating.

MG 2 Conduct efficient fertilizer and leaching practices.

- 2.1 Incorporate solid fertilizers in a manner that optimizes nutrient availability to growing roots. When mixing fertilizer into media, be sure that fertilizer is evenly distributed throughout the root zone/container and at the correct rate; this will provide good nutrition and avoid leaching losses of fertilizer nutrients.
- 2.2 Use composts or manures that are thoroughly composted before application. Composts and manures that are not thoroughly composted may contribute bacteria and other contaminants to runoff. (Photo #13, p.44)
- 2.3 Carefully apply top-dressed fertilizers to keep granules in the pot or around the plants at the correct rate. (Photo #14, p.44)
- 2.4 Ensure that injected fertilizers are carefully mixed and applied at correct rates. Excessive amounts of highly soluble liquid fertilizers are easily lost with leachate water.
- 2.5 Calibrate fertilizer injectors to accurately deliver liquid fertilizer through the irrigation system.
- 2.6 Utilize slow-release or controlled-release fertilizers to minimize leaching losses of nutrients.
- 2.7 Time fertilizers with environmental parameters and growth stage of the plants. Fertilizer management that provides nutrients at appropriate growth stages will result in better plant nutrition and minimize nutrient losses to the environment.

rig in a field, shut off the fertilizer applicators during turns.

- 3.11 Whenever you are injecting fertilizer into irrigation water, make sure that you do not allow backflow into wells or other water sources; install backflow prevention devices and check them at least once a year, recording the date and result of this check.
- 3.12 Dispose fertilizer bags in trash bins with lids to prevent trash with fertilizer residues from blowing into nearby waterways.

C. Erosion and Runoff Management Goals and Management Practices

The third section deals with erosion and runoff management designed to prevent sediments and water, which can both carry nutrients, from leaving the nursery property. Erosion and runoff management involves modifying soil and container substrates to enhance their ability to hold water, creating barriers to the movement of sediments and water and capturing unused irrigation water for reuse or storage. While the TMDL does not regulate sediments in the creek specifically, erosion and runoff management can help decrease the amount of nutrients reaching the creek.

MG 1 Evaluate water quality of storm runoff to comply with water regulations and determine options for reuse or treatment.

- 1.1 Inventory chemicals used in your operation, especially those likely to be present in runoff such as pesticides, fertilizers, and shading compounds.
- 1.2 To measure the effect of management practices, regularly sample storm runoff water. Irrigation runoff should not exit property. Follow commercial lab instructions for taking and handling storm runoff samples, as this will greatly affect the results.
- 1.3 Conduct analyses on runoff water samples to determine what is in it and at what levels. Parameters to test for include pH, electrical conductivity (EC), nitrate (NO_3^-) and phosphate (PO_4^{3-}), which can be analyzed on site with instruments and kits designed for use by growers. Alternatively, water samples can be sent to commercial labs. In addition, it is recommended to use a good commercial lab to test for other contaminants such as specific pesticides that you suspect may be present in runoff. The lab should use EPA standards and be certified for Good Laboratory Practices (GLP).
- 1.4 Compare water analyses against local and state water quality standards and regulations.

MG 2 Use practices that improve soil/media infiltration and water-holding capacity to reduce soil erosion, runoff, and excessive leaching.

- 2.1 Incorporate organic amendments on sandy soil to improve water holding capacity and prevent excessive leaching.
- 2.2 Incorporate amendments on clayey soil to improve infiltration and reduce runoff.
- 2.3 Use mulches or cover crops on bare soil to reduce runoff. (Photo #18, p.44)
- 2.4 Test media used in containers and select media for high water holding capacity as well

- 4.6 Use proper pest and nutrition management practices in hilly production areas and in hilly landscaped non-production areas to avoid pesticide and fertilizer runoff.
- 4.7 Perform maintenance on any hill erosion buffers annually or as needed to ensure they continue to function as intended.

MG 5 Design and manage nursery roads to prevent erosion and contaminated runoff.

- 5.1 Ensure that all new roads are properly designed and permitted to avoid erosion. This may require the submission of an engineering plan, specifications, and an environmental assessment. Soils should be evaluated for erodibility, and excessive slopes should be avoided.
- 5.2 Use waterbreaks (waterbars) on nursery roads with gradients exceeding 8%. These should be properly sized and placed only where water flow has an outlet and diverted water does not flow into septic fields or waterways.
- 5.3 Use filter strips between roads and waterways to absorb runoff from roads and trap toxic sediment. (Photo #25, p.46)
- 5.4 Inspect culverts and clean them out during winter rains so that water drains freely. (Photo #26, p.46)
- 5.5 Prevent contaminant-laden dust from traffic and wind erosion by sealing or watering unpaved roads. This will also help in mite control. Ensure that dust control with applied water does not create runoff.
- 5.6 Perform road maintenance annually or as needed.

MG 6 Collect excess irrigation and storm water runoff and sediment.

- 6.1 Use retention basins to store excess irrigation runoff and storm water. Basin capacity should be designed on the basis of probable storm events and to prevent seepage and groundwater contamination. Use qualified engineers for design and implementation. (Photo #27, p.46)
- 6.2 Use captured water to irrigate non-crop areas, thereby preventing overflow. (Photo #28, p.46)
- 6.3 Use captured water and then recycle it onto crops, treating or blending with fresh water as necessary, avoiding basin overflow during both dry and wet weather. (Photo #28, p.46)

MG 7 Manage greenhouse roof runoff to reduce pollution and erosion, to prevent flooding, and improve drainage.

- 7.1 Direct roof runoff away from the municipal storm water system or sewer system. Roof runoff may contain pollutants e.g. toxic sediments and shading compounds. (Photo #29, p.46)
- 7.2 Direct roof runoff into pervious areas (gravel, vegetative, paving material, self-contained tail water system or retention ponds). (Photo #29, p.46)

E. Record Keeping

This section describes the pieces of information of which growers should keep record. Records allow growers to prove which practices they have implemented in order to reduce their nutrient contribution, in addition to complying with other regulations that require records.

MG 1 Maintain records of all nursery practices and data.

- 1.1 Maintain records of fertilizer use. These may be required by regulatory agencies and are useful in obtaining permits or conditional waivers for agricultural discharge. Records can help you make informed decisions regarding fertilizer management.
- 1.2 Maintain records of runoff water quality for at least 5 years.
- 1.3 Implement and maintain a record-keeping system for documenting management practices addressing runoff management. Record-keeping may be required by some regulating authorities.
- 1.4 Maintain records of all personnel training for at least 5 years. Records should include when training occurred, who led the training, who participated, and what information was covered.

Top priority nutrient management options, continued:

- periodically test fertigation water (1.9)
- disk/plow in solid fertilizer (2.1)
- apply top fert. and injected fert. carefully (2.3, 2.4)
- grow border vegetation (2.3)
- calibrate fertilizer injectors (2.5)
- use controlled-release fertilizer (2.6)
- store fertilizers far from waters (3.2)
- mix and load on impermeable surface (3.5)
- inspect equipment (3.6)
- clean spills promptly (3.9)
- check valves (3.10)
- avoid backflow during fertigation (3.11)

Top priority erosion/runoff management options:

- inventory chemicals used (1.1)
- sample runoff water (1.2)
- analyze runoff water (1.3)
- compare against regulatory standards (1.4)
- maintain crop residues on unused land (2.4)
- determine runoff amount and locations (3.1)
- use barriers/buffers to water flow (3.2)
- shape/seed field edges (3.4)
- use sticking mulches (4.2)
- use vegetation to block water flow (4.3)
- use berms (4.4)
- use proper hill irrigation (4.5)
- use proper hill pest/nutrient manag. (4.6)
- direct roof runoff to avoid contaminants (7)

We also recommend prioritizing all personnel training and record keeping (Sec. D and E).

A. Irrigation Management Goals and Management Practices

The first section addresses irrigation management as a way of reducing nutrient runoff from fields and orchards. The overall goal of irrigation management is to use irrigation water in a way that minimizes the amount of wasted water and the amount of water leaving the property and potentially reaching the creek. Since nutrients are most often carried to the creek through surface or ground water, then minimizing the amount of water runoff will minimize nutrient runoff as well.

MG 1 Design or retrofit your irrigation system for improved irrigation uniformity and efficiency to reduce runoff and leaching.

- 1.1 Conduct an irrigation audit or utilize professional services to determine the efficiency of the system and make appropriate adjustments. An irrigation system audit or evaluation typically includes measuring the distribution uniformity of sprinklers using the "catch can" method and of emitters by a representative discharge sampling, as well as pressure distribution methods.
- 1.2 Have a schedule for regular audits; over time an efficient system can become inefficient if modifications are made or as clogging and wear reduce uniformity.
- 1.3 If irrigation uniformity remains low after all practical improvements have been made, consider converting to an irrigation system with potential of high uniformity.
- 1.4 Use pressure regulators where appropriate.
- 1.5 Use emitters that minimize pressure differences or pressure compensating emitters.
- 1.6 When growing on slopes, compensate for pressure differences at the top and bottom of the slope by running the main line vertical to the slope with pressure controllers at each

requirements. Water requirements can be determined from a reference evapotranspiration (ET) value modified with a coefficient for the specific crop. ET and coefficient values, which reflect actual weather conditions, are available from the California Irrigation Management Information System—CIMIS, although coefficient values for many ornamental crops have yet to be determined. Irrigation scheduling can also be based on measured water content in the soil (determined with pot weight, tensiometer, electrical resistance blocks, or dielectric soil moisture sensor). (Photo #9, p.43)

- 4.2 Regularly adjust irrigation schedules to reflect changes in weather, plant needs, or measured soil moisture values.
- 4.3 Avoid irrigating outdoors in windy conditions.
- 4.4 Consider pulse irrigation to split irrigation into smaller increments that can more effectively be used by plants.
- 4.5 When automatic time clocks are used, check regularly for accuracy and adjust to correlate scheduling with changing environmental conditions and plant growth stage. (Photo #10, p.43)

B. Nutrient Management Goals and Management Practices

The second section addresses nutrient management. The goal here is to apply only the amount of nutrients actually needed and usable by the target plants, and at the appropriate time based on plant growth stage and environmental factors. The intended result is that fewer nutrients end up unused and exposed to runoff. In addition, nutrient management involves handling fertilizers carefully at all stages of their use in order to prevent runoff to the creek.

MG 1 Evaluate irrigation water, soils, growing media, and plant tissue to optimize plant growth and avoid over-fertilization.

- 1.1 Regularly monitor the quality of your irrigation source water. Sample seasonally (if well water or if surface water such as ponds or creeks) or annually (if municipal water). Analyze for levels of constituents such as bicarbonates (HCO_3^-), sodium (Na), chloride (Cl^-), nitrate (NO_3^-), boron (B), soluble salts, and pH. Undesirable levels of these constituents may affect crop growth and health. Utilize a commercial lab for analysis. Soluble salts, pH, nitrate, and phosphate (PO_4^{3-}) can be analyzed on-site with instruments and kits designed for use by individual growers. (Photo #11, p.43)
- 1.2 If well water is used on-site for human consumption, have the well water tested regularly for contamination from fertilizers.
- 1.3 Maintain records of irrigation source water quality, especially if of variable quality.
- 1.4 Consider nutrients already present in your irrigation water, recovered runoff, composts,

- 3.3 Include a concrete pad and curb to contain spills and leaks in the fertilizer storage facility. This pad area should be protected from rainfall and irrigation to prevent fertilizer residues from washing into surface water bodies.
- 3.4 Equip fertilizer tanks with secondary containment to contain spills and leaks. (Photo #16, p.44)
- 3.5 Conduct fertilizer mixing and loading operations on an impermeable surface such as a concrete floor in areas where potential for runoff is low; perform fertilizer operations at least 100 feet down-slope of a well or other water supply. These are legal requirements. (Photo #17, p.44)
- 3.6 Verify regularly that fertigation equipment is properly calibrated and fertilizer solution tanks are free of leaks.
- 3.7 When transporting fertilizer, do not overfill trailers or tanks. Cover loads properly and display appropriate placards on vehicles.
- 3.8 When transferring fertilizer into on-farm storage or into a fertilizer applicator, take care that you do not allow materials to spill.
- 3.9 Immediately clean up fertilizer spills, and do so according to a predetermined protocol.
- 3.10 Use check valves on application equipment. When applying fertilizer from a tractor or rig in a field, shut off the fertilizer applicators during turns.
- 3.11 Whenever you are injecting fertilizer into irrigation water, make sure that you do not allow backflow into wells or other water sources; install backflow prevention devices and check them at least once a year, recording the date and result of this check.
- 3.12 Dispose fertilizer bags in trash bins with lids to prevent trash with fertilizer residues from blowing into nearby waterways.

C. Erosion and Runoff Management Goals and Management Practices

The third section deals with erosion and runoff management designed to prevent sediments and water, which can both carry nutrients, from leaving the property. Erosion and runoff management involves modifying soil to enhance its ability to hold water, creating barriers to the movement of sediments and water and capturing unused irrigation water for reuse or storage. While the TMDL does not regulate sediments in the creek specifically, erosion and runoff management can help decrease the amount of nutrients reaching the creek.

MG 1 Evaluate water quality of storm runoff to comply with water regulations and determine options for reuse or treatment.

- 1.1 Inventory chemicals used in your operation, especially those likely to be present in runoff such as pesticides, fertilizers, and shading compounds.
- 1.2 Regularly sample storm runoff water, as there will likely be seasonal variations in the analyses. Irrigation runoff should not exit property. Follow commercial lab instructions

- 3.7 Consider using polyacrylamide (PAM) to remove sediment from runoff water.
- 3.8 Use windbreaks or shelterbelts in areas prone to wind erosion. (Photo #22, p.45)
- 3.9 If your property is affected by discharge sediment or runoff from upslope or upstream properties, use practices to contain this sediment or runoff (such as diversions, filter strips, sediment basins, underground outlets, etc.).
- 3.10 Perform maintenance on runoff barriers annually or as needed to ensure they continue to function as intended.

MG 4 Manage hilly, sloped areas to prevent soil erosion and increased runoff volume and velocity. This includes hilly production areas as well as sloped non-production areas.

- 4.1 Use terraces where appropriate to control soil erosion and runoff. (Photo #35, p.47)
- 4.2 Use appropriate mulches where appropriate to control soil erosion and runoff. Ensure that mulch will stick to the soil where applied, and does not include large clumps that will run off instead of absorbing/blocking water flow.
- 4.3 Use vegetation (cover crops, buffer strips, grassed swales, etc) to control soil erosion and runoff.
- 4.4 Use berms to control soil erosion and runoff. (Photo #24, p.45)
- 4.5 Use proper irrigation management in hilly production areas and in hilly landscaped non-production areas avoid runoff and soil erosion.
- 4.6 Use proper pest and nutrition management practices in hilly production areas and in hilly landscaped non-production areas to avoid pesticide and fertilizer runoff.
- 4.7 Perform maintenance on erosion control annually or as needed to ensure they continue to function as intended.

MG 5 Design and manage property roads to prevent erosion and contaminated runoff.

- 5.1 Ensure that all new roads are properly designed and permitted to avoid erosion. This may require the submission of an engineering plan, specifications, and an environmental assessment. Soils should be evaluated for erodibility, and excessive slopes should be avoided. To prevent contaminant-laden dust from traffic and wind erosion, seal or water unpaved roads. Roads can be sealed with non-toxic sealants, or seeded with perennial grass when possible.
- 5.2 Use waterbreaks (waterbars) on property roads with gradients exceeding 8%. These should be properly sized and placed only where water flow has an outlet and diverted water does not flow into septic fields or waterways.
- 5.3 Use filter strips between roads and waterways to absorb runoff from roads and trap toxic sediment. (Photo #25, p.46)
- 5.4 Inspect culverts and clean them out during winter rains so that water drains freely. When not maintained, build-up of eroded soil or other matter can clog culverts, potentially directing water over areas where it can become contaminated. To avoid creating contaminated runoff, culverts must be kept clear. (Photo #26, p.46)

fertilizers.

- 2.2 Provide training to ensure that appropriate personnel understands safe fertilizer transport, storage, and disposal practices.
- 2.3 Provide training for all personnel on what to do in case of a fertilizer spill.

MG 3 Provide organized training sessions for personnel in runoff management in a language that personnel clearly understand.

- 3.1 Ensure that all appropriate employees receive training in runoff management and all applicable regulations. All growing operation employees must understand and implement the required practices for runoff management to be effective.
- 3.2 Train staff so that they become aware of all drainage conduits and ditches on the property and know where they drain.
- 3.3 Ensure that all municipal stormwater or sewer system conduits and ditches are stenciled or designated with signs, and that there are no illicit connections to the municipal stormwater or sewer system.

E. Record Keeping

This section describes the pieces of information of which growers should keep record. Records allow growers to prove which practices they have implemented in order to reduce their nutrient contribution, in addition to complying with other regulations that require records.

MG 1 Maintain records of all nursery practices and data.

- 1.1 Maintain records of fertilizer use. These may be required by regulatory agencies and are useful in obtaining permits or conditional waivers for agricultural discharge. Records can help you make informed decisions regarding fertilizer management.
- 1.2 Maintain records of runoff water quality for at least 5 years.
- 1.3 Implement and maintain a record-keeping system for documenting management practices addressing runoff management. Record-keeping may be required by some regulating authorities.
- 1.4 Maintain records of all personnel training for at least 5 years. Records should include when training occurred, who led the training, who participated, and what information was covered.

Top priority animal management options:

- inspect/clean culverts (1.8)
- divert wash water into barriers (1.1)
- div. water away from manure/bedding (1.2)
- clean pens 2 times/wk or as needed (4.2)
- store dry wastes in sheds (4.3)
- collect pet waste and dispose in trash (6.1)
- do not compost dog and cat waste (6.2)
- put kitty litter in trash (6.3)

A. Septic System Management Goals and Management Practices

The first section addresses septic system design and management as a way of reducing the nutrient contribution from residences and offices. It describes the proper design and maintenance required to help minimize the risk of damage to the septic system, which can result in added nutrient contribution.

MG 1 Design/retrofit your septic system to fit your household's or staff's needs and maintain the system with inspection and pumping

- 1.1 Ensure you are using the appropriate size and type of septic system, whether through new design or upgrade, for your household and your volume of water and solids.
- 1.2 Do not construct structures, walkways, patios, swimming pools, equipment storage, driveways or parking lots over a leachfield to prevent pressure damage and maintain maximum evapotranspiration.
- 1.3 Divert surface flow away from the leachfield to avoid erosion, minimize excess filtration in the leachfield and maximize the function of the leach lines.
- 1.4 Plant only shallow-rooted plants over the leachfield. Deep roots of trees and shrubs can cause damage to the system. (Photo #36, p.47)
- 1.5 Have your system inspected and pumped as recommended, generally every 3 to 5 years. See Appendix 2 for recommended inspection and pumping frequencies (p.38). Keep a record of when and by whom the system was inspected and pumped.
- 1.6 Keep records of your system size and location of the tank and leachfield. Records of systems for houses built after 1975 can be obtained from the Department of Environmental Health.
- 1.7 Familiarize yourself with the layout of the septic system: tank inlet, tank cover, tank outlet, and leach lines. Any unusual wetness or plant growth might indicate leakage. See Appendix 2 for a diagram and description of septic (p.38).

MG 2 Use water efficiently to reduce the risk of liquid overload to the system

- 2.1 When renovating, install high-efficiency toilets and showerheads to save water. To save water with a standard toilet, place a plastic milk jug filled with small rocks and tightly capped into the toilet tank, away from any moving parts. The jug will displace the water in the tank and allow the toilet to use less water with each flush.
- 2.2 Install faucet aerators in the kitchen and bathroom to reduce the volume of water used.
- 2.3 Turn off faucets when not in use while shaving, brushing teeth, washing dishes, etc.

as you open your hand. You can then spread your compost in garden beds, under shrubs, on your lawn, or use it as potting soil. (Photo #38, p.48)

- 1.3 Avoid placing compost piles near drains or surface waters.
- 1.4 Spread mulch, a layer of organic material like leaves, aged wood chips, compost or grass clippings around your plants in spring or fall. Never exceed more than three inches of mulch in your landscaping beds, and keep mulch about an inch away from stems and tree trunks. Mulch stabilizes soil temperature, prevents weeds, feeds the soil for healthier plants and helps to conserve water. (Photo #39, p.48)
- 1.5 When fertilizer is required use slow-release fertilizer. Nutrients are distributed to plants more evenly and slowly, allowing plants to use more of the nutrients provided. Fewer nutrients are therefore unused and able to leave the property as runoff.
- 1.6 When fertilizing, following fertilizer instructions carefully. Take care to ensure no fertilizer is applied to sidewalks or walkways. Do not fertilize during or directly before rain.

MG 2 Choose appropriate plants for your site

- 2.1 Assess the characteristics of your garden site (soil pH, soil type and sunlight) as well as your desires for the garden (privacy, play area, color) to determine appropriate plants.
- 2.2 Select plants that grow well in a warm and dry climate and fit the amount of sun, type of soil and water available in your yard. When possible, use low-water plants to save the time and expense of watering and minimize runoff. See Appendix 3 for websites with helpful plant lists (p.40). Think about how big a tree or shrub will be when mature, especially next to your house or driveway and near power lines.
- 2.3 Choose pest-resistant plants. Many garden centers and nurseries offer information about pest- and disease-resistant plant varieties. After they're established, they'll save you time and money on pest control.

MG 3 Water efficiently to conserve water and minimize the amount of water running off the property

- 3.1 Perform an irrigation system review to ensure your system is in working order.
- 3.2 Perform an irrigation review, consulting published irrigation recommendations, to determine the amount of water required by your plants. Both over- and under-watering can be damaging to plants.
- 3.3 Use soaker hoses or drip irrigation rather than sprinklers on beds to save water. (Photo #40, p.48)
- 3.4 Water in the early morning if possible. Water evaporates more readily at midday, and in the evening water is more likely to encourage the growth of mold or plant diseases.
- 3.5 Use an outdoor water timer to automatically adjust watering to weather conditions.

MG 1 Design and manage property facilities to prevent erosion and contaminated runoff.

- 1.1 Locate livestock facilities and conduct activities away from waterways, flood-prone areas and steep hillsides. Address water quality concerns in the design of new facilities and work to upgrade existing facilities.
- 1.2 Ensure that all new roads are properly designed and permitted to avoid erosion. This may require the submission of an engineering plan, specifications, and an environmental assessment. Soils should be evaluated for erodibility, and excessive slopes should be avoided.
- 1.3 Ensure that all new horse trails are designed to avoid erosion. Incorporate switchbacks on sloping trails.
- 1.4 Prior to October 1st, re-blade and repair erosion-prone roads and trails. Make sure they are graded properly to minimize erosion.
- 1.5 Install erosion control devices such as sandbags, silt fences and straw wattles along erosion-prone roads and trails as temporary measures. If left alone in place, these devices can break down and present a safety hazard. (Photo #43 and #44, p.49)
- 1.6 Use waterbreaks (waterbars) on property roads with gradients exceeding 8%. These should be properly sized and placed only where water flow has an outlet and diverted water does not flow into septic fields or waterways.
- 1.7 Use filter strips between roads and waterways to absorb runoff from roads and trap sediment. (Photo #25, p.46)
- 1.8 Inspect culverts and clean them out prior to October 1st so that water drains freely during winter rains. (Photo #26, p.46)
- 1.9 Prevent contaminant-laden dust from traffic and wind erosion by sealing or watering unpaved roads. Ensure that dust control with applied water does not create runoff.
- 1.10 Use dry cleaning methods, such as sweeping regularly in parking areas and roads to remove dirt and other contaminants that could enter waterways.

MG 2 Limit runoff of livestock waste by containing animals and their waste.

- 2.1 Use fencing to restrict livestock access to surface waters and drainage areas. Fencing limits the amount of animal waste reaching these areas, in addition to protecting surface water edges from erosion caused by livestock grazing. (Photo #45, p.49)
- 2.2 Use barriers such as vegetated filterstrips to protect surface waters, hold soil in place and filter runoff water. Buffers can be built around animal holding areas or facilities, and/or along the edge of surface waters. They can also be used to separate animal grazing areas from cropland treated with manure. (Photo #25, p.46)
- 2.3 Divert rainwater away from animal confinement areas to keep water from picking up wastes.

MG 3 Keep livestock wash water away from surface and ground water.

- 3.1 Divert animal wash or cooling water away from surface waters and/or into vegetated

Chapter 4

Common Pollution Prevention Management Options

Introduction

The section illustrates further ways all those working and/or living in the Rainbow Creek watershed can reduce their nutrient contribution from areas such as roads, walkways, vehicles and restrooms. These management options apply to all types of development, commercial and residential, in the watershed.

MG 1 Ensure that all non-production areas do not contribute to dry or wet weather runoff. These include walkways, driveways, packing areas, loading areas and parking areas.

- 1.1 Clean indoor walkways, loading areas, and packing areas using only "dry" methods (such as sweeping, dry absorbents) or if wet cleaned, ensure that wash- and rinse-water remain on the property. These areas may contain fertilizers, pesticides and vehicle fluids that could contaminate surface or groundwater.
- 1.2 Periodically clean outdoor driveways, walkways, parking areas, loading areas, and packing areas to remove debris, vehicle residues, and other contaminants and prevent them from washing off during wet weather. Use only "dry" methods (such as sweeping, dry absorbents) or if wet cleaned, ensure that wash- and rinse-water remain on the property.

MG 2 Maintain vehicles, trucks and tractors and their storage areas so that they do not leak fluids into ground or surface waters.

- 2.1 Regularly maintain vehicles, trucks, and tractors used in the operation to detect and prevent fluid leaks that are very toxic to the environment.
- 2.2 Take vehicles to a car wash, or ensure that wash runoff from vehicles, trucks and tractors remains on the property and does not drain into the municipal stormwater or sewer system, or leach into groundwater.
- 2.3 Properly dispose of collected fluids. (Photo #48, p.49)
- 2.4 Whenever possible, remove vehicles, equipment, and storage tanks that are no longer used on the property.
- 2.5 Drain and properly dispose of fluids from vehicles and equipment in long-term storage.
- 2.6 Locate maintenance and storage areas for vehicles, trucks, and tractors where wet weather will not wash fluids into surface water or cause them to percolate into groundwater.
- 2.7 Clean maintenance and storage areas to avoid oil and grease buildup.
- 2.8 Immediately and properly clean up spills from vehicles, trucks and tractors.

MG 3. Locate and maintain fuel tanks so that they do not leak, spill, overflow, or leach into ground or surface water.

- 3.1 Locate fuel tanks where wet weather will not wash fluids into surface water or cause them to percolate into groundwater.
- 3.2 Check and maintain fuel tanks to prevent leaks.
- 3.3 Perform fueling activities carefully to avoid overflow and spills.

Appendix 1

Nitrogen and Phosphorus Reductions Required by the TMDL

The TMDL report outlines required nutrient reductions over a 16-year period beginning 2005. These initial estimates were developed by the California Regional Water Quality Control Board, San Diego Region. These are based on available land use models and are calculated by multiplying the acreage of land in a particular use in 2000 by an appropriate nutrient export coefficient obtained from literature studies. These reductions will serve as targets with which to begin the process of reducing nutrient levels in Rainbow Creek. The TMDL includes provisions for re-evaluating the nutrient reduction targets at regular intervals as the program is implemented and new data becomes available. The following tables summarize the required percent reductions and the current and final target amounts of each nutrient in kilograms per year.

Required Reduction in Nitrogen

Source	% Required Reduction	Current kg N/yr	Target kg N/yr
Commercial nurseries	77	507	116
Agricultural Fields	77	655	151
Orchards	77	790	182
Residential Areas	77	650	149

Required Reduction in Phosphorus

Source	% Required Reduction	Current kg P/yr	Target kg P/yr
Commercial nurseries	89	27.4	3
Agricultural Fields	89	35.4	4
Orchards	90	63	6
Residential Areas	90	125	12

Recommended Septic Tank Pumping Frequencies (in years)

		Household Size (Number of Occupants)									
		1	2	3	4	5	6	7	8	9	10
Tank Size (gal)*											
1000		12.4	5.9	3.7	2.6	2.0	1.5	1.2	1.0	0.8	0.7
1250		15.6	7.5	4.8	3.4	2.6	2.0	1.7	1.4	1.2	1.0
1500		18.9	9.1	5.9	4.2	3.3	2.6	2.1	1.8	1.5	1.3
2000		25.4	12.4	8.0	5.9	4.5	3.7	3.1	2.6	2.2	2.0

* Septic Tank minimum size requirements

1000 gallons for 1-3 bedrooms

1250 gallons for 4 bedrooms

1500 gallons for 5-6 bedrooms

2000 gallons for 7 or more bedrooms

The RWQCB works to "preserve, enhance and restore" the quality of regional water bodies. This site links to all RWQCB programs and regulations.

Project Clean Water

www.projectcleanwater.org

Project Clean Water is an organization that provides a forum for interested parties to identify, become educated, discuss, and find consensus on relevant water issues in the San Diego Region.

Rainbow Creek

www.rainbowcreek.org

This site was created to track the progress of the this document. It includes information on the TMDL, links to various resources, meeting details, and more.

Composting:

How to Compost

<http://www.howtocompost.org>

This site provides a large amount of information on composting from small to large scale.

Cornell Composting

http://www.css.cornell.edu/compost/Composting_Homepage.html

This site is operated by the Cornell University Waste Management Institute and provides information on the science and practice of composting.

Solana Center for Environmental Innovation

http://www.solanacenter.org/1solana_compost.html

This site is the composting page of the site of the Solana Center, a private nonprofit organization located in San Diego County. The composting page includes a downloadable "Guide to Backyard Composting," among other useful information.

Low Water-Use Plants:

San Diego County Water Authority Xeriscape Principles

<http://www.sdcwa.org/manage/cnservation-xeriscape.phtml>

This site provides principles for growing a xeriscape, or low water-use, landscape, including a downloadable xeriscape brochure.

Eastern Municipal Water District Low Water-Use Plants List

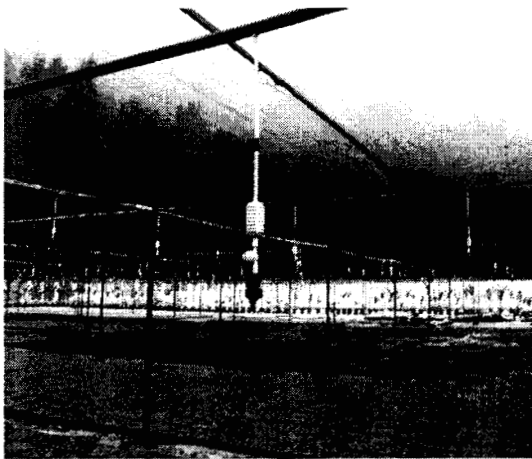
<http://www.emwd.org/cnservation/pdf/PlantsforSC.pdf>

This PDF file is both a list of low water-use plants and a guide for gardening with them.

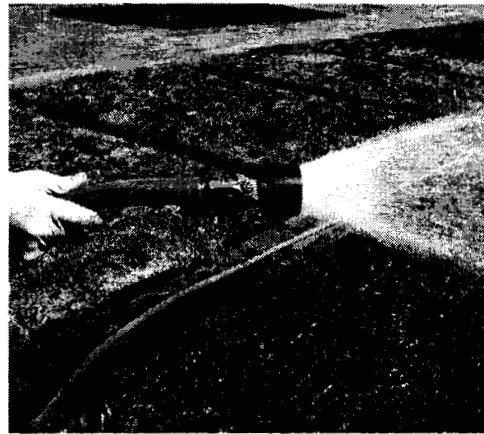
San Marcos Growers Low Water-Use Plants List

http://www.smgrowers.com/products/plants/region_list.asp?region_id=19&page=1

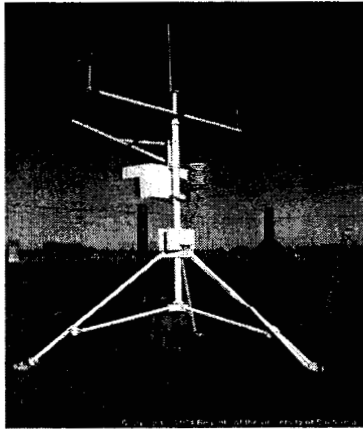
This site from the San Marcos Growers in Santa Barbara provides an extensive list of plants.



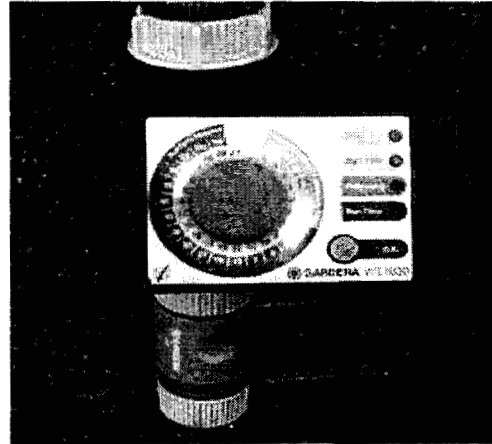
7. Emitters with check-valves (1.A.3.4, p.9)



8. On/off valve on hand watering (1.A.3.5), p.9



9. CIMIS weather monitoring (1.A.4.1, 2.A.4.1, p.10, 21)



10. Automatic watering clocks (1.A.4.6, 2.A.4.5, p.10, 21)



11. Source water quality monitoring (1.B.1.1, 2.B.1.1, p.10, 21)



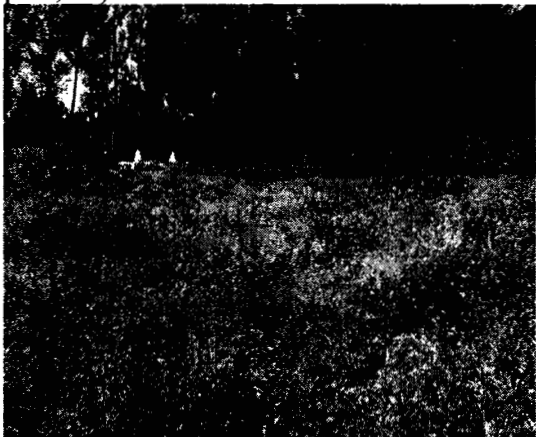
12. Soil/growing media testing (1.B.1.5, 2.B.1.5, p.11, 22)



19. Grass-lined channel (1.C.3.2, 2.C.3.2, p.14, 24)



20. Drainage channel with water-loving plants (1.C.3.2, 2.C.3.2, 2.C.6.3, p.14, 24, 26)



21. Use vegetation in bare soil areas (1.C.3.3, 2.C.3.6, p.14, 24)



22. Windbreaks to control erosion (1.C.3.5, 2.C.3.8, p.14, 25)



23. Terraced hills (1.C.4.1, p. 14)



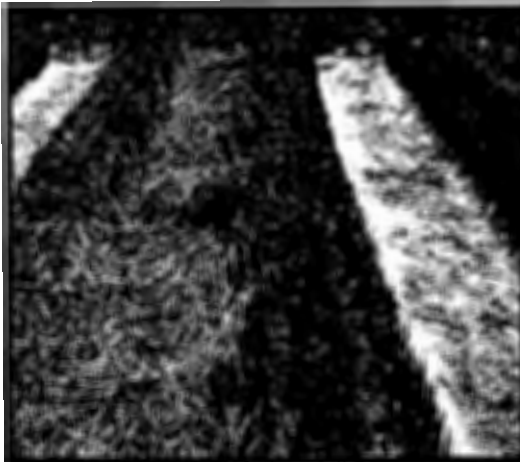
24. Berm (1.C.4.4, 2.C.4.4, p.14, 25)



31. Hand watering nozzle with on/off valve (2.A.3.4, p.20)



32. Cover crops on bare soil (2.C.2.3, p.24)



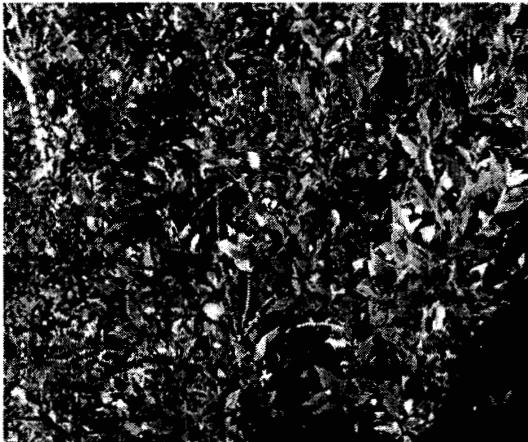
33. Crop residue (2.B.2.4, p.24)



34. Conservation tillage (2.C.3.5, p.24)



35. Use terracing on hills (2.C.4.1, p.25)



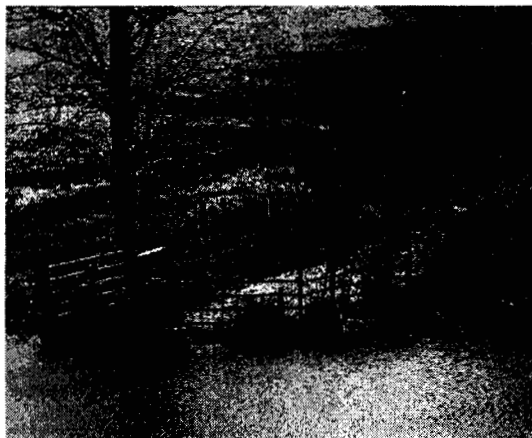
36. Myrtle, a shallow-rooted plant (3.A.1.4, p.29)



43. Silt fences next to a road (3.D.1.5, p.33)



44. Straw wattle near road (3.D.1.5, p.33)



45. Fencing to restrict livestock from surface waters and riparian areas (3.D.2.2, p.33)



46. Animal bedding (3.D.4.1, p.34)



47. Pet waste bags in walking area (3.D.6.1, p.34)



48. Vehicle oil disposal (4.2.3, p.35)

FOR DISCUSSION PURPOSES ONLY

**ATTACHMENT J – RECOMMENDED MANAGEMENT MEASURES
AND BEST MANAGEMENT PRACTICES**

BEST MANAGEMENT PRACTICES (BMP'S)

University of California Cooperative Extension

Management Options for Nurseries

A. Irrigation Management Goals and Management Practices

The first section addresses irrigation management as a way of reducing nutrient runoff from nurseries. The overall goal of irrigation management is to use irrigation water in a way that minimizes the amount of wasted water and the amount of water leaving the property and potentially reaching the creek. Since nutrients are most often carried to the creek through surface or ground water, then minimizing the amount of water runoff will minimize nutrient runoff as well.

1. Design or retrofit your irrigation system for improved irrigation uniformity and efficiency to reduce runoff and leaching.

- Conduct an in-house irrigation audit or utilize professional services to determine the efficiency of the system and make appropriate adjustments. An irrigation system audit or evaluation typically includes measuring the distribution uniformity of sprinklers using the “catch can” method and of emitters by a representative discharge sampling, as well as pressure distribution methods.
- Have a schedule for regular audits; over time an efficient system can become inefficient if modifications are made or as clogging and wear reduce uniformity.
- Make system upgrades, improvements and/or repairs as audits require.
- If irrigation uniformity remains low after all practical improvements have been made, consider converting to an irrigation system with potential of high uniformity.
- Use pressure regulators where appropriate.
- Use emitters that minimize pressure differences or pressure compensating emitters.
- When growing on slopes, compensate for pressure differences at the top and bottom of the slope by running the main line vertical to the slope with pressure controllers at each horizontal line junction and running each sub-line horizontal to the slope; include a pressure control valve.
- When using overhead or impact systems, use flow control nozzles when pressure is too
- Each watering zone should have spray stake/emitters with similar flow rates to maintain good uniformity; do not combine emitters with different flow rates in the same watering zone.
- Place plant types and pot sizes with similar water needs in the same watering zone.
- Correlate emitter flow rates for spray stakes and drippers with plant types, media infiltration rates, and pot sizes in each watering zone; emitters with flow rates that are too high will apply water faster than plants can absorb and runoff will result.
- Use appropriate and uniform nozzle sizes.
- Use sprinkler heads with a high uniformity rating.

2. Regularly maintain your irrigation system so that it continues to operate efficiently.

- Regularly inspect for leaks in mains and laterals, in irrigation connections, or at the ends of drip tape and feeder lines. Repair any found leaks.
- Regularly flush and unclog lines and emitters, keeping them free of mineral deposits and biological contaminants such as algae and bacterial slimes.
- Ensure that appropriate filtration is used and regularly clean filters.
- Maintain appropriate pressure throughout the system.
- Regularly replace worn, outdated or inefficient irrigation system components and equipment.

3. Regularly manage crops, crop areas, and irrigation systems to avoid applying water to non-cropped areas or applying irrigation when not needed.

- When using overhead or impact systems, regularly space pots or plants as closely together as is possible without compromising plant quality due to reduced light. This will minimize runoff from spaces between pots and plants.
- Manage spray stake and dripper systems to ensure every emitter is located in a plant or pot; manage harvest operations and retail areas to avoid creating watering zones with emitters located outside of pots.
- Consolidate plants and shut off irrigation in unused portions, including spray stakes and other emitters that can be “turned off” when not in use. Backfill plants into areas where plants have been sold.
- Consider using overhead emitters with check-valves to prevent line drainage and drip damage.
- Use an on/off valve in hand watering systems to prevent runoff.
- Check regularly to ensure that spray patterns of overhead irrigation systems are managed to uniformly deliver water only to plants, without creating overspray in walkways and edges.

4. Use appropriate irrigation rates and scheduling.

- Base irrigation scheduling and amount on environmental conditions and plant moisture requirements. Water requirements can be determined from a reference evapotranspiration (ET) value modified with a coefficient for the specific crop. ET and coefficient values, which reflect actual weather conditions, are available from the California Irrigation Management Information System—CIMIS, although coefficient values for many ornamental crops have yet to be determined. Irrigation scheduling can also be based on measured water content in the soil or plant growing media (determined with pot weight, tensiometer, electrical resistance blocks, or dielectric soil moisture sensor).
- Regularly adjust irrigation schedules to reflect changes in weather, plant needs, or measured soil moisture values.
- Group pot sizes and/or plant types in watering zones according to moisture requirements.
- Avoid irrigating outdoors in windy conditions.
- Consider pulse irrigation to split irrigation into smaller increments that can more effectively be used by plants.
- When automatic time clocks are used, check regularly for accuracy and adjust to correlate scheduling with changing environmental conditions and plant growth stage.

B. Nutrient Management Goals and Management Practices

The second section addresses Nutrient Management. The goal here is to apply only the amount of nutrients actually needed and usable by the target plants, and at the appropriate time based on plant growth stage and environmental factors. The intended result is that fewer nutrients end up unused and exposed to runoff. In addition, nutrient management involves handling fertilizers carefully at all stages of their use in order to prevent runoff to the creek.

1. Evaluate irrigation water, soils, growing media, and plant tissue to optimize plant growth and avoid over-fertilization.

- Regularly monitor the quality of your irrigation source water. Sample seasonally (if well water or if surface water such as ponds or creeks) or annually (if municipal water). Analyze for levels of constituents such as bicarbonates (HCO₃⁻), sodium (Na), chloride (Cl⁻), nitrate (NO₃⁻), boron (B), soluble salts, and pH. Undesirable levels of these constituents may affect crop growth and health. Utilize a commercial lab for analysis. Soluble salts, pH, nitrate, and phosphate (PO₄³⁻) can be analyzed on-site with instruments and kits designed for use by individual growers.
- If well water is used on-site for human consumption, have the well water tested regularly for contamination from fertilizers.

- Maintain records of irrigation source water quality, especially if of variable quality.
- Consider nutrients already present in your irrigation water, recovered runoff, composts, manures, and previous fertilizer applications in fertilizer management decision-making. Over-fertilization can result if nutrients already present in the growing environment are not taken into account.
- Regularly test soil/growing media for nutrients, soluble salts, and pH. Along with plant tissue analysis, soil tests are your best guide to effective use of fertilizers.
- Test plant tissue to determine concentrations of macro- and micro-nutrients.
- Use information and recommendations from soil, growing media, and plant tissue analyses in fertilization management.
- When available, use nutrient recommendations for your specific crop. Use the most up-to-date recommendations from farm advisors and publications.
- Periodically test fertigation water to monitor fertilizer levels and ensure injectors are properly operating.

2. Conduct efficient fertilizer and leaching practices.

- Incorporate solid fertilizers in a manner that optimizes nutrient availability to growing roots. When mixing fertilizer into media, be sure that fertilizer is evenly distributed throughout the root zone/container and at the correct rate; this will provide good nutrition and avoid leaching losses of fertilizer nutrients.
- Use composts or manures that are thoroughly composted before application. Composts and manures that are not thoroughly composted may contribute bacteria and other contaminants to runoff.
- Carefully apply top-dressed fertilizers to keep granules in the pot or around the plants at the correct rate.
- Ensure that injected fertilizers are carefully mixed and applied at correct rates. Excessive amounts of highly soluble liquid fertilizers are easily lost with leachate water.
- Calibrate fertilizer injectors to accurately deliver liquid fertilizer through the irrigation system.
- Utilize slow-release or controlled-release fertilizers to minimize leaching losses of
- Time fertilizers with environmental parameters and growth stage of the plants. Fertilizer management that provides nutrients at appropriate growth stages will result in better plant nutrition and minimize nutrient losses to the environment.
- Flush excess salts from the root systems by using carefully managed leaching practices. Excessive leaching represents wasted water, fertilizer, and greater runoff volumes to manage. Excess nutrients carried by leached water can be a source of groundwater and surface water contamination.
- Use the electrical conductivity (EC) of root media or leachate water to determine leaching practices. The soluble salt level of leachate water and/or root media can be monitored with a portable EC meter. Different plants have different tolerances to EC.
- High fertilizer concentrations are not recommended, as they require frequent leaching to avoid salt build-up in containers.
- Set irrigation schedules to perform leaching at specific irrigation events, rather than every time irrigation is performed. Perform leaching only with fertilizer injectors turned off (clear water).
- Measure the amount of leaching that occurs, and ensure that only 10-15% of the water applied runs through the container. Without actual measuring, the tendency is to underestimate leachate volumes and therefore leach excessively.

3. Avoid fertilizer material spills during all phases of transport, storage, and application.

- Store fertilizers in a storage structure that complies with local, state, and federal guidelines.
- Locate fertilizer storage and mixing areas as far away from water conveyances (streams, creeks, and storm drains) as possible.

- Prevent fertilizer residues from washing into surface waters. One strategy is to include a concrete pad and curb to contain spills and leaks in the fertilizer storage facility. This pad area should be protected from rainfall and irrigation to prevent fertilizer residues from washing into surface water bodies.
- Equip fertilizer tanks with secondary containment to contain spills and leaks.
- Conduct fertilizer mixing and loading operations on an impermeable surface such as a concrete floor in areas where potential for runoff is low; perform fertilizer operations at least 100 feet down-slope of a well or other water supply. These are legal requirements.
- Verify regularly that fertigation equipment is properly calibrated and fertilizer solution tanks are free of leaks.
- When transporting liquid fertilizer, do not overfill trailers or tanks. Cover loads properly and display appropriate placards on vehicles.
- When transferring fertilizer into on-farm storage or into a fertilizer applicator, take care that you do not allow materials to spill.
- Use check valves on application equipment. When applying fertilizer from a tractor or rig in a field, shut off the fertilizer applicators during turns.
- Whenever you are injecting fertilizer into irrigation water, make sure that you do not allow backflow into wells or other water sources; install backflow prevention devices.
- Dispose fertilizer bags in trash bins with lids to prevent trash with fertilizer residues from blowing into nearby waterways.

C. Erosion and Runoff Management Goals and Management Practices

The third section deals with erosion and runoff management designed to prevent sediments and water, which can both carry nutrients, from leaving the nursery property. Erosion and runoff management involves modifying soil and container substrates to enhance their ability to hold water, creating barriers to the movement of sediments and water and capturing unused irrigation water for reuse or storage. While the TMDL does not regulate sediments in the creek specifically, erosion and runoff management can help decrease the amount of nutrients reaching the creek.

1. Evaluate water quality of storm runoff to comply with water regulations and determine options for reuse or treatment.

- Inventory chemicals used in your operation, especially those likely to be present in runoff such as pesticides, fertilizers, and shading compounds.
- To measure the effect of management practices, regularly sample storm runoff water. Irrigation runoff should not exit property. Follow commercial lab instructions for taking and handling storm runoff samples, as this will greatly affect the results.
- Conduct analyses on runoff water samples to determine what is in it and at what levels. Parameters to test for include pH, electrical conductivity (EC), nitrate (NO₃⁻) and phosphate (PO₄³⁻), which can be analyzed on site with instruments and kits designed for use by growers. Alternatively, water samples can be sent to commercial labs. In addition, it is recommended to use a good commercial lab to test for other contaminants such as specific pesticides that you suspect may be present in runoff. The lab should use EPA standards and be certified for Good Laboratory Practices (GLP).
- Compare water analyses against local and state water quality standards and regulations.

2. Use practices that improve soil/media infiltration and water-holding capacity to reduce soil erosion, runoff, and excessive leaching.

- Incorporate organic amendments on sandy soil to improve water-holding capacity and prevent excessive leaching.
- Incorporate amendments on clayey soil to improve infiltration and reduce runoff.
- Use mulches or cover crops on bare soil to reduce runoff. (Photo #18, p.44)

- Test media used in containers and select media for high water holding capacity as well as good drainage. Consider the use of wetting agents in container media to increase water absorption, allow quicker wetting, and reduce channeling down the sides of pots. Wetting agents should not be overused, as they can be toxic to plants and a contaminant in runoff.
- 3. Use practices that will retard movement of runoff water and sediment and keep it on the property.**
- Determine where and how much erosion and runoff is generated and if runoff exits the property. All dry weather runoff and sediment is prohibited from entering street gutters, rivers, creeks, or other conveyances that drain to public waters. Discharging dry weather runoff and sediment onto neighboring properties is also illegal, unless done with consent.
 - Establish engineered barriers or buffers between production areas and ditches, creeks, ponds, lakes, or wetlands. Examples of plant buffers include vegetated buffer strips, grass-lined channels, grass swales, and constructed wetlands. Buffer vegetation can help absorb both dry and wet weather contaminated runoff if properly located. Engineered barriers such as berms and containment structures can regulate runoff flow and contain it. For example, detention basins can temporarily hold excess storm water; the basin will slowly drain as the collected water infiltrates into permeable soil or evaporates.
 - Convert paved or bare soil areas to vegetation that will retard runoff and take up nutrients, pesticides, and other pollutants wherever possible.
 - Consider using polyacrylamide (PAM) to remove sediment from runoff water.
 - Use windbreaks or shelterbelts in areas prone to wind erosion.
 - If your property is affected by discharge sediment or runoff from upslope or upstream properties, use practices to contain this sediment or runoff (such as diversions, filter strips, sediment basins, underground outlets, etc.).
 - Perform maintenance on any runoff buffers annually or as needed to ensure they continue to function as intended.
- 4. Manage hilly, sloped areas to prevent soil erosion and increased runoff volume and velocity. This includes hilly production areas as well as sloped non-production areas.**
- Use terraces where appropriate to control soil erosion and runoff. Ensure that any required permits are obtained for larger-scale terracing.
 - Use mulches where appropriate to control soil erosion and runoff.
 - Use vegetation (cover crops, buffer strips, grassed swales, etc) to control soil erosion and runoff.
 - Use berms to control soil erosion and runoff.
 - Use proper irrigation management in hilly production areas and in hilly landscaped nonproduction areas avoid runoff and soil erosion.
 - Use proper pest and nutrition management practices in hilly production areas and in hilly landscaped non-production areas to avoid pesticide and fertilizer runoff.
 - Perform maintenance on any hill erosion buffers annually or as needed to ensure they continue to function as intended.
- 5. Design and manage nursery roads to prevent erosion and contaminated runoff.**
- Ensure that all new roads are properly designed and permitted to avoid erosion. This may require the submission of an engineering plan, specifications, and an environmental assessment. Soils should be evaluated for erodibility, and excessive slopes should be avoided.
 - Use water breaks (water bars) on nursery roads with gradients exceeding 8%. These should be properly sized and placed only where water flow has an outlet and diverted water does not flow into septic fields or waterways.
 - Use filter strips between roads and waterways to absorb runoff from roads and trap toxic sediment.
 - Inspect culverts and clean them out during winter rains so that water drains freely.

- Prevent contaminant-laden dust from traffic and wind erosion by sealing or watering unpaved roads. This will also help in mite control. Ensure that dust control with applied water does not create runoff.
 - Perform road maintenance annually or as needed.
- 6. Collect excess irrigation and storm water runoff and sediment.**
- Use retention basins to store excess irrigation runoff and storm water. Basin capacity should be designed on the basis of probable storm events and to prevent seepage and groundwater contamination. Use qualified engineers for design and implementation.
 - Use captured water to irrigate non-crop areas, thereby preventing overflow.
 - 6.3 Use captured water and then recycles it onto crops, treating or blending with fresh water as necessary, avoiding basin overflow during both dry and wet weather.
- 7. Manage greenhouse roof runoff to reduce pollution and erosion, to prevent flooding, and improve drainage.**
- Direct roof runoff away from the municipal storm water system or sewer system. Roof runoff may contain pollutants e.g. toxic sediments and shading compounds.
 - Direct roof runoff into pervious areas (gravel, vegetative, paving material, self-contained tail water system or retention ponds).
 - Reuse collected roof runoff to irrigate non-crop or crop areas.

D. Personnel Training

This section outlines the various practices in which all, relevant operation personnel should be trained. Training ensures that personnel understand why and how nutrient reduction management practices should be done and increases the likelihood that practices will be implemented.

- 1. Provide appropriate training for personnel involved in irrigating in a language that personnel clearly understand, and maintain records documenting training.**
 - Provide training to ensure that irrigation duties are performed only by personnel who understand and practice appropriate irrigation scheduling, irrigation application practices, and crop management practices related to runoff management.
 - Ensure that appropriate personnel are trained in proper irrigation system maintenance procedures and record keeping related to maintenance.
 - If in-house irrigation audits are performed, ensure that personnel are trained to evaluate irrigation systems correctly and regularly.
- 2. Provide organized training sessions for personnel handling fertilizers in a language that personnel clearly understand, and maintain records documenting training.**
 - Provide training to ensure that appropriate personnel understand how and when to use fertilizers.
 - Provide training to ensure that appropriate personnel understand how and when to leach.
 - Provide training to ensure that appropriate personnel understands safe fertilizer transport, storage, and disposal practices.
 - Provide training for all personnel on what to do in case of a fertilizer spill.
- 3. Provide organized training sessions for personnel in runoff management in a language that personnel clearly understand, and maintain records documenting training.**
 - Ensure that all appropriate employees receive training in runoff management and all applicable regulations. All growing operation employees must understand and implement the required practices for runoff management to be effective.
 - Train staff so that they become aware of all drainage conduits and ditches on the property and know where they drain.

- Ensure that all municipal stormwater or sewer system conduits and ditches are stenciled or designated with signs, and that there are no illicit connections to the municipal stormwater or sewer system.

E. Record Keeping

This section describes the pieces of information of which growers should keep record. Records allow growers to prove which practices they have implemented in order to reduce their nutrient contribution, in addition to complying with other regulations that require records.

1. Maintain records of all nursery practices and data.

- Maintain records of fertilizer use. These may be required by regulatory agencies and are useful in obtaining permits or conditional waivers for agricultural discharge. Records can help you make informed decisions regarding fertilizer management.
- Maintain records of runoff water quality for at least 5 years.
- Implement and maintain a record-keeping system for documenting management practices addressing runoff management. Record keeping may be required by some regulating authorities.
- Maintain records of all personnel training for at least 5 years. Records should include when training occurred, who led the training, who participated, and what information was covered.

Management Options for Orchards and Field Agriculture Operations

A. Irrigation Management Goals and Management Practices

The first section addresses irrigation management as a way of reducing nutrient runoff from fields and orchards. The overall goal of irrigation management is to use irrigation water in a way that minimizes the amount of wasted water and the amount of water leaving the property and potentially reaching the creek. Since nutrients are most often carried to the creek through surface or ground water, then minimizing the amount of water runoff will minimize nutrient runoff as well.

- 1. Design or retrofit your irrigation system for improved irrigation uniformity and efficiency to reduce runoff and leaching.**
 - Conduct an irrigation audit or utilize professional services to determine the efficiency of the system and make appropriate adjustments. An irrigation system audit or evaluation typically includes measuring the distribution uniformity of sprinklers using the “catch can” method and of emitters by a representative discharge sampling, as well as pressure distribution methods.
 - Have a schedule for regular audits; over time an efficient system can become inefficient if modifications are made or as clogging and wear reduce uniformity.
 - If irrigation uniformity remains low after all practical improvements have been made, consider converting to an irrigation system with potential of high uniformity.
 - Use pressure regulators where appropriate.
 - Use emitters that minimize pressure differences or pressure compensating emitters.
 - When growing on slopes, compensate for pressure differences at the top and bottom of the slope by running the main line vertical to the slope with pressure controllers at each horizontal line junction and running each subline horizontal to the slope; include a pressure control valve.
 - When using overhead or impact systems, use flow control nozzles when pressure is too high or variable.
 - Each watering zone should have spray stake/emitters with similar flow rates to maintain good uniformity; do not combine emitters with different flow rates in the same watering zone.
 - Correlate emitter flow rates for spray stakes and drippers with plant types; emitters with flow rates that are too high will apply water faster than plants can absorb and runoff will result.
 - Use appropriate and uniform nozzle sizes.
 - Use sprinkler heads with a high uniformity rating.

- 2. Regularly maintain your irrigation system so that it continues to operate efficiently.**
 - Inspect monthly for leaks and clogs in mains and laterals, in irrigation connections, or at the ends of drip tape and feeder lines. Repair any found leaks.
 - Flush and unclog lines and emitters yearly, keeping them free of mineral deposits and biological contaminants such as algae and bacterial slimes.
 - Ensure that appropriate filtration is used and regularly clean filters.
 - Regularly replace worn, outdated or inefficient irrigation system components and equipment.

- 3. Regularly manage crops, crop areas, and irrigation systems to avoid applying water to non-cropped areas or applying irrigation when not needed.**
 - Manage spray stake and dripper systems to ensure every emitter is located near a plant or plants; manage harvest operations to avoid creating watering zones with emitters located away from plants.
 - Shut off irrigation in unused areas, including spray stakes and other emitters that can be “turned off” when not in use.
 - Consider using emitters with check-valves to prevent line drainage and drip damage.
 - Use an on/off valve in hand watering systems to prevent runoff.
 - Check regularly to ensure that spray patterns of irrigation systems are managed to uniformly deliver water directly to plants.

4. Use appropriate irrigation rates and scheduling.

- Base irrigation scheduling and amount on environmental conditions and plant moisture requirements. Water requirements can be determined from a reference evapotranspiration (ET) value modified with a coefficient for the specific crop. ET and coefficient values, which reflect actual weather conditions, are available from the California Irrigation Management Information System—CIMIS, although coefficient values for many ornamental crops have yet to be determined. Irrigation scheduling can also be based on measured water content in the soil (determined with pot weight, tensiometer, electrical resistance blocks, or dielectric soil moisture sensor).
- Regularly adjust irrigation schedules to reflect changes in weather, plant needs, or measured soil moisture values.
- Avoid irrigating outdoors in windy conditions.
- Consider pulse irrigation to split irrigation into smaller increments that can more effectively be used by plants.
- When automatic time clocks are used, check regularly for accuracy and adjust to correlate scheduling with changing environmental conditions and plant growth stage.

B. Nutrient Management Goals and Management Practices

The second section addresses nutrient management. The goal here is to apply only the amount of nutrients actually needed and usable by the target plants, and at the appropriate time based on plant growth stage and environmental factors. The intended result is that fewer nutrients end up unused and exposed to runoff. In addition, nutrient management involves handling fertilizers carefully at all stages of their use in order to prevent runoff to the creek.

1. Evaluate irrigation water, soils, growing media, and plant tissue to optimize plant growth and avoid over-fertilization.

- Regularly monitor the quality of your irrigation source water. Sample seasonally (if well water or if surface water such as ponds or creeks) or annually (if municipal water).
- Analyze for levels of constituents such as bicarbonates (HCO_3^-), sodium (Na), chloride (Cl^-), nitrate (NO_3^-), boron (B), soluble salts, and pH. Undesirable levels of these constituents may affect crop growth and health. Utilize a commercial lab for analysis. Soluble salts, pH, nitrate, and phosphate (PO_4^{3-}) can be analyzed on-site with instruments and kits designed for use by individual growers.
- If well water is used on-site for human consumption, have the well water tested regularly for contamination from fertilizers.
- Maintain records of irrigation source water quality, especially if of variable quality.
- Consider nutrients already present in your irrigation water, recovered runoff, composts, manures, and previous fertilizer applications in fertilizer management decision-making. Over-fertilization can result if nutrients already present in the growing environment are not taken into account.
- Regularly test soil for nutrients, soluble salts, and pH. Along with plant tissue analysis, soil tests are your best guide to effective use of fertilizers. (Photo #12, p.43)
- Test plant tissue to determine concentrations of macro- and micro-nutrients.
- Use information and recommendations from soil and plant tissue analyses in fertilization management.
- When available, use nutrient recommendations for your specific crop. Use the most up-to-date recommendations from farm advisors and publications.
- Regularly test fertigation water to monitor fertilizer levels and ensure injectors are properly operating.

2. Conduct efficient fertilizer and leaching practices.

- Incorporate solid fertilizers in a manner that optimizes nutrient availability to growing roots. Incorporate solid fertilizers into the soil through disking, plowing, rotary tilling or subsurface banding; this will provide good nutrition and avoid leaching losses of fertilizer nutrients.
- Use composts or manures that are thoroughly composted before application. Composts and manures that are not thoroughly composted may contribute bacteria and other contaminants to runoff.
- Carefully apply top-dressed fertilizers to keep granules around the plants at the correct rate. If using a spreader with an uneven broadcast ensure fields are bordered by vegetation to trap misapplied nutrients.
- Ensure that injected fertilizers are carefully mixed and applied at correct rates. If applying fertilizers using sprinkler irrigation ensure that fields are bordered by vegetation. Avoid sprinkler fertigation during windy weather.
- Calibrate fertilizer injectors to accurately deliver liquid fertilizer through the irrigation system.
- Utilize slow-release or controlled-release fertilizers to maximize the amount of fertilizer used by plants.
- Time fertilizers with environmental parameters and growth stage of the plants. Fertilizer management that provides nutrients at appropriate growth stages will result in better plant nutrition and minimize nutrient losses to the environment.

3. Avoid fertilizer material spills during all phases of transport, storage, and application.

- Store fertilizers in a storage structure that complies with local, state, and federal guidelines.
- Locate fertilizer storage and mixing areas as far away from water conveyances (streams, creeks, and storm drains) as possible.
- Include a concrete pad and curb to contain spills and leaks in the fertilizer storage facility. This pad area should be protected from rainfall and irrigation to prevent fertilizer residues from washing into surface water bodies.
- Equip fertilizer tanks with secondary containment to contain spills and leaks.
- 3.5 Conduct fertilizer mixing and loading operations on an impermeable surface such as a concrete floor in areas where potential for runoff is low; perform fertilizer operations at least 100 feet down-slope of a well or other water supply. These are legal requirements.
- Verify regularly that fertigation equipment is properly calibrated and fertilizer solution tanks are free of leaks.
- When transporting fertilizer, do not overfill trailers or tanks. Cover loads properly and display appropriate placards on vehicles.
- When transferring fertilizer into on-farm storage or into a fertilizer applicator, take care that you do not allow materials to spill.
- Immediately clean up fertilizer spills, and do so according to a predetermined protocol.
- Use check valves on application equipment. When applying fertilizer from a tractor or rig in a field, shut off the fertilizer applicators during turns.
- Whenever you are injecting fertilizer into irrigation water, make sure that you do not allow backflow into wells or other water sources; install backflow prevention devices and check them at least once a year, recording the date and result of this check.
- Dispose fertilizer bags in trash bins with lids to prevent trash with fertilizer residues from blowing into nearby waterways.

C. Erosion and Runoff Management Goals and Management Practices

The third section deals with erosion and runoff management designed to prevent sediments and water, which can both carry nutrients, from leaving the property. Erosion and runoff management involves modifying soil to enhance its ability to hold water, creating barriers to the movement of sediments and water and capturing unused irrigation water for reuse or storage. While the TMDL does not regulate sediments in the creek specifically, erosion and runoff management can help decrease the amount of nutrients reaching the creek.

- 1. Evaluate water quality of storm runoff to comply with water regulations and determine options for reuse or treatment.**
 - Inventory chemicals used in your operation, especially those likely to be present in runoff such as pesticides, fertilizers, and shading compounds.
 - Regularly sample storm runoff water, as there will likely be seasonal variations in the analyses. Irrigation runoff should not exit property. Follow commercial lab instructions for taking and handling storm runoff samples, as this will greatly affect the results.
 - Conduct analyses on runoff water samples to determine what is in it and at what levels. Parameters to test for include pH, electrical conductivity (EC), nitrate (NO₃⁻) and phosphate (PO₄³⁻), which can be analyzed on site with instruments and kits designed for use by growers. Alternatively, water samples can be sent to commercial labs. In addition, it is recommended to use a good commercial lab to test for other contaminants according to the products utilized such as specific pesticides that you suspect may be present in runoff. The lab should use EPA standards and be certified for Good Laboratory Practices (GLP).
 - Compare water analyses against local and state water quality standards and regulations.

- 2. Use practices that improve soil/media infiltration and water-holding capacity to reduce soil erosion, runoff, and excessive leaching.**
 - Incorporate organic amendments on sandy soil to improve water-holding capacity and prevent excessive leaching.
 - Incorporate amendments on clayey soil to improve infiltration and reduce runoff.
 - Use mulches or cover crops on bare soil to reduce runoff.
 - Maintain crop residues when not using cover crops.

- 3. Use practices that will retard movement of runoff water and sediment and keep it on the property.**
 - Determine where and how much erosion and runoff is generated and if runoff exits the property. All dry weather runoff and sediment is prohibited from entering street gutters, rivers, creeks, or other conveyances that drain to public waters. Discharging dry weather runoff and sediment onto neighboring properties is also illegal, unless done with consent.
 - Establish engineered barriers or buffers between production areas and ditches, creeks, ponds, lakes, or wetlands. Examples of plant buffers include vegetated buffer strips, grass-lined channels, grass swales, and constructed wetlands. Buffer vegetation can help absorb both dry and wet weather contaminated runoff if properly located. Engineered barriers such as berms and containment structures can regulate runoff flow and contain it. For example, detention basins can temporarily hold excess storm water; the basin will slowly drain as the collected water infiltrates into permeable soil or evaporates.
 - Discharge pumped or runoff water into filter areas.
 - Shape and seed field edges to filter runoff as much as possible.
 - Use conservation tillage practices such as no-till, ridge till, strip till and minimum till.
 - Convert paved or bare soil areas to vegetation that will retard runoff and take up nutrients, pesticides, and other pollutants wherever possible.
 - Consider using polyacrylamide (PAM) to remove sediment from runoff water.
 - Use windbreaks or shelterbelts in areas prone to wind erosion.
 - If your property is affected by discharge sediment or runoff from upslope or upstream properties, use practices to contain this sediment or runoff (such as diversions, filter strips, sediment basins, underground outlets, etc.).
 - Perform maintenance on runoff barriers annually or as needed to ensure they continue to function as intended.

- 4. Manage hilly, sloped areas to prevent soil erosion and increased runoff volume and velocity. This includes hilly production areas as well as sloped non-production areas.**
 - Use terraces where appropriate to control soil erosion and runoff.

- Use appropriate mulches where appropriate to control soil erosion and runoff. Ensure that mulch will stick to the soil where applied, and does not include large clumps that will run off instead of absorbing/blocking water flow.
- Use vegetation (cover crops, buffer strips, grassed swales, etc) to control soil erosion and runoff.
- Use proper irrigation management in hilly production areas and in hilly landscaped nonproduction areas avoid runoff and soil erosion.
- Use proper pest and nutrition management practices in hilly production areas and in hilly landscaped non-production areas to avoid pesticide and fertilizer runoff.
- Perform maintenance on erosion control annually or as needed to ensure they continue to function as intended.

5. Design and manage property roads to prevent erosion and contaminated runoff.

- Ensure that all new roads are properly designed and permitted to avoid erosion. This may require the submission of an engineering plan, specifications, and an environmental assessment. Soils should be evaluated for erodibility, and excessive slopes should be avoided. To prevent contaminant-laden dust from traffic and wind erosion, seal or water unpaved roads. Roads can be sealed with non-toxic sealants, or seeded with perennial grass when possible.
- Use water breaks (water bars) on property roads with gradients exceeding 8%. These should be properly sized and placed only where water flow has an outlet and diverted water does not flow into septic fields or waterways.
- Use filter strips between roads and waterways to absorb runoff from roads and trap toxic sediment.
- Inspect culverts and clean them out during winter rains so that water drains freely. When not maintained, build-up of eroded soil or other matter can clog culverts, potentially directing water over areas where it can become contaminated. To avoid creating contaminated runoff, culverts must be kept clear.
- Perform road maintenance annually or as needed.

6. Collect excess irrigation and storm water runoff and sediment.

- Use retention basins to store excess irrigation runoff and storm water. Basin capacity should be designed on the basis of probable storm events and to prevent seepage and groundwater contamination. Use qualified engineers for design and implementation.
- Use captured water to irrigate crops and/or non-crop areas, thereby preventing basin overflow.
- Consider planting water-loving crops (e.g. curly willow, papyrus) in collection basins to absorb water.

7. Manage roof runoff to reduce pollution and erosion, to prevent flooding, and improve drainage.

- Direct roof runoff to avoid flow across areas where contaminants will be washed into the municipal storm water, sewer system, or agricultural drainage system. Roof runoff may contain pollutants e.g. toxic sediments and shading compounds.
- Direct roof runoff into pervious areas (gravel, vegetative, paving material, self-contained tail water system or retention ponds).
- Reuse collected roof runoff to irrigate non-crop or crop areas.

D. Personnel Training

This section outlines the various practices in which all relevant operation personnel should be trained. Training ensures that personnel understand why and how nutrient reduction management practices should be done and increases the likelihood that practices will be implemented.

- 1. Provide appropriate training for personnel involved in irrigating in a language that personnel clearly understand.**
 - Provide training to ensure that irrigation duties are performed only by personnel who understand and practice appropriate irrigation scheduling, irrigation application practices, and crop management practices related to runoff management.
 - Ensure that appropriate personnel are trained in proper irrigation system maintenance procedures and record keeping related to maintenance.
 - If irrigation audits are performed, ensure that personnel are trained to evaluate irrigation systems correctly and regularly.

- 2. Provide organized training sessions for personnel handling fertilizers in a language that personnel clearly understand.**
 - Provide training to ensure that appropriate personnel understand how and when to use fertilizers.
 - Provide training to ensure that appropriate personnel understands safe fertilizer transport, storage, and disposal practices.
 - Provide training for all personnel on what to do in case of a fertilizer spill.

- 3. Provide organized training sessions for personnel in runoff management in a language that personnel clearly understand.**
 - Ensure that all appropriate employees receive training in runoff management and all applicable regulations. All growing operation employees must understand and implement the required practices for runoff management to be effective.
 - Train staff so that they become aware of all drainage conduits and ditches on the property and know where they drain.
 - Ensure that all municipal stormwater or sewer system conduits and ditches are stenciled or designated with signs, and that there are no illicit connections to the municipal stormwater or sewer system.

E. Record Keeping

This section describes the pieces of information of which growers should keep record. Records allow growers to prove which practices they have implemented in order to reduce their nutrient contribution, in addition to complying with other regulations that require records.

- 1. Maintain records of all nursery practices and data.**
 - Maintain records of fertilizer use. These may be required by regulatory agencies and are useful in obtaining permits or conditional waivers for agricultural discharge. Records can help you make informed decisions regarding fertilizer management.
 - Maintain records of runoff water quality for at least 5 years.
 - Implement and maintain a record-keeping system for documenting management practices addressing runoff management. Record keeping may be required by some regulating authorities.
 - Maintain records of all personnel training for at least 5 years. Records should include when training occurred, who led the training, who participated, and what information was covered.

Management Options for Residents and Animal Owners

A. Septic System Management Goals and Management Practices

The first section addresses septic system design and management as a way of reducing the nutrient contribution from residences and offices. It describes the proper design and maintenance required to help minimize the risk of damage to the septic system, which can result in added nutrient contribution.

- 1. Design/retrofit your septic system to fit your household's or staff's needs and maintain the system with inspection and pumping**
 - Ensure you are using the appropriate size and type of septic system, whether through new design or upgrade, for your household and your volume of water and solids.
 - Do not construct structures, walkways, patios, swimming pools, equipment storage, driveways or parking lots over a leachfield to prevent pressure damage and maintain maximum evapotranspiration.
 - Divert surface flow away from the leachfield to avoid erosion, minimize excess filtration in the leachfield and maximize the function of the leach lines.
 - Plant only shallow-rooted plants over the leachfield. Deep roots of trees and shrubs can cause damage to the system.
 - Have your system inspected and pumped as recommended, generally every 3 to 5 years. Keep a record of when and by whom the system was inspected and pumped.
 - Keep records of your system size and location of the tank and leachfield. Records of systems for houses built after 1975 can be obtained from the Department of Environmental Health.
 - Familiarize yourself with the layout of the septic system: tank inlet, tank cover, tank outlet, and leach lines. Any unusual wetness or plant growth might indicate leakage.

- 2. Use water efficiently to reduce the risk of liquid overload to the system**
 - When renovating, install high-efficiency toilets and showerheads to save water. To save water with a standard toilet, place a plastic milk jug filled with small rocks and tightly capped into the toilet tank, away from any moving parts. The jug will displace the water in the tank and allow the toilet to use less water with each flush.
 - Install faucet aerators in the kitchen and bathroom to reduce the volume of water used.
 - Turn off faucets when not in use while shaving, brushing teeth, washing dishes, etc.
 - Run the dishwasher and clothes washer only when they are full. Avoid running the clothes washer multiple times in one day to give the system time to process the water.
 - Fix all leaking faucets and toilets promptly.

- 3. Avoid discharging any clogging or hazardous materials into the system**
 - Minimize or avoid use of the garbage disposal to reduce the amount of solid matter entering the system.
 - Collect grease in a container near the sink rather than pouring it down the drain.
 - After scraping plates, use paper towels to finish wiping off food residue such as sauces and oil.
 - Do not flush non-degradable items such as diapers, sanitary napkins, kitty litter, paper towels, dental floss, cotton swabs, cigarette butts, coffee grounds, etc that can clog pipes.
 - Do not pour hazardous materials such as household chemicals, gasoline, oil, pesticides, antifreeze or paint down drains. These materials can destroy the biological treatment-taking place in the system and can contaminate surface and ground water.
 - Do not use commercially sold septic tank additives, which can disrupt the biologically processes occurring in the tank.

B. Garden Management Goals and Management Practices

These garden management practices encourage the establishment of healthy soil that can retain water and nutrients. The choice of appropriate plants and the efficient use of water and nutrients can minimize loss of these landscaping elements from the property.

1. Build and maintain healthy soil

- Use soil tests to determine how much nitrogen, phosphorus, potassium, lime, etc your soil already has. If enough of one or more nutrients already exist in your soil, you can avoid adding them artificially. Contact the Mission Resource Conservation District or Cooperative Extension office for soil tests.
- Use compost to increase the nutrient absorption capacity and porosity of your soil. Dig or rototill one to three inches of compost into 6 to 12 inches of topsoil when you're making new beds. Compost helps sandy soils hold nutrients and water, loosens clay soils and feeds the beneficial soil life so it can feed and protect your plants. Compost can be obtained from garden stores or the county landfill, or you can make your own.
- To make your own compost you can use leaves, chopped stalks, flowers and grass, as well as vegetable scraps and coffee grounds from the kitchen. Meats, dairy and oils can attract pests, so should be avoided. Turn your compost every few weeks with a pitchfork to distribute air and moisture. Sprinkle water on your pile in dry weather. Compost is ready when the waste becomes a dark, crumbly material that is uniform in texture. Use the hand squeeze test: The compost should hold its shape when squeezed but then crumble gently as you open your hand. You can then spread your compost in garden beds, under shrubs, on your lawn, or use it as potting soil.
- Avoid placing compost piles near drains or surface waters.
- Spread mulch, a layer of organic material like leaves, aged wood chips, and compost or grass clippings around your plants in spring or fall. Never exceed more than three inches of mulch in your landscaping beds, and keep mulch about an inch away from stems and tree trunks. Mulch stabilizes soil temperature, prevents weeds, feeds the soil for healthier plants and helps to conserve water. (Photo #39, p.48)
- When fertilizer is required use slow-release fertilizer. Nutrients are distributed to plants more evenly and slowly, allowing plants to use more of the nutrients provided. Fewer nutrients are therefore unused and able to leave the property as runoff.
- When fertilizing, following fertilizer instructions carefully. Take care to ensure no fertilizer is applied to sidewalks or walkways. Do not fertilize during or directly before rain.

2. Choose appropriate plants for your site

- Assess the characteristics of your garden site (soil pH, soil type and sunlight) as well as your desires for the garden (privacy, play area, color) to determine appropriate plants.
- Select plants that grow well in a warm and dry climate and fit the amount of sun, type of soil and water available in your yard. When possible, use low-water plants to save the time and expense of watering and minimize runoff. Think about how big a tree or shrub will be when mature, especially next to your house or driveway and near power lines.
- Choose pest-resistant plants. Many garden centers and nurseries offer information about pest and disease-resistant plant varieties. After they're established, they'll save you time and money on pest control.

3. Water efficiently to conserve water and minimize the amount of water running off the property

- Perform an irrigation system review to ensure your system is in working order.
- Perform an irrigation review, consulting published irrigation recommendations, to determine the amount of water required by your plants. Both over- and under-watering can be damaging to plants.
- Use soaker hoses or drip irrigation rather than sprinklers on beds to save water.
- Water in the early morning if possible. Water evaporates more readily at midday, and in the evening water is more likely to encourage the growth of mold or plant diseases.

- Use an outdoor water timer to automatically adjust watering to weather conditions.

C. Lawn Management Goals and Management Practices

The third section deals with lawn management practices designed to prevent waste and nutrients from leaving the property. Often in Southern California and other areas of dry, warm weather residents choose to landscape with native and low water plants instead of traditional lawn grass. However, if you choose to grow a lawn, these practices can be used to maximize the efficiency of water and fertilizers and to prevent runoff.

1. Water and fertilize lawns carefully and efficiently to avoid runoff

- Plant lawns only on relatively level ground with sufficient sun. When planting lawns consult with your local nursery or the UCCE Master Gardeners to determine the best variety for your location. On slopes or shady areas consider planting other ground covers that require less water and maintenance.
- Incorporate 6 to 12 inches of compost into the soil for a new lawn. Top dress existing lawns with a quarter- to half-inch of compost every spring or fall to maintain soil nutrients and porosity.
- Sharpen the mower blade frequently to cut the grass blades cleanly and evenly. Dull mower blades leave jagged tips on the grass that will dry out and turn brown, that causes many homeowners to over-water or over-fertilize needlessly.
- Maintain an optimal blade height to keep the lawn healthy.
- Aerate and de-thatch lawns routinely to provide a healthy root system. This practice can lead to more efficient irrigation and fertilizer use by allowing the soil easier access to applied water and nutrients.
- Avoid placing lawn clippings in storm drains or in areas where they are likely to be washed into drains. Clippings can be composted or thrown away.
- Use slow-release fertilizers when necessary to maximize the benefit to plants.
- Water only as much as required by your variety of grass. Avoid over watering your lawn to prevent runoff.
- Water in the early morning if possible. Minimize evaporation and growth of mold and plant diseases.
- Ensure that sprinklers do not water sidewalks or other impervious areas.

D. Livestock and Pet Management Goals and Management Practices

The fourth section provides management options to prevent the contribution of nutrients by pets and livestock. Animals can contribute nutrients to the creek and groundwater primarily through their waste. These management options help to keep waste and water contaminated with waste from reaching surface and/or ground waters. Practices that address erosion are intended to prevent soil and water contaminated with nutrients from leaving the property and entering waterways.

1. Design and manage property facilities to prevent erosion and contaminated runoff.

- Locate livestock facilities and conduct activities away from waterways, flood-prone areas and steep hillsides. Address water quality concerns in the design of new facilities and work to upgrade existing facilities.
- Ensure that all new roads are properly designed and permitted to avoid erosion. This may require the submission of an engineering plan, specifications, and an environmental assessment. Soils should be evaluated for erodibility, and excessive slopes should be avoided.
- Ensure that all new horse trails are designed to avoid erosion. Incorporate switchbacks on sloping trails.
- Prior to October 1st, re-blade and repair erosion-prone roads and trails. Make sure they are graded properly to minimize erosion.

- Install erosion control devices such as sandbags, silt fences and straw wattles along erosion-prone roads and trails as temporary measures. If left alone in place, these devices can break down and present a safety hazard.
 - Use water breaks (water bars) on property roads with gradients exceeding 8%. These should be properly sized and placed only where water flow has an outlet and diverted water does not flow into septic fields or waterways.
 - Use filter strips between roads and waterways to absorb runoff from roads and trap sediment.
 - Inspect culverts and clean them out prior to October 1st so that water drains freely during winter rains.
 - Prevent contaminant-laden dust from traffic and wind erosion by sealing or watering unpaved roads. Ensure that dust control with applied water does not create runoff.
 - Use dry cleaning methods, such as sweeping regularly in parking areas and roads to remove dirt and other contaminants that could enter waterways.
- 2. Limit runoff of livestock waste by containing animals and their waste.**
- Use fencing to restrict livestock access to surface waters and drainage areas. Fencing limits the amount of animal waste reaching these areas, in addition to protecting surface water edges from erosion caused by livestock grazing.
 - Use barriers such as vegetated filter strips to protect surface waters, hold soil in place and filter runoff water. Buffers can be built around animal holding areas or facilities, and/or along the edge of surface waters. They can also be used to separate animal grazing areas from cropland treated with manure.
 - Divert rainwater away from animal confinement areas to keep water from picking up wastes.
- 3. Keep livestock wash water away from surface and ground water.**
- Divert animal wash or cooling water away from surface waters and/or into vegetated filter strips and/or gravel filtration areas to allow for absorption of nutrients and salts.
 - Divert animal wash or cooling water away from manure and used bedding stockpiles to prevent water from collecting nutrients and salts.
- 4. Collect and store livestock waste carefully to prevent runoff of wastes.**
- Utilize animal bedding such as straw or wood shavings in confinement areas to absorb moisture and manure. (Photo #46, p.49)
 - Clean animal pens at least twice per week or as needed to prevent build up of wastes.
 - Use sheds or dumpsters, located away from surface waters, for storage of waste. Waste can then be incorporated into soil to meet the needs of treated plants or transported out of the watershed for disposal in a landfill.
- 5. Treat animal wastes to create safe, usable material for fertilization or soil treatment.**
- Compost manure in sheds or open-air stacks to make a humus-like material that can be applied to land as a fertilizer or soil conditioner. Regularly mix or turn the stack to provide air for decomposition of waste solids. Household organic waste can be added to this compost. If spreading a thin layer of horse manure over the top of cropland, use approximately 7 tons/acre. If incorporating into the soil use between 5 and 6 tons/acre to distribute 80 lb N/acre.
- 6. Collect and dispose of household pet waste properly to avoid contribution to surface or groundwater nutrient levels.**
- Collect pet wastes from yard and pet walking areas daily and dispose of in trash.
 - Do not compost pet wastes to prevent transmission of parasites.
 - Dispose of used kitty litter in the trash as opposed to flushing down the toilet.

Common Pollution Prevention Management Options

- 1. Ensure that all non-production areas do not contribute to dry or wet weather runoff. These include walkways, driveways, packing areas, loading areas and parking areas.**
 - Clean indoor walkways, loading areas, and packing areas using only "dry" methods (such as sweeping, dry absorbents) or if wet cleaned, ensure that wash- and rinse-water remain on the property. These areas may contain fertilizers, pesticides and vehicle fluids that could contaminate surface or groundwater.
 - Periodically clean outdoor driveways, walkways, parking areas, loading areas, and packing areas to remove debris, vehicle residues, and other contaminants and prevent them from washing off during wet weather. Use only "dry" methods (such as sweeping, dry absorbents) or if wet cleaned, ensure that wash- and rinse-water remain on the property.

- 2. Maintain vehicles, trucks and tractors and their storage areas so that they do not leak fluids into ground or surface waters.**
 - Regularly maintain vehicles, trucks, and tractors used in the operation to detect and prevent fluid leaks that are very toxic to the environment.
 - Take vehicles to a car wash, or ensure that wash runoff from vehicles, trucks, and tractors remains on the property and does not drain into the municipal stormwater or sewer system, or leach into groundwater.
 - Properly dispose of collected fluids. (Photo #48, p.49)
 - Whenever possible, remove vehicles, equipment, and storage tanks that are no longer used on the property.
 - Drain and properly dispose of fluids from vehicles and equipment in long-term storage.
 - Locate maintenance and storage areas for vehicles, trucks, and tractors where wet weather will not wash fluids into surface water or cause them to percolate into groundwater.
 - Clean maintenance and storage areas to avoid oil and grease buildup.
 - Immediately and properly clean up spills from vehicles, trucks and tractors.

- 3. Locate and maintain fuel tanks so that they do not leak, spill, overflow, or leach into ground or surface water.**
 - Locate fuel tanks where wet weather will not wash fluids into surface water or cause them to percolate into groundwater.
 - Check and maintain fuel tanks to prevent leaks.
 - Perform fueling activities carefully to avoid overflow and spills.
 - Immediately and properly clean up fuel spills.

- 4. Keep the property free of green waste, construction debris and trash so that it does not clog storm drains and create an unsightly mess in waterways and on beaches.**
 - Regularly maintain the entire property to keep it clean and free of debris. Solid waste and debris can cause fatalities for marine life through strangling or ingestion.
 - Ensure that an adequate number of waste containers are available where needed and that they are regularly collected to avoid overflow.
 - Ensure that waste containers are kept in good condition and kept closed.
 - Ensure that waste containers, collection areas, storage areas, and stockpile areas are located indoors or covered when outdoors to prevent wet weather or wind from washing or blowing trash into storm drains and waterways.
 - Dispose of green waste in designated green waste receptacles or compost in a contained compost pile or bin.

5. Maintain restrooms to avoid spills and leakage of fecal coliform from human waste into the municipal stormwater or sewer system. Fecal coliform at high levels causes beach closures and poses serious human and animal health hazards.

- Ensure that adequate restrooms and portable toilets are available where needed. Providing restrooms prevents human waste from contributing nutrients to the soil or water of the property. In addition, restrooms are required in work places by the Department of Labor's Occupational Safety and Health Standards.
- Ensure that toilets, floor, and sink drains in restrooms are properly hooked up to the sanitary sewer system.
- Ensure that portable toilets are located where wet weather will not wash waste into the municipal stormwater system and where vehicles will not knock them over.
- Ensure that restrooms and portable toilets are regularly maintained to prevent sewage and human waste from entering the municipal stormwater systems.

6. Provide organized training sessions in waste, sanitation, and spill management for all personnel in a language that they clearly understand, and maintain records documenting training.

- Ensure that all employees receive training in proper waste disposal and use of restrooms/portable toilets.
- All employees should be trained on what to do in the event of a spill.
- Educate and require your employees to recycle all the waste that you can from your nursery operation, such as metal, oil, paper, and plastic.
- Educate employees in the proper disposal of batteries, paints, and other potentially hazardous materials used.
- Document and maintain records of employee training for at least five years. Recordkeeping helps to document waste, sanitation, and spill management practices and is required by some regulating authorities.