CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

PROPOSED ORDER NO. R3-2017-0002
ATTACHMENT A

ADDITIONAL FINDINGS, APPLICABLE WATER QUALITY CONTROL PLANS AND DEFINITIONS
FOR
CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS
FOR
DISCHARGES FROM IRRIGATED LANDS

Order No. R3-2017-0002 (*Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands*) requires Dischargers to comply with applicable state plans and policies and applicable state and federal water quality standards and to prevent nuisance. Water quality standards are set forth in state and federal plans, policies, and regulations. The California Regional Water Quality Control Board Central Coast Region's (Central Coast Water Board) Water Quality Control Plan contains specific water quality objectives, beneficial uses, and implementation plans that are applicable to discharges of waste and/or waterbodies that receive discharges of waste from irrigated lands. The State Water Resources Control Board (State Water Board) has adopted plans and policies that may be applicable to discharges of waste and/or surface waterbodies or groundwater that receive discharges of waste from irrigated lands. The United States Environmental Protection Agency (USEPA) has adopted the *National Toxics Rule* and the *California Toxics Rule*, which constitute water quality criteria that apply to waters of the United States.

The specific waste constituents required to be monitored and the applicable water quality standards that protect identified beneficial uses for the receiving water are set forth in Monitoring and Reporting Program (MRP) Order No. R3-2017-0002-01, MRP Order No. R3-2017-0002-02, and MRP Order No. R3-2017-0002-03.

This Attachment A lists additional findings (Part A), relevant plans, policies, regulations (Part B), and definitions of terms (Part C) used in Order No. R3-2017-0002.

PART A. ADDITIONAL FINDINGS

The California Regional Water Quality Control Board, Central Coast Region additionally finds that:

1. The Central Coast Water Board is the principal state agency in the Central Coast Region with primary responsibility for the coordination and control of water quality. (Cal. Wat. Code § 13001, Legislative Intent) The purpose of this Order is to is focus on the highest water quality priorities and maximize water quality protection to ensure the long-term reliability and availability of water resources of sufficient supply and quality for all present and future beneficial uses, including drinking water and aquatic life. Given the magnitude and severity of water quality impairment and impacts to beneficial uses caused by irrigated agriculture and the significant cost to the public, the Central Coast Water Board finds that it is reasonable and necessary to require specific actions to protect water quality.

2. The Central Coast Water Board recognizes that Dischargers may not achieve immediate compliance with all requirements. Thus, this Order provides reasonable schedules for Dischargers to reach full compliance over many years by implementing management practices and monitoring and reporting programs that demonstrate and verify measurable progress annually. This Order includes specific dates to achieve compliance with this Order and milestones that will reduce pollutant loading or impacts to surface water and groundwater in the short term (e.g., a few years) and achieve water quality standards in surface water and groundwater in the longer term (e.g., decades); some compliance dates extend beyond the term of this Order. The focus of this Order is non-tile drain discharges, although Tier 3 tile drain discharges on individual farms/ranches must be monitored. Dischargers with tile drains must also describe management practices used or proposed to be used to attain water quality standards or minimize exceedances in receiving waters while making progress to attain water quality standards. The Executive Officer will evaluate any proposed longer timeframes to address tile-drain discharges.

3. According to California Water Code Section 13263(g), the discharge of waste to waters of the State is a privilege, not a right. It is the responsibility of dischargers of waste from irrigated lands to comply with the Water Code by seeking waste discharge requirements (WDRs) or by complying with a waiver of WDRs. This Order waiving the requirement to obtain WDRs provides a mechanism for dischargers of waste from irrigated lands to meet their responsibility to comply with the Water Code and to prevent degradation of waters of the State, prevent nuisance, and to protect the beneficial uses. Dischargers are responsible for the quality of surface waters and ground waters that have received discharges of waste from their irrigated lands.

AGRICULTURAL AND WATER RESOURCES IN THE CENTRAL COAST REGION

4. In the Central Coast Region, nearly all agricultural, municipal, industrial, and domestic water supply comes from groundwater. Groundwater supplies approximately 90 percent of the drinking water on the Central Coast. Currently, more than 700 municipal public supply wells in the Central Coast Region provide drinking water to the public. In addition, based on 1990 census data, there are more than 40,000 permitted private wells in the Region, most providing domestic drinking water to rural households and communities from shallow sources. The number of private domestic wells has likely significantly increased in the past 20 years due to population growth.

5. In the Salinas, Pajaro, and Santa Maria groundwater basins, agriculture accounts for approximately 80 to 90 percent of groundwater pumping (MCWRA, 2007; PVWMA, 2002; Luhdorff and Scalmanini Consulting Engineers. April 2009).

6. The Central Coast Region supports some of the most significant biodiversity of any temperate region in the world and is home to the last remaining population of the California sea otter, three sub-species of threatened or endangered steelhead (*Oncorhynchus mykiss*) and one sub-species of endangered coho salmon (*Oncorhynchus kisutch*). The endangered marsh sandwort (*Arenaria paludicola*), Gambel's watercress (*Nasturtium rorippa gambelii*), California least tern (*Sterna antillarum browni*), and threatened red-legged frog (*Rana aurora*) are present in the region.

7. Several watersheds drain into Monterey Bay National Marine Sanctuary, one of the largest marine sanctuaries in the world. Elkhorn Slough is one of the largest remaining tidal wetlands in the United States and one of the National Oceanic and Atmospheric Administration (NOAA) designated National Estuarine Research Reserves. The southern portion includes the Morro Bay National Estuary and its extensive salt marsh habitat.

8. The two endangered plants, marsh sandwort and Gambel's watercress, are critically imperiled and their survival depends upon the health of the Oso Flaco watershed. The last remaining known population of marsh sandwort and one of the last two remaining known populations of Gambel's watercress occur in Oso Flaco Lake (United States Department of the Interior Fish and Wildlife Service, 2007).

9. The Central Coast of California is one of the most productive and profitable agricultural regions in the nation, reflecting a gross production value of more than six billion dollars in 2008 and contributing to more than 14 percent of California's agricultural economy. The region produces many high value specialty crops including lettuce, strawberries, raspberries, artichokes, asparagus, broccoli, carrots, cauliflower, celery, fresh herbs, mushrooms, onions, peas, spinach, wine grapes, tree fruit and nuts. An adequate water supply of sufficient quality is critical to supporting the agricultural industry on the Central Coast.

LEGAL AND REGULATORY CONSIDERATIONS

10. This Attachment A to Order No. R3-2017-0002 identifies applicable plans and policies adopted by the State Water Board and the Central Coast Water Board that contain regulatory requirements that apply to the discharge of waste from irrigated lands. This Attachment A also provides definitions of terms for purposes of this Order.

11. The Water Code grants authority to the State Water Board with respect to State drinking water, water rights and water quality regulations and policy, and establishes nine Regional Water Boards with authority to regulate discharges of waste that could affect the quality of waters of the State and to adopt water quality regulations and policy.

12. Water Code section 106.3 declares that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes, and requires all relevant state agencies to consider this state policy when revising, adopting, or establishing policies, regulations, and grant criteria. On February 16, 2016, the State Water Board adopted Resolution No. 2016-0010 which identifies the human right to water as a top priority and core value of the state and regional Water Boards. Similarly, on January 26, 2017, the Central Coast Water Board adopted human right to water Resolution No. 2017-0004 which states that protecting drinking water and human health, and preventing and addressing discharges that could threaten human health by causing or contributing to pollution or contamination of drinking water sources of waters of the state, are the Central Coast Water Board's highest priorities. Furthermore, Resolution No. R3-2017-0004 also states that the Central Coast Water Board will promote policies that advance the human right to water and discourage actions that delay or impede opportunities for communities to secure safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes; and that discharges shall be regulated to attain the highest water quality which is reasonable, considering all demands being made on those waters and the total values involved. (Wat. Code, §§ 13000, 13050, subds. (i)-(m), 13240, 13241, 13263). The Central Coast Water Board is implementing the Human Right to Water law and the Central Coast Water Board's resolution by prioritizing drinking water and replacement water issues in the agricultural program, including shifting staff resources and requiring replacement water where necessary, working to obtain grant finding where possible, focusing on disadvantaged communities, and by limiting this order to a shorter, three-year term as part of a phased approach to achieve water quality objectives.

13. As further described in the Order, discharges from irrigated lands affect the quality of the waters of the State depending on the quantity of the waste discharge, quantity of the waste, the quality of the waste, the extent of treatment, soil characteristics, distance to surface water, depth to groundwater, crop type,

implementation of management practices and other site-specific factors. Discharges from irrigated lands have impaired and will continue to impair the quality of the waters of the State within the Central Coast Region if such discharges are not controlled.

14. Water Code Section 13267(b)(1) authorizes the Central Coast Water Board to require dischargers to submit technical reports necessary to evaluate Discharger compliance with the terms and conditions of this Order and to assure protection of waters of the State. The Order, this Attachment A, and the records of the Water Board provide the evidence demonstrating that discharges of waste from irrigated lands have degraded and/or polluted the waters of the state. Persons subject to this Order discharge waste from irrigated lands that impacts the quality of the waters of the state. Therefore it is reasonable to require such persons to prepare and submit technical reports.

15. Water Code Section 13269 provides that the Central Coast Water Board may waive the requirement in Water Code section 13260(a) to obtain WDRs. Water Code section 13269 further provides that any such waiver of WDRs shall be conditional, must include monitoring requirements unless waived, may not exceed five years in duration, and may be terminated at any time by the Central Coast Water Board or Executive Officer.

16. Water Code Section 13269(a)(4)(A) authorizes the Central Coast Water Board to include as a condition of a conditional waiver the payment of an annual fee established by the State Water Board. California Code of Regulations, Title 23, Division 3, Chapter 9, Article 1, Section 2200.3 sets forth the applicable fees. The Order requires each Discharger to pay an annual fee to the State Water Board in compliance with the fee schedule.

17. The *Water Quality Control Plan for the Central Coastal Basin* (Basin Plan) designates beneficial uses, establishes water quality objectives, contains programs of implementation needed to achieve water quality objectives, and references the plans and policies adopted by the State Water Board. The water quality objectives are required to protect the beneficial uses of waters of the State identified in this Attachment A.

18. The Order is consistent with the Basin Plan because it requires Dischargers to comply with applicable water quality standards, as defined in this Attachment A, and requires terms and conditions, including implementation of management practices. The Order also requires monitoring and reporting as defined in MRP Order No. R3-2017-0002-01, MRP Order No. R3-2017-0002-02, and MRP Order No. R3-2017-0002-03 to determine the effects of discharges of waste from irrigated lands on water quality, verify the adequacy and effectiveness of this Order's terms and conditions, and to evaluate individual Discharger's compliance with this Order.

19. Water Code Section 13246 requires boards, in carrying out activities that affect water quality to comply with State Water Board policy for water quality control. This Order requires compliance with applicable State Water Board policies for water quality control.

20. This Order is consistent with the requirements of the *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (NPS Policy) adopted by the State Water Board in May 2004. The NPS Policy requires, among other key elements, that an NPS control implementation program's ultimate purpose shall be explicitly stated and that the implementation program must, at a minimum, address NPS pollution in a manner that achieves and maintains water quality objectives and beneficial uses, including any applicable anti-degradation requirements. The NPS Policy improves the State's ability to effectively manage NPS pollution and conform to the requirements of the Federal Clean Water Act and the Federal Coastal Zone Act Reauthorization Amendments of 1990. The NPS Policy provides a bridge between the State Water Board's January 2000 *NPS Program Plan* and its 2010 *Water Quality Enforcement Policy*. The NPS Policy's five key elements are:

    a. Key Element #1 - Addresses NPS pollution in a manner that achieves and maintains water quality objectives and beneficial uses
    b. Key Element #2 - Includes an implementation program with descriptions of the Management Practices (MPs) and other program elements and the process to be used to ensure and verify proper MP implementation
    c. Key Element #3 - Includes a specific time schedule and corresponding quantifiable milestones designed to measure progress toward reaching the specified requirements
    d. Key Element #4 - Contains monitoring and reporting requirements that allow the Water Board, dischargers, and the public to determine that the program is achieving its stated purpose(s) and/or whether additional or different MPs or other actions are required
    e. Key Element #5 - Clearly discusses the potential consequences for failure to achieve the NPS control implementation program's stated purposes

21. Consistent with the NPS Policy, management practice implementation assessment may, in some cases, be used to measure nonpoint source control progress. However, management practice implementation never may be a substitute for meeting water quality requirements.

22. State Water Board Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California,* hereafter Antidegradation Policy) requires that the Central Coast Water Board maintain high quality waters of the state unless the Central Coast Water Board determines that any authorized degradation is consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses, and will not result in water quality less than that prescribed in state and regional policies. The Central Coast Water Board

must also ensure that any authorized degradation of existing high quality waters is subject to conditions that will result in the best practicable treatment or control (BPTC) of the discharge necessary to ensure that pollution or nuisance will not occur and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

23. The federal antidegradation policy (Section 131.12, Title 40, Code of Federal Regulations) also requires that when high quality surface waters constitute an outstanding national resource, such as surface waters of national and state parks and wildlife refuges and surface waters of exceptional recreational or ecological significance, that surface water quality shall be maintained and protected. The federal antidegradation policy has limited applicability to nonpoint source programs, requiring only that the State must assure the achievement of "all cost-effective and reasonable best management practices for nonpoint source control."

24. Assessment of High Quality Waters: The Central Coast Water Board has assessed water quality in agricultural areas of the Central Coast Region and has information in its records that has been collected by the State Water Board, Central Coast Water Board, Department of Water Resources (DWR), Department of Pesticide Regulation (DPR), local agencies, and academic and research institutions. This information documents historical (since 1968) surface water and groundwater quality conditions where baseline water quality is better than that required by water quality control plans and policies and therefore, must be protected.

25. Impacts of Agricultural Discharge on High Quality Waters: Pollutant loading from agricultural discharges is a critical problem of severe magnitude in many areas of the Central Coast Region. The Central Coast Water Board has information in its records that has been collected by the Central Coast Water Board, growers, resources agencies, academic institutions, and others that demonstrates that agricultural discharges have degraded and threaten to degrade high quality waters within the Central Coast Region with various pollutants, including but not limited to, pesticides, toxicity, nitrate, and salts. Many surface water bodies are listed as impaired pursuant to Clean Water Act section 303(d) and 305(b), and many groundwater basins exceed safe drinking water standards. The most significant impairment resulting from agricultural discharges is the impact to groundwater sources of drinking water, including those serving disadvantaged communities. Water quality impacts from agricultural waste discharges take on added significance and urgency because of their impacts on public health, drought and climate change conditions, limited sources of drinking water supplies, and the proximity of the region's agricultural lands to critical habitat for species of concern.

26. Application of the Antidegradation Policy: As described in Findings 24 and 25 above, the Central Coast Water Board finds that agricultural waste discharges allowed by this waiver of waste discharge requirements have degraded and will continue to degrade high quality waters; therefore, the Antidegradation Policy does apply. and the Central Coast Water Board must ensure that this Order requires best

practicable treatment or control to minimize degradation, consistent with the maximum benefit to the people of the state.

27. Best Practicable Treatment or Control (BPTC): The Antidegradation Policy requires the Central Coast Water Board to establish requirements and standards that will result in implementation of BPTC measures to limit the degradation of receiving waters, since agricultural discharges will degrade high-quality waters. BPTC determinations may consider the relative benefits of proposed treatment or control methods to proven technologies; performance data; alternative methods of treatment or control; methods used by similarly situated dischargers; and promulgated best available technology or other technology-based standards. Methods used to treat or control agricultural discharges of waste may include, but are not limited to: education and planning (e.g. Farm Plan), siting requirements to limit discharges of waste in vulnerable areas (e.g. buffers), management practices to minimize source of wastes (e.g. nutrient budgets, integrated pest management), good housekeeping requirements (e.g. proper handling and storage of waste), recordkeeping and reporting of sources of waste (e.g. total nitrogen applied or pesticide use reporting), management practices to control waste (e.g. irrigation efficiency, nutrient or pesticide management), waste containment requirements (e.g. pond construction), waste reduction requirements (e.g. runoff controls, nitrogen application limits, effluent limits), and waste treatment requirements (e.g. treatment wetlands, bioreactors). BPTC must be achieved within a reasonable timeframe, but full implementation will extend beyond the term of this order given the complexity and evolving nature of regulating discharges from irrigated agriculture. This Order requires growers to continue implementing management practices and conducting monitoring and reporting, to ensure they are making progress in ongoing efforts not to cause or contribute to exceedances of water quality objectives in surface waters or groundwater. Furthermore, this Order is limited to a three-year term and is part of a phased or iterative approach to bring dischargers into full compliance with requirements to implement BPTC that results in attainment of groundwater and surface water quality objectives and the highest water quality that is reasonable.

28. Maximum Benefit to the People of the State: In considering the maximum benefit to the people of the State, the Central Coast Water Board must consider the costs to the affected public, such as costs to treat drinking water supplies affected by a discharge. Additionally, while the Central Coast Water Board has the regulatory responsibility to protect water quality, and has prioritized the protection of drinking water sources and public health, the Board also finds that the public has an interest in the viability of agriculture as a source of food and an important economic driver in the State. Further, it is not to the benefit of the people of the State for discharges from irrigated agriculture to continue with no regulatory program during the time needed to develop new requirements, or to make major changes to the 2012 Agricultural Order just before the State Water Board issues a precedential order addressing the irrigated lands regulatory program. The Antidegradation Policy does not allow degradation that causes a pollution or nuisance, so discharges must ultimately not cause exceedences of water quality objectives, including maximum

contaminant levels that are incorporated by reference as water quality objectives. As a result, the affected public should not generally have to incur costs to treat drinking water supplies. The board recognizes that there will be short term costs to treat drinking water or provide replacement water. The board has considered these costs to the extent that information is available, and expects dischargers whose activities cause or contribute to pollution of drinking water supplies to bear their fair share of these costs. The Central Coast Water Board finds that implementing this Order as a short term interim order to control discharges and minimize degradation is a reasonable next step as part of a phased approach and is consistent with the maximum benefit to the people of the State.

29. Monitoring: The Central Coast Water Board finds that monitoring and reporting is necessary to detect changes in water quality and to inform development of new and better treatments or controls to protect high quality waters. The monitoring must include evaluating discharges of waste, effectiveness of management practices, compliance with requirements and changes in water quality. This Order requires surface receiving water monitoring and groundwater monitoring of domestic wells and irrigation wells, Farm Plans that assess management practice effectiveness and progress toward compliance with water quality objectives as well as individual discharge monitoring and reporting total nitrogen applied for a subset of dischargers.

30. Iterative Nature of Agricultural Regulatory Program: Agricultural Order No. R3-2017-0002 is a temporary three-year order that will expire on March 9, 2020. The short term of this order is intended as part of the iterative agricultural regulatory program. The recent information gained from implementation of the 2012 Agricultural Order and this Order will allow the Board to develop more precise requirements based on new guidance, data analysis and research. Consistent with the Antidegradation Policy, this Order requires growers to continue the iterative process of implementing best practicable treatment or control and conducting and adapting monitoring and reporting, to ensure they are making progress in ongoing efforts not to cause or contribute to exceedances of water quality objectives in surface waters or groundwater. This Order also includes an increase in the implementation of total nitrogen applied reporting and expands this existing requirement to additional acreage for crop types with high potential to discharge nitrogen to groundwater. The expansion of this existing reporting requirement is a reasonable next step to improve the Central Coast Water Board's ability to identify and minimize sources of waste that may impact high quality waters, specifically nitrate loading to groundwater which may impair drinking water sources—a priority for the Central Coast Water Board. The next Order anticipated for adoption in 2020 (2020 Agricultural Order) will continue to improve requirements to ensure that any authorized degradation of existing high quality waters is subject to regulatory conditions that will result in BPTC of the discharge necessary to ensure that pollution or nuisance will not occur and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

RATIONALE FOR THIS ORDER

31. On April 15, 1983, the Central Coast Water Board approved a policy waiving WDRs for 26 categories of discharges, including irrigation return flows and non-NPDES stormwater runoff. Pursuant to Water Code Section 13269, these waivers terminated on January 1, 2003.

32. On July 9, 2004, the Central Coast Water Board adopted Resolution No. R3-2004-0117 establishing the 2004 Agricultural Order. On March 15, 2012, the Central Coast Water Board replaced the 2004 Agricultural Order with Order No. R3-2012-0011, establishing the 2012 Agricultural Order. This Order, No. R3-2017-0002, the replaces the 2012 Agricultural Order.

33. Dischargers enrolled in the 2004 Agricultural Order established the Cooperative Monitoring Program (CMP) in compliance with monitoring requirements. The CMP collected and analyzed data for 15 to 20 parameters from 50 sites in multiple watersheds and identified severe surface water quality impairments resulting from agricultural land uses and discharges. CMP did not attempt to identify the individual farm operations that are causing the surface water quality impairments. The lack of discharge monitoring and reporting, the lack of verification of on-farm water quality improvements, and the lack of public transparency regarding on-farm discharges, were critical limitations of the 2004 Agricultural Order, especially given the scale and severity of the surface water and groundwater impacts and the resulting costs to society. The 2012 Agricultural Order and this Order address these limitations.

34. The Central Coast Water Board extended the 2004 Agricultural Order multiple times. The 2004 Agricultural Order was replaced with the 2012 Agricultural Order, which is renewed by this Order.

35. The Central Coast Water Board reviewed all available data, including information collected in compliance with the 2004 Agricultural Order, and determined that discharges of waste from irrigated lands continue to result in degradation and pollution of surface water and groundwater, and impairment of beneficial uses, including drinking water and aquatic habitat, and determined that additional conditions are necessary to ensure protection of water quality and to measure the effectiveness of implementation of the Order.

36. It is appropriate to adopt a waiver of WDRs for this category of discharges because, as a group, the discharges have the same or similar waste from the same or similar operations and use the same or similar treatment methods and management practices (e.g., source control, reduced agricultural surface runoff, reduced chemical use, holding times, cover crops, etc.).

37. It is appropriate to regulate discharges of waste from irrigated lands under a conditional waiver rather than individual WDRs in order to simplify and streamline

the regulatory process. Water Board staff estimate that there are more than 3000 individual owners and/or operators of irrigated lands who discharge waste from irrigated lands; therefore, it is not an efficient use of resources to adopt individual WDRs for all Dischargers within a reasonable time.

38. This Order is in the public interest because:

    a. The Order was adopted in compliance with Water Code Sections 13260, 13263, and 13269 and other applicable law;
    b. The Order requires compliance with water quality standards;
    c. The Order includes conditions that are intended to eliminate, reduce and prevent pollution and nuisance and protect the beneficial uses of the waters of the State;
    d. The Order contains more specific and more stringent conditions for protection of water quality compared to the 2004 and 2012 Agricultural Orders.
    e. The Order contains conditions that are similar to the conditions of municipal stormwater NPDES permits, including evaluation and implementation of management practices to meet applicable water quality standards and a more specific MRP;
    f. The Order focuses on the highest priority water quality issues and most severely impaired waters;
    g. The Order provides for an efficient and effective use of Central Coast Water Board resources, given the magnitude of the discharges and number of persons who discharge waste from irrigated lands;
    h. The Order provides reasonable flexibility for the Dischargers who seek coverage under this Order by providing them with a reasonable time schedule and options for complying with the Water Code.

39. This Order waives the requirement for Dischargers to obtain WDRs for discharges of waste from irrigated lands if the Dischargers are in compliance with the Order. This Order is conditional, may be terminated at any time, does not permit any illegal activity, does not preclude the need for permits that may be required by other State or local government agencies, and does not preclude the Central Coast Water Board from administering enforcement remedies (including civil liability) pursuant to the Water Code.

40. The Central Coast Water Board may consider issuing individual WDRs to some Dischargers because of their actual or potential contribution to water quality impairments, history of violations, or other factors.

IMPACTS TO WATER QUALITY FROM AGRICULTURAL DISCHARGES

Impacts to Groundwater – Drinking Water and Human Health

41. Nitrate pollution of drinking water supplies is a critical problem throughout the Central Coast Region. Studies indicate that fertilizer from irrigated agriculture is the primary source of nitrate pollution of drinking water wells and that significant loading of nitrate continues as a result of agricultural fertilizer practices (Carle, S.F., et al., June 2006).

42. Groundwater pollution from nitrate severely impacts public drinking water supplies in the Central Coast Region. A Department of Water Resources (DWR, 2003) survey of groundwater quality data collected between 1994 and 2000 from 711 public supply wells in the Central Coast Region found that 17 percent of the wells (121 wells) detected a constituent at concentrations above one or more State Water Board Division of Drinking Water (DDW) drinking water standards or primary maximum contaminant levels (MCLs). Nitrate caused the most frequent MCL exceedances (45 mg/L nitrate as nitrate or 10 mg/L nitrate as nitrogen), with approximately 9 percent of the wells (64 wells) exceeding the drinking water standard for nitrate. According to data reported by the State Water Resources Control Board's Groundwater Ambient Monitoring and Assessment Program (GAMA) GeoTracker website (http://www.waterboards.ca.gov/gama/), recent impacts to public supply wells are greatest in portions of the Salinas Valley (up to 20 percent of wells exceeding MCLs) and Santa Maria (approximately 17 percent) groundwater basins. In the Gilroy-Hollister Groundwater Basin, 12.5 percent of the public supply wells exceed MCLs (data obtained using the GeoTracker DPH Public Supply Well Search Tool for nitrate for wells located in the Gilroy-Hollister groundwater basin. The well data includes DDW data for well sampling information ranging from 2006 until 2009). DDW identified over half of the drinking water supply wells as vulnerable to discharges from agricultural-related activities in that basin. This information is readily tracked and evaluated because data are collected on a regular frequency, made publicly available, and public drinking water supplies are regulated by DDW as required by California law.

43. Groundwater pollution from nitrate severely impacts shallow domestic wells in the Central Coast Region resulting in unsafe drinking water in rural communities. Domestic wells (wells supplying one to several households) are typically drilled in relatively shallow groundwater, and as a result exhibit higher nitrate concentrations than deeper public supply wells. The 2012 Agricultural Order required testing of all domestic wells located on ranches enrolled in the agricultural order; resulting data indicate that 25 percent of 1733 domestic wells sampled exceed the nitrate drinking water standard in agricultural areas in the Central Coast Region. Other than the agricultural order, private domestic well water quality testing is generally not required and the drinking water from these wells is not regulated. Therefore, more private wells may be impacted and users of these wells may be uninformed. The 2012 Agricultural Order also required testing of the primary irrigation well

located on ranches enrolled in the agricultural order; resulting data indicate that 26 percent of 2266 primary irrigation wells sampled also exceed the nitrate drinking water standard.

44. In the northern Salinas Valley, 25 percent of 352 wells sampled (88 wells) had concentrations above the nitrate drinking water standard. In other portions of the Salinas Valley, up to approximately 50 percent of the wells surveyed had concentrations above the nitrate drinking water standard, with average concentrations nearly double the drinking water standard and the highest concentration of nitrate approximately nine times the drinking water standard (Monterey County Water Resources Agency [MCWRA], 1995). Nitrate exceedances in the Gilroy-Hollister and Pajaro groundwater basins reflect similar severe impairment, as reported by local water agencies/districts for those basins (SCVWD, 2001; SWRCB, 2005; San Benito County Water District, 2007; Kennedy/Jenks Consultants, 2008).

45. Local county and water district reports indicate that in the Pajaro River watershed, the highest recent nitrate concentration (over 650 mg/L nitrate, more than 14 times the drinking water standard) occurred in shallow wells in the eastern San Juan subbasin under intense agricultural production. High values of nitrate concentration in groundwater (greater than 500 mg/L nitrate) have also been reported in the Llagas subbasin and the lower Pajaro coastal aquifer.

46. The costs of groundwater pollution and impacts to beneficial uses caused by irrigated agriculture are transferred to the public. Public drinking water systems expend millions of dollars in treatment and replacement costs and private well owners must invest in expensive treatment options or find new sources. Rural communities, those least able to buy alternative water sources, have few options to replace the contaminated water in their homes. This Order addresses groundwater pollution to ensure protection of beneficial uses and public health.

47. Excessive concentrations of nitrate or nitrite in drinking water are hazardous to human health, especially for infants and pregnant women. The United States Environmental Protection Agency (USEPA) established a nitrate drinking water standard of 45 mg/L nitrate as nitrate (10 mg/L nitrate as nitrogen). While acute health effects from excessive nitrate levels in drinking water are primarily limited to infants (methemoglobinemia or "blue baby syndrome"), research evidence suggests there may be adverse health effects (i.e., increased risk of non-Hodgkin’s, diabetes, Parkinson’s disease, alzheimers, endrocrine disruption, cancer of the organs) among adults as a result of long-term consumption exposure to nitrate (Sohn, E., 2009; Pelley, J., 2003; Weyer, P., et. al., 2001, Ward, M.H., et. al., 1996).

48. Nitrogen compounds are known to cause cancer. University of Iowa research found that up to 20 percent of ingested nitrate is transformed in the body to nitrite, which can then undergo transformation in the stomach, colon, and bladder to form

N-nitroso compounds that are known to cause cancer in a variety of organs in more than 40 animal species, including primates (Weyer, P., et. al., 2001).

49. In many cases, whole communities that rely on groundwater for drinking water are threatened due to nitrate pollution, including the community of San Jerardo and other rural communities in the Salinas Valley. Local agencies and consumers have reported impacts to human health resulting from nitrate contaminated groundwater likely due to agricultural land uses, and spent significant financial resources to ensure proper drinking water treatment and reliable sources of safe drinking water for the long-term (CCRWQCB, 2009).

50. Current strategies for addressing nitrate in groundwater to achieve levels protective of human health typically include avoidance (abandoning impacted wells or re-drilling to a deeper zone), groundwater treatment to remove nitrate (i.e., dilution using blending, ion exchange, reverse osmosis, biological denitrification, and distillation), or developing additional water supplies (i.e., percolation ponds, surface water pipelines, reservoirs) to dilute nitrate-impacted sources (Lewandowski, A.M., May 2008; Washington State Department of Health, 2005).

51. The costs to treat and clean up existing nitrate pollution to achieve levels that are protective of human health are very expensive to water users (e.g., farmers, municipalities, domestic well users). Research indicates that the cost to remove nitrate from groundwater can range from hundreds of thousands to millions of dollars annually for individual municipal or domestic wells (Burge and Halden, 1999; Lewandowski, May 2008). Wellhead treatment on a region-wide scale is estimated to cost billions of dollars. Similarly, the cost to actively clean up nitrate in groundwater on a region wide scale would also cost billions of dollars, and would be logistically difficult. If the nitrate loading due to agricultural activities is not significantly reduced, these costs are likely to increase significantly.

52. Many public water supply systems are required to provide well-head treatment or blending of drinking water sources, at significant cost, to treat nitrate before delivery to the drinking water consumer due to elevated concentrations of nitrate in groundwater. The community of San Jerardo (rural housing cooperative of primarily low-income farmworker families with approximately 250 residents) initially installed well-head treatment to treat groundwater contaminated with nitrate and other chemicals at significant cost, with on-going monthly treatment costs of approximately $17,000. Monterey County public health officials determined that the community of San Jerardo requires a new drinking water well to ensure safe drinking water quality protective of public health at an approximate cost of more than $4 million. The City of Morro Bay uses drinking water supplies from Morro and Chorro groundwater basins. Study results indicate that agricultural activities in these areas, predominantly over-application of fertilizer, have impacted drinking water supplies resulting in nitrate concentrations more than four times the drinking water standard (Cleath and Associates, 2007). The City of Morro Bay must blend or provide well-head treatment to keep nitrate concentrations at levels safe for

drinking water at significant cost (City of Morro Bay, 2006). The City of Santa Maria public supply wells are also impacted by nitrate (in some areas nearly twice the drinking water standard) and must also blend sources to provide safe drinking water (City of Santa Maria, 2008).

Impacts to Groundwater – Nitrate and Salts

53. Groundwater pollution due to salts is also one of the most significant and critical problems in the Central Coast Region. Agricultural activities are a significant cause of salt pollution (Monterey County Flood Control and Water Conservation District, 1990). Salt increases in irrigated agricultural coastal basins are primarily due to the following:

    a. Seawater intrusion within the coastal basins (e.g., Salinas and Pajaro groundwater basins) caused primarily by excessive agricultural pumping (MCWRA, 2007).
    b. Agricultural pumping/recycling of groundwater that concentrates salts in the aquifers.
    c. Agricultural leaching of salts from the root zone.
    d. The importation of salts into the basin from agricultural soil amendments and domestic/municipal wastewater discharges.

54. Based on the high proportion of groundwater extractions, agricultural pumping of groundwater contributes to saltwater intrusion into the Salinas and Pajaro groundwater basins, which is causing increasing portions of the groundwater basins to be unusable for agriculture and municipal supply (MCWRA, 2008 and Pajaro Valley Water Resource Agency, 2002).

55. Agricultural activities contribute significant loading of nitrates into groundwater from the following sources (Monterey County Flood Control and Water Conservation District, 1988):

    a. Intensive fertilizer applications on permeable soils.
    b. Liquid fertilizer hookups on well pump discharge lines lacking backflow prevention devices.
    c. Groundwater wells that are screened through multiple aquifers, thereby acting as conduits for pollution transport into deeper groundwater.
    d. Spills and/or uncontrolled wash water or runoff from fertilizer handling and storage operations.

56. Agricultural waste discharges contribute to pollution of groundwater basins most vulnerable to waste migration, including major portions of the Santa Maria, Salinas, and Gilroy-Hollister groundwater basins. However, any groundwater basin, including those that are confined (pressured), are susceptible to downward waste migration through improperly constructed, operated (e.g., fertigation or chemigation without backflow prevention), or abandoned wells. Additionally, land with

permeable soils and shallow groundwater are susceptible to downward waste migration. Such areas of groundwater vulnerability often overlap with important recharge areas that serve to replenish drinking water supplies.

57. Agricultural discharges of fertilizer are the main source of nitrate pollution to shallow groundwater based on nitrate loading studies conducted in the Llagas subbasin and the lower Salinas groundwater basin (Carle, S.F., et al., June 2006). In 2007, the California Department of Food and Agriculture (CDFA) reported that approximately 56 million pounds of nitrogen were purchased as fertilizer in Monterey County. A 1990 Monterey County study of nitrate sources leaching to soil and potentially groundwater in Santa Cruz and Monterey Counties indicated that irrigated agriculture contributes approximately 78 percent of the nitrate loading to groundwater in these areas (Monterey County Flood Control and Water Conservation District, November 1990).

58. A groundwater study in the Llagas subbasin indicates that nitrate pollution in groundwater is elevated in the shallow aquifer because it is highly vulnerable due to high recharge rates and rapid transport, and that the dominant source of nitrate is synthetic fertilizers. Groundwater age data in relation to nitrate concentration indicate that the rate of nitrate loading to the shallow aquifer is not yet decreasing in the areas sampled. In areas east of Gilroy, groundwater nitrate concentrations more than double the drinking water standard correspond to younger groundwater ages (less than seven years old and in some cases less than two years old), indicating that the nitrate pollution is due to recent nitrate loading and not legacy farming practices (Moran et al., 2005).

59. The University of California Center for Water Resources (WRC) developed the Nitrate Groundwater Pollution Hazard Index (Nitrate Hazard Index) in 1995. The Nitrate Hazard Index identifies agricultural fields with the highest vulnerability for nitrate pollution to groundwater, based on soil, crop, and irrigation practices. Based on the Nitrate Hazard Index, the following crop types present the greatest risk for nitrate loading to groundwater: Beet, Broccoli, Cabbage, Cauliflower, Celery, Chinese Cabbage (Napa),Collard, Endive, Kale, Leek, Lettuce, Mustard, Onion, Spinach, Strawberry, Pepper, and Parsley.

60. The California Legislature added section 83002.5 to the California Water Code, which included requirements for the State Water Board to develop pilot projects addressing groundwater nitrate contamination in the Salinas Valley and Tulare Lake Basin and to submit a report to the Legislature. In response, the University of California, Davis developed a report for the State Water Board titled "*Addressing Nitrate in California's Drinking Water*" which documented severe nitrate contamination in the Salinas Valley and Tulare Lake Basin and found that agricultural fertilizers and animal wastes applied to cropland are by far the largest regional sources of nitrate in groundwater (UC Davis, 2012). The State Water Board's report to the Legislature included specific recommendations to address the issues associated with nitrate contaminated groundwater, including a

recommendation to convene a panel of experts to assess existing agricultural nitrate control regulatory programs and to provide recommendations on an appropriate agricultural regulatory approach (State Water Board, 2013). The Agricultural Expert Panel resulted from these actions.

61. In September 2014, the Agricultural Expert Panel provided recommendations to the State Water Board that included the creation of irrigation and nutrient management plans, by each grower, which should include data updated annually, such as nitrogen applied from all sources, including from fertilizer, compost, and irrigation water.

62. The 2012 Agricultural Order required a subset dischargers with Tier 2 and Tier 3 ranches to report total nitrogen applied on these ranches. These dischargers grew crops that have a high risk of loading nitrogen to groundwater or surface water, including the following crops: beet; broccoli; cabbage; cauliflower; celery; Chinese cabbage (Napa); collard; endive; kale; leek; lettuce (leaf and head); mustard; onion (dry and green); spinach; strawberry; pepper (fruiting); Brussel sprout; chicory; radish; rutabaga.

63. Over 4,400 ranches representing over 424,000 acres of irrigated agricultural land are enrolled in the 2012 Agricultural Order. Over 2,600 ranches, representing over 277,000 acres, report growing crops that have a high risk of loading nitrogen.

64. About 600 ranches, representing over 115,000 acres of irrigated agricultural land, were required and submitted total nitrogen applied information for the 2013-2014 reporting period. About 700 ranches, representing over 118,000 acres of irrigated agricultural land, were required and submitted total nitrogen applied information for the 2014-2015 reporting period. About 70% of the ranches that report growing crops that have a high risk of loading nitrogen were not required to report total nitrogen applied in the 2012 Agricultural Order. About 65% of the acreage that reported total nitrogen applied for the 2014-2015 reporting period was reported for lettuce, broccoli and spinach. For the 2014-2015 reporting period, total nitrogen applied to lettuce ranged from about 40 to over 500 pounds per acre; total nitrogen applied to broccoli ranged from about 20 to over 600 pounds per acre; and total nitrogen applied to spinach ranged from about 20 to over 600 pounds per acre.

Impacts to Groundwater – Pesticides

65. The Department of Pesticide Regulation (DPR) has identified two Groundwater Protection Areas that are vulnerable to pesticide contamination in San Luis Obispo County (south of Arroyo Grande, west of Nipomo Mesa, and north of the Santa Maria River) and Monterey County (Salinas area).

66. Based on a 2007 DPR report, pesticide detections in groundwater are rare in the Central Coast region. Of 313 groundwater wells sampled in the Central Coast

region, six wells (1.9%) had pesticide detections in less than two samples (considered unverified detections).

67. A review of DPR data collected from 1984 – 2009 indicates that the three pesticides/pesticide degradates with the highest detection frequency in groundwater were chlorthal-dimethyl and degradates (total), TPA (2,3,5,6-tetrachloroterephthalic acl) and carbon disulfide. Compounds reported by DPR above a preliminary health goal (PHG) or drinking water standard include (by county): ethylene dibromide (2002), atrazine (1993), and dinoseb (1987) Monterey; heptachlor (1989), ethylene dibromide (1989) Santa Barbara; benzene (various dates 1994-2007), 1,2,4-trichlorobenzene (1991) Santa Cruz; ethylene dibromide (1994, 2008, 2009) San Luis Obispo; and 1,1,2,2-tetrachloroethane (1998) Santa Clara.

68. Results from pesticide analyses conducted as part of the Groundwater Ambient Monitoring and Assesment Program (GAMA) studies in the Central Coast region (Kulongoski, 2007; Mathany 2010) indicate a significant presence of pesticides in groundwater. GAMA achieved ultra-low detection levels of between 0.004 and 0.12 micrograms per liter (generally less than .01 micrograms per liter). Out of 54 wells sampled in groundwater basins in the south coast range study unit (bounded by the Santa Lucia and San Luis Ranges, and San Raphael Mountains to the north and east, and the Santa Ynez mountains to the south), 28 percent of the wells had 11 pesticides or pesticide degradates detected in groundwater samples, with the three most abundant detections being deethylatrazine (18.5 percent), atrazine (9.3 percent), and simazine (5.6 percent). Twenty-eight percent of 97 wells sampled in the Monterey Bay and Salinas Valley Basins had pesticide detections, including 18 percent for simazine, 11 percent for deethylatrazine, and 5 percent for atrazine. None of the pesticides detected as part of the GAMA program exceeded any drinking water standard or health-based threshold value.

Impacts to Surface Water

69. The 2010 Clean Water Act Section 303(d) List of Impaired Waterbodies for the Central Coast Region (2010 List of Impaired Waterbodies) identified surface water impairments for approximately 700 waterbodies related to a variety of pollutants (e.g. salts, nutrients, pesticides/toxicity, and sediment/turbidity). Sixty percent of the surface water listings identified agriculture as one of the potential sources of water quality impairment.

70. The impact from agricultural discharges on surface water quality is or has been monitored by various monitoring programs, including:

    a. The Central Coast Water Board's Ambient Monitoring Program: Over the past 15 years, the Central Coast Ambient Monitoring Program (CCAMP) has collected and analyzed water quality data to address 25 conventional water quality parameters from 185 sites across the Central Coast Region to assess

surface water quality. To support analysis of conventional water quality data CCAMP has collected bioassessment data from 100 of the 185 sites, water toxicity data from 134 of the 185 sites, and sediment toxicity from 57 of the 185 sites. CCAMP data show widespread toxicity and pollution in agricultural areas.

b. Cooperative Monitoring Program (CMP): Over the last ten years, the CMP has focused on assessing agricultural water quality for the 2004 and 2012 Agricultural Orders, and collected and analyzed data for 15 to 20 parameters from 50 sites in multiple watersheds. CMP data show widespread toxicity and pollution in agricultural areas.

71. Data from CCAMP and CMP indicate that surface waterbodies are severely impacted in the lower Salinas and Santa Maria watersheds due to the intensive agricultural activity in these areas, and water quality in these areas are the most severely impaired in the Central Coast Region.

Impacts to Surface Water – Nutrients

72. Nitrate pollution in surface water is widespread in the Central Coast Region, with 46 waterbodies listed as impaired for this pollutant on the 2010 List of Impaired Waterbodies List. Seventy percent of these nitrate listings occur in the three major agricultural watersheds: Salinas area (16 waterbodies), Pajaro River (5 waterbodies) and Santa Maria River (12 waterbodies). Other significant nitrate listings fall in small drainages in areas of intensive agriculture or greenhouse activity along the south coast, including Arroyo Paredon, Franklin Creek, Bell Creek, Los Carneros and Glen Annie creeks (CCRWQCB, 2009a)

73. The DDW drinking water standard is 10 mg/L nitrate as N. The drinking water standard is not intended to protect aquatic life and Water Board staff estimates that 1 mg/L nitrate is necessary to protect aquatic life beneficial uses from biostimulation based on an evaluation of CCAMP data (CCRWQCB, 2009b). Water Board staff used this criteria to evaluate surface water quality impairment to aquatic life beneficial uses in the 2010 Impaired Waterbodies List.

74. In a broadly scaled analysis of land uses, nitrate pollution is associated with row crop agriculture. In addition, discharge from even a single agricultural operation can result in adjacent creek concentrations exceeding the drinking water standard and the much lower limits necessary to protect aquatic life. Many heavily urbanized creeks show only slight impacts from nitrate, with most urban impact associated with wastewater discharges. (CCAMP, 2010a).

75. Agricultural discharges result in significant nitrate pollution in the major agricultural areas of the Central Coast Region (CCAMP, 2010a). More than sixty percent of all sites from CCAMP and CMP combined datasets have average nitrate concentrations that exceed the drinking water standard and limits necessary to protect aquatic life (CCAMP, 2010b). Ten percent of all sites have average nitrate

concentrations that exceed the drinking water standard by five-fold or more. Some of the most seriously polluted waterbodies include the following:

a. Tembladero Slough system (including Old Salinas River, Alisal Creek, Alisal Slough, Espinosa Slough, Gabilan Creek and Natividad Creek),
b. Pajaro River (including Llagas Creek, San Juan Creek, and Furlong Creek),
c. Lower Salinas River (including Quail Creek, Chualar Creek and Blanco Drain),
d. Lower Santa Maria River (including Orcutt-Soloman Creek, Green Valley Creek, and Bradley Channel),
e. Oso Flaco watershed (including Oso Flaco Lake, Oso Flaco Creek, and Little Oso Flaco Creek).

76. Dry season flows decreased over the last ten years in some agricultural areas that have large amounts of tailwater runoff. Detailed flow analysis by the CMP showed that 18 of 27 sites in the lower Salinas and Santa Maria watersheds had statistically significant decreases in dry season flow over the first five years of the program. Some sites that show increasing concentrations of nitrate have coincident declining trends in flow, possibly due to reductions in tailwater (CCWQP, 2009a). CCAMP monitoring has detected declining flows at other sites elsewhere in the Region through the end of 2009 (CCAMP, 2010a), likely because of drought.

77. Some statistically significant changes in nitrate concentration are evident in CCAMP and CMP data. Several drainages are improving in water quality in the Santa Barbara area (such as Bell Creek, which supports agricultural activities) and on Pacheco Creek in the Pajaro watershed. However, in some of the most polluted waters (Old Salinas River, Orcutt Creek, Santa Maria River mouth), nitrate concentrations are getting worse (CCAMP, 2010a). In the lower Salinas and Santa Maria watersheds, flow volumes are declining at some sites (CCWQP, 2009a; CCAMP, 2010a).

78. Nitrate concentrations in Oso Flaco Lake exceed the levels that support aquatic life beneficial uses, threatening remaining populations of two endangered plants, marsh sandwort and Gambel's watercress. In 25 water samples taken from Oso Flaco Lake in 2000-2001 and 2007, levels of nitrate/nitrite (as N) averaged 30.5 mg/L with a minimum of 22.0 mg/L and a maximum of 37.1 mg/L (CCAMP, 2010a). Biostimulation in Oso Flaco Lake has caused the rapid and extreme growth of common wetland species, which are now crowding out sensitive species that have not become similarly vigorous (United States Department of the Interior Fish and Wildlife Service, 2010).

79. Agricultural discharges result in un-ionized ammonia concentrations at levels that are toxic to salmonids at some sites in areas dominated by agricultural activity (USEPA, 1999). The waterbodies where these sites are located are on the 2010

List of Impaired Waterbodies due to un-ionized ammonia, particularly in the lower Salinas and Santa Maria river areas (CCRWQCB, 2009).

Impacts to Surface Water – Toxicity and Pesticides

80. The Basin Plan general objective for toxicity states the following: "All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in human, plant, animal or aquatic life." The Basin Plan general objective for pesticides states the following: "No individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life."

81. Based on CCAMP, CMP, and other monitoring data, multiple pesticides and herbicides have been detected in Central Coast surface waterbodies (identified below). The Basin Plan general objective for pesticides states that no individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses, and no increase in pesticide concentrations shall be found in bottom sediments or aquatic life. Many currently applied pesticides have not been tested for, and staff is only recently aware of data showing several relatively new fungicides (azoxystrobin, pyraclostrobin and boscalid) in fish tissue and sediment of lagoons in the Central Coast Region.[1] This is a violation of the Basin Plan general objective for pesticides. Additional monitoring for individual pesticides is needed to identify changes in pesticide loading and to identify concentrations of toxic and/or bioaccumulating substances not previously identified.

2,4-D	esfenvalerate	oryzalin
Alachlor	ethalfluralin	oxadiazon
Aldicarb	ethoprop	oxamyl
Atrazine	fenamiphos	oxyfluorfen
azinphos-methyl		
Azoxystrobin	fenoxycarb	paraquat dichloride
Benefin	fenpropathrin	pendimethalin
bentazon, sodium salt	fipronil	permethrin
Bifenthrin		
Boscalid	glyphosate	phorate
Bromacil	hexazinone	phosmet
bromoxynil octanoate	hydramethylnon	prodiamine
butylate	imidacloprid	prometon
Carbaryl	lambda cyhalothrin	prometryn
Carbofuran	linuron	propanil

[1] "Watershed-scale Evaluation of Agricultural BMP Effectiveness in Protecting Critical Coastal Habitats: Final Report on the Status of Three Central California Estuaries" (Anderson et al, 2010). http://www.ccamp.org/ccamp/documents/EstuariesFinalReport022311.pdf.

Chlorpyrifos	malathion	propargite
chlorthal-dimethyl	MCPA	propiconazole
cycloate	MCPA, dimethylamine salt	propoxur
Cyfluthrin	metalaxyl	propyzamide
Cypermethrin	methidathion	Pyriproxyfen pyraclostrobin
DDVP	methiocarb	S.S.S-tributyl phosphorotrithioate
Deltamethrin	methomyl	siduron
Diazinon	methyl isothiocyanate	simazine
Dicamba	methyl parathion	tebuthiuron
Dicofol	metolachlor	terbuthylazine
Dimethoate	metribuzin	tetrachlorvinphos
Disulfoton	molinate	thiobencarb
Diuron	naled	triallate
Endosulfan	napropamide	triclopyr
EPTC	norflurazon	trifluralin

82. Multiple studies, including some using Toxicity Identification Evaluations (TIEs), have shown that organophosphate pesticides and pyrethroid pesticides in Central Coast waters are likely causing toxicity to fish and invertebrate test organisms (CCAMP, 2010a, CCWQP, 2008a; CCWQP, 2009; CCWQP, 2010a; CCWQP, 2010d (in draft); Hunt et al., 2003, Anderson, et al. 2003; Anderson et al., 2006b. This is a violation of the Basin Plan general objective for toxicity.

83. Data on current commercial application of pesticides indicates that neonicotinoid and pyrethroid pesticide use in the Central Coast Region and statewide is increasing in urban and agricultural settings and these pesticides have been detected at levels known to be toxic at a number of locations in the Central Coast Region in recent years. Both the Environmental Protection Agency and the California Department of Pesticide Regulation are reevaluating uses of pyrethroid and neonicotinoid pesticides because of environmental impacts. Neonicitinoids are also of concern because of their known impacts to honey bees and other pollinators.

84. California Department of Pesticide Regulation data from 2010 to 2014 for Monterey and Santa Barbara Counties show an annual increase of neonicotinoid pesticide active ingredient applied (thiamethoxam, imidacloprid, thiacloprid, dinotefuran, acetamiprid) from 43,351 pounds in 2010 to 70,824 pounds in 2014 applied. For the same time period, pounds of active ingredient applied of pyrethroid pesticides (gamma-cyhalothrin, lambda-cyhalothrin, bifenthrin, beta-cyfluthrin, cyfluthrin, esfenvalerate, permethrin, cypermethrin, fenvalerate) increased from 46,638 pounds applied in 2010 to 70,378 pounds applied in 2014.

85. In September 2014, a collaborative study between Central Coast Water Board's Central Coast Ambient Monitoring Program (CCAMP), the Department of Pesticide Regulation and the Granite Canyon Marine Pollution Studies Laboratory evaluated nine sites in the Santa Maria and Salinas watersheds for a broad suite of pesticides and two different toxicity test organisms. These sites are also sampled by the Central Coast Cooperative Monitoring Program for Agriculture.

    The study data showed frequent detections of imidicloprid and pyrethroid pesticides, with toxicity commonly found to *Hyalella* (an amphipod sensitive to pyrethroids) and *Chironomus* (a fly larvae sensitive to neonicotinoids). All but one site (89%) were toxic to one or both test species. The Cooperative Monitoring Program for Agriculture sampled the same sites one month earlier in August, 2014, using the traditional toxicity test species required by the 2012 Irrigated Lands Monitoring and Reporting Program - *Ceriodaphnia* (waterflea), *Selenastrum* (algae), and *Pimephales* (fat-head minnow). No toxicity was found at any of the sites using these test species. These findings demonstrate the importance of selecting test organisms that are sensitive to the chemicals found at the site and also suggest that monitoring requirements for the Cooperative Monitoring Program need to be adjusted in response to changes in pesticide use patterns.

86. The California Department of Pesticide Regulation's *Surface Water Monitoring for Pesticides in Agricultural Areas of California, 2015* found that two of the four pesticides with the highest detection frequencies included imidacloprid (a neonicotinoid pesticide) and bifenthrin (a pyrethroid pesticide). 47% of the 30 bifenthrin samples exceeded an aquatic life benchmark; 21% of the 77 Imidacloprid samples exceeded a aquatic life benchmark. The areas studied included agricultural areas in Monterey, San Luis Obispo and Santa Barbara counties of the Central Coast Region.

87. Agricultural use rates of pesticides in the Central Coast Region and associated toxicity is among the highest in the State. In a statewide study of four agricultural areas conducted by the Department of Pesticide Regulation (DPR), the Salinas study area had the highest percent of surface water sites with pyrethroid pesticides detected (85 percent), the highest percent of sites that exceeded levels expected to be toxic and lethal to aquatic life (42 percent), and the highest rate (by three-fold) of active ingredients applied (113 lbs/acre) (Starner, et al. 2006).

88. Agriculture-related toxicity studies conducted on the Central Coast since 1999 indicated that toxicity resulting from agricultural waste discharges of pesticides has caused declining aquatic insect and macroinvertebrate populations in Central Coast streams (Anderson et al., 2003; Anderson et al., 2006a; Anderson et al., 2006b; Anderson et al., 2010). This is a violation of the Basin Plan general objective for toxicity.

89. The breakdown products of organophosphate pesticides are more toxic to amphibians than are the products themselves (Sparling and Fellers, 2007).

90. The lower Salinas and Santa Maria areas have more overall water column invertebrate toxicity than other parts of the Central Coast Region, with much of the toxicity explained by elevated diazinon and chlorpyrifos concentrations (CCAMP, 2010a, CCWQP, 2008a; CCWQP, 2009; Hunt et al., 2003, Anderson, et al. 2003; Anderson et al., 2006a). Some agricultural drains have shown toxicity nearly every time the drains are sampled (CCAMP, 2010a).

91. Fish and sand crabs from the Salinas, Pajaro, and Santa Maria estuaries had detectable levels of currently applied fungicides, herbicides, and legacy pesticides like DDT based on a recently completed study of these central coast lagoons Anderson et al. (2010). Multiple samples from the Santa Maria Estuary, the most impacted of the three estuaries, also contained chlorpyrifos, diazinon, and malathion (organophosphate pesticides) and bifenthrin and cyfluthrin (pyrethroid pesticides). Department of Public Health human consumption guideline levels for these pesticides in fish tissue are not available. This is the first study in this Region documenting these currently applied pesticides in fish tissue. The Basin Plan requires that "there shall be no increase in pesticide concentrations found in bottom sediments or **aquatic life** (emphasis added)".

92. The National Oceanic Atmospheric Administration National Marine Fisheries Service (NMFS) issued a Biological Opinion that concluded that US EPA's registration of pesticides containing chlorpyrifos, diazinon, and malathion is likely to jeopardize the continued existence of 27 endangered and threatened Pacific salmonids and is likely to destroy or adversely modify designated critical habitat for 25 threatened and endangered salmonids because of adverse effects on salmonid prey and water quality in freshwater rearing, spawning, migration, and foraging areas (NMFS, 2008)

93. Three court-ordered injunctions impose limitations on pesticide use (including chlorpyrifos, diazinon, and malathion) within certain proximity of waterbodies to protect endangered species (DPR, 2010).

94. Creek bottom sediments are most consistently toxic in the lower Salinas and Santa Maria watersheds, areas dominated by intensive agricultural activity. Seventy percent of sites sampled for sediment in the Central Coast region have been toxic at least once (although sites selected for sediment toxicity sampling typically represent higher risk areas) (CCAMP, 2010a).

95. A CMP follow-up study on sediment toxicity (CCWQP, 2010d, in draft) showed pyrethroid pesticides to be the most prevalent and severe source of toxicity to sediments. Santa Maria area sites averaged 7.5 toxic units (TUs) from pyrethroid pesticides and 1.3 TUs from chlorpyrifos. One TU is sufficient to kill 50% of the test organisms in a toxicity test). All Santa Maria area sites were toxic to test organisms. Second highest pesticide levels were found in Salinas tributaries and the Salinas Reclamation canal, averaging 5.4 TUs pyrethroids and 0.8 TUs

chlorpyrifos. Organochlorine pesticides were present, but not at levels sufficient to cause toxicity.

96. Peer-reviewed research has also shown pyrethroid pesticides are a major source of sediment toxicity in agricultural areas of the Central Coast Region (Ng et al., 2008; Anderson et al., 2006a, Phillips et al., 2006; Starner et al., 2006).

97. Agricultural sources of metals are particulate emissions, irrigation water, pesticides, biosolids, animal manure, and fertilizer applied directly to the soil (Chang et al, 2004). Metals, including arsenic, boron, cadmium, copper, lead, nickel, and zinc are common active ingredients in many pesticides (Fishel, 2008; Nesheim, 2002; Holmgren, 1998; Reigert and Roberts, 1999). Metals can be present in subsurface drainage discharge and may be associated with sediment in tailwater discharge. Some phosphate fertilizers contain cadmium, which can lead to an increase in the concentration of cadmium in soil. Past studies have found soils containing high concentrations of cadmium and lead in major vegetable production areas of the Salinas Valley (Chang et al, 2004; Page et al, 1987; USEPA, 1978; Jelinek and Braude, 1978).

98. The Basin Plan contains the following general objective for Phenols, 0.1 mg/L or 100 µg/L. Phenols are components or breakdown products of a number of pesticide formulations, including 2,4 D, MCPA, carbaryl, propoxur, carbofuran, and fenthion (Crespin, et al., 2001, Agrawal, et al., 1999). Phenolic compounds can cause odor and taste problems in fish tissue, some are directly toxic to aquatic life, and some are gaining increasing notice as endocrine disruptors (e.g., bisphenol A and nonylphenol). The original water quality standards were developed in response to concerns about odor and taste and direct toxicity.

99. One phenolic compound of known concern in Central Coast waters is nonylphenol. Agricultural sources of nonylphenol and the related nonylphenol ethoxylates include pesticide products as “inert” ingredients and as adjuvants added by the pesticide user. Adjuvant ingredients are not reported in California's Pesticide Use Database. Adjuvants enhance a chemical’s effect. Nonylphenol and related compounds are used as surfactants to make the pesticide product more potent and effective (Cserhati, 1995). Nonylphenol and its ethoxylates are acutely toxic to a wide variety of animals, including aquatic invertebrates and fish. In some cases, the nonylphenol is more toxic to aquatic species than the pesticide itself (National Research Council of Canada, 1982). Concern exists about these adverse effects of nonylphenol and its ethoxylates increases because these compounds also bioaccumulate in algae, mussels, shrimp, fish, and birds (Ahel et al, 1993; Ekelund (1990).

100. The San Luis Obispo Science and Ecosystem Alliance (SLOSEA) at California Polytechnic State University has found nonylphenol in elevated concentrations in fish tissue and has linked the occurrence to gonadal abnormalities and liver damage in fish in Morro Bay and other Central Coast locations. The Basin Plan

standard of 100 µg/L for phenols is relatively protective for direct toxicity of nonylphenol to rainbow trout, which have an LC50 (lethal concentration impacting 50% of test organisms) of 194 µg/L. However, this limit is not protective for endocrine disruption purposes, which for rainbow trout is estimated at an EC50 (estrogenic concentration impacting 50% of test organisms) of 14.14 µg/L (Lech, 1996). Regardless of the limitations of the Basin Plan standard, it is important to assess this chemical in areas that are heavily influenced by agricultural activity.

Impacts to Surface Water – Turbidity and Temperature

101. Turbidity is a cloudy condition in water due to suspended silt or organic matter. Waters that exceed 25 nephalometric turbidity units (NTUs) can reduce feeding ability in trout (Sigler et al., 1984). Elevated turbidity during the dry season is an important measure of discharge across bare soil, and thus can serve as an indicator of systems with heavy irrigation runoff to surface waters.

102. The Basin Plan requires that "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses" (CCRWQCB, 1994).

103. Most CCAMP sites outside of agricultural areas have a median turbidity level less than 5 NTUs (CCAMP, 2010a). Many sampling sites that include significant agricultural discharge have turbidity levels that exceed 100 NTUs as a median value (CCAMP, 2010a).

104. Agricultural discharges cause and contribute to sustained turbidity throughout the dry season at many sampling sites dominated by agricultural activities. Resulting turbidity greatly exceeds levels that impact the ability of salmonids to feed. Many of these sites are located in the lower Santa Maria and Salinas-Tembladero watersheds. The CMP detected some increasing trends in turbidity on the main stem of the Salinas River (CCRWQCB, 2009a; CCAMP, 2010a; CCWQP, 2009a).

105. Agricultural discharges and vegetation removal along riparian areas cause and contribute to water temperatures that exceed levels that are necessary to support salmonids at some sites in areas dominated by agricultural activity. Several of these sites are in major river corridors that provide rearing and/or migration habitat for salmonids. A good example of this is Orcutt Creek (CCAMP, 2010a), where upstream shaded areas are cooler than downstream exposed areas, in spite of lower upstream flows. Tailwater discharge and removal of riparian vegetation in downstream areas cause temperatures to rise above levels safe for trout. Several locations impacted by temperature are in major river corridors that provide rearing and/or migration habitat for salmonids. These include the Salinas, Santa Maria, and Santa Ynez rivers (CCAMP, 2010a).

106. Biological sampling shows that benthic biota are impaired in the lower Salinas and Santa Maria watersheds, and also shows that several measures of habitat quality, such as in-stream substrate and canopy cover, are poor compared to the upper

watersheds and to other high quality streams in the Central Coast Region (CCWQP, 2009b; CCWQP, 2009c, CCWQP, 2009d; CCWQP, 2009e; CCAMP, 2010b)

107. Agricultural land use practices, such as removal of vegetation and stream channelization, and discharges from agricultural fields, can cause the deposition of fine sediment and sand over stream bottom substrate (Waters, 1995). This problem is especially prevalent in areas dominated by agricultural activity (lower Salinas and Santa Maria rivers) (CCWQP, 2009b; CCWQP, 2009c, CCWQP, 2009d; CCWQP, 2009e; CCAMP, 2010b). This deposition of fine sediment and sand in streams causes major degradation of aquatic life beneficial uses by eliminating pools and by clogging gravel where fish eggs, larvae, and benthic invertebrates that serve as a food source typically live (CCAMP, 2010b; Waters, 1995). Effective erosion control and sediment control management practices include but are not limited to cover crops, filter strips, and furrow alignment to reduce runoff quantity and velocity, hold fine particles in place, and increase filtration to minimize the impacts to water quality (USEPA, 1991).

108. Orchards, vineyards, and row crops have the greatest erosion rates in irrigated agriculture, especially those that are managed with bare soil between tree or vine rows (ANR, 2006). A vegetative filter strip offers one way to control erosion rates and discharge of sediment rather than letting it be carried off site in drainage water. A vegetative filter strip is an area of vegetation that is planted intentionally to help remove sediment and other pollutants from runoff water (Dillaha et al., 1989) Vegetative filter strips intercept surface water runoff and trap as much as 75 to 100 percent of the water's sediment. They capture nutrients in runoff, both through plant uptake through adsorption to soil particles. They promote degradation and transformation of pollutants into less-toxic forms, and they remove over 60% of certain pathogens from the runoff. (ANR, 2006).

Impacts to the Marine Environment

109. The marine environment in the Central Coast Region is impacted by runoff from irrigated agriculture and other sources. Legacy pesticides have impacted the marine environment and are still found in sediment and tissue at levels of concern today (CCLEAN, 2007; Miller et al., 2007; Dugan, 2005, BPTCP, 1998). Currently applied pesticides are persistent in the aquatic environment, but initial testing has not found them in offshore areas of Monterey Bay (CCAMP, 2010b).

110. Two Marine Protected Areas (MPAs), Elkhorn Slough and Moro Cojo Slough, are heavily impacted by agricultural chemicals and activities in the vicinity. The Elkhorn Slough and Moro Cojo Slough MPAs are at very high to extremely high risk for additional degradation of beneficial uses. Other MPAs that are relatively near shore in agricultural areas are at medium risk for degradation of beneficial uses; these include the South Santa Ynez River MPA, and the two Monterey Bay

MPAs. Other MPAs that are not near agricultural areas are at medium to low risk from agricultural discharges (CCAMP, 2010b).

111. Nitrate loading from the Pajaro and Salinas Rivers to Monterey Bay has been found to be a potential driver of plankton blooms during certain times of year. Research shows a clear onshore to offshore gradient in nitrate load influence from rivers, and also shows overall increasing trends in loading from rivers, whereas nitrate loading from upwelling shows no trends (Lane, 2009; Lane et al., in review). Using infrared remote sensing, Monterey Bay Aquarium Research Institute researchers have documented bloom initiation immediately following "first flush" events just offshore Moss Landing and Pajaro River discharges, that then evolved into very large red tides that killed many sea birds (Ryan, 2009; Jessup et al., 2009). These bloom initiation events were documented in 2007 and 2008.

Impacts to Aquatic Habitat and Riparian and Wetland Areas

112. Riparian and wetland areas play an important role in protecting several of the beneficial uses designated in the Basin Plan. Agricultural activities have degraded, and threaten to degrade, these beneficial uses related to aquatic habitat, which include, but are not limited to:

    a. Ground Water Recharge;
    b. Fresh Water Replenishment;
    c. Warm Fresh Water Habitat;
    d. Cold Fresh Water Habitat;
    e. Inland Saline Water Habitat;
    f. Estuarine Habitat;
    g. Marine Habitat;
    h. Wildlife Habitat;
    i. Preservation of Biological Habitats of Special Significance;
    j. Rare, Threatened or Endangered Species;
    k. Migration of Aquatic Organisms;
    l. Spawning, Reproduction and/or Early Development;
    m. Areas of Special Biological Significance;

113. The Basin Plan contains requirements to protect aquatic habitat, including, but not limited to, Chapter 2, Section II Water Quality Objectives to Protect Beneficial Uses, and Chapter 5, Page V-13, V.G. Erosion and Sedimentation: A filter strip of appropriate width, and consisting of undisturbed soil and riparian vegetation or its equivalent, shall be maintained, wherever possible, between significant land disturbance activities and watercourses, lakes, bays, estuaries, marshes, and other water bodies. For construction activities, minimum width of the filter strip shall be thirty feet, wherever possible.

114. Riparian and wetland areas play an important role in achieving several water quality objectives established to protect specific beneficial uses. These include, but

are not limited to, those water quality objectives related to natural receiving water temperature, dissolved oxygen, suspended sediment load, settleable material concentrations, chemical constituents, and turbidity.

115. The 2004 and 2012 Agricultural Orders required protection of beneficial uses including aquatic and wildlife habitat. This Order includes that requirement to achieve protection of aquatic life beneficial uses and to address water quality degradation that has occurred, in part, as a result of encroachment by agricultural land uses on riparian and wetland areas.

116. In particular, seasonal and daily water temperatures are strongly influenced by the amount of solar radiation reaching the stream surface, which is influenced by riparian vegetation (Naiman, 1992; Pierce's Disease/Riparian Habitat Workgroup (PDRHW), 2000.). Removal of vegetative canopy along surface waters threatens maintenance of temperature water quality objectives, which in turn negatively affects dissolved oxygen related water quality objectives, which in turn negatively affects the food web (PDRHW, 2000).

117. Riparian and wetland areas function to retain and recycle nutrients (National Research Council (NRC), 2002; Fisher and Acreman, 2004), thereby reducing nutrient loading directly to surface water or groundwater. Riparian and wetland areas trap and filter sediment and other wastes contained in agricultural runoff (NRC, 2002; Flosi et al., 1998; PDRHW, 2000; Palone and Todd,1998), and reduce turbidity (USEPA, 2009). Riparian and wetland areas temper physical hydrologic functions, protecting aquatic habitat by dissipating stream energy and temporarily allowing the storage of floodwaters (Palone and Todd, 1998), and by maintaining surface water flow during dry periods (California Department of Water Resources, 2003). Riparian and wetland areas regulate water temperature and dissolved oxygen, which must be maintained within healthy ranges to protect aquatic life (PDRHW, 2000). In the absence of human alteration, riparian areas stabilize banks and supply woody debris (NRC 2002), having a positive influence on channel complexity and in-stream habitat features for fish and other aquatic organisms (California Department of Fish and Game 2003).

118. Riparian areas are critical to the quality of in-stream habitat. Riparian vegetation provides woody debris, shade, food, nutrients and habitat important for fish, amphibians and aquatic insects (California Department of Fish and Game 2003). Riparian areas help to sustain broadly based food webs that help support a diverse assemblage of wildlife (NRC, 2002). More than 225 species of birds, mammals, reptiles, and amphibians depend on California's riparian habitats (Riparian Habitat Joint Venture, 2004).

119. Riparian vegetation provides important temperature regulation for instream resources. In shaded corridors of the Central Coast region, temperatures typically stay under 20 degrees Celsius or 68 degrees F (within optimum temperature ranges for salmonids), but can rapidly increase above 20 degrees Celsius when

vegetation is removed. Orcutt Creek in the lower Santa Maria watershed is an example where upstream shaded areas remain cooler than downstream exposed areas, in spite of lower upstream flows (CCAMP, 2010a).

120. Land management and conservation agencies describe three vegetated zones within a riparian buffer that can provide water quality protection (NRCS, 2006; Welsch, 1991, Tjaden and Weber). These zones are described below:
    a. Zone 1 – The goal for this zone is to control temperature and turbidity discharges by establishing a mix of trees and shrubs that provide shade and streambank stability. A mix of native woody species that vary from large tree species as they mature to understory trees and shrubs will provide canopy cover and shading next to the water.
    b. Zone 2 – The goal for this zone is to establish a mix of trees and shrubs that will absorb and treat waterborne nutrients and other pollutants and allow water to infiltrate into the soil.
    c. Zone 3 – The goal for this zone is to act as a transitional zone between cropland and zones 1 and 2, serving to slow flows, disperse flows out into more diffuse, sheet flow, and promote sediment deposition. The use of stiff multi-stemmed grasses and forbs are preferred and will help disperse concentrated flows.

121. CCAMP and CMP bioassessment data show that streams in areas of heavy agricultural use are typically in poor condition with respect to benthic community health and that habitat in these areas is often poorly shaded, lacking woody vegetation, and heavily dominated by fine sediment. Heavily sedimented stream bottoms can result from the immediate discharge of sediment from nearby fields, the loss of stable, vegetated stream bank habitat, the channelization of streams and consequent loss of floodplain, and from upstream sources.

122. Up to approximately 43 percent of the federally threatened and endangered species rely directly or indirectly on wetlands for their survival (United States Environmental Protection Agency, 2008). Of all the states, California has the greatest number of at-risk animal species (15) and, by far, the greatest number of at-risk plant species (104) occurring within isolated wetlands (Comer et al., 2005).

123. California has lost an estimated 91 percent of its historic wetland acreage, the highest loss rate of any state. Similarly, California has lost between 85 and 98 percent of its historic riparian areas (State Water Resources Control Board, 2008). Landowners and operators of agricultural operations historically removed riparian and wetland areas to plant cultivated crops (Braatne et al., 1996; Riparian Habitat Joint Venture, 2004).

124. The California Wetlands Conservation Policy (Executive Order W-59-93), also known as “the No Net Loss Policy,” adopted by Governor Wilson in 1993, established the State’s intent to develop and adopt a policy framework and strategy to protect California’s unique wetland ecosystems. One of the goals of

this policy is to ensure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect for private property.

125. Real and/or perceived incompatible demands between food safety and environmental protection are a major issue in the Central Coast Region. Technical Assistance Providers have reported that growers have removed vegetated management practices intended to protect water quality (in some cases, after receiving substantial public funds to install vegetated management practices).

126. According to a spring 2007 survey by the Resource Conservation District of Monterey County (RCDMC), 19 percent of 181 respondents said that their buyers or auditors had suggested they remove non-crop vegetation from their ranches to prevent pollution from pathogens such as the O157:H7 bacteria. In response to pressures by auditors and/or buyers, approximately 15 percent of all growers surveyed indicated that they had removed or discontinued use of previously adopted management practices used for water quality protection. Grassed waterways, filter or buffer strips, and trees or shrubs were among the management practices removed (RCDMC, 2007). According to a follow-up spring 2009 survey by RCDMC, growers are being told by their auditors and/or buyers that wetland or riparian plants are a risk to food safety (RCDMC, 2009). To assist in the co-management of water quality protection and food safety, the RCDMC has developed a handbook of agricultural conservation practices, photos, and descriptions with food safety considerations (RCDMC, 2009).

127. The Food Safety Modernization Act (FSMA) was signed into law on January 4, 2011 giving the U.S Food and Drug Administration (FDA) a mandate to pursue a farm to table system that is based on science and addresses food safety hazards. The law requires FDA to apply sound science to any requirements that might impact wildlife and wildlife habitat on and near farms, and take into consideration conservation and environmental practice standards and policies.

128. Riparian vegetation and vegetated buffer zones are critically important to prevent the transport of sediment and bacteria, which may include the downstream transport of O157:H7 bacteria. Tate et al. (2006) tested vegetated buffers on cattle grazing lands and found that they are a very effective way to reduce inputs of waterborne E. coli into surface waters. Data indicates that the major source of O157:H7 bacteria are cattle, not wildlife (RCDMC, 2006). In many agricultural areas of the Central Coast Region, cattle operations are located upstream of irrigated agricultural fields. Therefore, the removal of riparian and wetland vegetation and their buffer zones increases the transport of pathogens such as O157:H7 and the risk of food contamination. The removal of riparian and wetland vegetation for food safety purposes is not warranted, is not supported by the literature, and may increase the risk of food contamination.

129. Agriculture near surface waterbodies can lead to removal or reduction of riparian vegetation and the impairment of its ecological functions (ANR, 2007). Once riparian vegetation is removed, it no longer serves to shade water, provide food for aquatic organisms, maintain stream banks, provide a source of large woody debris, or slow or filter runoff to streams. The result is degraded water quality and fish habitat (ANR, 2007). For these reasons, maintenance of riparian vegetation is a critical element of any type of land use (ANR, 2007).

130. Buffer strips are areas of vegetation left beside a stream or lake to protect against land use impacts (ANR, 2007). Whether or not harvesting is permitted within the buffer strip, well-designed and managed buffers can contribute significantly to the maintenance of aquatic and riparian habitat and the control of pollution. Riparian buffer strips protect aquatic and riparian plants and animals from upland sources of pollution by trapping or filtering sediments, nutrients, and chemicals from forestry, agricultural and residential activities. (ANR, 2007).

131. Vegetated riparian areas provide greater environmental value than unvegetated floodplains or cropped fields. Riparian forests provide as much as 40 times the water storage of a cropped field and 15 times that of grass turf (Palone and Todd, 1998). Agricultural floodplains are approximately 80 to 150 percent more erodible than riparian forest floodplains (Micheli et al., 2004) and riparian forest floodplains serve a valuable function by trapping sediment from agricultural fields (National Resource Council, 2002; Flosi and others, 1998; PDRHW 2000; Palone and Todd 1998).

132. Riparian and wetland areas are an effective tool in improving agricultural land management. Wide riparian areas act as buffers to debris that may wash onto fields during floods, thereby offsetting damage to agricultural fields and improving water quality (Flosi et al., 1998; PDRHW, 2000).

133. Exotic plant species exclude native riparian and wetland vegetation by out-competing native species for habitat. Additionally, exotic plants do not support the same diversity of wildlife native to riparian forests, often use large amounts of water, and can exist as monocultural stands of grass. Grass habitat is very different from the complex habitat structure provided by a diversity of riparian trees and shrubs, and results in habitat changes that affect the aquatic based food web (California Department of Fish and Game, 2003).

MANAGEMENT PRACTICE IMPLEMENTATION

134. Commercial agriculture is an intensive use of land. Relatively sophisticated agronomic and engineering approaches are available and necessary to minimize the discharge of waste from irrigated lands, including sediment, nutrients, and pesticides that impact water quality and beneficial uses of waters of the State. Traditionally, conservation practices available to Dischargers were developed for irrigation efficiency or for erosion control, and not necessarily for water quality

protection. To achieve water quality protection and improvement, Dischargers are responsible for selecting and effectively implementing management strategies to resolve priority water quality problems associated with the specific operation and receiving water, utilize proper management practice design and maintenance, and implement effectiveness monitoring.

135. The Central Coast Water Board recognizes efforts to maximize water quality improvement using innovative and effective local or regional treatment strategies and it is the Central Coast Water Board's intent to provide flexibility in the implementation of this Order to encourage discharger participation in such efforts. The Central Coast Water Board will evaluate proposed local or regional treatment strategies based upon the anticipated effectiveness, time schedule for implementation, and proposed verification monitoring and reporting to measure progress towards water quality improvement and compliance with this Order.

136. The Central Coast Water Board recognizes efforts to improve recharge conditions and restore groundwater recharge function that have been lost due to urbanization and agricultural development. Managed aquifer recharge (MAR) has been successfully applied in areas of the Central Coast region, improving both water supply and water quality in the basin (Racz et al., in review). Water applied to percolation basins for MAR projects often have a high quality relative to that in underlying aquifers in many locations, despite exceedances of water quality standards. Recharging this water into the ground is important for improving and maintaining water quality in critical aquifers. In addition, considerable improvement in water quality can be achieved during percolation of surface water because of beneficial microbial and filtering processes that occur (Schmidt et al., in review). The Central Coast Water Board encourages MAR efforts, which will result in improving both water supply and water quality.

137. Dischargers are responsible for implementing management measures to achieve water quality improvement, including practices and projects at the scale of a single farm, or cooperatively among multiple farms in a watershed or sub watershed. The 2004 and 2012 Agricultural Orders required dischargers to describe implementation of management practices in the Farm Plan and the 2012 Agricultural Order required dischargers to report a subset of the Farm Plan's management practices implemented in an annual compliance form.

138. The Farm Plan is an effective tool to identify the management practices that have been or will be implemented to protect and improve water quality in compliance with this Order. Elements of the Farm Plan include irrigation management, pesticide management, nutrient management, salinity management, sediment and erosion control, and aquatic habitat protection. Farm Plans also contain a schedule for implementation of practices and an evaluation of progress in achieving water quality improvement. The development and implementation of Farm Plans was a requirement of the 2004 Agricultural Order. This Order renews the requirement to prepare the Farm Plan, and adds new conditions requiring each Discharger to

verify the effective implementation of management practices focused on resolving water quality issues and for a subset of Dischargers considered a higher threat to water quality to conduct individual discharge monitoring to verify the effective implementation of management practices.

139. Dischargers can significantly reduce the potential impact from agricultural discharges by the effective implementation of management practices identified in Farm Plans focused on priority water quality issues related to the specific operation and watershed.

140. Individual on-farm water quality monitoring is critical to adaptively manage and effectively implement practices to protect water quality. The data and reporting will inform the Discharger, the Water Board, and the public regarding compliance with this Order, and increases the potential success in adapting management practices to address priority water quality issues. Dischargers participating in on-farm water quality monitoring have reported, in some cases, significant reduction or elimination of their discharge of waste through effective and adaptive management practice implementation.

141. Agricultural discharges, especially surface irrigation runoff, have the potential to transport sediments and associated waste constituents that exceed water quality standards. Minimizing irrigation runoff is an effective way to minimize and/or eliminate agricultural discharges of waste to waters of the State.

142. Agricultural water quality research identifies the importance of minimizing the amount of water runoff coming from farms. Irrigation runoff occurs when the application rate of the irrigation system exceeds the infiltration rate of the soil due to numerous factors, including poor irrigation efficiency. The percent of applied water lost to runoff may start off low, and increase towards the end of longer irrigations, or with frequent irrigation where soil is saturated. Fields with soils susceptible to low infiltration rates may lose 5 percent to 30 percent or more of their applied water to runoff.

143. Applying fertilizer, soil amendments, or agricultural products directly through an irrigation system (fertigation) increases nitrate levels in irrigation water. Runoff from fertigation is likely to be extremely high in nitrate concentrations. Agricultural research conducted in the Pajaro Valley and Salinas Valley watersheds has identified nitrate values in agricultural tailwater and drainage ditches exceeding 100 mg/L nitrate as N in some cases (more than ten times the drinking water standard, and likely more than 100 times the level necessary to protect aquatic life) (Anderson, 2003).

144. Agricultural studies document the common over-application of fertilizers, and fertilizer and animal manure are the most dominant and widespread nitrate sources to groundwater (Harter, 2009; Kitchen, 2008; Lawrence Livermore National Lab GAMA Studies Llagas subbasin, 2005). Effective irrigation and nutrient

management practices to reduce the concentration of nutrients in irrigation runoff, deep percolation, and stormwater include but are not limited to, irrigation efficiency to reduce runoff and deep percolation, nutrient budgeting to optimize fertilizer application and eliminate excessive nutrient applications, and techniques to trap nutrients between crop growing seasons and during intense periods of rainfall.

145. Agricultural studies and practices demonstrate that minimizing the production of polluted tailwater through irrigation efficiency and nutrient management practices and keeping runoff from leaving the farm is cost effective (Meals, 1994). Improving irrigation water application according to real time soil moisture data has resulted in some of the lowest concentrations of nutrients in percolating waters, confirming that irrigation efficiency is a key factor in reducing leaching of nutrients (United Water Conservation District, 2007).

146. Nitrate in water leaving subsurface drain ("tile") systems often exceeds drinking water standards and contributes to low-oxygen in marine environments. Denitrification, including the use of wood-chip bioreactor treatment systems, is an effective method of removing nitrate from soil water before it enters subsurface drains (Jaynes, et al., 2006; Starrett, 2009).

147. Agricultural land uses can disrupt the natural vegetation-soil cycles and biota diversity, keeping the soil surface unprotected and vulnerable to erosive forces (wind and rain), which increases the amount of sediments dispersed and transported from agricultural lands into surface water (USEPA, 2003).

148. Agricultural mechanization and tillage of soil and land for bed preparation, crop maintenance and pest control, can destroy the soil structure and degrade the land, which increases the amount of sediment and associated waste constituents discharged into surface water (Fawcett, 2005).

149. Managing uncropped areas, minimizing and protecting bare soil and heavy use areas and unpaved road from concentrated flows of water, and implementing practices to detain or filter sediment and runoff before it leaves agricultural operations are effective ways to reduce soil erosion and capture sediment before it enters waterways, where it can cause water quality impairments downstream (ANR Publications 8124 and 8071).

150. Stormwater runoff from irrigated lands often results in significant erosion and the discharge of sediment, nutrients, and pesticides. Effective erosion control and sediment control management practices include but are not limited to cover crops, filter strips, and furrow alignment to reduce runoff quantity and velocity, hold fine particles in place, and increase filtration to minimize the impacts to water quality (USEPA, 1991). Crops grown using impervious plastic can be particularly problematic as they often result in significantly increased irrigation runoff volumes and velocities in agricultural furrows and ditches that may drain to waters of the State.

151. Education and technical assistance is an important tool in advancing the implementation of new effective management practices that protect and enhance water quality.

152. There are many technical resources available to the agricultural industry to assist farmers in pollution prevention and addressing water quality problems associated with irrigated agriculture. The United States Department of Agriculture - Natural Resources Conservation Service (NRCS), Resource Conservation Districts (RCD), and University of California Cooperative Extension (UCCE) provide non-regulatory technical services and research to promote conservation and address natural resource problems. There are also many non-profit agricultural and commodity-specific organizations and initiatives that promote sustainable agriculture, and provide education and technical support. Private consulting companies and individual professionals working in the field of environmental and engineering sciences, investigations, site remediation and corrective actions, treatment system design, sampling, and reporting are available to assist the agricultural industry in water quality improvement and achieving compliance with this Order.

153. The State and Regional Water Boards have made over $600 Million of public grant funds available to address agricultural water quality issues from approximately 2000 – 2011. These funds came from Bond Propositions 13, 40, 50, and 84, and addressed a myriad of water quality projects, watershed protection, and nonpoint source pollution control throughout California. In addition, the State Water Board, in coordination with USEPA, also allocates approximately $4.5 Million per year in 319(h) program funding to address nonpoint source pollution. Between 2013 and 2016, over $2 million have been granted to agricultural-related projects in the Central Coast Region.

AGRICULTURAL REGULATORY PROGRAM IMPLEMENTATION

154. The Central Coast Water Board is maximizing regulatory effectiveness by identifying and prioritizing actions that address the most significant agricultural water quality problems in the Central Coast Region, including nitrate in groundwater from discharge related to excess fertilizer application, the discharge of waste in agricultural tailwater, surface water toxicity resulting from pesticides, surface water nutrients from fertilizer, increasing salinity, sediment discharge, and degradation of aquatic habitat.

155. The Central Coast Water Board is addressing priority agricultural water quality issues, on a watershed basis in coordination with other Water Board programs and efforts, focused in the most intensive agricultural areas of the region including the Salinas, Pajaro, and Santa Maria watersheds. In addition, Central Coast Water Board staff will assess and track progress towards specific measures of water quality improvement, and adapt to the feedback the tracking provides.

156. The Central Coast Water Board will evaluate compliance of individual Dischargers with the terms and conditions of this Order based on enrollment information, threat of water quality impairment, content of technical reports (including Annual Compliance Document, Farm Plan, Irrigation and Nutrient Management Plan, and Water Quality Buffer Plan), prioritized inspections, and water quality monitoring data. Failure to comply with enrollment requirements may result in enforcement action for individual landowners and operators. In addition to the determination of noncompliance and water quality impairment, the Central Coast Water Board will enforce the conditions of this Order in a manner similar to enforcement of WDRs and consistent with the State Water Board's Enforcement Policy, focusing on the highest priority water quality issues and most severely impaired waters.

157. The Central Coast Water Board will consider the history of compliance and violations and progress made toward compliance and water quality improvement demonstrated by individual Dischargers when determining potential enforcement actions. In some cases, the Central Coast Water Board may terminate coverage under this Order and require the Discharger to submit a ROWD and comply with the Water Code pursuant to individual WDRs.

MONITORING AND REPORTING

158. Monitoring and Reporting Program (MRP) No. R3-2017-0002 is part of this Order. The MRP requires dischargers to collect samples from groundwater monitoring wells and submit reports with the results. The costs of groundwater monitoring are reasonable in light of the benefits of groundwater monitoring and its role in protecting public health. Dischargers can reduce their costs by joining a third-party group for groundwater monitoring in lieu of individual monitoring. Water Code section 13269 requires monitoring to "support the development and implementation of the waiver program, including, but not limited to, verifying the adequacy and effectiveness of the waiver's conditions." The Water Board needs these reports to document and ensure compliance with this Order. Findings 41-68 document the impacts of agricultural impacts to groundwater that demonstrate the need for groundwater monitoring reports and provide the evidence that supports requiring dischargers to submit the reports.

159. The MRPs associated this Order require all dischargers to sample ambient surface waters and some dischargers to sample waste discharges that leave enrolled farms and report the results. The cost of such surface water monitoring is reasonably related to the benefit of identifying and addressing the discharges at highest risk of impacting surface water quality. Surface water monitoring is necessary due to the presence of toxicity and pollution in receiving waters that receive agricultural runoff, as detailed in Findings 69-133 above. The MRPs require surface receiving water monitoring for neonicotinoid and pyrethroid pesticides twice each year in 2017 and 2018 and toxicity testing using the indicator Chironomus spp. twice each year in 2017 and 2018. Laboratory analysis cost is a portion of the total cost incurred for surface water quality monitoring. Laboratory

costs resulting from the surface receiving water monitoring requirements in the MRPs associated with this Order will increase relative to those associated with the 2012 Agricultural Order; the increase is an estimated 60-70% over the least expensive monitoring year of the 2012 Agricultural Order and 9% over the most expensive monitoring year of the 2012 Agricultural Order. Dischargers can reduce their costs by joining a third-party group for ambient surface water monitoring in lieu of individual monitoring.

160. The MRPs associated this Order require some dischargers to report the amount of nitrogen applied to crops. This Order expands the requirement to report the total amount of nitrogen applied to farms from about 600 ranches required in Order No. R3-2012-0011 to an estimated 1,700 ranches required by this Order. The cost of this reporting is reasonably related to the benefit of identifying and addressing the discharges at highest risk of degrading water quality. As stated throughout these findings, discharges of nitrogen from agricultural practices are a significant source of nitrate pollution in the Central Coast Region. The Water Board estimates that the aggregate additional cost of this expansion to dischargers is about $440,000 for the first year, $270,000 for the second year, and $100,000 for the third year and any year beyond this. This assumes that the average grower will spend four hours on the requirement to calculate and report nitrogen applied in the first year, and by the third year will spend one hour on the requirement. In addition to providing data, tracking nitrogen applied is a component of nutrient management. It therefore serves as a management practice in addition to a monitoring or reporting requirement. Findings 60-64 above provide additional evidence that supports requiring dischargers to submit the reports.

161. The burden, including costs, of the monitoring and reporting required by Order R3-2017-0002 bears a reasonable relationship to the need for the information for the reasons stated in Findings 158 through 160.

PART B. RELEVANT PLANS, POLICIES, AND REGULATIONS

Water Quality Control Plan

The *Water Quality Control Plan for the Central Coastal Basin* (Basin Plan) was adopted by the Central Coast Water Board in 1975 and is periodically revised. Tables 1A and 1B include a summary of Narrative and Numeric Water Quality Objectives. The Basin Plan is available by contacting the Central Coast Water Board at (805) 549-3147 or by visiting the Central Coast Water Board's website at: http://www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/

Other Relevant Plans, Policies, and Regulations

State Water Resources Control Board, Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California,* October 1968.

State Water Resources Control Board, *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California*, June 1972.

State Water Resources Control Board, Resolution No. 74-43, *Water Quality Control Policy for the Enclosed Bays and Estuaries of California*, May 1974.

State Water Resources Control Board, Resolution No. 88-63, *Sources of Drinking Water Policy*, May 1988. Amended February 1, 2006.

State Water Resources Control Board, *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program,* May 2004.

State Water Resources Control Board, Resolution No. 2004-0063, *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List,* December 13, 2004.

State Water Resources Control Board, *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP)*, February 2005

"State Water Resources Control Board, Resolution No. 2008-0070, *Water Quality Control Plan for Enclosed Bays and Estuaries - Part 1 Sediment Quality,* August 25, 2009.

State Water Resources Control Board, *Water Quality Control Plan for Ocean Waters of California (CA Ocean Plan),* September 2009.

State Water Resources Control Board, Resolution No. 2009-0011, *Recycled Water Policy*, May 20, 2010.

State Water Resources Control Board, *Water Quality Enforcement Policy,* May 20, 2010.

State Water Resources Control Board, Resolution No. 2016-0010, *Adopting the Human Right to Water as Core Value and Directing its Implementation in Water Board Programs and Activities*, February 16, 2016.

US EPA, *National Toxics Rule*, 40 CFR 131.36, 57 FR 60848, December 1992.

US EPA, *California Toxics Rule*, 40 CFR 131.38, 65 FR 31682, May 2000.

Table 1A. Narrative and Numeric Water Quality Objectives for Surface Water.

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
TOXICITY	
Toxicity *(BPGO, III-4)* *Narrative Objective:* All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. *Indicators of Narrative Objective:* Chemical concentrations in excess of toxic levels for aquatic life including but not limited to the following: Chlorpyrifos 0.025 ug/L Diazinon 0.14 ug/L *(Source: Sipmann and Finlayson 2000)*	All Surface Waters
TOXICANTS	
Nutrients	
Ammonia, Total (N) ***(****BPSO, Table 3.3)* >30 mg/L NH4-N	AGR
Ammonia, **Un-ionized** *(BPGO, III-4)* 0.025 mg/L NH3 as N	All Surface Waters
Nitrate ***(****a. BPSO, Table 3-2* *b. BPSO, Table 3-3)* a. 10 mg/L NO3-N b. >30 mg/L NO3-N	a. MUN b. AGR
Organics	
Chemical Constituents *(BPSO, III-5 and* *Table 3-2)* Waters shall not contain concentrations of chemical constituents in excess of the limits specified in California Code of Regulations, Title 22, Article 4, Chapter 15, Section 64435, Tables 2 and 3 as listed in Table 3-2.	MUN

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
Chemical Constituents *(BPSO, III-5 and Table 3-3)* Waters shall not contain concentrations of chemical constituents in amounts which adversely affect the agricultural beneficial use. Interpretation of adverse effect shall be as derived from the University of California Agricultural Extension Service guidelines provided in Table 3-3. In addition, waters used for irrigation and livestock watering shall not exceed concentrations for those chemicals listed in Table 3-4	AGR
Chemical Constituents *(BPSO, III-10, Table 3-5, Table 3-6)* Waters shall not contain concentrations of chemical constituents known to be deleterious to fish or wildlife in excess of the limits listed in Table 3-5 or Table 3-6.	COLD, WARM, MAR
Oil and Grease *(BPGO, III-3)* *Narrative Objective:* Waters shall not contain oils, greases, waxes, or other similar materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.	All Surface Waters
Organic Chemicals *(BPSO, III-5 and Table 3-1)* All inland surface waters, enclosed bays, and estuaries shall not contain concentrations of organic chemicals in excess of the limiting concentrations set forth in California Code of Regulations, Title 22, Chapter 15, Article 5.5, Section 64444.5, Table 5 and listed in Table 3-1.	MUN
Other Organics *(BPGO, III-3)* **Phenol** *(BPSO, III-5)* Waters shall not contain organic substances in concentrations greater than the following: Methylene Blue Activated Substances < 0.2 mg/L Phenols < 0.1 mg/L Phenol (MUN) ≤ 1.0 µg/L PCBs < 0.3 µg/L	All Surface Waters

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
Phthalate Esters < 0.002 µg/L	
Metals	
Chromium *(BOSP, III-12)* ≤ 0.01 mg/L	SHELL
Cadmium *(BPGO, III-11)* ≤ 0.03 mg/L in hard water or ≤.0.004 mg/L in soft water (Hard water is defined as water exceeding 100 mg/L $CaCO_3$).	COLD, WARM
Chromium *(BPGO, III-11)* ≤ 0.05 mg/L	COLD, WARM
Copper *(BPGO, III-11)* ≤ 0.03 mg/L in hard water or ≤.0.01 mg/L in soft water (Hard water is defined as water exceeding 100 mg/L $CaCO_3$).	COLD, WARM
Lead *(BPGO, III-11)* ≤ 0.03 mg/L	COLD, WARM
Mercury *(BPGO, III-11)* ≤ 0.0002 mg/L	COLD, WARM
Nickel *(BPGO, III-11)* ≤ 0.4 mg/L in hard water or ≤.0.1 mg/L in soft water (Hard water is defined as water exceeding 100 mg/L $CaCO_3$).	COLD, WARM
Zinc *(BPGO, III-11)* ≤ 0.2 mg/L in hard water or	COLD, WARM

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
≤.0.004 mg/L in soft water (Hard water is defined as water exceeding 100 mg/L $CaCO_3$).	
CONVENTIONALS	
Biostimulatory Substances *(BPGO, III-3)* *Narrative Objective:* Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. *Indicators of Narrative Objective:* Indicators of biostimulation include chlorophyll-a, dissolved oxygen, phosphorous, and nitrate. *(Source: Central Coast Water Board. April 2009. Central Coast Ambient Monitoring Program Technical Paper: Interpreting Narrative Objectives for Biostimulatory Substances Using the Technical Approach for Developing California Nutrient Numeric Endpoints)*	All Surface Waters
Boron *(BPSO, III-13)* Waterbody specific. Median values, shown in Table 3-7 for surface waters. Sub-Basins Objectives range from 0.2 – 0.5 mg/L.	Specific Surface Waters
Chloride *(BPSO, III-13)* Waterbody specific. Median values, shown in Table 3-7 for surface waters. Sub-Basins Objectives range from 150-1400 mg/L.	Specific Surface Waters
Color *(BPGO, III-3)* Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses. Coloration attributable to materials of waste origin shall not be greater than 15 units or 10 percent above natural background color, whichever is greater.	All Surface Waters
Conductivity *(BPSO, III-8, Table 3-3)* >3.0 mmho/cm	AGR
Dissolved Oxygen (DO) ***(****BPGO, III-2)* Mean annual DO ≥ 7.0 mg/L	All Ocean Waters

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
Minimum DO $\geq$ 5.0 mg/L	
Dissolved Oxygen *(BPGO, III-4)* For waters not mentioned by a specific beneficial use: DO $\geq$ 5.0 mg/L DO Median values $\geq$ 85 percent saturation	All Surface Waters
Dissolved Oxygen *(BPSO, III-10)* DO $\geq$ 7.0 mg/L	COLD, SPWN
Dissolved Oxygen *(BPSO, III-10)* DO $\geq$ 5.0 mg/L	WARM
Floating Material *(BPGO, III-3)* *Narrative Objective:* Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.	All Surface Waters
pH ***(****BPSO, III-10)* The pH value shall not be depressed below 7.0 nor above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters.	COLD, WARM,
pH ***(****BPSO, III-10)* The pH value shall not be depressed below 7.0 or raised above 8.5[2]. Changes in normal ambient pH levels shall not exceed 0.2 units.	MAR
pH ***(****BPSO, III-5)* The pH value shall not be depressed below 6.5 nor above 8.3.	MUN, REC-1, REC-2, AGR
Settleable Material *(BPGO, III-3)*	All Surface Waters

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
Narrative Objective: Waters shall not contain settleable material in concentrations that result in deposition of material that causes nuisance or adversely affects beneficial uses.	
Sediment *(BPGO, III-3)* *Narrative Criteria:* 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.	All Surface Waters
Sodium *(BPSO, III-13)* Waterbody specific. Median values, shown in Table 3-7 for surface waters. Sub-Basins Objectives range from 20-250 mg/L.	
Sulfate *(BPSO, III-13)* Waterbody specific. Median values, shown in Table 3-7 for surface waters. Sub-Basins Objectives range from 10-700 mg/L.	
Suspended Material *(BPGO, III-3)* *Narrative Criteria:* Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.	All Surface Waters
Taste and Odor *(BPGO, III-3)* *Narrative Criteria:* Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.	All Surface Waters
Temperature ***(****BPGO, III-3)* *Narrative Criteria:* Natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.	All Surface Waters
Temperature *(BPGO, III-4)* *Narrative Objective:*	All Surface Waters

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
Natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. *a) Indicators of Narrative Objective for COLD Habitat:* **Coho** December - April 48-54 ºF 7-DAM[3] 56-58 ºF 1-DAM May – November 57-63 ºF 7-DAM 68-70 ºF 1-DAM **Steelhead** December - April 55-57 ºF 7-DAM 56-58 ºF 1-DAM May – November 56-63 ºF 7-DAM 70-73 ºF 1-DAM *(Source: Hicks 2000)* *b) Indicators of Narrative Objective for WARM Habitat:* **<u>Stickleback</u>** Upper optimal limit = 75 ºF (This temperature is also the low end of the upper lethal limit for steelhead) *(Source: Moyle 1976)* Note: 7-DAM refers to the rolling arithmetic average of seven consecutive daily maximum temperatures. 1-DAM refers to the highest daily maximum temperature.	a) COLD b) WARM
Temperature *(BPSO, III-10)* At no time or place shall the temperature be increased by more than 5^{o}F above natural receiving water temperature.	COLD, WARM
Total Dissolved Solids (TDS) *(BPSO, III-13)* Waterbody specific. Median values, shown in Table 3-7 for surface waters. Sub-Basins Objectives range from 10-250 mg/L.	

SURFACE WATER QUALITY OBJECTIVE *(Source of WQO-Page in Basin Plan)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
Turbidity *(BPGO, III-3)* *Narrative Objective:* Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. *Indicators of Narrative Objective:* Turbidity greater than 25 NTU's causes reduction in juvenile salmonid growth due to interference with their ability to find food. *(Source: Central Coast Water Board. April 2009. Clean Water Act Sections 305(b) and 303(d) Integrated Report for the Central Coast Region; Sigler et al. 1984. Effects of chronic turbidity on density and growth of steelheads and coho salmon. Transactions of the American Fisheries Society 113:142-150)*	All Surface Waters
PATHOGEN INDICATORS	
Fecal Coliform *(BOSP,III-5)* Log mean 200 MPN/100mL. Max 400 MPN/100mL.	REC-1
Fecal Coliform *(BOSP,III-10)* Log mean 2000 MPN/100mL. Max 4000 MPN/100mL.	REC-2
E. coli *(USEPA)* Max 235 MPN/100 mL	REC-1
Total Coliform *(BOSP,III-12)* Median $\leq$ 70/100 MPN/100mL Max 230 MPN/100 mL	SHELL

Table 1B. Narrative and Numeric Water Quality Objectives for Groundwater.

GROUNDWATER QUALITY OBJECTIVE *(Source of WQO-Page in BP)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
TOXICANTS	
Chemical Constituents *(BPSO, III-14)* Groundwaters shall not contain concentrations of chemical constituents in excess of federal or state drinking water standards.	MUN
Chemical Constituents *(BPSO, III-14 and Tables 3-3 and 3-4)* Groundwaters shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use. Interpretation of adverse effect shall be as derived from the University of California Agricultural Extension Service guidelines provided in Table 3-3. In addition, water used for irrigation and livestock watering shall not exceed the concentrations for those chemicals listed in Table 3-4.	AGR
Total Nitrogen *(BPSO, III-15 and Table 3-8)* Groundwater Basin Objectives for Median values range from 1-10 mg/L as N.	Specific Groundwater Basins
CONVENTIONALS	
Total Dissolved Solids (TDS) *(BPSO, III-15)* Groundwater Basin Objectives for median values range from 100-1500 mg/L TDS.	Specific Groundwater Basins
Chloride (Cl) *(BPSO, III-15)* Groundwater Basin Objectives for median values range from 20-430 mg/L Cl.	Specific Groundwater Basins
Sulfate (SO_4) *(BPSO, III-15)* Groundwater Basin Objectives for median values range from 10-1025 mg/L SO_4.	Specific Groundwater Basins
Boron (B) *(BPSO, III-15)* Groundwater Basin Objectives for median values range from 0.1-2.8 mg/L B.	Specific Groundwater Basins
Sodium (Na)	Specific

GROUNDWATER QUALITY OBJECTIVE *(Source of WQO-Page in BP)* (Objectives are numeric unless labeled "narrative")	BENEFICIAL USE
(BPSO, III-15) Groundwater Basin Objectives for median values range from 10-730 mg/L.	Groundwater Basins

Acronyms:
BP = Basin Plan or Water Quality Control Plan for the Central Coast Region
BPGO = Basin Plan General Objective
BPSO = Basin Plan Specific Objective related to a designated beneficial use
TMDL = Specific Objective related to an adopted Total Maximum Daily Load
WDR = Waste Discharge Requirements
SB = State Board established guideline
USEPA = US Environmental Protection Agency
CCAMP = Central Coast Ambient Monitoring Program
SWAMP = Surface Water Ambient Monitoring Program
MCL = Maximum Contaminant Level, California drinking water standards set forth in California Code of Regulations, Title 22.
NTU = Nephelometric Turbidity Unit
mg/L = milligram/Liter
MPN = Most Probable Number

PART C. DEFINITIONS

The following definitions apply to Order No. R3-2017-0002, MRP Order No. R3-2017-0002-01, MRP Order No. R3-2017-0002-02, and MRP Order No. R3-2017-0002-03 as related to discharges of waste from irrigated lands. The terms are arranged in alphabetical order. All other terms not explicitly defined for the purposes of this Order and Monitoring and Reporting Program shall have the same definitions as prescribed by California Water Code Division 7 or are explained within the Order or the MRP documents.

1. Antidegradation. The State Water Board established a policy to maintain high quality waters of the State - Resolution No. 68-16, "*Statement of Policy with Respect to Maintaining High Quality Waters in California*." Resolution No. 68-16 requires existing high quality water to be maintained until it has been demonstrated that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of water, and will not result in water quality less than that prescribed in the policies. Regional Water Boards are required to ensure compliance with Resolution No. 68-16. The Central Coast Water Board must require discharges to be subject to *best practicable treatment or control* of the discharge necessary to avoid pollution or nuisance and to maintain the highest water quality consistent with maximum benefit to the people of the State. Resolution No. 68-16 has been approved by the USEPA to be consistent with the federal antidegradation policy.

2. Aquatic Habitat. The physical, chemical, and biological components and functions of streams and lakes, including riparian areas and wetlands and their buffer zones.

3. Aquifer. A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs. (see also uppermost aquifer).

4. Back flow Prevention. Back flow prevention devices are installed at the well or pump to prevent contamination of groundwater or surface water when fertilizers, pesticides, fumigants, or other chemicals are applied through an irrigation system. Back flow prevention devices used to comply with this Order must be those approved by USEPA, DPR, DDW, or the local public health or water agency.

5. Basin Plan. The Basin Plan is the Central Coast's Region Water Quality Control Plan. The Basin Plan describes how the quality of the surface and groundwater in the Central Coast Region should be managed to provide the highest water quality reasonably possible. The Basin Plan includes beneficial uses, water quality objectives, and a program of implementation.

6. Beneficial Uses. The Basin Plan establishes the beneficial uses to be protected in the Central Coast Region. Beneficial uses for surface water and groundwater are divided into twenty-four standard categories identified below. The following beneficial uses have been identified in waterbodies within the Region:

   - agricultural supply (AGR)
   - aquaculture (AQUA)
   - areas of special biological significance (ASBS)
   - cold freshwater habitat (COLD)
   - commercial and sportfishing (COMM)
   - estuarine habitat (EST)
   - freshwater replenishment (FRESH)
   - groundwater recharge (GWR)
   - hydropower generation (POW)
   - industrial process supply (PRO)
   - industrial service supply (IND)
   - inland saline water habitat (SAL)
   - marine habitat (MAR)
   - municipal and domestic supply (MUN)
   - migration of aquatic organisms (MIGR)
   - navigation (NAV)
   - non-contact recreation (REC2)
   - preservation of biological habitats of special significance (BIOL)
   - rare, threatened or endangered species (RARE)
   - shellfish harvesting (SHELL
   - spawning, reproduction, and development (SPWN)
   - warm freshwater habitat (WARM)
   - water contact recreation (REC1)
   - wildlife habitat (WILD)

7. Chemigation. The application of pesticides, fertilizers, fumigants or other chemicals through an irrigation system.

8. Commercial. Irrigated lands producing commercial crops are those operations that have one or more of the following characteristics:

    a. The landowner or operator holds a current Operator Identification Number/Permit Number for pesticide use reporting;
    b. The crop is sold, including but not limited to (1) an industry cooperative, (2) harvest crew/company, or (3) a direct marketing location, such as Certified Farmers Markets;.
    c. The federal Department of Treasury Internal Revenue Service form 1040 Schedule F Profit or Loss from Farming is used to file federal taxes.

9. Concentration. The relative amount of a substance mixed with another substance. An example is 5 parts per million (ppm) of nitrogen in water or 5 mg/L.

10. Crop Types with High Potential to Discharge Nitrogen to Groundwater. Based on the Groundwater Pollution Nitrate Hazard Index developed by the University of California Division of Agriculture and Natural Resources (UCANR), the following crop types present the greatest risk for nitrogen loading to groundwater: beet, broccoli, cabbage, cauliflower, celery, Chinese cabbage (napa),collard, endive, kale, leek, lettuce (leaf and head), mustard, onion (dry and green), spinach, strawberry, pepper (fruiting), and parsley.

11. Discharge. A release of a waste to waters of the State, either directly to surface waters or through percolation to groundwater. Wastes from irrigated agriculture include but are not limited to earthen materials (soil, silt, sand, clay, and rock), inorganic materials (metals, plastics, salts, boron, selenium, potassium, nitrogen, phosphorus, etc.) and organic materials such as pesticides.

12. Discharger. The owner and operator of irrigated lands that discharge or have the potential to discharge waste that could directly or indirectly reach waters of the State and affect the quality of any surface water or groundwater. See also Responsible Party.

13. Discharges of Waste from Irrigated Lands. Surface water and groundwater discharges, such as irrigation return flows, tailwater, drainage water, subsurface drainage generated by irrigating crop land or by installing and operating drainage systems to lower the water table below irrigated lands (tile drains), stormwater runoff flowing from irrigated lands, stormwater runoff conveyed in channels or canals resulting from the discharge from irrigated lands, runoff resulting from frost control, and/or operational spills containing waste.

14. Ephemeral Stream. A channel that holds water during and immediately after rain events.

15. Erosion. The wearing away of land surface by wind or water, intensified by land-clearing practices related to farming, residential or industrial development, road building, or logging.

16. Erosion and Sediment Control Practices. Practices used to prevent and reduce the amount of soil and sediment entering surface water in order to protect or improve water quality.

17. Environmental Justice. Providing equal and fair access to a healthy environment for communities of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies; and proactive efforts to take into account existing environmental injustices and to protect from new or additional environmental hazards and inequitable environmental burdens;

18. Exceedance. A reading using a field instrument or a detection by a California State-certified analytical laboratory where the detected result is above an applicable water quality standard for the parameter or constituent. For toxicity tests, an exceedance is a result that is statistically lower than the control sample test result.

19. Farm or Ranch. For the purposes of this Order, a tract of land where commercial crops are produced or normally would have been produced. Individual farms/ranches typically have a similar farm/ranch manager, operator or landowner(s) and are categorized by farm size, primary output(s), and/or geographic location.

20. Farm Water Quality Management Plan (Farm Plan). The Farm Plan is a document that contains, at a minimum, identification of management practices that are being or will be implemented to protect and improve water quality by addressing irrigation management, pesticide management, nutrient management, salinity management, sediment and erosion control, and aquatic habitat protection. Farm Plans also contain a schedule for the effective implementation of management practices and verification monitoring to determine compliance with the requirements of this Order (schedules, milestones, effluent limits, etc.). Consistent with the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands adopted by the Board in July 2004 (Order No. R3-2004-0117), and in March 2012 (Order No. R3-2012-0011), this Order requires Dischargers to develop and implement a Farm Plan focused on the priority water quality issues associated with a specific operation and the priority water quality issues associated with a specific watershed or subwatershed.

21. Fertigation. The application of fertilizers through an irrigation system.

22. Freshwater Habitat. Uses of water that support cold or warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

23. Groundwater. The supply of water found beneath the earth's surface, usually in aquifers, which supply wells and springs.

24. Groundwater Protection Practices. Management practices designed to reduce or eliminate transport of nitrogen, pesticides, and other waste constituents into groundwater.

25. Integrated Pest Management Program (IPM). A pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as encouraging biological control, use of resistant varieties, or adoption of alternative cultivating, pruning, or fertilizing practices or modification of habitat to make it incompatible with pest development. Pesticides are used only when careful field monitoring indicates they are needed according to pre-established guidelines or treatment thresholds.

26. Intermittent Stream. A stream that holds water during wet portions of the year.

27. Irrigated Lands. For the purpose of this Order, irrigated lands include lands where water is applied for the purpose of producing commercial crops and include, but are not limited to, land planted to row, vineyard, field and tree crops as well as commercial nurseries, nursery stock production and greenhouse operations with soil floors, that do not have point-source type discharges, and are not currently operating under individual Waste Discharge Requirements (WDRs). Lands that are planted to commercial crops that are not yet marketable, such as vineyards and tree crops, must also obtain coverage under this Order.

28. Irrigation. Applying water to land areas to supply the water and nutrient needs of plants.

29. Irrigation Management Practices. Management practices designed to improve irrigation efficiency and reduce the amount of irrigation return flow or tailwater, and associated degradation or pollution of surface and groundwater caused by discharges of waste associated with irrigated lands.

30. Irrigation Runoff or Return Flow. Surface and subsurface water that leaves the field following application of irrigation water. See also, Tailwater.

31. Irrigation System Distribution Uniformity. Irrigation System Distribution Uniformity is a measure of how uniformly irrigation water is applied to the cropping area, expressed as a percentage. A nonuniform distribution can deprive portions of the crop of sufficient irrigation water, and can result in the excessive irrigation leading

to water-logging, plant injury, salinization, irrigation runoff and transport of chemicals to surface water and groundwater.

32. Landowner. An individual or entity who has legal ownership of a parcel(s) of land. For the purposes of this Order, the landowner is responsible for ensuring compliance with this Order and for any discharge of waste occurring on or from the property.

33. Limited Resource Farmer. A Limited Resource Farmer is defined by the U.S. Dept. of Agriculture (USDA) as:

    a. A person with direct or indirect gross farm sales not more than the current indexed value (determined by USDA) in each of the previous 2 years, and

    b. A person who has a total household income at or below the national poverty level for a family of four, or less than 50 percent of county median household income in each of the previous 2 years.

    The USDA's Limited Resource Farmer "Self Determination Tool" is available at: http://www.lrftool.sc.egov.usda.gov/DeterminationTool.aspx?fyYear=2012

34. Load. The concentration or mass of a substance discharged over a given amount of time, for example 10 mg/day or 5 Kg/day, respectively.

35. Monitoring. Sampling and analysis of receiving water quality conditions, discharge water quality, aquatic habitat conditions, effectiveness of management practices, and other factors that may affect water quality conditions to determine compliance with this Order or other regulatory requirements. Monitoring includes but is not limited to: surface water or groundwater sampling, on-farm water quality monitoring undertaken in connection with agricultural activities, monitoring to identify short and long-term trends in in-stream water quality or discharges from sites, inspections of operations, management practice implementation and effectiveness monitoring, maintenance of on-site records and management practice reporting.

36. Nitrate Hazard Index. In 1995, the University of California Center for Water Resources (WRC) developed the Nitrate Groundwater Pollution Hazard Index (Nitrate Hazard Index) (Wu, 2005). The purpose of the Nitrate Hazard Index is to identify agricultural fields with the highest vulnerability for nitrate pollution to groundwater, based on soil, crop, and irrigation practices. The hazard index number can range from 1 through 80 with the hazard increasing with increasing hazard index number. The WRC states that an index number greater than 20 indicates greater risk for nitrate pollution to groundwater and should receive careful attention.

    http://ucanr.org/sites/wrc/Programs/Water_Quality/Nitrate_Groundwater_Pollution_Hazard_Index/

37. Nitrate Loading Risk Factor. A measure of the relative risk of loading nitrate to groundwater based on the following criteria a) Nitrate Hazard Index Rating by Crop Type, b) Irrigation System Type, and c) Irrigation Water Nitrate Concentration.

38. Non-point Source Pollution (NPS). Diffuse pollution sources that are generally not subject to NPDES permitting. The wastes are generally carried off the land by runoff. Common non-point sources are activities associated with agriculture, timber harvest, certain mining, dams, and saltwater intrusion.

39. Non-Point Source Management Measures. To combat NPS pollution, the State Water Board NPS Program adopted management measures as goals for the reduction of polluted runoff generated from five major categories, including agriculture. Management measures address the following components for agriculture: Erosion and sediment control; facility wastewater and runoff from confined animal facilities; nutrient management; pesticide management; irrigation water management; grazing management, and groundwater protection.

40. Non-Point Source Management Practices. Methods or practices selected by entities managing land and water to achieve the most effective, practical means of preventing or reducing pollution from diffuse sources, such as wastes carried off the landscape via urban runoff, excessive hill, slope or streambed and bank erosion, etc. Management practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Management practices can be applied before, during, and after pollution-causing activities to prevent, reduce, or eliminate the introduction of wastes into receiving waters.

41. Nutrient. Any substance assimilated by living things that promotes growth.

42. Nutrient Management Practices. Management practices designed to reduce the nutrient loss from agricultural lands, which occur through edge-of-field runoff or leaching from the root zone.

43. Operator. Person responsible for or otherwise directing farming operations in decisions that may result in a discharge of waste to surface water or groundwater, including, but not limited to, a farm/ranch manager, lessee or sub-lessee. The operator is responsible for ensuring compliance with this Order and for any discharge of waste occurring on or from the operation.

44. Operation. A distinct farming business, generally characterized by the form of business organization, such as a sole proprietorship, partnership, corporation, and/or cooperative. A farming operation may be associated with one to many individual farms/ranches.

45. Operational Spill. Irrigation water that is diverted from a source such as an irrigation well or river, but is discharged without being delivered to or used on an individual field.

46. Perennial Stream. A stream that holds water throughout the year.

47. Pesticide Management Practices. Management practices designed to reduce or eliminate pesticide runoff into surface water and groundwater.

48. Point Source. Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which wastes are or may be discharged.

49. Pollutant. The man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water, including dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

50. Public Water System. A system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. A public water system includes the following: (1) Any collection, treatment, storage, and distribution facilities under control of the operator of the system which are used primarily in connection with the system; (2) Any collection or pretreatment storage facilities not under, the control of the operator that are used primarily in connection, with the system; (3) Any water system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

51. Quality of the Water. The “chemical, physical, biological, bacteriological, radiological, and other properties and characteristics of water which affect its use” as defined in the California Water Code Sec. 13050(g).

52. Receiving Waters. Surface waters or groundwater that receive or have the potential to receive discharges of waste from irrigated lands.

53. Requirements of Applicable Water Quality Control Plans. Water quality objectives, prohibitions, Total Maximum Daily Load (TMDL) Implementation Plans, or other requirements contained in the Basin Plan, as adopted by the Central Coast Water Board and approved according to applicable law.

54. Responsible Party. The owner and operator of irrigated lands that discharge or have the potential to discharge waste that could directly or indirectly reach waters of the State and affect the quality of any surface water or groundwater. See also Discharger.

55. Riparian Area. Vegetation affected by the surface water or groundwater of adjacent perennial or intermittent streams, lakes or other waterbodies. Vegetation species are distinctly different from adjacent areas or are similar to adjacent areas but exhibit more vigorous or robust growth forms indicative of increased soil moisture. Riparian areas may also include floodplains. Floodplains are critical areas for retaining floodwaters, allowing for sediment deposition and the natural movement of riparian areas, as well as space for colonization of new riparian and wetland vegetation necessary due to natural meandering. (Dall et. al. 1997, p.3)

56. Source of Drinking Water. Any water designated as municipal or domestic supply (MUN) in a Regional Water Board Basin Plan and/or as defined in SWRCB Resolution No. 88-63.

57. Stormwater. Stormwater runoff, snow melt runoff, and surface runoff and drainage, as defined in 40 CFR 122.26(b)(13).

58. Subsurface Drainage. Water generated by installing drainage systems to lower the water table below irrigated lands. The drainage can be generated by subsurface drainage systems, deep open drainage ditches or drainage wells.

59. Surface Runoff. Precipitation, snow melt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions; a major transporter of non-point source wastes in rivers, streams, and lakes.

60. Tailwater. Runoff of irrigation water from the lower end of an irrigated field. See also, Irrigation Runoff or Return Flow.

61. Tile Drains. Subsurface drainage which removes excess water from the soil profile, usually through a network of perforated tile tubes installed 2 to 4 feet below the soil surface. This lowers the water table to the depth of the tile over the course of several days. Drain tiles allow excess water to leave the field. Once the water table has been lowered to the elevation of the tiles, no more water flows through the tiles. The Central Coast Water Board anticipates evaluating longer timeframes necessary to address tile-drain discharges, for inclusion in a subsequent Agricultural Order.

62. Total Maximum Daily Load (TMDL). The condition of an impaired surface waterbody (on the List of Impaired Waterbodies) that limits the amount of pollution that can enter the waterbody without adversely affecting its beneficial uses, usually expressed as a concentration (e.g., mg/L) or mass (e.g., kg); TMDLs are proportionally allocated among dischargers to the impaired surface waterbody.

63. Total Nitrogen Applied. Total nitrogen applied includes nitrogen in any product, form, or concentration including, but not limited to, organic and inorganic fertilizers, slow release products, compost, compost teas, manure, extracts, nitrogen present in the soil, and nitrate in irrigation water; it is reported in units of pounds of nitrogen per crop, per acre for each farm/ranch or nitrate loading risk unit.

64. Uppermost Aquifer. The geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer.

65. 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" as defined in the California Water Code Sec. 13050(d). "Waste" includes irrigation return flows and drainage water from agricultural operations containing materials not present prior to use. Waste from irrigated agriculture includes *earthen materials* (such as soil, silt, sand, clay, rock), *inorganic materials* (such as metals, salts, boron, selenium, potassium, nitrogen, phosphorus), and *organic materials* such as pesticides.

66. Water Quality Buffer. A water quality protection zone surrounding perennial or intermittent channels, including adjacent wetlands (as defined by the Clean Water Act), with riparian vegetation and/or riparian functions that support beneficial uses and protect water quality.

67. Water Quality Control. The "regulation of any activity or factor which may affect the quality of the waters of the State and includes the prevention and correction of water pollution and nuisance" as defined in the California Water Code Sec. 13050(i).

68. Water Quality Criteria. Levels of water quality required under Sec. 303(c) of the Clean Water Act that are expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes. The *California Toxics Rule* adopted by USEPA in April 2000, sets numeric Water Quality Criteria for non-ocean waters of California for a number of pollutants. See also, Water Quality Objectives.

69. Water Quality Objectives. "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 specified area," as defined in Sec. 13050(h) of the California Water Code. Water Quality Objectives may be either numerical or narrative and serve as Water Quality Criteria for purposes of

Section 303 of the Clean Water Act. Specific Water Quality Objectives relevant to this Order are identified in this Appendix A in Tables 1A and 1B.

70. Water Quality Standard. Provisions of State or Federal law that consist of the beneficial designated uses or uses of a waterbody, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular waterbody, and an anti-degradation statement. Water quality standards includes water quality objectives in the Central Coast Water Board's Basin Plan, 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. For groundwater with the beneficial use of municipal or domestic water supply, the applicable drinking water standards are those established by the United States Environmental Protection Agency (USEPA) or California DDW, whichever is more stringent. Under Sec. 303 of the Clean Water Act, each State is required to adopt water quality standards.

71. Waters of the State. "Any surface water or groundwater, including saline waters, within the boundaries of the State" as defined in the California Water Code Sec. 13050(e), including all waters within the boundaries of the State, whether private or public, in natural or artificial channels, and waters in an irrigation system.

72. Wetland. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (40 CFR 230.3(t)).

73. Wildlife Habitat. Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.