Appendix L
Gabilan Watershed Blueprint

INTRODUCTION

The Gabilan Watershed Blueprint is the result of a pilot project conducted by the Greater Monterey County Regional Water Management Group (RWMG) aimed at addressing and resolving water-related conflicts in the region, while promoting stakeholder collaboration and project integration. This process is called "Water Resource Project Coordination" (WRPC).

While many attempts at traditional conflict resolution in Monterey County have been made in the past, most of these attempts have failed. The RWMG concluded that a new approach was needed to foster collaboration and enable project integration to occur. In response to this need, the RWMG developed the Water Resource Project Coordination concept. The WRPC was conceived as a fact-finding process in which parties would discuss what factual questions they believed to be relevant to a decision, exchange information, identify where they agreed and where they disagreed, then seek additional information to fill gaps, address hurdles, or resolve areas of disagreement. The goal of the WRPC process was to alleviate areas of mistrust and confusion and increase collaborative dialogue so that mutual solutions could be achieved.

A pilot project to test the WRPC process in one sub-watershed area of the Greater Monterey County IRWM region – the Gabilan Watershed – was initiated in early 2011, and involved numerous stakeholders representing agricultural interests, environmental groups, government agencies, academic institutions, and interested citizens. The pilot project ended in early 2014. The process and outcomes are described in detail in Section I Integration of the Greater Monterey County Integrated Regional Water Management (IRWM) Plan.

The end product of the WRPC process was the Gabilan Watershed Blueprint. Based on the results of a stakeholder meeting held in January 2013, the RWMG's WRPC Committee determined that the challenges to "making progress" in the Gabilan Watershed had less to do with a lack of information (e.g., scientific data) and more to do with funding constraints and other barriers. The challenges spanned such a large range of topics that the Committee felt a comprehensive "umbrella" was needed to pull it all together. That umbrella is what they termed the "Gabilan Watershed Blueprint." The Gabilan Watershed Blueprint was envisioned as a process to address some of the major hurdles that have slowed and prevented progress in resolving problems related to water quality, and to a lesser extent flooding, in the Gabilan Watershed.

The Gabilan Watershed Blueprint is comprised of four main sections, designed to address some of the regional challenges and opportunities expressed during the January 2013 stakeholder meeting. The four Blueprint sections are: 1) The Landscape Strategy, 2) On-Farm Solutions, 3) Corporate Social Responsibility, and 4) Agency Coordination. The background for each of these sections is described briefly below, and the sections themselves follow this Introduction as "standalone" documents.

1. The Landscape Strategy

One important outcome of the stakeholder meeting held in January 2013 was a collection of visual depictions of ideal and/or desired future characteristics of the Gabilan Watershed. The purpose of the Landscape Strategy was to bring these images together in order to outline common goals for the watershed and to describe some of the common hurdles affecting the ability to advance joint work in the

watershed. The drawings contained in the Landscape Strategy section of the Blueprint distill the themes expressed in the January 2013 stakeholder drawings – flood control, water quality, habitat restoration, public access to parks and natural areas, safe community, and productive agriculture – along with the following *shared ideals*:

- Residents of Salinas will enjoy and have good access to green places, and ample outdoor education and activities will engage children and other community members in maintaining local environmental quality.
- Within city boundaries, urban runoff management practices and facilities will minimize the impact of urban impervious surfaces on storm flows to regional waterways.
- Area farms will host a variety of farm runoff water quality management techniques reflective of individual approaches and needs and innovations, resulting in cleaner waterways amidst a thriving agricultural economy.
- The Reclamation Ditch/creek system will be able to safely and effectively convey storm flows while protecting or enhancing water quality as flows are conveyed to Elkhorn Harbor. Where possible, wetlands and other wildlife habitat will be incorporated into the system's function.
- Pedestrian and bike-friendly paths connecting Salinas to regional path systems will be developed along acceptable routes.

The graphics in the Landscape Strategy will be used for continued outreach and education in the watershed.

2. On-Farm Solutions

Some of the challenges voiced at the January 2013 stakeholder meeting were the "barriers" to implementing on-farm sustainable management practices. One barrier was a simple lack of technical information regarding certain practices, such as nutrient management practices, and the lack of an industry-led approach to address the issue. In response to this challenge, a strategy was developed to help growers answer some of those questions in order to help build capacity within the local grower community for implementing sustainable management practices in the Gabilan Watershed. The On-Farm Solutions section of the Blueprint is the outcome of that effort.

The idea for On-Farm Solutions was first developed at a Grower-Shipper Association (GSA) meeting in the fall 2012, at which time the GSA's Water Committee had identified a few priority needs for grower assistance in terms of water quality improvement. One of those needs was a focus on better understanding Nitrate Quick Tests, including how to use them, compile them, and interpret them, and their true cost to the organization.

The GSA, in association with researchers at the Watershed Institute of California State University Monterey Bay, purchased and distributed Nitrate Quick Test kits to growers in the Salinas Valley, and then tracked their use. The results of this effort were compiled into a document (Standard Operating Procedures) intended to provide growers with a comprehensive guide, in both English and Spanish, on how to perform and use soil Nitrate Quick Tests as a diagnostic tool for fertilizer management decisions. The guide is regionally specific, and addresses differences in soil sampling, frequency of testing, and interpreting nitrate results based on crop types (general categories, such as shallow-rooted vs. not, cool season crops, longer season crops) and growing environments (e.g., soil type, irrigation system, fertilizer application methods). An appendix to the guide includes a cost analysis of the Nitrate Quick Tests that are commercially available and those that growers create from multiple sources.

The On-Farm Solutions section of the Blueprint is comprised of the following documents:

- Nitrate Quick Test Standard Operating Procedures – How to Use the Nitrate Quick Test
- Nitrate Quick Test SOP – Spanish: Cómo Utilizar las Pruebas Rápidas de Nitrato
- Appendix A: Cost Analysis of Nitrate Quick Test Program – What are the True Costs to Growers?
- Apéndice A: Análisis de Costo del Programa de Pruebas de Rápidas de Nitrato: ¿Cuáles Son los Costos Reales Para los Productores?
- Appendix B: In-season Soil Nitrate Testing Explained
- Apéndice B: Explicación de las Pruebas de Nitrato en Suelos en Temporada

In addition to creating the guide, a website was developed to provide Nitrate Quick Test information for growers in the Salinas Valley, along with a database for storing the results of the testing. The website address is: www.growershipper.com/sys/static/irwmp.php. The website will be continually updated, with new information based on grower requests.

3. Corporate Social Responsibility

Like "On-Farm Solutions," the goal of this Blueprint section was to advance agricultural sustainability in the Gabilan Watershed. With "On-Farm Solutions" working on the individual grower level, the Corporate Social Responsibility (CSR) part of the Blueprint was intended to address the next level of the agriculture industry. SureHarvest, a private consulting company that provides solutions to growers and agrifood companies pursuing sustainability strategies, was hired to lead this effort.

The goal of the effort was to initiate greater dialogue within the agricultural industry about social/environmental responsibility programs, and to encourage agricultural leaders to take a greater role in funding sustainability practices. In March 2014, SureHarvest convened an industry-focused working session in the City of Salinas to bring together CSR leaders in the agricultural community to initiate an action-oriented discussion focused on advancing business models for stewardship of Monterey Bay watersheds. The workshop was co-sponsored by Central Coast Grower-Shipper Association, Western Growers, and Monterey County Sustainability Working Group. Twenty-two industry leaders, company executives, and CSR/sustainability directors on California's Central Coast and beyond participated in the workshop. Participants identified values, challenges, and opportunities for collaborative action across three broad categories: market and regulatory compliance; program design and core elements; and data collection, confidentiality, and information sharing. A summary report of the CSR workshop comprises this section of the Blueprint document.

4. Agency Coordination

One of the major challenges to project implementation identified during the January 2013 stakeholder workshop was permitting and regulatory compliance. Hurdles to project implementation brought about by lack of interagency coordination and difficult and confusing regulation were voiced time and time again at the January 2013 stakeholder meeting. The goal of this section of the Blueprint was to identify the regulatory constraints and challenges that projects in the Gabilan Watershed might encounter, and identify possible options for coordinating agency review and consultation. The result was a matrix summarizing primary permitting and regulatory oversight (see Table 3). At the suggestion of various agency staff, the matrix is a linked document which gets the project sponsor or member of the public to the official website of the agency.

As the final product of the WRPC process, an effort was initiated to integrate projects within the Gabilan Watershed. The project integration process proceeded in two phases: 1) review of all existing IRWM Plan projects located in the Gabilan Watershed to identify integration options, and 2) discussions with a wide

variety of project proponents to identify possible partners and integrated project components. The result was identification of several integrated multi-objective, multi-stakeholder projects that can potentially be developed and put forward for IRWM and other grant funds. These projects are briefly described in the Agency Coordination Final Report.

The Agency Coordination section of the Blueprint is comprised of the following documents:

- Final Report – Agency Coordination in the Gabilan Watershed: From the Mountains to the Sea
- Table 2 – Monterey Agency Contact List
- Table 3 – Permitting Matrix
- Table 4 – WRPC Project Integration Matrix
- Table 5 – 2012 WRPC Project List Sorted by Program

REPORT TO MAY 28, 2014 STAKEHOLDER MEETING

SUB-PROJECT: "GRAPHIC" EXPLORATION OF SHARED INTERESTS FOR MULTIPLE-BENEFIT LANDSCAPES AND PROJECTS IN THE GABILAN/REC-DITCH WATERSHED

PAUL ROBINS, RESOURCE CONSERVATION DISTRICT OF MONTEREY COUNTY

Background

One outcome of the January 2013 Water Resource Project Coordination (WRPC) stakeholder meeting was a collection of visual depictions and descriptions of ideal, desired, and/or expected future characteristics of the Gabilan Watershed. The WRPC subcommittee was struck with how closely aligned many of these depictions were, and how they could possibly act as a tool to help stakeholders of all backgrounds identify areas of agreement that could inform development of integrated projects that meet multiple objectives (social, economic, and environmental) for watershed health. This sub-project was to review the range of original drawings and descriptions and condense them into a smaller set of conceptual drawings representing the range and intersections of ideas. These conceptual drawings were then submitted for additional review and discussion with ten members of different stakeholder groups in the watershed: farmers, water managers, municipalities, urban/rural residents, community groups and academia. Preparation for and follow-up from these discussions (mostly one-on-one) was vetted through a subcommittee of five people from the Resource Conservation District of Monterey County, Monterey County Water Resources Agency, Central Coast Wetlands Group, California Rural Legal Assistance, and The Nature Conservancy.

The anticipated deliverable was a large drawing, depicting a conceptualized birds-eye view of the Gabilan/Rec Ditch watershed with "pop-out" images of conceptual multiple-benefit watershed improvement project outcomes in the different landscapes (urban, agricultural, etc.) of the region, accompanied by descriptive language and recommendations for moving forward for achievable, integrated water resource (or "watershed") projects. An ideal outcome would have been a depiction of a common vision for the watershed, but developing such a vision would need a much more intensive, comprehensive and extensive stakeholder process. As evidenced from the original set of stakeholder drawings, while there are many areas of congruence, there remains considerable diversity of opinion on key landscape elements (e.g., Rec Ditch improvements). Regardless, the product as proposed is a step towards informing or structuring a more rigorous effort to forward good work in the region.

Context

In preparation for and in response to meeting with various stakeholders, the following reference documents were used to gain a better understanding of the local history of Gabilan and Rec Ditch watershed meetings, assessments and projects. In the interest of time, the review focused on documents developed since the floods in the late 1990s, although those documents for the most part filled in the details regarding prior work and studies. The more current documents included:

- *A Vision Plan for Carr Lake Regional Park* (CSU Pomona, 2003)
- *Reclamation Ditch Watershed Assessment & Management Strategy* (MCWRA & CSUMB, 2006)
- *The Carr Lake Project: Potential Biophysical Benefits of Conversion to a Multiple-Use Park* (CSUMB, 2012)

In the context of the individual meetings, other documents discussed included the *Zone 9 Reclamation Ditch Drainage Systems Operations* and *Carr Lake Multi-Purpose Flood Control* studies by Schaff & Wheeler in 1999 and 2002.

These reports reflect the primary concerns in the watershed: flood control, water quality, habitat restoration, and public access to parks and natural areas, all in the context of a growing urban area nested in one of the world's most productive agricultural regions, set near the heart of the Monterey Bay National Marine Sanctuary.

The Process

The following drawings were distilled from the themes expressed in the January 2013 drawings: urban parks and greenspace access, urban runoff management, agricultural water quality management, Rec Ditch management, and access from Salinas to the ocean.

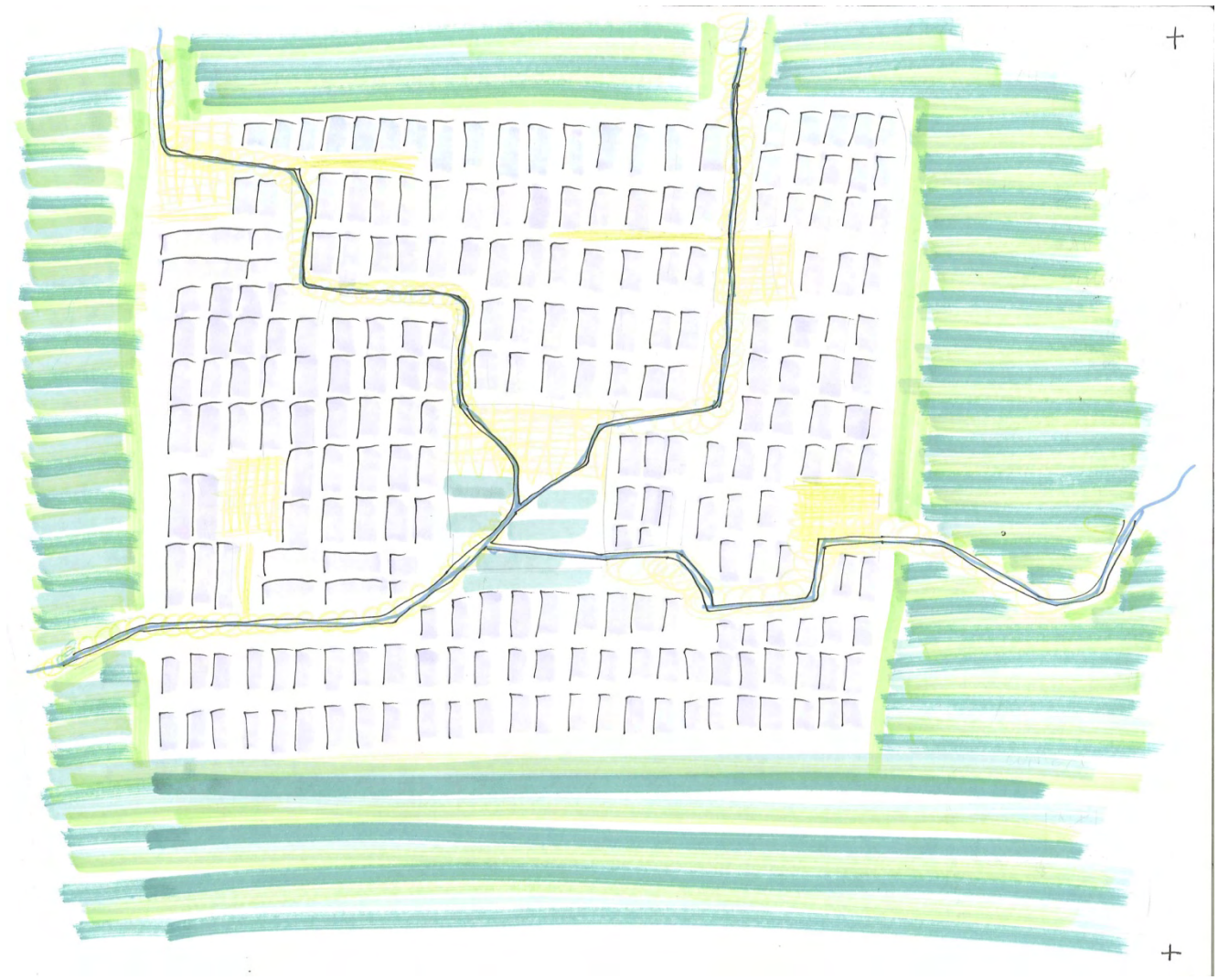


Figure 1: Conceptual graphic showing network of greenways linking neighborhoods and parks with a large, central park

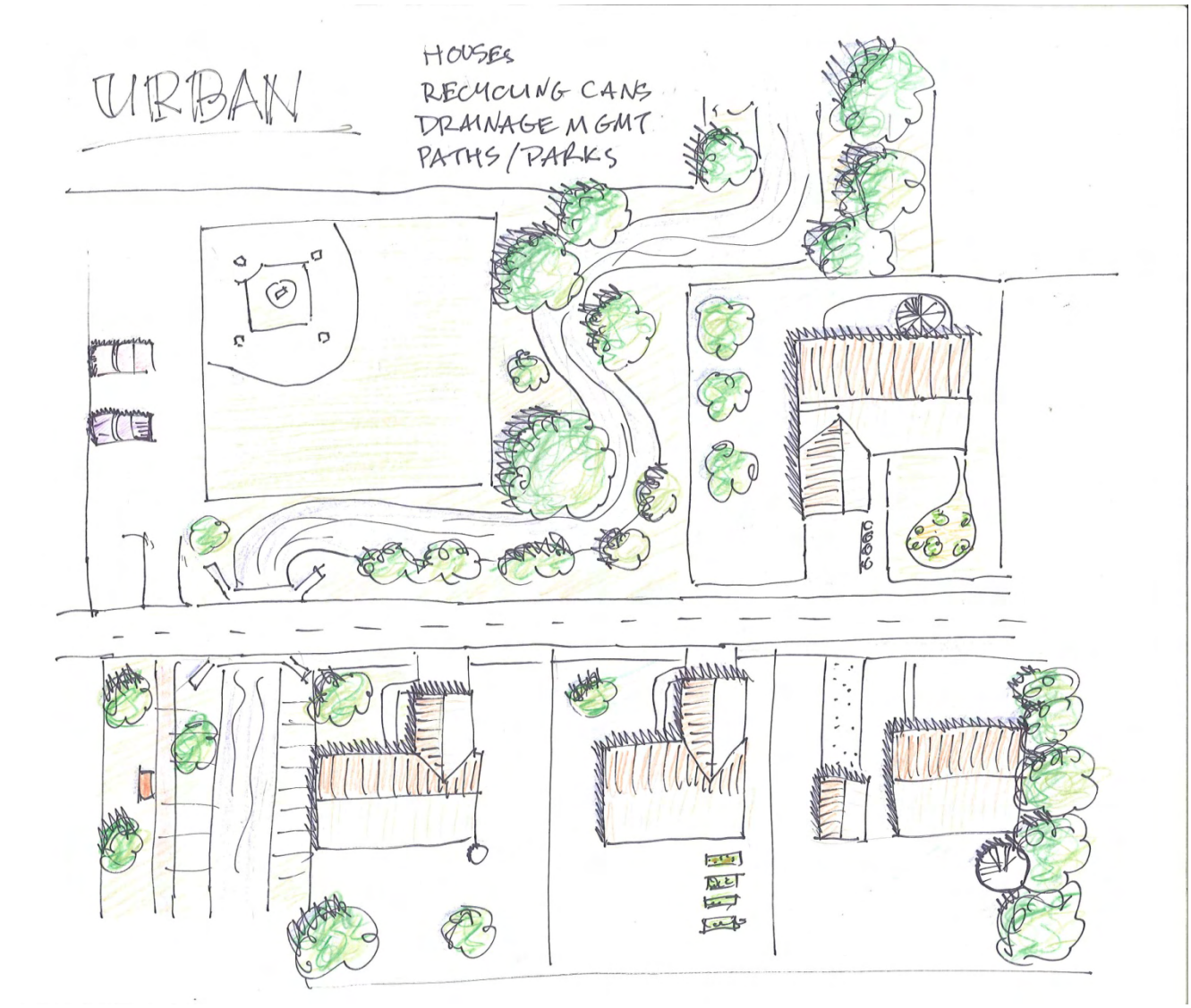


Figure 2: Illustration of suburban neighborhood with naturalized parkways, paths, and 'backyard' conservation opportunities such as vegetable gardens, rainwater catchment barrels, rain gardens, and permeable surface driveways.

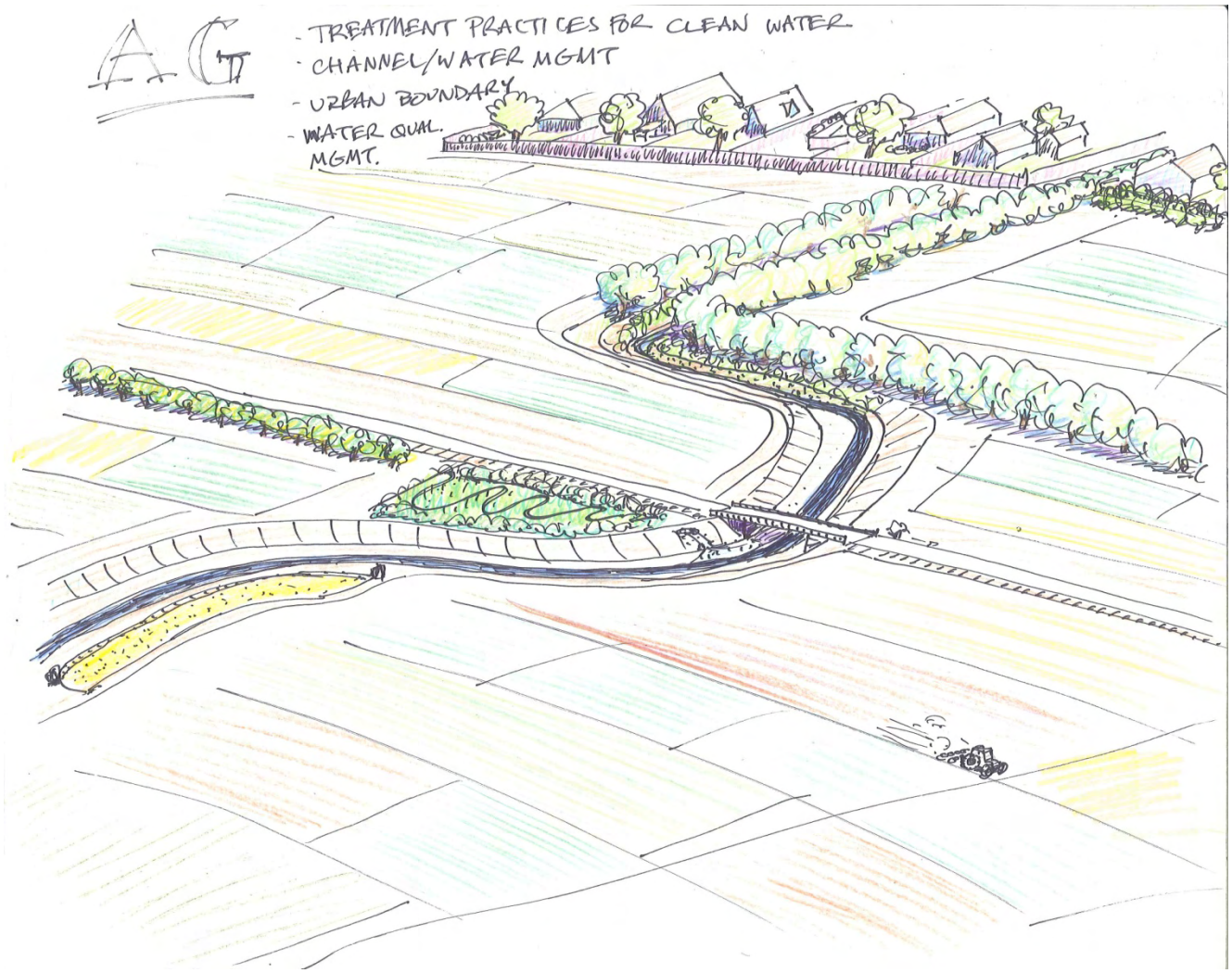


Figure 3: Illustration of agricultural landscape displaying a range of wildlife and water quality management practices reflective of the diversity of farmers and landowners. It also shows a clear urban boundary--a common interest expressed at the January 2013 workshop.

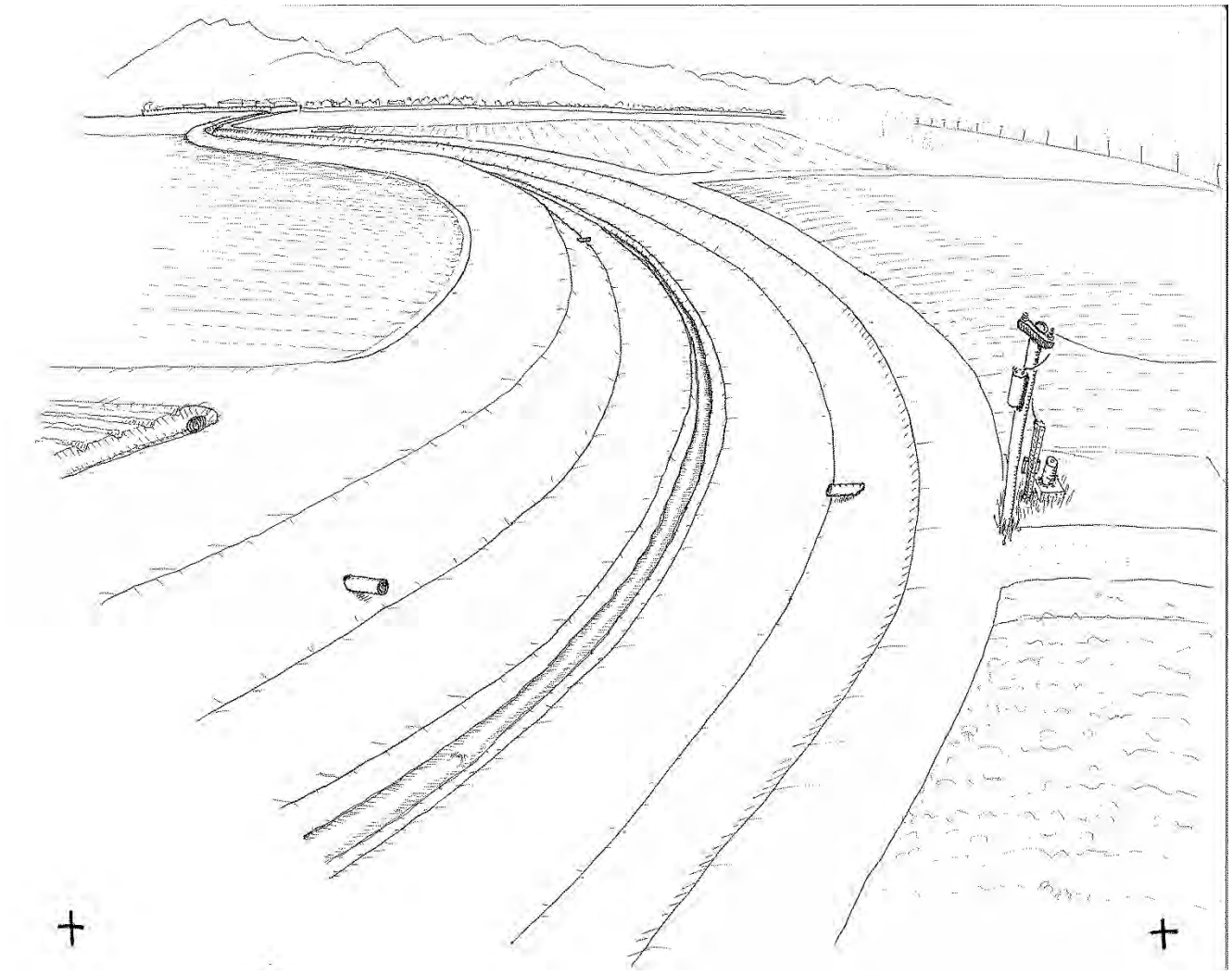


Figure 4: "Base" drawing of a bare, earthen channel in the Rec Ditch watershed used as basis for overlays of different scenarios in meetings with stakeholders.

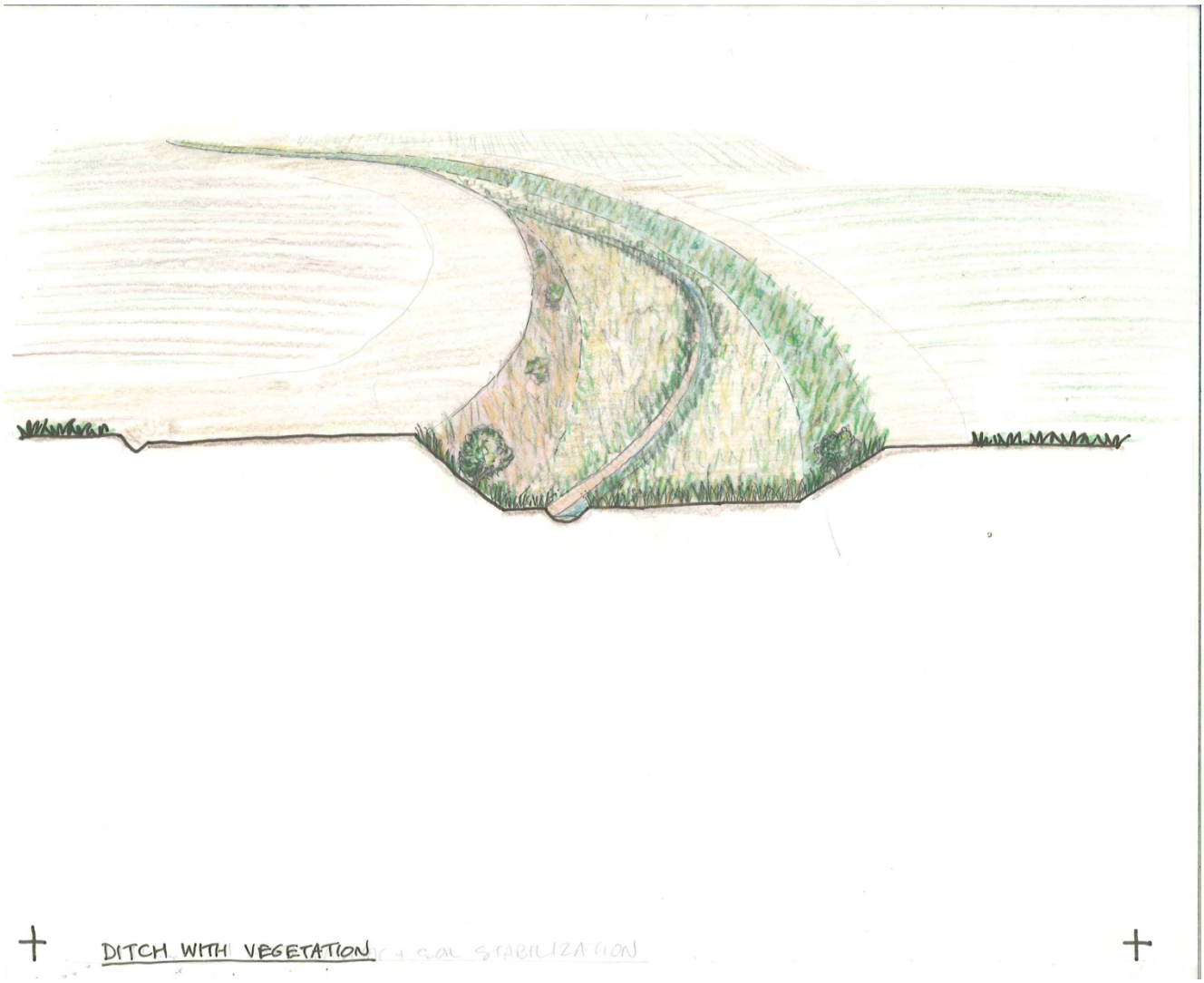


Figure 5: Tracepaper overlay of a combined section/perspective view of the ditch in Figure 4 with herbaceous vegetation from bank to bank and a meandering channel.

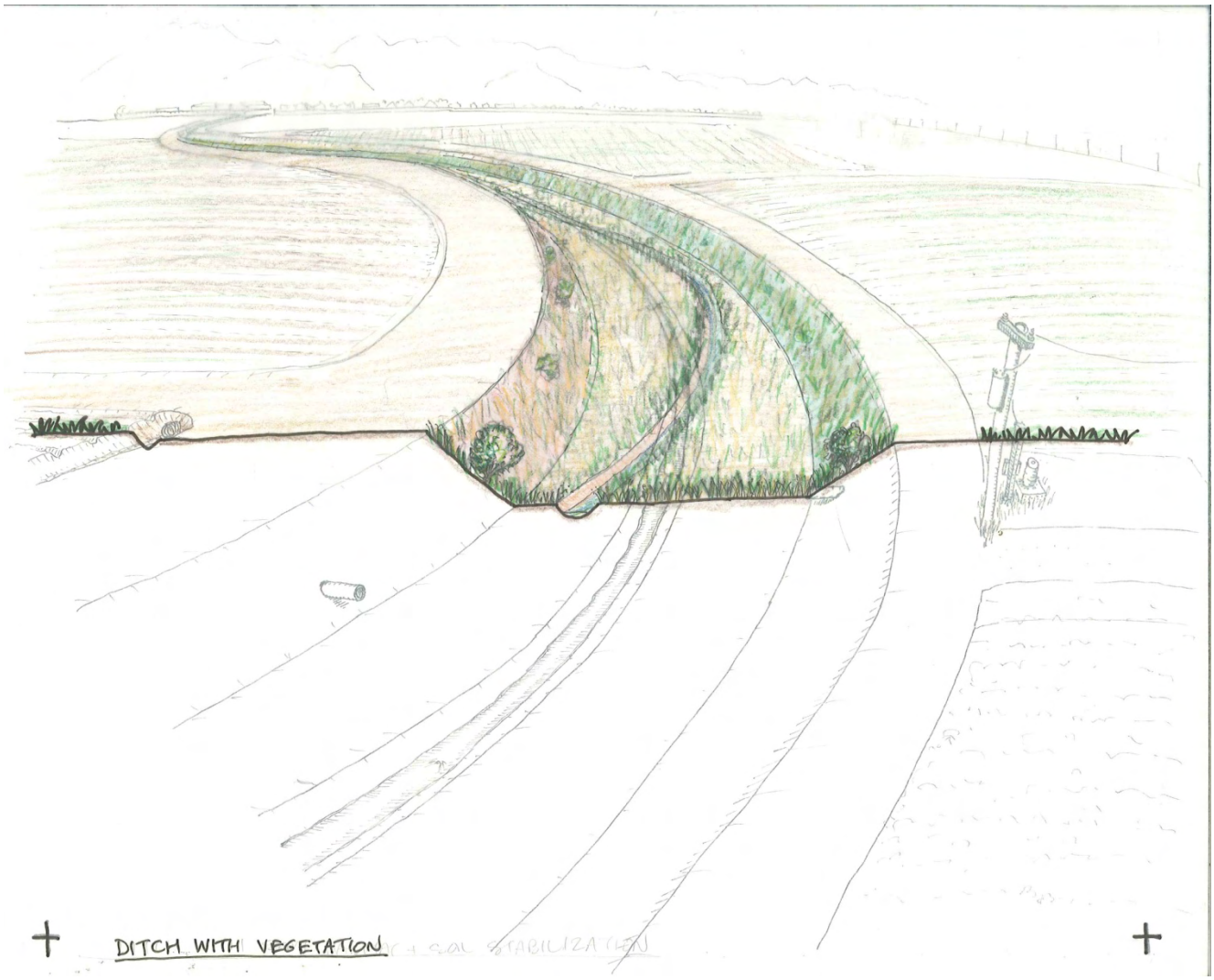


Figure 6: An overlay of Figure 5 on top of the Figure 4 base drawing.

Figure 7: This image, overlaid atop the Figure 4 base drawing, illustrated a representation of a trail system incorporated into a waterway (to many stakeholders, this was specifically the "Rec Ditch") as a means to connect urban residents with natural areas outside of Salinas and Castroville.

Figure 8: A simplified representation of the region upon which most of the January 2013 drawings focused: namely the portions of the Gabilan/Rec Ditch watershed in the Salinas Valley from immediately upstream of the City of Salinas to the ocean. Consistent with the common themes among those drawings, it shows a predominantly agricultural (and highly productive) landscape with distinct urban areas linked by roads and waterways. This drawing also features notes drawn during meetings with stakeholders adding existing trails (dashed line parallel to Hwy 1 in center left) and potential project areas along streams in the City of Salinas.

The outcomes of those meetings are expressed below in terms of areas of agreement on desired future states of the watershed and potential projects.

Shared Ideals

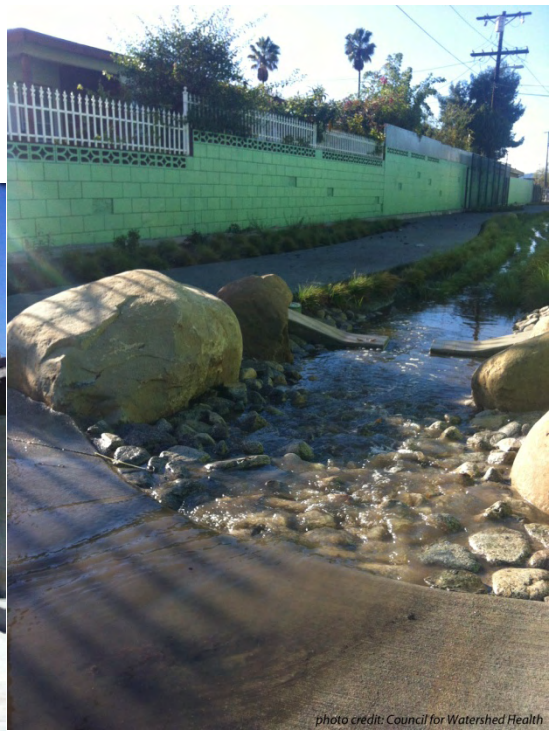
1. Residents of Salinas will enjoy and have good access to green places, and ample outdoor education and activities will engage children and other community members in maintaining local environmental quality.

The City of Salinas is well below a national standard of 10 open space acres per 1000 people (CSU Pomona, 2003). Building Healthy Communities, other citizen groups, and the City of Salinas are eager to rectify this by creating accessible green spaces wherever possible in the city by various means, including: development of paths and parks along waterways in the city (e.g., Gabilan, Natividad, Santa Rita, and Alisal Creeks); creation of new parklands pending new developments and willing sale of farmed lands in Carr Lake; and development of "green streets" with more trees/vegetation, slower traffic, and permeable surfaces.

Community programs are needed to draw kids outdoors more to learn about nature and participate in projects that contribute to their local environment. The consensus was that we need more of this good thing. Existing efforts at the Santa Rita School and Return of the Natives were referenced.

Figures 9 & 10: Examples of means of engaging community members in improving natural and common areas in the City: vegetation planting and community murals.

New pathways or access points to parks are needed to encourage community use, help keep pedestrians off high-speed roads such as Constitution Blvd., and can be designed for maximum infiltration and native landscape value.



Figures 11 & 12: Images exemplifying urban area improvements that convert a blighted area (in this case, a regularly-flooded alleyway in Los Angeles County) into a greenway designed to accommodate winter stormwater in a naturalized manner. Source: Elmer Ave Community Alleyway Project, Los Angeles, CA

Figure 13: Many drawings at the January 2013 workshop referenced the desired for a large park at Carr Lake, and many interviewees spoke positively of the conceptual plan for such a park as developed by a team of Cal Poly Pomona graduate students in 2003. Their plan was designed to meet multiple community needs for recreation, natural areas, and flood water management.

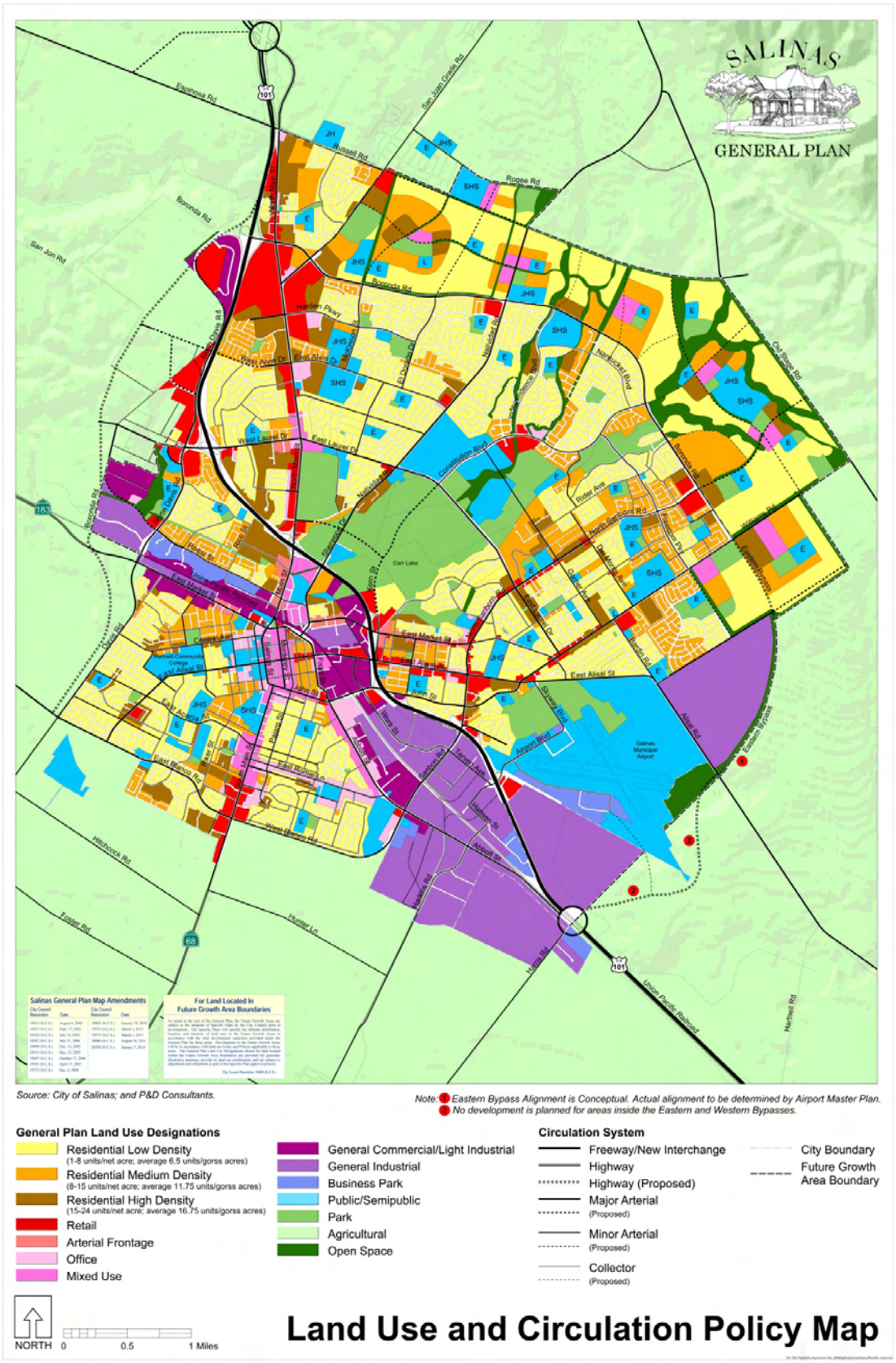


Figure 14: From the City of Salinas General Plan, showing desired parks and parkways, including a large park at Carr Lake.

2. Within city boundaries, urban runoff management practices and facilities will minimize the impact of urban impervious surfaces on storm flows to regional water ways.

Low Impact Development techniques for new development make for more attractive neighborhoods with more shade and vegetation while enhancing local percolation of rainwater and reducing stress on the Reclamation Ditch system.

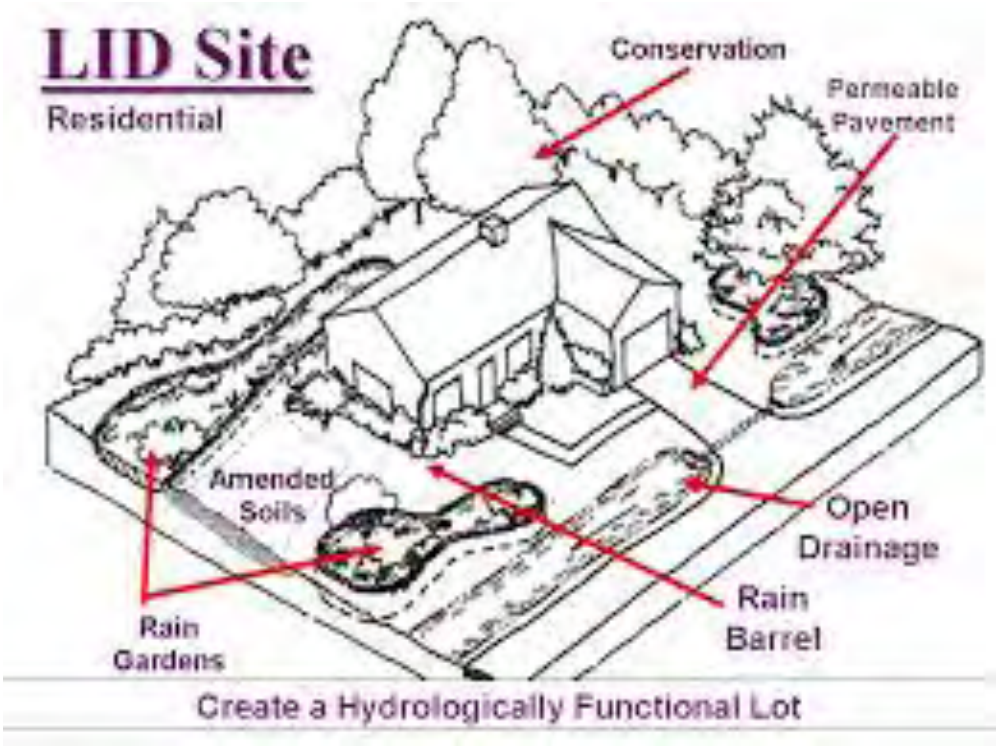


Figure 15: Conceptualized drawing of an urban lot designed to minimize runoff from the site. Future growth plans for the City of Salinas call for "Low Impact Development" (LID) techniques such as these to reduce stress on the already "maxed out" Rec Ditch system that would be anticipated as the urban "impermeable" footprint contributing runoff to the watershed is increased.

Figures 16 & 17: Pictures of lots and neighborhoods incorporating LID techniques.

Retention and Percolation ponds in parks and new developments can serve as recreation areas during dry periods, create ponds and wetland features in the winter, serve as nearby-nature year round, reduce stress on the Reclamation Ditch system and enhance local aquifer recharge.

Figures 18-20: Suburban detention basins serving multiple purposes with wildlife and recreational values.

Based on soils and their permeability, topography, and land use (See Appendix C), an area with the highest potential suitability for recharge would have highly permeable soils, with percolation rates six inches per hour or greater. Soils that are not very permeable could also potentially contribute to re-

High
Moderatly High
Moderate
Moderatly Low
Low
Not Suitable

	Topography	Land Use	Soil Permeability
High	Less than 6% slope	Vacant undeveloped land; open space	6 to 20 inches per hour
Moderate	6-16% slope	Sports fields, parks; farm land adjacent to creeks	Less than 6 and more than .6 in/hr
Low	16% and greater slope	Occupied developed land	Less than .6 in/hr

Figure 49, above: Suitability for aquifer recharge. Areas of darkest green have the highest potential for the placement of infiltration basins.
Figure 50, right: Suitable areas were determined based on these criteria.

46 Carr Lake Regional Park

Figure 21: Map developed by Cal Poly students illustrating opportunity areas in the watershed for percolating captured surface water for groundwater recharge.

Figure 105: A 25-year flood event in Carr Lake Regional Park.

108 CARR LAKE REGIONAL PARK

Figure 22: Image developed by Cal Poly students illustrating how their Carr Lake park conceptual plan would be designed to handle a "10-year" storm event based on historical rainfall records and hydrologic modeling.

3. Area farms will host a variety of farm runoff water quality management techniques reflective of the individual approaches and needs and innovations, resulting in cleaner waterways amidst a thriving agricultural economy.

New technologies such as those using bioreactors and resin beads give farmers the flexibility to treat runoff water quality concerns while limiting food safety program liabilities associated with open ponds and vegetation. Resin bead systems allow recovery of the trapped nutrients and potential re-use by the farmer or elsewhere.

Wetlands can be designed to perform multiple functions (habitat and water quality) where land is available for the wetland and an associated food safety buffer.

Figure 23: A modification of Figure 3 incorporating comments from interviewees regarding additional farmland practices for water conservation and food safety protection: in-field soil moisture monitoring stations and low-stature "food safety" fences along waterway and pond edges to minimize small wildlife incursion into vegetable production fields.

4. The Reclamation Ditch/creek system will be able to safely and effectively convey storm flows while protecting or enhancing water quality as flows are conveyed to Elkhorn Harbor. Where possible, wetlands and other wildlife habitat will be incorporated into the system's function.

The Reclamation Ditch system is desperately in need of improvement for bank protection, strategic stormwater retention and conveyance capacity within a challenging context of water quality regulations and general public scrutiny. Any project to treat the system will be extremely costly, which will require a combination of local fund-raising (fees, bond sales, etc.) and external grants. Such a large, publicly funded project will require broad acceptance and political support and demonstrate meeting multiple criteria for conveyance and environmental quality concerns.

If a comprehensive treatment of the Rec Ditch system seems financially or politically out of reach, another approach could be to identify sets of projects to treat critical locations in the system and treat them individually as prioritized. These are identified in the studies by Schaff & Wheeler, CSUMB and CSU Pomona.

In the meantime, interviewees noted that the ditch bottom and banks can be intentionally or passively vegetated with low-statured, herbaceous vegetation that will protect the channel without inhibiting storm flows, with silt fencing on the edges and 50' bare earth buffers from edge of vegetation to crop to meet current food safety standards. The comfort level of the individual farmer and the configuration of the channel in a given locale affect how much vegetation grows in the channel, as some prefer to keep banks bare but the channel bottom "green." Some sections of ditch are less stable and may require more substantial armoring than vegetation can provide.

Incorporation of a public access element to the waterway (such as park nodes or paths) has been suggested as a possible means to expand potential funding options and public interest, but would have to overcome substantial opposition from the host agricultural community, for which a financial and political cost-benefit analysis would need to be developed considering the "heat" associated with the topic.

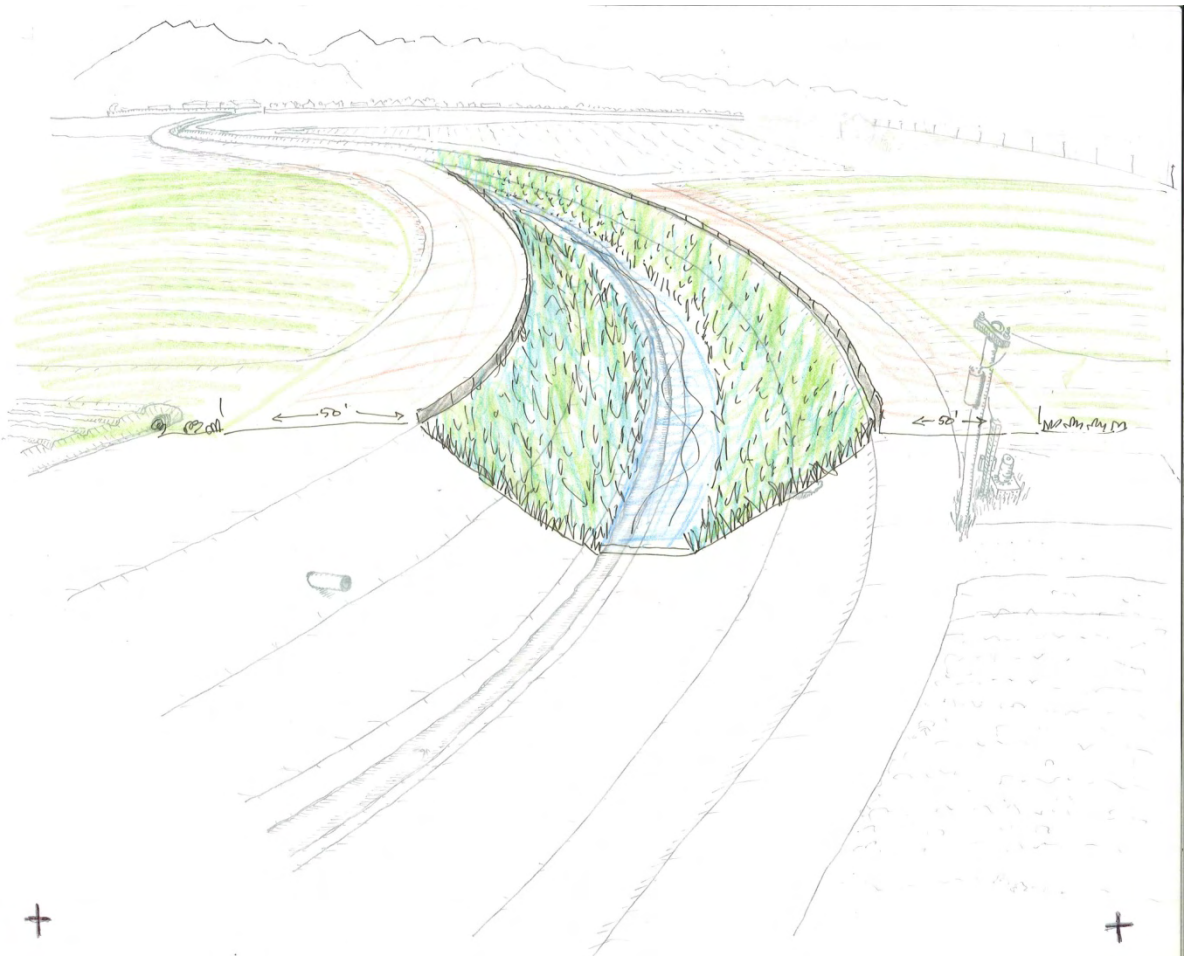


Figure 24: An overlay of the ditch schematic more illustrative of a typical Rec Ditch cross-section with "bank-to-bank" herbaceous vegetation, calling out specific elements needed to meet food safety concerns: low-stature fence and 50' bare-earth buffers between edge of vegetation and field.

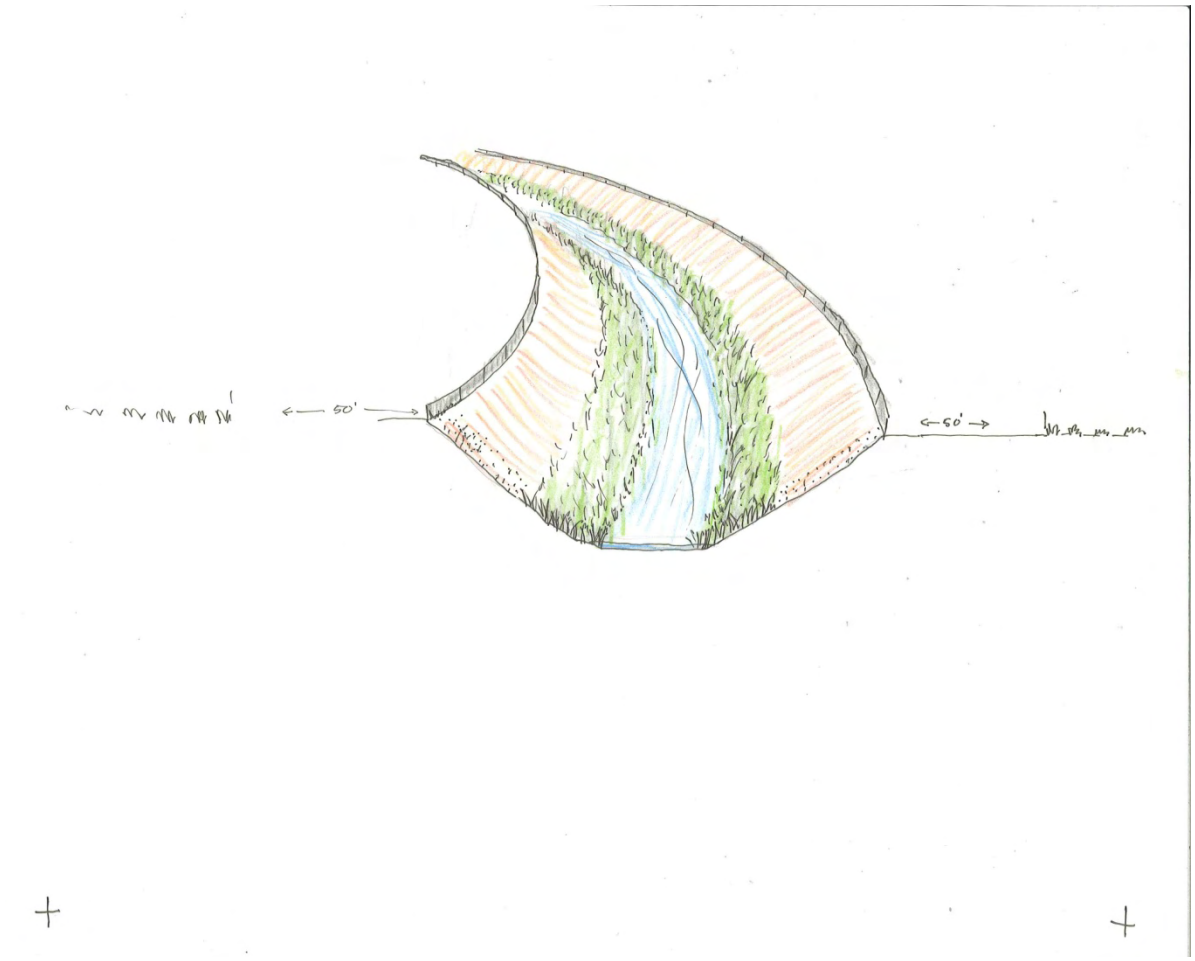


Figure 25: The most-preferred option among the farmers interviewed for a Rec Ditch cross section: namely vegetation just in the lower part of the channel where it's difficult to control, but potentially provides erosion control and may draw nutrients from the saturated soil along the channel. A bare bank is preferred by food safety inspectors, especially augmented with a low-stature fence and additional bare earth buffer.

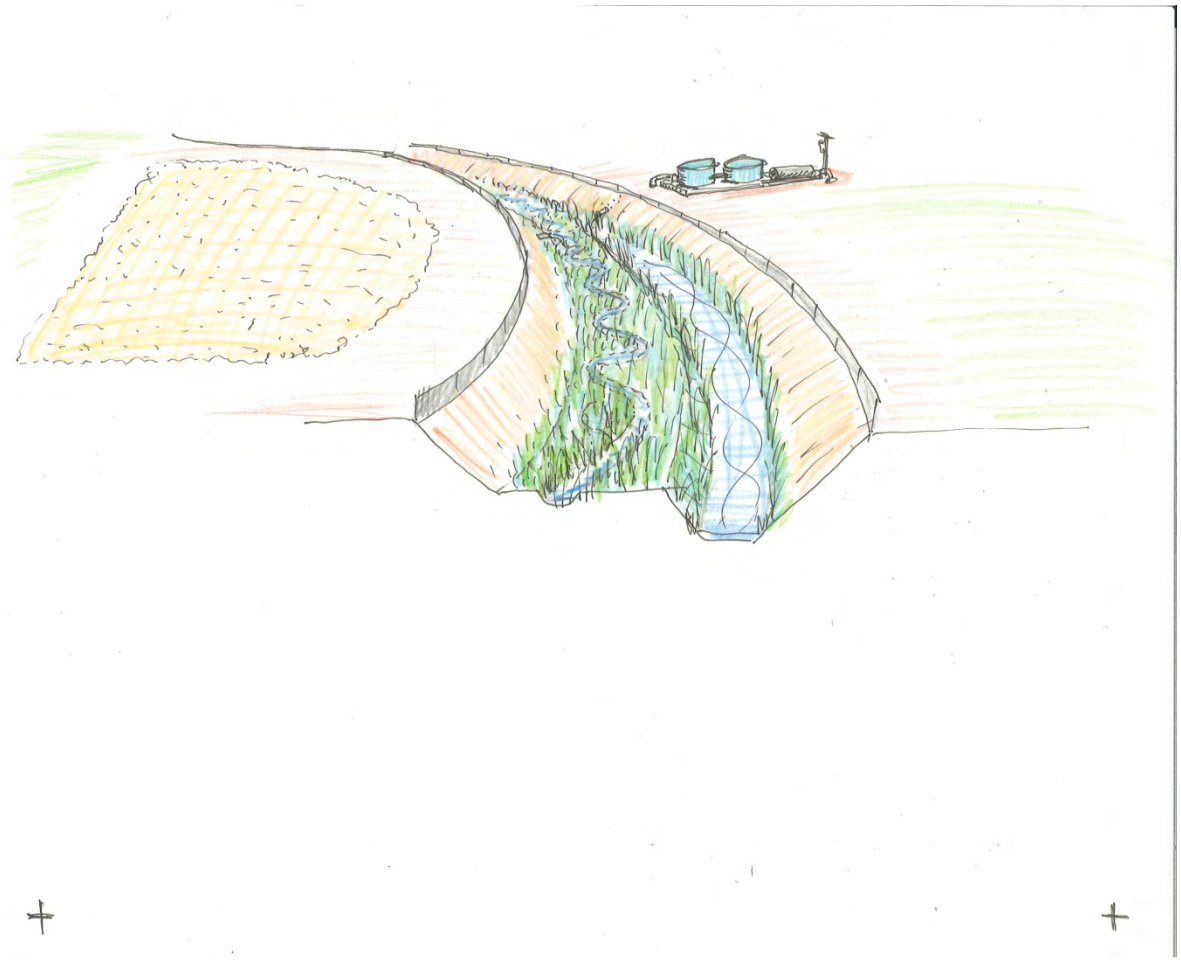


Figure 26: Illustration of an alternative ditch cross section showing several water quality treatment practices (from left to right): 1) woodchip denitrification bioreactor on edge of field outside ditch treating water before it drains into channel; 2) water quality treatment wetland on a perched "bench" through which drain waters flow before dropping into the active channel below (with food safety fence on either side of channel); 3) new intensive water treatment technologies (in tanks, for example) still in development. No single technique alone is assumed to be able to improve runoff water quality, nor is any one technique considered applicable to every situation. A future, healthy landscape is assumed to feature a variety of combinations of water quality management practices reflective of the diversity of soils, crops, hydrology, water systems and land managers.

5. Pedestrian and bike-friendly paths connecting Salinas to regional path systems will be developed along paths or nodes of least resistance.

While inclusion of a trail into the Rec Ditch cross-section was not considered a conveyance liability, it was unanimously rejected by farmers as a hazard for food safety, vandalism and general liability. Some indicated that it could only be a consideration if fencing was installed and compensation was available for the land lost to additional buffers and associated production constraints. Most of those interviewed thought there might be less controversial or challenging routes for trails between Salinas and Castroville, such as along existing right of ways, similar to the trail between Castroville and Molera Road or through easements across less productive farmland.

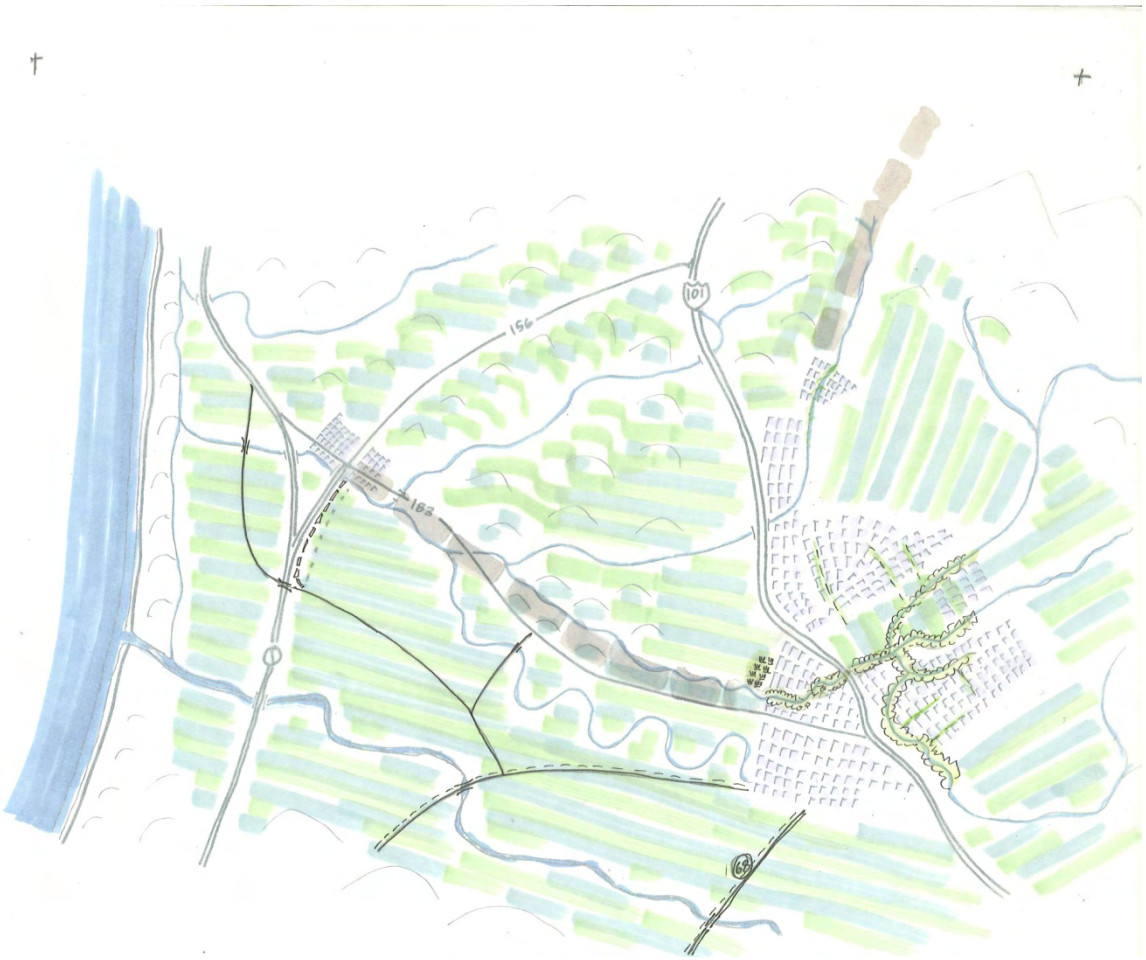


Figure 27: A tracepaper overlay of desired (fat grey dashed lines) and existing pathways in the watershed along with potential greenways in the city of Salinas as traced over Figure 8.

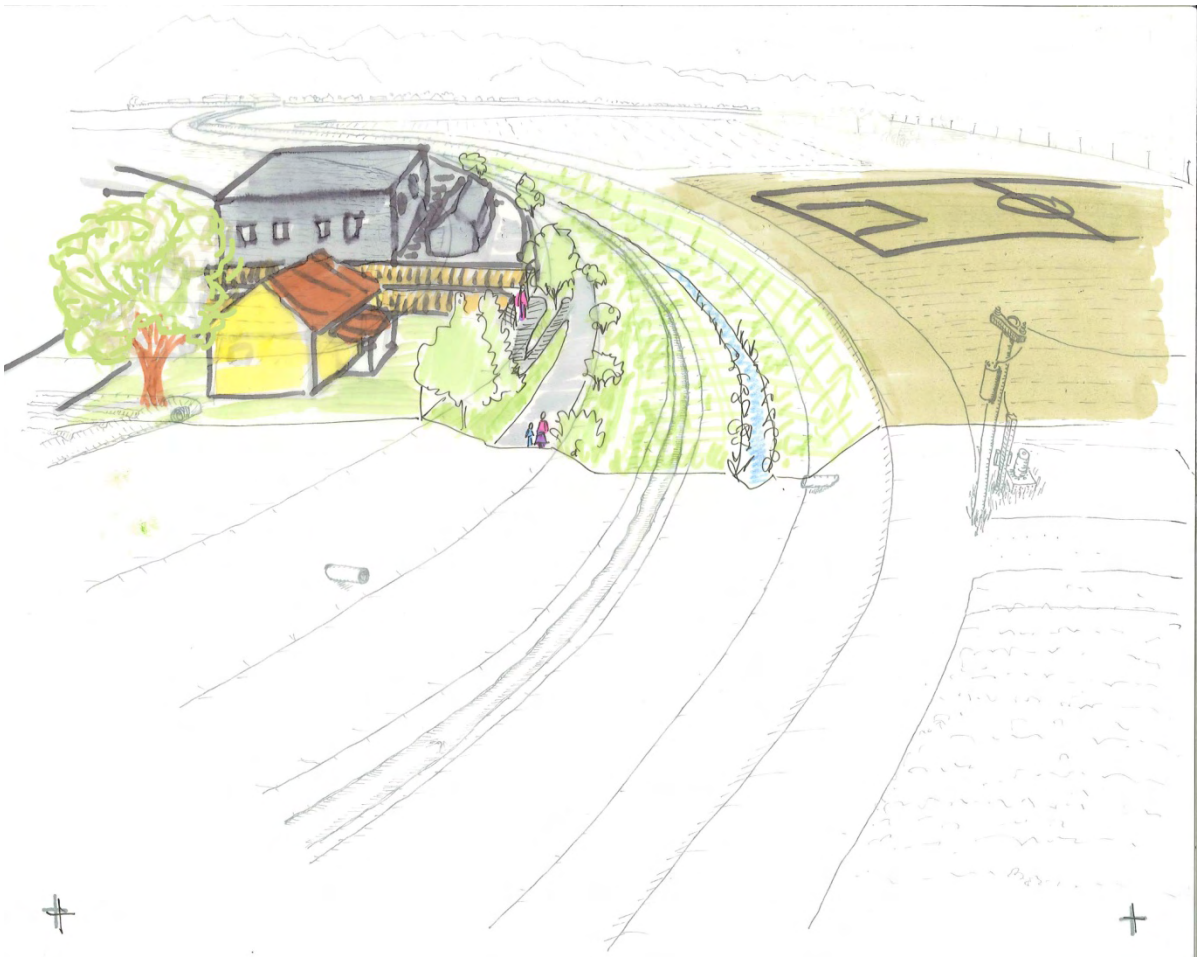


Figure 28: Conceptual image of a "parkway" trail incorporated into the right-of-way of a waterway on the edge of a park in Salinas, as overlaid upon the ditch schematic in Figure 4.

Figure 29: Existing path between Hwy 156 and farmland running from Castroville to Molera Road.

Watershed Objectives Defined at January 2013 Workshop

- Minimize Maintenance Costs
- Children in the Environment
- Sustainable Safe Ag
- Community connection to their creeks and rivers
- Healthy Families and Communities
- Clean Safe Water
- Flood Protection
- Manageable landscapes
- Safe Food Supply
- Environmental Stewardship
- Functioning drainage systems
- Buffers and Water purifying habitat
- Stormwater Management
- Recreation and Open space
- Productive Farming
- Wetland Resource Restoration and Conservation
- Education and Research
- Water Quality projects (BMPs)

Project Hurdles

- Additional Operations and Maintenance costs
- Land Owner agreements/ acquisition
- Construction Costs
- Land use changes
- Food Safety guidelines
- Lighting
- Fencing
- Public Safety
- Trespassing
- Flood protection
- Threatened and Endangered Species
- Protected habitats
- Coastal Protection
- Water Quality Regulations

HOW TO USE THE NITRATE QUICK TEST

Standard Operating Procedures prepared for the Grower-Shipper Association of Central California by Stefanie Kortman with the assistance of Marc Los Huertos
Spanish Translation by Gabriela Alberola

Table of Contents

Purpose of On-farm Nitrate Testing

In-field nitrate quick tests (NQTs) can be a cost effective tool to determine residual soil nitrate-nitrogen concentration and make fertilizer management decisions to match crop demand. Performing the NQT method requires no formal training, but does require the proper equipment and careful attention to follow the method. When done correctly, the test can provide a reasonably accurate estimate of residual soil nitrate-nitrogen, which can be used to improve fertilizer management decisions to meet crop needs.

DISCLAIMER

This is provided as a guide. As a compilation of existing research and resources, the GSA and its consultants can provide no guarantees regarding the performance of the test or the crops that the tool is being used to manage.

Overview of Method

The method for using in-field NQTs involves five main steps, and generally requires 30-60 minutes to complete:

1) Prepare a simple solution to extract nitrate from the soil.
2) Sample the soil in a field.
3) Add soil to the extracting solution.
4) Dip a test strip in solution and read the result.
5) Interpret the result for nitrate-nitrogen according to soil type and moisture.

Recommended Frequency of Performing Nitrate Quick Tests

The University of California Cooperative Extension (UCCE) has determined that testing for nitrate during early growing season and prior to the first in-season N application may provide potential to reduce fertilization rates and increase N efficiency. On the other hand, for maximum N efficiency NQT sampling can occur as often as necessary to reduce unnecessary fertilization. Table 1 provides a summary of the recommended frequency of NQT sampling according to experience with on-farm nitrate testing.

Table 1. General recommendations from the UC Cooperative Extension for when to perform NQT sampling based on experience with on-farm sampling and testing.

Experience with NQT Sampling	Frequency of NQT Sampling
Beginner	Early growing season prior to first in-season fertilization.
Experienced	At minimum- early growing season prior to first in-season fertilization. Additionally, as often as necessary[1,2] or resources permit.

[1]Longer-season crops may require up to 3 samplings to inform fertilization decisions.
[2]Lettuce growers will benefit from the early season sampling prior to first in-season fertilization in addition to a second test 2-3 weeks later.

Materials[1]

Supply	Retailer
Distilled Water	Orchard Supply
Calcium chloride (aquarium grade OK)	Pet stores or Amazon
Volumetrically marked centrifuge tubes	Cole Parmer
Soil sampling probe	Amazon
Bucket	Home Depot
Nitrate quick test strips[2]	Hach, Ben Meadows, Cole Parmer

[1]For more information on materials, please refer to the Cost Analysis of Nitrate Quick Test Program
[2]Retailer information corresponds to Hach, LaMotte, and Merckoquant test strips, respectively.

Soil Sampling Procedure

The goal for soil sampling is to collect many representative samples from the crop field or area in which nitrate assessment is needed, consolidate the soil samples, and combine subsamples of the soil with the extracting solution to determine nitrate and/or nitrate-nitrogen (crop-available nitrogen) concentration in soil. **If soil samples do not cover a representative area of the field, NQT results may be unreliable.**

Step 1: Using a soil probe and bucket, collect soil from throughout a crop field or area of interest, sampling soil in an "X" or "N" shape pattern that covers the sides of a field and through the middle. Field-scale results from the NQT will be more accurate the more random the sampling, and the greater the area from which samples are taken. Use Table 2 to determine how many soil samples to collect.

Table 2. Collect soil samples according to observed degree of spatial variability in your crop area/field.

Degree of spatial variability	# Soil Cores to Collect
Low variability	8-12
High variability*	15-20

**High spatial variability includes differences in soil type and/or texture (e.g. sandy, rocky, clay sections of a block); unevenness in plant establishment, irrigation and/or fertilization uniformity; uneven pest pressure; differences in drainage, slope, and/or crop residue present in the soil. If any of these factors of variability are present, or there is concern for nitrate-nitrogen differences, consider dividing the field into separate sections for soil sampling, or at the very least collect the recommended number of soil cores for high variability.*

If you do not know the soil type on your farm, you can use this link to navigate to the NRCS Web Soil Survey where you can easily input your region or even specific address to find the soil type(s) on your farm. Additionally, you can obtain a printed soil survey from the NRCS, USDA office, or local conservation office, or access a Web version. There is also a free smartphone app called SoilWeb, maintained by the Soil Resource Laboratory at UC Davis, and will provide the soil type for the ground over which you stand while using the app.

Step 2: Insert the soil probe at an angle starting at the seedline and toward the fertilizer band or drip tape (Figures 1, 2, 3). The degree of the angle will depend on where in the bed the seedline and fertilizer band or drip tape are. Collect soil at a depth according to root zone depth, as described in Table 3. A soil probe may be difficult to use in heavy clay soil;

an alternative to the soil probe is a sampling trowel that can be used to obtain soil samples to the recommended depth.

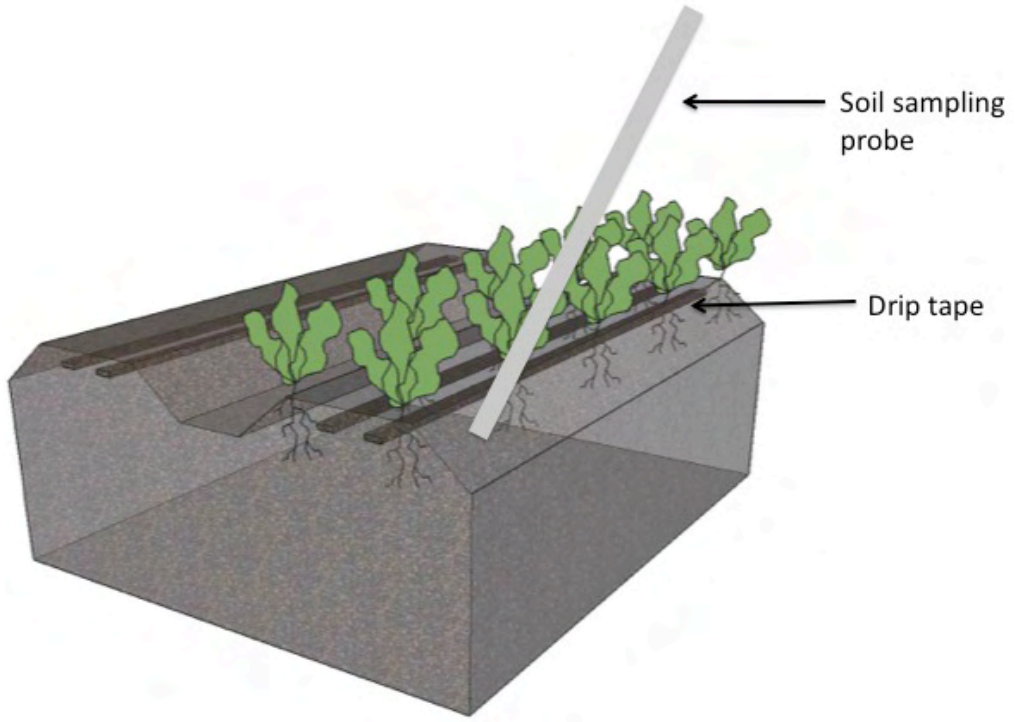


Figure 1. Example of proper soil probe placement in a bed with two lines of subsurface drip tape, where soil probe is inserted at an angle starting at the seedline and extending into the bed below the drip tape. Soil probe insertion depth depends on if plant is shallow vs. deeper rooted; 12-inch depth for deeper rooted, 6-inch for shallow. Sampling should not be restricted to one side of the bed, but should alternate either side throughout the field. Soil sampling technique would be the same with surface drip tape, or with a trowel in place of a soil probe.

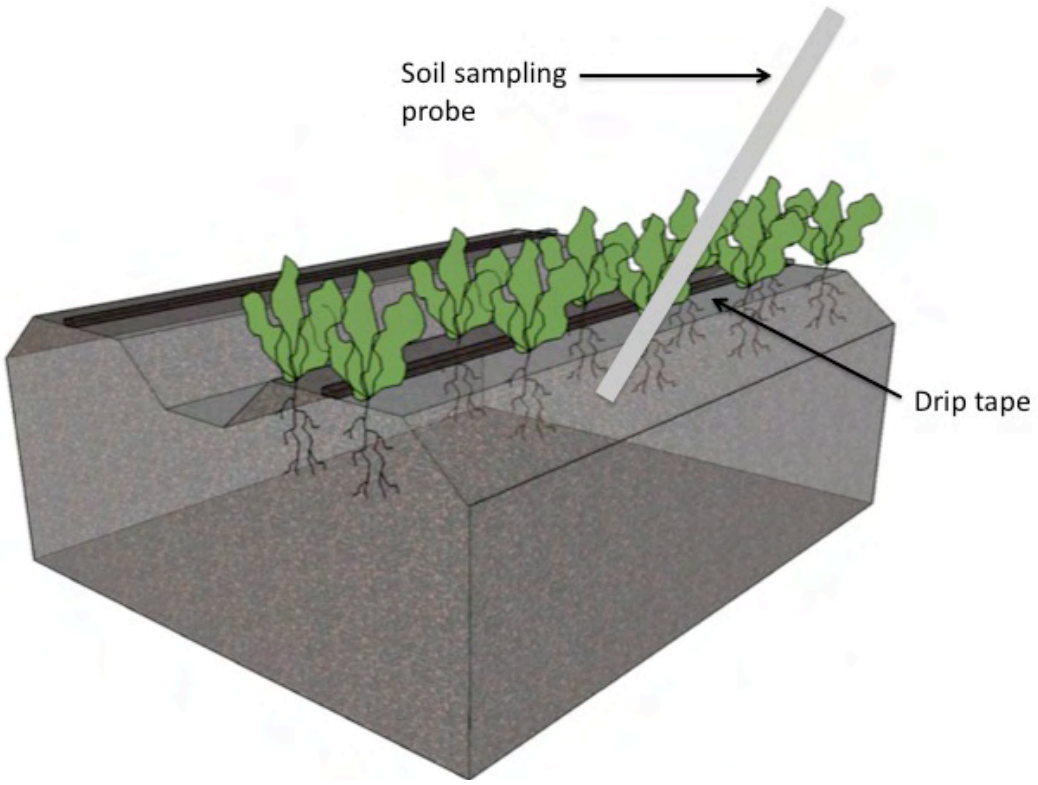


Figure 2. Example of proper soil probe placement in a bed with one line of surface drip tape, where soil probe is inserted at an angle starting at the seedline and extending into the bed below the drip tape. Soil probe insertion depth depends on if plant is shallow vs. deeper rooted; 12-inch depth for deeper rooted, 6-inch for shallow. Sampling should not be restricted to one side of the bed, but should alternate either side throughout the field. Soil sampling technique would be the same with sub-surface drip tape, or with a trowel in place of a soil probe.

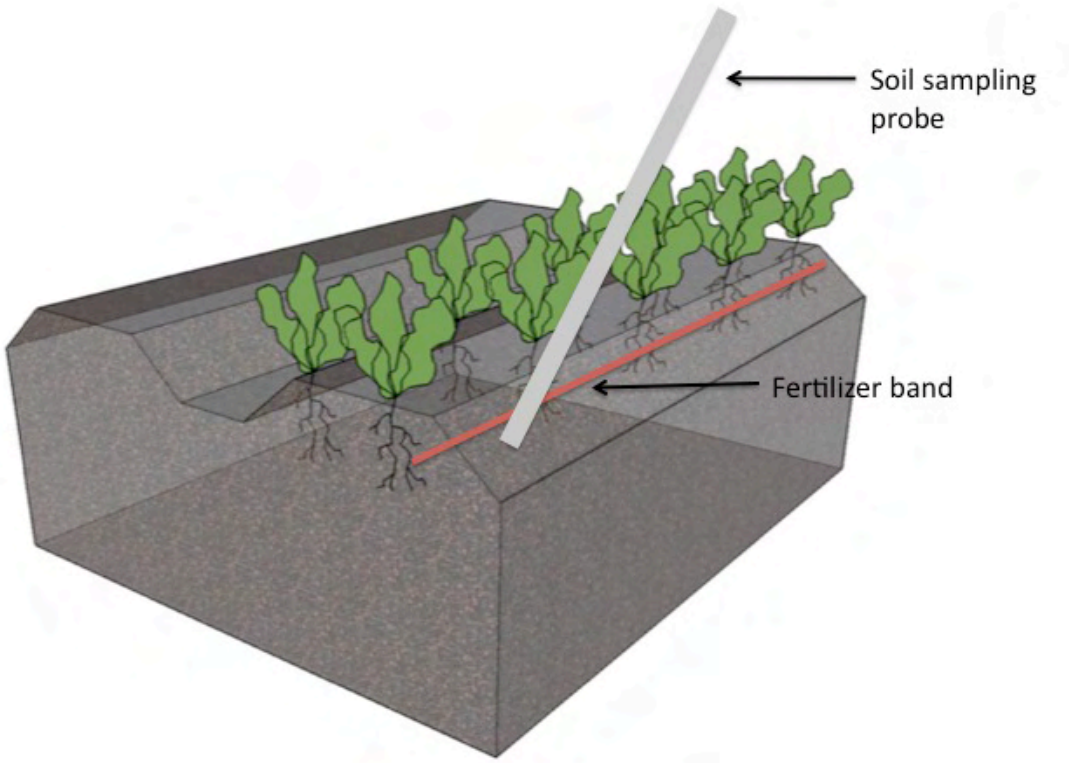


Figure 3. Example of proper soil probe placement in a sprinkler-irrigated system, where soil probe is inserted at an angle starting at the seedline and extending into the bed below the fertilizer band (but NOT immediately after fertilization). Sampling should not be restricted to one side of the bed or fertilizer band, but should alternate either side throughout the field. Soil probe insertion depth depends on if plant is shallow vs. deeper rooted; 12-inch depth for deeper rooted, 6-inch for shallow, or with a trowel in place of a soil probe.

Table 3. Depth at which to collect soil sample according to crop type

General Root Depth	Depth of Soil Sample
Non-shallow rooted crops	12 inches
Shallow-rooted crops (beans, baby lettuce, beets, grains, spinach)	6 inches

Avoid sampling from zones where fertilizer was recently applied, and where soil is too dry for root activity.

Step 3: Accumulate soil cores in a bucket. *For all soil cores, the top 2 inches of soil should be removed from the core before consolidating*, as the soil from this zone may contain high nitrate, but is unavailable for plants to access if soil is dry. When sampling is complete, homogenize soil cores by thoroughly mixing and breaking up clods. Remove any large plant material and/or rocks.

If soil is too difficult to homogenize, such as with heavy clay or gummy wet loam soils, use the "pinch" method:

1) Lay out soil cores, remove top 2 inches of each core, and pinch off small amounts from up and down the cores.

2) Mix the pinches together to equal the amount needed to add to the extracting solution (as described in "Nitrate Testing" section below).

Nitrate Testing Procedure

Step 1: Make the extracting solution by adding roughly 6 grams (about 1 teaspoon) of the calcium chloride to one gallon of distilled water, and mix thoroughly until dissolved. One gallon of distilled water and 5.6 grams of calcium chloride will be sufficient for approximately 125 tests.

Step 2: Fill volumetric container to 30 mL mark with the solution.

The above two steps can be done in advance, where the extracting solution is stored in a fridge or at room temperature for several months.

Step 3: Add soil to the container until the solution level is at the 40 mL mark. Cap container tightly and shake vigorously until all soil is broken up and dispersed in solution.

Step 4: Allow sample to sit and soil particles to settle out. This may take a few minutes or up to an hour depending on the soil type; clay soils take longer.

Soil **should not** sit in solution for more than an hour, as soil microbes continue to transform nitrogen into the nitrate form even in solution. If soil sits in solution too long, the

nitrate quick test results may reflect a final nitrate concentration that is more than what is actually present in the field, and results may not be representative of the soil you sampled.

Step 5: Dip the nitrate test strip into the clear solution near the top of the container, remove after one second and shake off excess solution on the strip. Wait 60 seconds, then compare the color on the test strip to the standard color chart provided by the test strip manufacturer. It is very important this comparison be done in good light, with a test strip that is NOT expired (expiration date is on test strip container), and IMMEDIATELY after 60 seconds from the time the test strip was dipped in solution, as the test strips may continue to develop color with time. If the color on the test strip is between 2 of the standard color chips, estimate the value of NO3/NO3-N based on the intensity of color on the test strip. For more accurate results, run duplicate samples for each field/soil type.

Interpreting the Results of Nitrate Quick Test Strips

Nitrate test strips may be calibrated in different units; the LaMotte Instatest and Hach Aquacheck test strips show results in equivalents of parts per million (ppm) nitrate-nitrogen (NO3-N); the Merckoquant test strips show results in ppm of nitrate (NO3). The following calculations in Steps 1-2 apply to the test strips that show results in ppm of nitrate (NO3). You must perform basic calculations to determine what the test strip result means for your soil/crop/field.

For more detailed information from the UCCE on what NQT result may mean for your crop and soil in terms of the rate of crop N uptake and how to time fertilizer application accordingly, please refer to the document in Appendix A. Additionally, the Nitrate Groundwater Pollution Hazard Index can provide information to farmers interested in voluntary management practices that reduce nitrogen contamination potential in groundwater.

Determine the Correction Factor

Step 1. **Skip this step if the test strip provides results in ppm nitrate-nitrogen (NO3-N), such as with LaMotte Instatest and Hach Aquacheck test strips.*

If the test strips are calibrated in parts per million (ppm) of nitrate (NO3), you will need to convert the strip reading to ppm nitrate-nitrogen (NO3-N) on a dry soil basis to determine the amount of nitrogen available to the crop. First, find the correction factor for your soil type using the chart below, and considering if your soil was wet or dry when you sampled. Dry soil will appear lighter in color, will break up more easily, and may be powdery. Moist soil will be darker in color and should hold together well.

Table 4. Correction factors for converting results from NQT to ppm nitrate-nitrogen. Use the correction factor based on soil condition at time of sample (moist or dry) and soil texture. Take an average of correction factors for multiple soil texture types if your soil includes those.

	Correction Factor	
Soil Texture	**Moist Soil**	**Dry Soil**
Sand	2.3	2.6
Loam	2	2.4
Clay	1.7	2.2

Example 1: The soil you sampled from is classified as Chualar loam, and the soil was moist when you collected the sample, thus the correction factor would be 2.

2 (for moist loam) = 2 correction factor

Example 2: If your soil is classified as more than one texture type, calculate the average of the correction factors for each texture. To do this, add the correction factors for each soil texture present in your soil and divide by the number of soil types.

Your soil is moist Gorgonio **sandy loam**, so your correction factor can be found by:

2.3 (for moist sandy) + 2 (for moist loam)= 4.3

4.3 ÷ 2 (for 2 soil texture types) = 2.15 correction factor

Determine the concentration (ppm) of nitrate-nitrogen (NO3-N) on a dry soil basis

Step 2. **Skip this step if the test strip provides results in ppm nitrate-nitrogen (NO3-N), such as with LaMotte Instatest and Hach Aquacheck test strips.* Convert the strip reading to ppm nitrate-nitrogen (NO3-N) on a dry soil basis by dividing by the correction factor. Test strip reading (ppm NO3) ÷ correction factor = ppm NO3-N in dry soil

Example 1. Using the soil from Step 1 Example 1 (Chualar loam, correction factor=2), and a nitrate quick test trip reading of 15 ppm NO3, the calculation would be:

15 ÷ 2 = 7.5 ppm NO3-N in dry soil

Convert test strip result from ppm NO3-N in dry soil to pounds of available nitrogen per acre available to the crop

Step 3. [Optional] Determine the pounds of available nitrogen per acre in your sample. To do this, use the result from Step 2 (7.5 ppm NO3-N) to convert Nitrate-N in the soil to pounds of available nitrogen per acre in a 12" sample by multiplying the result from Step 2 by a correction factor of 4.

ppm NO3-N in dry soil × 4 = pounds of nitrogen per acre available to the crop

7.5 × 4 = 30 pounds of nitrogen per acre available to the crop

If you collected soil sampled to a 6-inch depth, multiply by a correction factor of 2 instead of 4.

7.5 × 2 = 15 pounds of nitrogen per acre available to the crop

Sample Scenarios

Scenario 1: Moist soil is collected at a 12" depth from a crop field. You know your soil is silty clay loam, and assume equal parts clay and loam. You used nitrate test strips calibrated in parts per million (ppm) of nitrate (NO3), and the result on the test trip was 35 ppm NO3.

Step 1.
Determine the correction factor for your soil.

2 (for moist loam) + 1.7 (for moist clay)= 3.7

3.7 ÷ 2 (for 2 soil texture types) = 1.85 correction factor

Step 2.
Convert the strip reading of 35 ppm NO3 to ppm Nitrate-N (NO3-N) on a dry soil basis by dividing the strip result by the soil correction factor.

35 ÷ 1.85 = 19 ppm NO3-N in dry soil

Step 3.
Determine the pounds of available nitrogen per acre in your sample by multiplying the result from Step 2 by 4 (for 12" soil sampling depth).

19 × 4 = 76 pounds of nitrogen per acre available to the crop

Scenario 2: You used the Web Soil Survey to determine the soil type on your field. The result, as seen in Figure 2 below, is that your crop block includes two different soil types, Clear Lake clay and Pico fine sandy loam, distributed unevenly throughout the field. For the most accurate NQT results possible, at a minimum the field should be sampled in 2 parts, thus you collect 15-20 random soil samples across the two sections of Pico fine sandy loam, and another 15-20 random soil samples throughout the Clear Lake clay section.* You assume 40% of the field is Pico fine sandy loam, and 60% is Clear Lake clay. Dry soil is collected at a 6" depth. You used nitrate test strips calibrated in parts per million (ppm) of nitrate (NO3) (Merckoquant test strips) and the result on the test trip was 15 ppm NO3.

**It is also important to use your own knowledge of your farm system to determine sampling needs. Consider how NQT soil sampling could be achieved to account for differences in management and/or in the soil environment that may influence the presence or absence of nitrogen available to the crops. An additional consideration is to redesign a block of field for planting based on one, or similar, soil type.*

Map Unit Legend

Monterey County, California (CA053)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cg	Clear Lake clay, moderately wet	5.2	60.3%
Pf	Pico fine sandy loam	3.4	39.7%
Totals for Area of Interest		**8.6**	**100.0%**

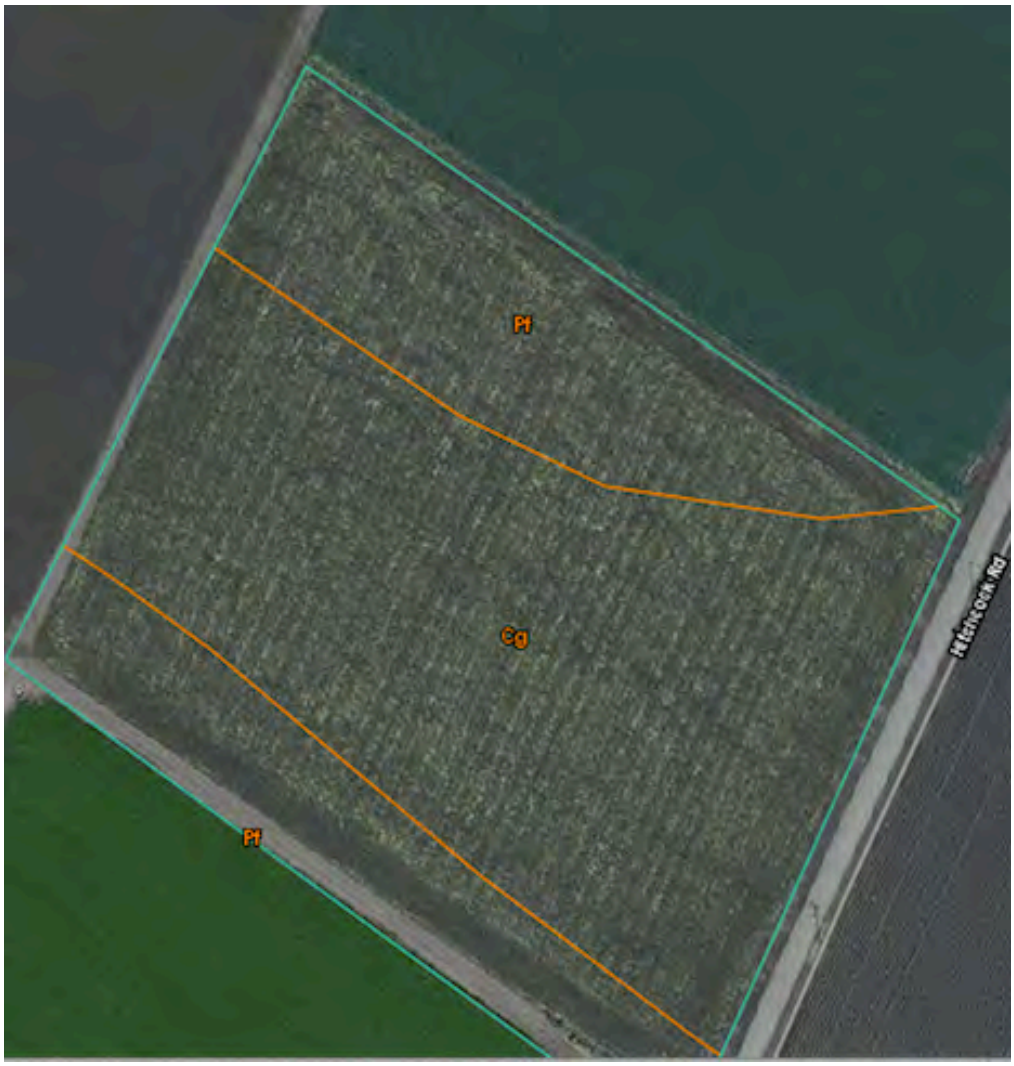


Figure 4. Example of output (cropped for better viewing) from the Web Soil Survey, including a table and a map of the soil types in a user-defined area.

Step 1.

Determine the correction factor for your soil based on dry soil constituents and estimated percent cover.

Pico fine sandy loam (estimated 30% cover in field):

2.6 (for dry sand) + 2.4 (for dry loam) = 5

5 x 0.4 (for 40% cover) = 2

Clear Lake clay (estimated 60% cover in field):

2.2 (for dry clay)

2.2 x 0.6 (for 60% cover) = 1.3

Add correction factors for different soil types together to get the total correction factor:

2 (correction factor for Pico fine sandy loam) +

1.3 (correction factor for Clear Lake clay) = 3.3 total correction factor

Step 2.

Convert the strip reading of 15 ppm NO3 to ppm Nitrate-N (NO3-N) on a dry soil basis by dividing the strip result by the soil correction factor.

15 ÷ 3.3 = 4.5 ppm NO3-N in dry soil

Step 3.

Determine the pounds of available nitrogen per acre in your sample by multiplying the result from Step 2 by 2 (for 6" soil sampling depth).

4.5 × 2 = 9 pounds of nitrogen per acre available to the crop

References

- Details on the Nitrate Quick Test - Salinas Valley Agriculture. Richard Smith, ANR Blogs. Click here for link to blog.
- Soil Nitrate-Nitrogen Quick Test. Agriculture Water Quality Alliance. Click here for link to PDF.
- Accuracy of test strips for assessing nitrate concentration in soil and water. Michael Cahn, Thomas Lockhart, Laura Murphy, UC Cooperative Extension. Click here for link to PDF.

This document is a synthesis of the works cited above, and respectful credit is given to these authors and organizations for their contributions to establishing NQT protocols and interpreting results.

Appendix A

Cost Analysis of Nitrate Quick Test Program: What are the True Costs to Growers? Click here for link to PDF in English or Spanish.

Appendix B

In-season soil nitrate testing explained. Tim Hartz, UC Davis, and Richard Smith, Monterey County UCCE. Click here for link to PDF in English or Spanish.

Nitrate Quick Test SOP Appendix A:
Cost Analysis of Nitrate Quick Test Program:
What are the True Costs to Growers?

Prepared for the Grower-Shipper Association of Central California by Jaclyn Wiley with the assistance of Kay Mercer and Joel Wiley
Spanish Translation by Gabriela Alberola

The goal of this study is to determine the cost of implementing a nitrate quick test (NQT) program for a growing operation. Given the number of variables involved in an NQT program, it is important that growers evaluate their goals for this program and determine their needs. The following study will give growers the tools needed to evaluate and establish a cost effective nitrate quick test program.

Nitrate Quick Test Strips:

Although the University of California Cooperative Extension identified three brands of nitrate quick tests to adequately estimate soil nitrate levels, research for this cost analysis found that most industry professionals rely on the EM Quant Nitrate Test Strips (Merckoquant NO_3/NO_2). This test strip allows growers to evaluate nitrate levels on a real time basis at a smaller concentration than the other brands and does not require any additional calculations to determine the nitrate (NO_3) concentration in soil or water. It is important to note that these test strips may not be effective for soils with lower nitrate levels as they are unable to measure nitrate levels lower than 10ppm. Additionally, the Merckoquant test strips DO require additional calculations if concentration of nitrate-nitrogen (NO_3-N) is desired, which is the case for growers who are using NQT to determine residual soil nitrate-nitrogen concentration and make fertilizer management decisions to match crop demand.

All prices listed in this report are considered retail prices. Growers will need to contact vendors directly for bulk pricing as discount varies based on quantity and vendor.

Nitrate Test Strip Pricing and Details

Brand	Measurement	Price	# of Strips	Price/Strip	Retailer
Merckoquant NO_3/NO_2[2]	NO3 (10-500ppm)	$68.00	100	$0.68	Cole Parmer
LaMotte Instatest NO_3/NO_2[1]	NO3-N (0-50ppm)	$11.70	50	$0.23	Ben Meadows
Hach Aquachek[1]	NO3-N (0-50ppm)	$19.95	25	$0.80	Hach Company

[1]LaMotte and Hach test strips measure NO_3-N (i.e. crop-available nitrogen); some calculations will be necessary to determine NO_3 concentration.

[2]The Merckoquant test strips measure NO_3 concentration; some calculations will be required to determine soil NO_3-N concentration (i.e. crop-available nitrogen). These test strips will also require the added cost of refrigeration, either in an office or vehicle refrigeration unit.

Nitrate Test Strip Cost Evaluation

Brand	Price for 100 strips	Price for 500 strips	Price for 5,000 strips
Merckoquant NO_3/NO_2	$68.00	$340.00	$3,400.00
LaMotte Instatest NO_3/NO_2	$23.40	$117.00	$1,170.00
Hach Aquachek	$79.80	$399.00	$3,990.00

Required Nitrate Quick Test Supplies:

When determining the test supplies appropriate for an operation, a series of questions need to be answered. If testing will be done in the field, a vehicle refrigerator will be needed to refrigerate Merckoquant test strips. A grower will have to decide between round or flat bottom centrifuge tubes and the quantity of tubes. You can safely estimate that each centrifuge tube has a lifetime of 100 samples. Round bottom centrifuge tubes cost less than flat bottom but will require a tube rack, while flat bottom tubes could be free standing eliminating the need for a tube rack.

Additionally, acquiring laboratory grade calcium chloride may pose a challenge for some growers as it can be considered a hazardous material. Aquarium calcium chloride, which can be purchased at most pet stores, has the necessary properties to create a soil suspension without adding the complex ordering requirements of laboratory grade chemicals.

In the three charts below, the required supplies are broken down as supplies purchased one-time, supplies to be replaced after 100 uses and supplies that are completely disposable.

Nitrate Quick Test Supplies to be Purchased Once

	Supply	Price	Quantity	Retailer
1	Centrifuge Tube Rack (Holds 16 tubes)[1]	$31.33-$42.70	1	Cole Parmer, Amazon
2	Scale	$59.95-$150.00	1	Amazon
3	Truck Refrigerator[2]	$105.95-$200.00	1	Amazon
4	Long Handled Sampling Trowel[3]	$23.00-$25.00	1	Amazon
5	Soil Probe[3]	$29.95-$60.00	1	Amazon
6	Bucket	$2.78	1	Home Depot

[1] A centrifuge tube rack is only required if a grower is using a round bottom centrifuge tube but may also be helpful when organizing tubes even when using flat bottom centrifuge tubes.

[2] The truck refrigerator is only required for the Merckoquant test strips.

[3] A grower should decide whether to use a sampling trowel or soil probe. Although soil probes are able to take a deeper sample, they may be difficult to use in heavy clay soils. Soil probes may also cause compaction within the sample.

Nitrate Quick Test Supplies to be replaced after Approximately 100 Uses

	Supply	Price	Quantity/pack	Retailer
7	Centrifuge Tubes (round bottom)[1]	$164.00	500	Cole Parmer
8	Centrifuge Tubes (flat bottom)[1]	$201.00	500	Cole Parmer

*A grower should select one type of centrifuge tube and one type of calcium chloride.

* Please note that sites such as Amazon.com carry centrifuge tubes in smaller quantity making it a lower cost.

*Although centrifuge tubes are reusable items, we can estimate that one tube can be used for approximately 100 samples before needing to be replaced.

[1] A centrifuge tube rack is needed when using round bottom centrifuge tubes but may also be helpful when organizing samples even when using flat bottom tubes.

Nitrate Quick Test Supplies that are Disposable

	Supply	Price	Quantity/pack	Retailer
9	Paper Bags (lunch bag size)[1]	$10.99-$12.99	500	Amazon.com
10	Calcium Chloride (Laboratory grade)[2,3]	$55.00-$57.00	500 grams	Cole Parmer
11	Calcium Chloride (aquarium grade)[2,3]	$8.99-$16.99	800 grams	Amazon.com
12	Distilled Water[3]	$1.89	1 gallon	Orchard Supply

[1] One paper bag will be used per soil sample.

[2] Laboratory grade calcium chloride is not necessary for this use and may require additional paperwork with a vendor as it is considered a hazardous material. Aquarium grade calcium chloride is just as effective and can be purchased from any aquarium store.

[3] One gallon of distilled water and 5.6 grams of calcium chloride will be sufficient for approximately 125 samples.

Supply Cost Estimates

The charts included below outline the estimated cost of supplies to maintain a nitrate quick test program. The range of costs is based on the high and low retail prices included in the charts above. To calculate the numbers below we used item numbers 1, 2, 3, 4, 6, 7, 9, 11, and 12 from the charts above as well as the Merckoquant test strips as they are the most widely used by both researchers and practitioners in the industry.

A few things to remember…

-When considering the cost of these supplies, it is important to remember that the upfront cost for the one-time purchase supplies will be the same no matter how many tests a grower plans run. However, the more tests a grower runs, the more these items depreciate and their overall cost per sample goes down.

-We can estimate that each centrifuge tube will last for approximately 100 tests before needing to be replaced. Taking this into consideration, a bag of 500 centrifuge tubes will last for 5,000 samples. After 5,000 samples a grower should consider replacing centrifuge tubes.

-One gallon of distilled water and 5.6 grams of calcium chloride will be sufficient for approximately 125 tests. If a grower purchases 500 grams of calcium chloride, and it is stored correctly, they would have enough calcium chloride to complete over 11,000 samples.

Supply Cost Estimate if a Grower Plans to Complete 100 Samples

Supplies for 100 Samples	Price per Sample	Price per 100 Samples
One Time Purchase supplies	$2.30-$3.61	$229.96-$361.43
100 Use supplies	$1.64	$164.00
Disposable supplies	$0.90-$1.00	$89.87-$99.87
Total	**$4.84-$6.25**	**$483.83-$625.30**

Supply Cost Estimate if a Grower Plans to Complete 500 Samples

All Supplies for 500 Samples	Price per Sample	Price per 500 Samples
One Time Purchase supplies	$0.46-$0.72	$229.96-$361.43
100 Use supplies	$0.33	$164.00
Disposable supplies	$0.74-$0.76	$367.54-$377.54
Total	**$1.53-$1.81**	**$761.50-$902.97**

Supply Cost Estimate if a Grower Plans to Complete 5,000 Samples

All Supplies for 5,000 Samples	Price per Sample	Price per 5,000 Samples
One Time Purchase supplies	$0.05-$0.07	$229.96-$361.43
100 Use supplies	$0.03	$164.00
Disposable supplies	$0.72-$0.73	$3,594.49-$3,622.49
Total	**$0.80-$0.83**	**$3,988.45-$4,147.92**

Other Associated Costs of Sampling

Labor Considerations:

There is no consensus or standard operating procedure on sampling methodology for nitrate quick tests. Different fields, blocks and operations may take samples differently depending on the end goal. Samplers may pull anywhere from 8-20 soil sub samples to create a composite sample for testing a block. Others may take three separate samples at different points and test each one to determine whether nitrate content is consistent throughout the block. It is important to note that the more samples taken, the less variability you need to be concerned with, and the more accurate and informative the results from the NQT. Other contributing factors to take into consideration:

- Testing time may vary depending on soil type and absorption rate. A reasonable expectation of time per sample will range from 30 minutes to one hour, but may be longer for fields with more than one soil type, clayey soil that is difficult to sample and requires more time to settle in solution, high spatial variability is soil inputs and/or crop/soil environment, or crop blocks that cover greater area.
- Travel time will vary greatly depending on proximity of ranches, samplers with other tasks, and whether the sampler was already on the ranch for another task.

Estimated Labor Costs

Labor Type	Cost/hour
Grower	$125.00
Consultant	$70.00-$100.00
Sampler/other staff	$18.75-$25.00

*Staff wage estimated at $15.00 - $20.00 per hour with a 25% estimate for benefits. The cost of benefits will vary based on the packages offered by the operation.

Transportation Considerations:

The costs of transportation will vary with each operation. If a vehicle has to be purchased to complete these samples, it will obviously cause a substantial increase in the cost of a sample. Each operation will have to evaluate their transportation cost as it is heavily dependent on the number of samples and the distance between ranches or blocks.

Estimated Transportation Costs

Transportation	Additional Cost (estimate)
Operation has vehicle available	Current cost to grower
Operation purchases new truck (4x4)[1]	$27,000-35,000
Operation purchases gently used[2]	$18,000-25,000
Operation reimburses employee[3]	$0.56/mile

[1] New vehicle cost based on Ford F-150 STX 4x4 model

[2] Used vehicle price based on Kelley Blue Book estimate for F-150 STX 4x4 model with approximately 30,000 miles

[3] Reimburse price based on IRS standard mileage rate for 2014

Space Considerations:

Cost for space for completing nitrate quick tests will also vary by operation. A grower who decides to complete samples in the field or truck will not need to have the office or lab space to complete testing. If a grower decides to complete tests in an office or lab space, we estimate that they will need a 6'x3' space for 25 samples. Agricultural office space in the Salinas area rents for approximately $1.00-$1.30 sq ft.

Space	Estimated Cost/sqft for ag office space	Additional sqft needed for 25 samples	price for space for 25 sample	100	500	5000
Testing completed in Field or Space Already Available	$0.00	0	0	0	0	0
Testing completed at Office	$1.15	18	$20.70	$82.80	$414.00	$4,140.00

*Office or lab space may not be required. Space required depends on operation preference.

*It is not likely that all samples will be processed at the same time leaving room for overlap on space requirements.

Alternatives:

- The grower can contact their fertilizer supplier or crop service company to inquire about testing. Prices vary.
- The grower can purchase testing supplies from Wilbur Ellis. Some custom sampling companies may also offer testing supplies.
- The grower could hire a third party sampling company to run nitrate quick tests. Food Safety Sampling offers these services. Prices vary based on number of samples.
- Some contractors and service companies also offer rapid result nitrate testing with in house test equipment. NH3 and Morgan Consulting offer this service. Prices vary.

It is important to note that a nitrate quick test program will not be cost effective if the test is not performed correctly. Please refer to 'How to Use the Nitrate Quick Test' for detailed information on effective sampling and processing procedures for NQT.

In-season soil nitrate testing explained

Tim Hartz, UC Davis and Richard Smith, Monterey County UCCE

The recent adoption of the new 'Ag Order' by the Central Coast Region Water Quality Control Board has increased interest in management practices that can help growers reduce nitrogen fertilization. In-season soil nitrate testing is one such practice; we have conducted dozens of field trials showing that testing soil for residual nitrate-nitrogen (NO_3-N) prior to sidedressing or fertigation can reliably identify fields in which N application can be reduced or postponed. UC has promoted a value of 20 parts per million (PPM) residual soil NO_3-N in the root zone of vegetable crops as the action threshold. Above that level no N fertilization is required *at that time*; below that threshold, some application may be appropriate. In our contacts with growers and consultants it is clear that there are a number of questions about how to safely and efficiently use in-season soil nitrate testing. Here are answers to some questions that we have been asked repeatedly.

1. Does the 20 PPM NO_3-N threshold work for all crops?

This threshold is broadly applicable across a range of common vegetable crops. That is because 20 PPM represents enough N to supply crop N uptake requirements for an extended period of time. If you take a sample of the top 12 inches of soil, that sample will represent approximately 4,000,000 lb of soil per acre; if that soil has a NO_3-N concentration of 20 PPM, then the soil contains about 80 lb NO_3-N per acre. Cool season vegetable crops have a characteristic N uptake pattern. During the first half of the growing season plants take up N slowly, typically no more than 1-2lb N/acre/day. Therefore, when a soil nitrate test is taken prior to first sidedressing, a 20 PPM NO_3-N value means that crop N uptake can be easily met for at least 2-3 weeks just from residual soil nitrate. From midseason until harvest, crop N uptake is much faster, 3-4 lb N/acre/day for lettuce and up to perhaps 5-6 lb N/acre/day for celery and brassica crops. A soil test taken at midseason would indicate that sufficient N is available for a couple of weeks.*The 20 PPM threshold does not apply to strawberries, which have a low N uptake rate, and can thrive with a lower level of available soil N. Also, spinach presents special challenges, which we will address in a subsequent article.*

2. Does a 20 PPM NO_3-N test result mean the same thing in all fields?

Two field characteristics should be considered when evaluating an in-season soil NO_3-N test result. First, what is the nitrogen supplying power of the soil? In general, soil with higher organic matter content, or in which a large amount of vegetable crop residue has recently been incorporated, will supply more nitrogen over time, thereby reducing the rate at which the current crop will deplete the residual soil NO_3-N. A soil with > 2% organic matter will mineralize more crop-available N than a soil with < 1%; a field in which the prior crop was spring mix will mineralize less N than a field in which the prior crop was broccoli (which leaves vastly more crop residue than spring mix). The other major factor is irrigation. A heavy textured soil being drip irrigated is likely to have much less leaching than a sandy soil being sprinkler irrigated.Where heavy leaching is experienced, the soil nitrate test would have to be repeated to ensure accuracy.

3. Do I need to maintain at least 20 PPM NO_3-N in soil throughout the growth cycle for crops to grow at a peak rate?

Absolutely not. The whole point of the test is to determine whether there is enough available soil N to carry the crop for an extended period of time. Vegetable crops can grow at peak rates until soil NO_3-N concentration is depleted to a much lower level. In evaluating the soil NO_3-N concentration at harvest in the many lettuce fertilization trials we have run, high yields were often achieved with N treatments in which soil NO_3-N ended up between 5-10 PPM at harvest. This is an important point, because if fields are managed to maintain at least 20 PPM NO_3-N right up to harvest, then a large amount of soil nitrate will be available to be leached by the germination water of the following crop, or by winter rainfall.

4. If my residual soil NO_3-N is below 20 PPM, does that mean I should apply my full N sidedress rate?

For maximum efficiency of fertilizer N recovery by the crop, it makes more sense to scale your application depending on the soil value. As previously explained, a foot of soil weights about 4,000,000 lb/acre, so each PPM NO_3-N on a soil test represents about 4 lb N/acre. In theory, you could tailor your N application rates exactly using this relationship. However, it is more realistic to use a system in which you apply a half rate if the soil test is between 10-20 PPM, and a full rate if the test is less than 10 PPM.

5. How do I collect a sample that is representative of the root zone?

This can be a complicated topic. When sampling is performed at an early growth stage, before a sidedress or fertigation has been done, sampling in the plant row will generally do a good job. However, once an N application has been made, the soil nitrate is not uniformly distributed throughout the bed, and your sampling technique must attempt to represent the overall condition. Because different growers use different configurations of knives on sidedress rigs, and have different combinations of bed width/number of plant rows/number of drip tapes, there is no sampling protocol that works for everyone. Obviously, zones of recent banded application need to be avoided and, in the case of drip irrigation, areas of the bed that remain too dry for root activity should be avoided as well.

6. How often should soil NO_3-N sampling be done?

From the standpoint of achieving maximum N efficiency, the answer is as often as necessary to ensure that unnecessary N fertilization is minimized. For lettuce, a system of soil sampling prior to the first sidedress or fertigation, and a second test 2-3 weeks later, would provide sufficient information with which to efficiently schedule N applications throughout the season. Longer season crops like celery or cauliflower may require up to 3 samplings to inform fertilization decisions. As a practical matter, soil sampling prior to the first in-season N application offers the greatest potential for reducing fertilization rates, and increasing N efficiency. While repeat samplings can be beneficial, the logistics of sampling multiple times per crop, and responding to those results, can be challenging. Particularly for growers who have no experience with in-season soil sampling, we recommend beginning with only an early season sample. Once that practice has been integrated into your management routine, in-season sampling can be expanded.

Advancing Business Models for Agricultural Stewardship of Monterey Bay Watersheds

Convening an Agricultural Industry Roundtable on Sustainability

Final Report
May 2014

Prepared by
Melanie Beretti, M.A. and Andrew Arnold, M.Sc.

SureHarvest

This report was prepared for the Water Resource Project Coordination subcommittee with funding from the Integrated Regional Watershed Management Program grant subcontract through the Monterey Bay Sanctuary Foundation.

Special thanks to the Monterey County Sustainability Working Group, Water Resource Project Coordination subcommittee, Central Coast Grower-Shipper Association and Western Growers for providing insight and support for this project!

2901 Park Avenue, Suite A2• Soquel, CA 95073• Phone: 831-477-7797
E-Mail: info@sureharvest.com Web: www.sureharvest.com

Table of Contents

Executive Summary

Working in consultation with the Water Resources Project Coordination subcommittee and members of the Monterey County Sustainability Working Group, Western Growers, and the Central Coast Grower-Shipper Association, SureHarvest convened and facilitated an agricultural industry roundtable discussion on sustainability initiatives on March 28, 2014 in Salinas, California. Twenty-two industry leaders, company executives, and CSR/sustainability directors on California's Central Coast and beyond participated in the roundtable.

In large and small group discussion, participants shared experience and knowledge about a number of locally relevant sustainability topics and initiatives. Locally relevant topics discussed included:

- Industry sustainability update and trends
- Self-assessment initiatives
- Performance-based initiatives
- Certification programs
- Other sustainability tools and initiatives
- Regional projects

Together, the group discussed and attempted to answer a number of questions including: In a future with more people to feed, fewer resources, and less predictable weather, what initiatives and tools hold the most promise to benefit people, planet, and profit? How can we collaborate to build and scale-up locally-relevant sustainability initiatives? What roadblocks stand in our way? How can we clear those hurdles to do more to enhance our local economy and environment? Can we leverage the region's uniqueness and natural diversity in the marketplace, and vice versa?

Participants identified value, challenges and opportunities for collaborative action across three broad categories: Market and regulatory compliance; Program design and core elements; and Data collection, confidentiality, and information sharing. At the highest level the group expressed interest in and support for taking an industry-led proactive approach to advance sustainability for agriculture, our community and environment.

This report summarizes the group's discussion, identifies key strategic opportunities and high value next steps:

- *Support the continued development and expansion of existing tools and initiatives*
- *Improve coordination amongst industry groups, resource agencies, and nonprofits*
- *Educate buyers and consumers on ag conservation/sustainability efforts in our region*
- *Create a roadmap for the development of a collaborative sustainability program*

Background

In January 2013, the Gabilan Watershed Water Resource Project Coordination (WRPC) effort – funded through the Integrated Regional Watershed Management Program grant – convened its second stakeholder meeting. A key next step identified during this meeting was to engage agricultural leaders, company executives, and sustainability/social responsibility directors in a collaborative, proactive discussion to identify opportunities to build and strengthen the business case for sustainability and agricultural stewardship of Monterey Bay watersheds.

Sustainability initiatives across the agrifood sector have gained prevalence over the past decade to meet changing consumer demand and address increasing resource scarcity and variability. More and more companies are formalizing their sustainability programs and dedicating significant resources toward these efforts. In order for the agricultural industry to promote the widespread adoption of sustainability actions in our region, a stronger business case is needed – one that supports a collaborative, proactive and sustainable future for agriculture, our community and environment.

SureHarvest, an agribusiness sustainability consulting and software company, was contracted to convene an industry-focused workshop to gauge broader interest and opportunities to participate in the development and/or expansion of initiatives to promote sustainable watershed stewardship. This project is a critical first step toward developing and implementing a broader strategy for advancing business models for agricultural stewardship in the Monterey Bay region.

Project Description

Working in consultation with the WRPC subcommittee and members of the Monterey County Sustainability Working Group, Western Growers, and the Central Coast Grower-Shipper Association, SureHarvest facilitated an agricultural industry roundtable discussion on sustainability initiatives on March 28, 2014 in Salinas, California (Attachment 1). The Monterey County Sustainability Working Group is an agricultural industry-led network for sharing current sustainability efforts among producers, shippers and processors in the Central Coast region. Industry leaders, company executives, and CSR/sustainability directors on California's Central Coast and beyond were invited to participate in the roundtable.

The goal for this meeting was to increase participants' collective understanding of the underlying business opportunities and challenges for key sustainability initiatives and tools, and set the stage for collaborative action. The meeting was attended by five agricultural company owners/presidents, ten agricultural company sustainability directors/coordinators, three industry service providers, two agricultural association representatives, and two resource agency representatives. Participants discussed the questions: In a future with more people to feed, fewer resources, and less predictable weather, what initiatives and tools hold the most promise to benefit people, planet, and profit? How can we collaborate to build and scale-up locally-relevant sustainability initiatives? What roadblocks stand in our way? How can we clear those hurdles to do more to enhance our local economy and environment? Can we leverage the region's uniqueness and natural diversity in the marketplace, and vice versa?

Locally-relevant topics discussed included:

- Industry sustainability update and trends
- Self-assessment initiatives
- Performance-based initiatives
- Certification programs
- Other sustainability tools and initiatives
- Regional projects

Sustainability Initiatives Overview

Over the past decade a growing number of public and private initiatives and tools have been developed to ensure our food and beverage production system can sustain itself and meet the needs of our changing world. To address the social, economic and environmental issues impacting the Monterey Bay region, a number of programs, tools and initiatives stood out as being most relevant to our local agricultural industry. Below is a brief overview of the types of sustainability efforts that provided a foundation for discussion during the industry workshop.

Self-Assessment Initiatives

Self-assessment programs are designed to be voluntary and allow participants to complete an accompanying assessment (questionnaire). Self-assessments can be practice-based, performance-based, or a combination of both. Typically, these programs are used by grower-oriented trade associations to collect grower responses to crop-specific practice questions across a number of management areas such as water, energy, pests, nutrients, human resources, etc. Programs vary in their geographic focus from regional to statewide to national in scope. Growers complete assessments over multiple seasons to see how they are progressing along the sustainability continuum. Associations use the data to monitor industry progress over time through benchmarking of aggregate data and using that information for industry-level communications with the market and policy makers. Assessment results also drive targeted education and research opportunities.

Workshop participants shared their experience with a number of well-established self-assessment programs including the California Sustainable Winegrowing Program (Information about SWP is available at www.sustainablewinegrowing.org), and the California Almond Sustainability Program (Information about CASP is available at www.almondboard.com/growers/sustainability/Pages/Default.aspx), United Fresh Produce Foundation's Sustainability Guide and Self-Assessment for Fruit and Vegetable Production for individual companies to use (More information about sustainability at United Fresh is available at www.unitedfresh.org/programs).

Performance-Based Initiatives

Performance-based tools and programs are relatively new in the sustainability program landscape. The metrics-oriented programs and initiatives are introducing quantitative performance metrics that can be used to measure water use efficiency, nitrogen application,

energy efficiency, greenhouse gas emissions and other resource usage. The goal of these programs is to track performance over time to drive continuous improvement and innovation at the individual operation level as well as providing growers the ability to compare their performance against their peers. Programs are also including other members of the agrifood supply chain such as shippers, processors and distributors with performance measurement tools. Retailers and foodservice companies are easing into understanding product level sustainability where metric data is being requested from suppliers. The addition of performance metrics to practice-based programs is a next step in the evolution of sustainability programs.

Workshop participants shared their experience participating in the development of and using metrics tools such as the Stewardship Index for Specialty Crops (Information about SISC can be found at www.stewardshipindex.org) and Performance Incentives for Conservation in Agriculture (Contact Lisa Lurie with the Resource Conservation District of Santa Cruz County for more information, llurie@rcdsantacruz.org).

Certification Programs

Certification programs differ from the voluntary self-assessment programs in that they use a standard consisting of prescribed practices and in some cases, metrics to certify a certain level of performance. Growers must score above a certain threshold level in order to be certified by a third-party auditor and certification body. Certifications are most widely used for eco-labels and food safety programs.

Workshop participants shared their experience with certification programs including Sustainability in Practice (Information about SIP Certified wines available at www.sipcertified.org) and Certified Organic (More information about the National Organic Program is available at www.ams.usda.gov/AMSv1.0/nop).

Other Tools and Initiatives

Other tools and initiatives that were discussed include Western Growers ToolBox, Farmers for Water Quality and On Farm Solutions, and the Agricultural Water Quality Alliance (AWQA). Western Growers is supporting the development of a Grower ToolBox, an online platform WG intends to be a one-stop water quality, food safety and sustainability data management service available to WG members (Contact Hank Giclas at Western Growers for more information, hgiclas@wga.com). On Farm Solutions is a Central Coast grower-supported initiative currently engaged in evaluating water quality practice efficacy and facilitating information sharing and adoption amongst its members (Contact Abby Taylor-Silva with the Grower-Shipper Association, abby@growershipper.com). The AWQA has been a long-standing collaboration amongst the agricultural industry, resource agencies, and nonprofits on the Central Coast (More information available at www.awqa.org).

Regional Projects

Two regional projects aimed at addressing complex water resource management issues facing the agricultural and natural resource communities in Monterey County were discussed during the workshop. Along the Salinas River, agricultural landowners and operators have been participating in demonstration projects as part of the Salinas River multi-benefit floodplain management approach (Contact Jennifer Biringer with the Nature Conservancy, jbiringer@tnc.org). In the Gabilan and other watersheds on the Central Coast, agricultural landowners have been collaborating in wetland research and restoration projects (More information available from the Central Coast Wetlands Group - ccwg.mlml.calstate.edu/projects/current-projects).

Strategic Opportunities

Challenges to Overcome

A number of major themes were identified by the group as key challenges that need to be addressed as part of any collaborative approach to advance sustainability.

Market and Regulatory Compliance

- Companies are focusing significant time, energy and resources toward complying with water quality regulations right now. Meeting buyer sustainability requests is not as pressing an issue compared to regulatory problems being addressed and taking up staff and service provider focus and time.
- Buyer sustainability questionnaires and programs are creating additional burdens for operations. Companies are being asked to complete an increasing number of buyer sustainability/social responsibility questionnaires, but receiving little to no value from these efforts.
- The marketplace is not necessarily asking for balanced values (people, planet, profit), and purchasing decisions and supplier contracts are still heavily focused on product cost, quality and yield.
- National sustainability standards being developed will add another layer that is not consistent with what is currently in the marketplace.

Program Design and Core Elements

- Certifications were viewed as costly, may dilute individual brands, and occupy a relatively small niche in the marketplace. While certifications play a role in the marketplace, caution was raised that certifications can hinder continuous improvement and are very burdensome to obtain.
- Prescriptive initiatives constrain individual action and limit innovation and change over time.
- Large or extensive questionnaires can be overwhelming at first, and are particularly challenging when they focus on farm-level activities.
- Companies operating in this region also grow and ship throughout the U.S. and internationally, so the global context must be taken into account for any broad sustainability efforts.

- Regionally-based approaches can enhance a broader initiative and local agricultural community leadership is needed to drive any effort.

Data Collection, Confidentiality, and Information Sharing

- At the farm-level, there is resistance to data sharing, and requests for data are largely viewed as invading privacy and company trade secrets. Extrapolating production costs from metrics data is of particular concern.
- There is a general concern that any proactive initiatives and information sharing will be used to develop more regulations on the industry.
- The value of sharing information to drive innovation and demonstrate what is being done well, is not broadly recognized across the industry.
- Many operations are limited by not having adequate protocols and record-keeping tools to track and demonstrate success.
- Current lack of a confidential data and information sharing platform for industry is limiting.

Value and Opportunities

In light of the challenges and concerns discussed above, a number of possible solutions and opportunities were identified through the group discussions.

Market and Regulatory Compliance

- There is a desire to take a proactive approach with buyers to talk about sustainability and demonstrate to them what the produce industry is doing in the sustainability area.
- It is important that any program or initiative help growers comply with regulations, provide regulatory relief, or reduce the overall cost and burden associated with regulations.
- A number of participants were interested in other incentives beyond compliance that a broader sustainability program could support (e.g., ecosystem services, insurance premium reductions).

Program Design and Core Elements

- Voluntary self-assessment programs were favored over certifications by the group.
- Value was seen in practice-based programs to share information and help drive innovation, yet performance-based programs were of interest to track, measure and demonstrate progress.
- Key program elements identified by participants include: 1) that it be industry-led; 2) be updated regularly to take into consideration new science, technologies, and changing needs of the industry and community; and, 3) integrate or align with existing data and documentation requirements.
- Sustainability is about continuous improvement and programs or initiatives need to encourage change and innovation to benefit people, planet and profit.
- The sustainability efforts of an organization must be supported by top management and best lead by someone with broad understanding of sustainability and able to engage the organization broadly.

Data Collection, Confidentiality and Information Sharing

- It was broadly recognized that it is more comfortable to share quantitative information about change and improvements (e.g. percent reductions), as opposed to the raw data directly.
- Greater awareness is needed across the industry on the value and importance of information sharing (e.g. to allow industry to be proactive not reactive, to learn from peers and keep from "recreating the wheel").
- It was recognized that a confidential, common information/data digital platform would be needed to facilitate data capture and sharing.

Strategic Opportunities

There is clear desire amongst participants for the agricultural industry to come together and take a proactive lead in sustainability. There are increasing sustainability/social responsibility initiatives coming from buyers, yet in most cases, the buyers themselves are still in the process of developing their programs for the agricultural supply chain. There is a window of opportunity for the agricultural industry to come together to help drive and create the vision of sustainability. This vision can create a working model to meet grower's diverse needs, facilitate marketplace and consumer education, and show others how it can be done.

The Monterey County Sustainability Working Group is an established network of individuals and companies committed to sharing ideas and learning from each other about sustainability, and is a logical partner to help engage this conversation more broadly within the industry. Key industry associations that serve the growing community could also be in the position of playing a role to engage a broader conversation of sustainability. Associations serving the Monterey Bay region and the Central Coast are the Grower-Shipper Association (GSA), County Farm Bureaus, and Western Growers. Active commodity specific associations such as the California Strawberry Commission, Central Coast Vineyard Team, also have a role to play in the broader industry discussion as well to advance and promote sustainability within their respective commodity groups. Recent collaboration between MCSWG and GSA establishes a potential platform for the industry to engage further in this discussion here on the Central Coast.

Sustainability covers the broadest range of topics key to ensuring a sustainable future for agriculture, our community and environment. Any successful industry-wide initiative or program must include a clear vision of the key outcomes or value propositions to guide a program's development. Once the overall program vision is agreed upon, there is a need to answer a number of questions and engage the right stakeholders to determine the program elements. First, you need to have a clear understanding of what the group needs and wants to accomplish out of the program. Then you need to identify who the players are and what is already happening. Lastly a clear understanding is needed of the status and availability of existing resources and tools and those that may be under development.

Using water quality as an example, one clear need from a program would be to ease compliance requirements and provide regulatory relief for the agricultural industry. There are a number of groups and organizations already actively working to address water quality issues in the region that would need to be at the table. There are also many different tools and resources being

developed to help growers measure and improve water use, nutrient use, and overall water quality that would be more readily accessible and therefore hopefully more widely used. Since so much of the activity surrounding water quality is geared to meeting regulatory requirements, a broader sustainability framework will also serve to unite the regulatory activities with other important, inter-connected issues such as habitat protection and enhancement, risk management and water supply, and more.

The value of a broader sustainability program for the industry would be to bring together the various groups, initiatives, and tools in a way that optimizes value, reduces redundancy, and drives efficiencies for the industry. An industry-led sustainability program would also serve as a platform to proactively discuss issues within the agribusiness community and to communicate with buyers and the marketplace, policy makers, regulators, political leaders, employees, activists, and the local community.

Recommendations for Next Steps

Support the continued development and expansion of existing tools and initiatives

- In light of the group's interest and support for performance-based initiatives, an emphasis should be placed on increasing industry participation in SISC case studies and internal usage of SISC metrics and the PICA program on the Central Coast.
- Western Growers was an original partner with SISC and has more recently invested in its grower ToolBox to provide tools to its membership to provide data management and analytics addressing food safety, water quality, and critical sustainability concerns confronting the industry. Given the broad commodity and geographic interest covered by WG members, the WG Toolbox will be a key initiative supporting the evolution and development of industry sustainability initiatives.
- The local and regional partnerships to restore and establish wetlands, riparian floodplain conservation for habitat and flood mitigation, as well as to identify effective technologies to improve water quality, will fit well into the development of any collective sustainability initiative. Growers that have been engaged with these projects are important spokespersons within the industry to encourage increased participation and ensure they continue to evolve to identify areas of win-wins.

Improve coordination amongst industry groups, resource agencies, and nonprofits

- The most successful examples of sustainability programs are industry-led and are often spearheaded by commodity-based or other industry associations. One of the challenges (and opportunities) on the Central Coast is the number of different industry groups and nonprofits that actively serve the agricultural community. Recently the MCSWG and GSA have started to collaborate to foster sustainability information sharing and provide a critical industry network to advance sustainability. This collaboration creates an ideal platform for the Central Coast produce industry to continue the conversation of sustainability, collaborate to expand current initiatives, and explore the development of an industry-led sustainability program. MCSWG/GSA could then potentially serve as a

liaison to coordinate with Western Growers, the Produce Marketing Association, United Fresh, and other industry associations with a broader geographic membership to address industry-wide sustainability needs.

- The Agricultural Water Quality Alliance (AWQA) is a vital network to foster and promote the voluntary, proactive collaboration between resource agencies, technical service providers, nonprofits, agricultural companies and associations, toward common water quality goals. In the past, AWQA enjoyed the broad participation of the agricultural industry through representation of the Central Coast Farm Water Quality Coalition. While the Coalition and a few company representatives are active in AWQA, there is the need for other industry associations and agricultural companies themselves to participate in AWQA to best leverage strengths and opportunities to advance common goals. Currently AWQA holds monthly meetings on the second Wednesday of each month, and industry members are encouraged to participate. While AWQA has regularly scheduled meetings, it would be worthwhile to convene a meeting focused on increasing industry participation and discussing interest and opportunities to work together to build, expand and promote sustainability/stewardship initiatives.

Educate buyers and consumers on agricultural conservation/sustainability efforts in our region

- There was a good deal of value and interest expressed by participants to be proactive with buyers to talk about sustainability and demonstrate what the produce industry is doing for sustainability. This idea has been discussed at the MCSWG as well, and it is worthwhile to pursue this idea. The MCSWG and GSA collaboration provides an excellent opportunity to continue this conversation. In addition, one of the core goals of formalizing and branding the AWQA network was to promote and educate about the good work AWQA partners are doing. Given the history of collaboration through AWQA and other innovative private-public partnerships happening on the Central Coast, there's an opportunity to collaborate on buyer as well as consumer/public education about agricultural sustainability.

Create a roadmap for the development of a collaborative sustainability program

- Given the high level of interest and participation in the workshop, and the general consensus amongst participants that a collaborative, proactive approach to sustainability is desirable, a timely next step would be to conduct a needs assessment and create a sustainability roadmap for the industry. A detailed assessment can: identify conflicting and complementary industry needs; highlight regulatory, market, environmental and social issues relevant to the region; identify key stakeholders and provide an understanding of the existing stakeholder landscape; evaluate and gauge the interest level of the broader industry in this approach; and outline a detailed strategy for stakeholder engagement and program funding models.

Appendices

1. Invitation Letter
2. Agenda
3. SureHarvest Overview Presentation

March 12, 2014

RE: Invitation to Participate in an Agricultural Industry Roundtable on Sustainability Initiatives – March 28th

Dear Industry Leader, Company Executive, and CSR/Sustainability Director:

Please **join** SureHarvest, your industry associations, and members from the Monterey County Sustainability Working Group – an industry-led network for sharing current sustainability efforts among agricultural producers, shippers and processors in the Central Coast region -- in a roundtable discussion. Together we will share experiences and discuss opportunities to build a stronger business case for widespread adoption of sustainability actions in our region.

As a **leader** in our industry and within your own company, you have unique insight and ability to truly influence change in the right direction. Help us chart the course to toward a collaborative, proactive and sustainable future for agriculture, our community and environment!

In a **future** with more people to feed, fewer resources, and less predictable weather, what initiatives and tools hold the most promise to benefit people, planet, *and* profit? How can we collaborate to build and scale-up locally-relevant sustainability initiatives? What roadblocks stand in our way? How can clear those hurdles to do more to enhance our local economy and environment? Can we leverage the region's uniqueness and natural diversity in the marketplace?

The **goal** for this meeting is to increase our collective understanding of the underlying business opportunities and challenges for key sustainability tools and initiatives. SureHarvest will capture and compile each initiative's potential benefits, outline broad strategic opportunities and identify collaborative next steps in a summary document.

Topics to be discussed include:

- Industry Sustainability Update and Trends (e.g. The Sustainability Consortium, Sustainability standard efforts)
- Performance Efforts (Stewardship Index for Specialty Crops, Performance Incentives for Conservation in Ag)
- Self-Assessment Programs (e.g. California Almond Sustainability Program, United Fresh's Self-Assessment)
- Certification Programs (e.g. Sustainability In Practice, Certified CA Sustainable Winegrowing, Fields to Ocean)
- Other Tools and Initiatives (e.g. OnFarm Solutions, Wetlands to improve water quality, Riparian floodplain enhancements to mitigate flooding, Western Grower's ToolBox, and more)

Friday March 28. 11 a.m. – 2 p.m. (lunch provided) at Grower-Shipper Association, 512 Pajaro Street, Salinas.

Sincerely,

Melanie Beretti

RSVP or questions to Melanie at mberetti@sureharvest.com or 831-262-1199

Thanks to the Water Resource Project Coordination subcommittee of the Integrated Regional Watershed Management Program grant for funding this gathering!

Today at a Glance

11:00 – 11:15	**Welcome**
11:15 – 11:35	Sustainability Trends
11:35 – 12:15	Initiatives Overview
12:15 – 12:30	Break/Lunch
12:30 – 1:15	Roundtable Breakouts
1:15 – 1:45	Group Discussion
1:45 – 2:00	Next Steps

We will wrap at 2:00 sharp!

Agricultural Industry Roundtable on Sustainability

March 28, 2014
11 am – 2 pm
512 Pajaro Street, Salinas, CA

SUSTAINABILITY FROM THE GROUND UP

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SUSTAINABILITY FROM THE GROUND UP

Thanks to…

Water Resource Project Coordination **subcommittee of the Integrated Regional Watershed Management Planning grant**

Thanks to *Monterey County Sustainability Working Group* members, Western Growers, and Grower-Shipper Association

SUSTAINABILITY FROM THE GROUND UP

Goal

…build a stronger business case for widespread adoption of sustainability initiatives in our region…

SUSTAINABILITY FROM THE GROUND UP

SUSTAINABILITY FROM THE GROUND UP

Let's consider…

How to collaborate to scale-up sustainability initiatives?

What are roadblocks?
How can we clear those hurdles for win-win-win?

Can we leverage region/efforts in marketplace?
Can we leverage the market trends for our region?

SUSTAINABILITY FROM THE GROUND UP

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We will wrap at 2:00 sharp!

Industry Sustainability Update and Trends

Andrew Arnold
Sustainability Senior Associate
SureHarvest
aarnold@sureharvest.com

SUSTAINABILITY FROM THE GROUND UP

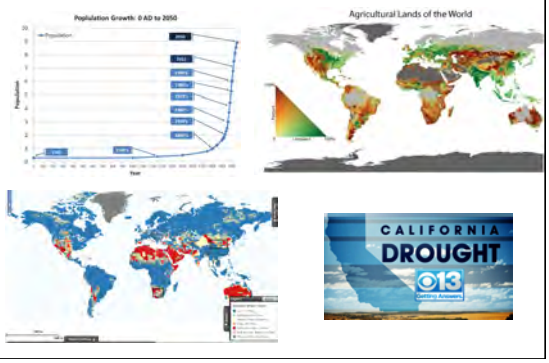
Sustainability Trends in Agribusiness

SUSTAINABILITY FROM THE GROUND UP

Big Picture

- 9 Billion people by 2050…increasing every day
- Resource constraints – more with less
- Impact on agrifood supply chains – risks

"More with Less"



SUSTAINABILITY FROM THE GROUND UP

California Context

- Water availability
- Water quality
- Land availability
- Labor
- Climatic uncertainty
- Other?

SUSTAINABILITY FROM THE GROUND UP

1. Sustainability Being Embedded into Overall Strategy
2. Greater Emphasis on Value Creation
   - Reduce Costs
   - Grow Sales
   - Manage Risks
   - Enhance Brand
3. "More with Less" is Becoming a Need to Have not a Nice to Have
   - Real Resource Constraints (e.g. water, land, etc.)
4. Trust and Transparency More Important than Ever

SUSTAINABILITY FROM THE GROUND UP

Continuous Improvement Drives Value

SUSTAINABILITY FROM THE GROUND UP

The Initiative Landscape

- Self-Assessment Programs
- Performance-based Programs
- Certifications
- Buyer Programs
- Government Programs

SUSTAINABILITY FROM THE GROUND UP

Regional Initiative Landscape

- OnFarm Solutions
- Wetlands & water quality
- Riparian areas & flooding

SUSTAINABILITY FROM THE GROUND UP

Specific Initiatives Discussion

AGENCY COORDINATION IN THE GABILAN WATERSHED

FROM THE MOUNTAINS TO THE SEA

Designing and Permitting Multi-Benefit Projects:
Multiple Agencies and Stakeholders
Diverse Interests, Directives and Priorities

August 2014

AGENCY COORDINATION IN THE GABILAN WATERSHED

FROM THE MOUNTAINS TO THE SEA

Designing and Permitting Multi-Benefit Projects:
Multiple Agencies and Stakeholders
Diverse Interests, Directives and Priorities

Prepared for:

Water Resource Project Coordination Committee
for the
Greater Monterey County Integrated Regional Water Management Plan

Prepared by:
Burdick & Company

One of the major challenges to project implementation identified during the January 2013 Water Resource Project Coordination (WRPC) stakeholder workshop was permitting and regulatory compliance. Hurdles to project implementation brought about by lack of interagency coordination and difficult and confusing regulation were voiced time and time again at the January 2013 meeting. Examples included confusion over which agency had control over waterways, coordination with and between permitting agencies, the practical and legal effects of differing biological opinions, and a general confusion over which agency managed what resources. The goal of this section of the Blueprint was to consider the regulatory constraints and challenges that projects in the Gabilan Watershed might encounter, and identify possible options for coordinating agency review and consultation.

The work effort included two primary components: data collection and strategy development.

Data Collection

The data collection component focused on:

1. Using a list of agencies provided by WRPC Committee members and other stakeholders recommended by the committee, perform a basic analysis of plans and policies, mandates, and regulations that affect Moro Cojo/Tembladero/Elkhorn Sloughs, TMDL listings, flood management, water treatment (supply and discharge) and other issues of concern in the watershed. Existing plans were evaluated to identify relevant policies and which departments within larger bureaucracies needed to be contacted.
2. Conducting meetings, phone calls and/or conference calls with agency staff to get to buy-in as well as methods for streamlining both coordination and permitting.
3. Creating a matrix (agency mandates, regulations and policies) that presents the results of the data collection and preparing a short analysis of conclusions and recommendations.
4. Performing a gap analysis with the assistance of contacted agencies with a particular emphasis on identifying contradictory strategies, mandates and/or policies. Identifying types of projects that trigger the various agency involvements and working with contacted agencies to identify possible solutions to overlapping jurisdictions, contradictory mandates or policies and other issues identified by the team and the WRPC Committee.
5. Refining and finalizing the matrix and preparing a short analysis of conclusions and recommendations.

Strategy Development

The strategy development component focused on:

1. Evaluating options for protocol/processes/options to support collaboration for assessing and/or developing projects or interacting with project sponsors.
2. Consideration of opportunities to involve other regional stakeholders, beyond the agencies in the matrix.

3. Assistance in identifying comprehensive, multi-objective, multi-stakeholder projects to serve as model pilot projects to support more detailed agency discussions concerning coordination and permitting.

DATA COLLECTION

The consulting team used the following strategies to assess possible project integration options and the corresponding permitting/regulatory challenges:

- Internet research and phone interviews with agencies regarding permitting requirements and documents
- Meetings with key agency staff to discuss permitting processes and requirements
- Preparation of a permitting requirement matrix summarizing primary permitting and regulatory oversight
- Evaluation of existing projects within the watershed to identify options for integration and consolidation
- Meetings with project proponents to discuss specific options for integrated projects
- Identification of permitting constraints or coordination challenges (based on the level of specificity of the project, i.e., the readiness to proceed)
- Identification of potential funding options for the identified projects

ENTITIES CONTACTED

The following agencies and organizations were contacted by the project team to learn more about the regulatory and permitting authorities in the region:

Big Sur Land Trust
City of Salinas
Castroville Community Services District
CSUMB Watershed Institute
CSUMB Return of the Natives
Monterey County
No Salinas Valley Mosquito Abatement Dist
Monterey Bay National Marine Sanctuary Moss Landing Harbor District
State Water Resources Control Board/RWQCB
California Coastal Commission
California Coastal Conservancy
California Dept of Fish & Wildlife
California Dept of Public Health
Monterey Bay Citizen Watershed Monitoring Network
California Native Plant Society
NOAA Fisheries
USDA Resource Conservation Service/local RCD
US Fish & Wildlife Service
US Army Corps of Engineers

Table 2 (attached) provides detailed contact information for all consulted agencies and organizations.

SUMMARY MATRIX

Early in the interview process it became clear that many permitting agencies were unable to define actual permitting requirements without at least a conceptual project description at hand. Agencies were contacted and asked to distinguish permitting requirements for types of projects, but could not respond to this request because permitting requirements are determined based on a variety of factors, including project location, resource(s) impacted by project construction and operation, project operational features, and jurisdiction; project type is generally not a factor in determining permit requirements. Though a project list was available, project locations were largely undefined and the range of over 30 possible projects, most candidates for substantial alteration and integration in the future, precluded any meaningful feedback. Due to time and staff constraints, the permitting technicians contacted could not provide information on the number of scenarios provided other than to indicate whether permitting alignment is generally supported within their agency (noted in Table 3, attached) and to briefly review the list of projects and provide general support of project ideas. Projects with beneficial water quality and supply impacts were generally well supported by permitting staff. Most permitting technicians recommended developing a specific project description prior to consultation and referred the consultants to general permitting requirements within their agency.

Although permitting requirements change infrequently, staff turnover can result in subtle but significant changes in interpretation or in the review process, while agency budget changes can dictate new procedures and processes, as well as staff availability. The specific attributes of a project can result in multiple departments or staffers being involved in any given permitting action.

Further, addressing a permit form requirement does not always result in a project being processed without further conversations and refinement – as not all project components can be assessed simply on the basis of information provided in response to a standardized form. The mandate to coordinate with other agencies, while common and clearly sincere, is not always supported by adequate budgeting or staffing allocations to support the detailed level of interaction that is required when considering a project that is designed to be a multi-benefit, multi-objective and multi-stakeholder project.

In short, the consensus was that presenting a matrix of applicable permits would result in the need for frequent and careful update and would not embody the nuanced complexity of permitting processes. As a result, the agencies suggested an alternative approach – develop a matrix that provides links to websites on which more specific information is provided. Hence, the decision was made to create a contact matrix with a summary statement for each agency. Table 3, attached, includes brief comments on agency jurisdiction, regulations, types of permits needed for different projects/project impacts, a list of websites with additional detailed permitting information, and project alignment opportunities, if applicable. Sections below further expand on the likely steps required to achieve a truly coordinated permitting system in the region.

GAP ANALYSIS

The gap analysis proved to be a complex undertaking with a relatively simple outcome: after many interviews and review of a wide variety of applicable plan and policy documents it became clear early in the process that integrating the results of a comprehensive analysis would far exceed the available budget, and further that the agencies contacted did not feel that an exercise of that nature would result in concrete outcomes.

- There are no natural resources in the area that are exempt or overlooked in the review process. Wetlands, riparian zones, endangered or threatened species, aesthetics/viewsheds, soil erosion and other similar issues or concerns are thoroughly covered in the planning and permitting requirements of local, state and federal agencies. Furthermore, many of the same resources are regulated by multiple agencies, and the exact location of resources often dictates the regulatory agencies involved.

- The installation of infrastructure is similarly well addressed. Storm water, water supply and treatment/distribution and sewage treatment facilities and associated infrastructure, are also well regulated and have overlapping jurisdictional considerations.
- The concern raised by the interviews and evaluation is not that a topic, issue or area is somehow missing from regulatory oversight. Nor is it that the various permitting processes are not clear, at least in their outline. Rather, the complexity of project evaluation on the part of multiple agencies does not lend itself to an informal collaborative process.
- There are local examples of processes that have been developed to expedite and coordinate project permitting, such as the Partners in Restoration program, which is active throughout the area but most particularly in adjacent Santa Cruz County.
- The gap identified as a result of considerable interviews and evaluation appears to be associated with creating a linkage between project design and the permitting process. Frequently a project will be developed based on the specific needs of a site or sponsor. That project is then refined in anticipation of probable permitting requirements. If project permitting involves multiple agencies (either as responsible or consulted entities), the dynamic involved in refining design prior to application magnifies.
- The local governments have developed processes that support early consultation, coordination among county and city departments, early coordination of design issues, and clearly understood processes for amending or revising projects in response to identified issues. However, there is no such process prior to application for simultaneous multi-agency review that would include state and federal agencies.
- To actually achieve permitting alignment would require policy-level decisions at the upper-management level of the affected agencies, and that is unlikely to occur without concerted effort dedicated to that outcome. Permitting technicians are generally not in a position to make decisions regarding permit alignment or streamlining.
- Finding ways for state and federal agencies to participate in project design problem-solving discussions would require agency commitment in the form of budget allocation for staff; at this date and in this constrained economy, it is unlikely that such a mandate would be created.
- A systematic effort to evaluate the significant number of planning documents, policies, and mandates with respect to inherent conflicts, divergence, and potential alignment is a significant work effort which would require substantial time investment on the part of the targeted agencies, which is further complicated by the lack of available funding and agency mandate.
- While agency staff are consistently supportive of multi-stakeholder/multi-benefit projects, the systems in which they function are not configured in such a way that the staff-level support can translate into an aligned permitting process. Agency staff are handicapped in their ability to participate in project-development activities by lack of budget, lack of staff time, and the internal permitting process and framework within their individual agency.

PROJECT FUNDING

Funding options for Integrated Regional Water Management (IRWM) related projects, based on research by the team, is shown in Table 1, Options for Project-specific Implementation Funding. Determination of funding options relies on a clear description of the intended and measurable project outcomes.

TABLE 1 - Options for Project-specific Implementation Funding

Capital Improvements Program Funding (Revenue Bonds, Certificates of Participation)

Property Tax Assessment (Assessed Valuation)
User Fees

State Funding

Proposition 84
- Integrated Regional Water Management Grant Program
- Department of Water Resources – Local Groundwater Assistance
- Department of Public Health – Emergency and Urgent Water Protection
- State Water Resources Control Board – Storm Water Grant Program
- Local Levee Assistance Program
- Flood Protection Corridor Program
- Flood Control Subventions Program
- Urban Streams Restoration Program

Proposition 1E
- Stormwater Flood Management Program
- Early Implementation Program

Proposition 50
- Department of Water Resources – Water Use Efficiency Grants
- Department of Water Resources – Contaminant Removal
- Department of Water Resources – UV and Ozone Disinfection

Other State Funding
- California Financing Coordinating Committee (CFCC)
- State Revolving Fund
  - Safe Drinking Water SRF
  - Infrastructure SRF
  - Clean Water SRF
- State Water Resources Control Board – Federal 319 Program
- State Water Resources Control Board – Water Recycling Funding Program
- Department of Water Resources – New Local Water Supply Construction Loans
- Department of Housing and Community Development – Community Development Block Grant
- California Energy Commission (CEC) – Energy Financing Program

Federal Funding

- Environmental Protection Agency, Source Reduction Assistance
- Environmental Protection Agency, Wetlands Program Development Grants
- Environmental Protection Agency, Five Star Restoration Program
- Water Resources Development Act
- National Rural Water Association (NRWA) Revolving Loan Fund
- National Park Service (NPS), Rivers, Trails, and Conservation Assistance (RTCA) Program
- U.S. Department of Agriculture (USDA) – Rural Development, Water and Waste Disposal Program
- U.S. Bureau of Reclamation (USBR), WaterSMART, Grant Programs
- U.S. Fish and Wildlife Service (USFWS), North American Wetlands Conservation Act Grant

STRATEGY DEVELOPMENT

COLLABORATIVE PROCESS FOR EVALUATING AND DEVELOPING PROJECTS AND ANTICIPATING PERMITTING REQUIREMENTS

The following points emerged from the interviews conducted across the region:

- All contacted agencies have indicated a willingness to collaborate and coordinate to enable important projects to be implemented; however, at a project-design/permitting level, the specifics of how various project components meet or are consistent with regulatory requirements can become extremely complex.
- There is no one-size-fits-all permitting strategy; every project will have to utilize a project-specific application strategy that can be informed by available permitting and regulatory information but will not necessarily be evaluated or conditioned based on those criteria. In other words, internal decision-making and determination of appropriate project mitigation and permit requirements vary from project to project (even within a single agency) and cannot be predicted prior to engaging in the permitting process.
- One significant challenge is extremely limited staff time, which leads to unavailability for early and frequent consultation, at the conceptual level in particular. In many agencies, the individual staff responsible for identifying project-specific requirements or mitigations frequently is not available for consultation until the project application has already been submitted.
- An increasing phenomenon due to lack of budget is agencies requiring project proponents to complete extensive baseline condition analysis or other forms of data collection, in order to determine potential project mitigations or meet unfunded agency mandates.
- At this point, the design and implementation of individual projects will not be significantly impacted by this analysis unless and until an integrated multi-agency permitting alignment strategy is developed. At this point in time, it appears more realistic for projects to be designed to achieve specific objectives rather than designed to facilitate possible permitting. Further, while pursuing implementation of an individual or integrated project may lend itself to an alignment effort, there is no guarantee that the outcomes of that alignment effort would in fact affect any other project(s).
- Absent funding to support project design and evaluation, including collection of baseline data, many projects will never get to the application stage; if they do, the requirements that result from the permitting process can effectively make the project infeasible. Conversations with a wide variety of agency staff made it clear that identifying possible project-specific options and mitigations early in the process doesn't preclude other issues from being identified later in the process. Further, the

process of attempting to design mitigation into a project can have the unanticipated impact of creating more permitting complexity for the project. So (and as noted above), no individual project appears to be able to pave the way for subsequent projects and there is no method currently available for predicting the timing, expense, logistics or applicable considerations for any given project in advance of permitting application.

- Cities and counties have developed integrated permitting strategies across their own departments which have streamlined many permitting processes; however these permits do not include coordination with other regulatory entities which have their own separate processes.
- The frustration experienced by both applicants and agency staff over the complexity of permit coordination is substantial.
- There is no central authority which can serve to coordinate or expedite permitting process and procedures.
- Productive coordination cannot be achieved without development of a framework that supports both attaining agency mandates and project proponents' desired project-level outcomes – across multiple agencies.

As a result of the research effort it is clear that, without a mandate from the higher level management within the various permitting agencies, as well as an allocation of budget and staffing resources, the prospect for a fully integrated permitting strategy within this complex region remains unlikely.

Perhaps the best example of a process which has shown promise of success and is currently being implemented is the Santa Cruz Partners in Restoration Program/Santa Cruz Countywide Permit Coordination Program, sponsored by the Santa Cruz Resource Conservation District. The group has sponsored and developed funding for a coherent and organized permit alignment process, involving multiple agencies. The typical projects served by this program encompass some of the types of projects that the Gabilan area would expect (e.g., steam bank protection, grade stabilization structures, habitat restoration, sediment basis), however the more infrastructure-intensive projects that characterize the project list for the Gabilan region represent a different project focus, and one which is not currently part of the Santa Cruz program. Regulatory agencies that have signed on to this "one-stop regulatory shopping" program for Santa Cruz County include: the County of Santa Cruz, California Coastal Commission, California Department of Fish and Game, Central Coast Regional Water Quality Control Board, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and National Oceanic and Atmospheric Administration Fisheries. Development of the Program was funded primarily by the California Coastal Conservancy with additional funding from the Natural Resources Conservation Service (NRCS) and the Community Foundation of Santa Cruz County.

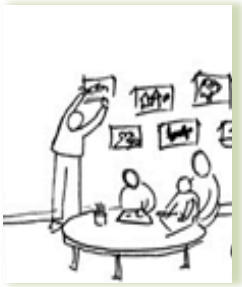
This program could definitely serve as a model for creating a formal alignment of agencies and regulatory programs within the Gabilan Watershed and should be considered from a funding perspective and with an implementation focus.

INVOLVEMENT OF ADDITIONAL STAKEHOLDERS

A wide variety of interviews with the preliminary list of contacts provided by the WRPC Committee resulted in the identification of few additional stakeholders to involve in the project development or permitting coordination dialogues. The IRWM program has had an extensive outreach effort. These contacts and

stakeholders were, in turn, provided to the project team as they initiated their outreach. This contact list was extensive and proved to cover virtually all of the stakeholders in the region – regulatory and non-regulatory.

It appears that the most likely constituencies for additional outreach are within the agricultural community. While individual ranchers and farmers will likely be identified in the next work effort, at this point in time the agricultural community prefers to be contacted through their professional associations or their connections within the Resource Conservation Districts (RCDs). The next round of project development will likely use contacts developed via the rest of the Blueprint effort to reach a bit deeper into the agricultural community.



DEVELOPMENT OF MODEL INTEGRATED PROJECTS

As the final product of the WRPC process, the facilitators led an effort to integrate projects within the Gabilan Watershed. The project integration process proceeded in two phases:

1) review of all existing IRWM Plan projects located in the Gabilan Watershed to identify integration options (see Table 5 – 2012 WRPC Project List, Sorted by Program and Table 4 – 2012 WRPC Project List Integration Matrix), and

2) discussions with a wide variety of project proponents to identify possible partners and integrated project components.

REVIEW OF EXISTING PROJECTS

The review of existing projects resulted in "groupings" of projects, organized by integrative themes or "integratable" places, e.g., Moro Cojo or the City of Salinas (where diverse projects could all be implemented in the same place, addressing different objectives).

The outcome of this review process was the development of six preliminary integrated project "bundles" or "suites," containing components of 18 previous IRWM Plan projects. These options are undergoing continued refinement as stakeholders within the region will need to reach consensus as to the specific characteristics of the possible projects. The six potential project suites are as follows (project numbers correspond to those numbers in Table 5):

- Principal creek systems (Santa Rita, Natividad, Tembladero, Gabilan, Salinas River, Rec Ditch):
  - Applicable projects: 2, 11, 15, 28, and 31
  - Possible narrative: These projects are general enough to be tailored to any of the six major waterways within the watershed. An integrated project might consist of reducing septic leakage in disadvantaged communities (2) along urban waterways to address one major source of water pollution. At the same time, combining that effort with projects to restore watersheds with native plants (11), constructed wetlands (15) and improvements to engineered flood-control channels (28) would address down-stream water quality. Finally, funding a research partnership with California State University Monterey Bay (CSUMB) to

study water quality best management practices (BMPs) (31) would provide longitudinal data on the health of the watershed.

- Moss Landing:
  - Applicable projects: 13, 16, and 17
  - Possible narrative: Monterey County Water Resources Agency (MCWRA) and Monterey County Public Works could integrate three physical infrastructure projects proposed for the Moss Landing Area, consisting of improvements to the Potrero Road Tide Gates (13), the guide rail at the sanitation district (16) and the SCADA project (17). Together, these projects promise to reduce flooding and accidental sewage releases.
- Elkhorn Slough:
  - Applicable projects: 1, 14, and 27
  - Possible narrative: Combining these three projects in or adjacent to the Elkhorn Slough would yield a holistic approach to wetland health. A sustainable agriculture demonstration station (1) next to the slough would develop and disseminate knowledge about BMPs; restoring coastal dunes and wetlands in the slough (14) would improve habitat quality and ecosystem services; and mapping drainages within the slough would improve understanding of nutrient and sediment flows (27).
- Southwest Salinas:
  - Applicable projects: 22, 24 and 26
  - Possible narrative: The City of Salinas has proposed three similar, related infrastructure projects in the southwest part of the city, near Davis Road, which are ideal candidates for integration. They would consist of replacing a sewage pipeline (22), improving treatment facilities (24) and diverting urban run-off to detention ponds (26), which would reduce pollutant load entering the Salinas River.
- Boronda:
  - Applicable projects: 2, 17 and 23
  - Possible narrative: The Boronda district of Salinas, currently on the city's outskirts, is a high growth sector of the city which may facilitate the addition of 50,000 residents in coming decades. The City has proposed to improve the sanitation district's guide rail system (23) and implement the SCADA program there (17). Combined with assistance for disadvantaged communities to address septic leakages, these projects present a holistic strategy to reduce water contamination from both point and non-point sources.
- Coastal zone:
  - Applicable projects: 3, 8, 14 and 18
  - Possible narrative: These projects are geographically specific to the coastal zone where the Gabilan watershed drains into Monterey Bay. If partnerships between the proposing organizations could be formed, the result might be a stronger alliance for the health of coastal ecosystems through projects such as planning for sea level rise (3), monitoring water quality with buoys (8), restoring dunes (14) and cleaning up beaches (18).

In addition, during the interview and contact process several jurisdictions indicated a willingness and desire to rethink their project options in light of the integrated perspective. These conversations are now ongoing through the region.

INTERVIEWS WITH INDIVIDUAL PROJECT PROPONENTS – INTEGRATED PROJECT DEVELOPMENT OPTIONS

Following this initial project review and aggregation exercise, members of the project team engaged in a series of targeted interviews to advance the integration discussion and begin the process of identifying and resolving project development challenges. A series of one-on-one meetings were held across the region to discuss possible projects with the various proponents and stakeholders with respect to integration options.

As a result of these meetings, a systematic process has been identified to begin development of integrated projects with multiple stakeholders. This process will continue via coordination with the WRPC Committee. The results of the process will be integrated into the IRWM Plan as consensus is reached as to specific project descriptions, measurable outcomes and confirmed partners. A key focus of the effort will also be addressing the needs of disadvantaged communities within the project area. Preliminary indications are that the City of Salinas, the City of Castroville, the Moro Cojo area and Tembladero Slough will be areas of most immediate focus in this effort.

TABLE 2. Contacted Organizations (including regulatory and non-regulatory entities)

Entity Name	Dept/Division	Contact Person(s)	Email	Phone	Physical Address
LOCAL AGENCIES					
City of Salinas	Dept of Public Works: Engineering & Transportation, Environmental & Maintenance Svcs	Michael Ricker, Environmental Resource Planner	mikeri@ci.salinas.ca.us	831-758-7450	200 Lincoln Avenue, Salinas, CA 93901
City of Salinas	Dept of Public Works	Gary Petersen, Director of Public Works	garyp@ci.salinas.ca.us	831-758-7241	200 Lincoln Avenue, Salinas, CA 93901
City of Salinas	Planning Dept	Courtney Grossman	courtg@ci.salinas.ca.us	831-758-7486	200 Lincoln Avenue, Salinas, CA 93901
City of Salinas	Community & Economic Development Dept: Permit & Inspection Services	Walter Grant, Senior Engineer	walterg@ci.salinas.ca.us	831-758-7485	200 Lincoln Avenue, Salinas, CA 93901
Castroville Community Services District	N/A	Eric Tynan	cwderic@redshift.com	831-633-2560	PO Box 1065, Castroville, CA 95012
CSUMB Watershed Institute	N/A	Laura Lee Lienk	laura_lienk@csumb.edu	831-582-3689	Watershed Institute Building (Building 42), 100 Capmus Center, Seaside, CA 93955
CSUMB Return of the Natives	N/A	Laura Lee Lienk	laura_lienk@csumb.edu	831-582-3689	Watershed Institute Building (Building 42), 100 Capmus Center, Seaside, CA 93955
Elkhorn Slough National Estuarine Research Reserve	N/A	Bryan Largay	bryan@elkhornslough.org	831-728-2822 X 308	1700 Elkhorn Rd, Watsonville, CA
Monterey Bay Citizen Watershed Monitoring Network	N/A	Lisa Emanuelson	lisa.emanuelson@noaa.gov	(831) 647-4227	99 Pacific Street, Bldg. 455A, Monterey, CA 93940
Monterey Bay National Marine Sanctuary	N/A	Bridget Hoover	bridget.hoover@noaa.gov	831-647-4217	99 Pacific Street, Bldg. 455A, Monterey, CA 93940
Monterey County	Ag Commissioner's Ofc	Christina McGinnis	AgComm@co.monterey.ca.us	831-759-7384	1428 Abbott Street, Salinas, CA 93901
Monterey County	Water Resources Agency	Rob Johnson	johnsonr@co.monterey.ca.us	831-755-4860	893 Blanco Circle, Salinas, CA 93901
Monterey County	Environmental Health	Roger Van Horn; Richard Le Warne	vanhornrw@co.monterey.ca.us	831-755-4579	1270 Natividad, Rm 42B, Salinas, CA 82805
Monterey County	Parks	John Akeman	AkemanJD@co.monterey.ca.us	831-755-4911	320 Lincoln Ave., Salinas, CA 93901
Monterey County	Resource Mgmt Agency (includes Planning, Building, Public Works)	Tom Moss and Carl Holm	mosst@co.monterey.ca.us; Holmcp@co.monterey.ca.us	831-755-5847; 831-755-5103	168 W. Alisal, 2nd Floor, Salinas, CA 93901
Monterey County	Community and Economic Development	Alan Stumpf, Director	stumpfa@co.monterey.ca.us	831-758-7334	200 Lincoln Avenue, Salinas, CA 93901
Moss Landing Harbor District	N/A	Linda G McIntyre, General Mgr	mcintyre@mosslandingharbor.dst.ca.us	831-633-5417	7881 Sandholdt Road, Moss Landing, CA 95039

TABLE 2. Contacted Organizations (including regulatory and non-regulatory entities)

Entity Name	Dept/Division	Contact Person(s)	Email	Phone	Physical Address
Northern Salinas Valley Mosquito Abatement District	N/A	Kenneth Klemme	ken@montereycountymosquito.com	831-422-6438	342 Airport Boulevard, Salinas, CA 93905
Resources Conservation District	Monterey County	Paul Robins	info@rcdmonterey.org	831-424-1036	744 LaGuardia Street, Bldg A, Salinas, CA
STATE AGENCIES					
State Water Resources Control Board /Regional Water Quality Board	Central Coast District Office	Katie McNeill, Grants Program Coordinator	katie.mcneill@waterboards.ca.gov	805-549-3336	895 Aerovista Place, Ste. 101, San Luis Obispo, CA 93401
California Coastal Commission	Central Coast District Office	Katie Butler, Coastal Planner; Tamara Down, Water Quality Specialist	katie.butler@coastal.ca.gov; tamara.doan@coastal.ca.gov	(831) 427-4863	725 Front Street, Suite 300, Santa Cruz, CA 95060-4508
California Coastal Conservancy	N/A	Trisha Chapman	tchapman@scc.ca.gov	510-286-1015	1330 Broadway, 13th Floor, Oakland, CA 94612-2530
California Dept of Fish & Wildlife	Marine Region - Monterey Field Office and Laboratory	Brandon Sanderson	brandon.sanderson@dfg.ca.gov	805-594-6141	20 Lower Ragsdale Dr., Suite 100, Monterey, CA 93940
California Dept of Public Health	Drinking Water Program, District 05	Jan Sweigert	jan.sweigert@cdph.ca.gov	831-655-6939	1 Lower Ragsdale Dr., Bldg 1., Ste. 120, Monterey, CA 93940
California Native Plant Society	Monterey Bay Chapter	Christopher Hauser, President; Corky Matthews, Conservation Chair	chauser@slconservancy.org; mmatthev	831-392-6931; (831) 659-2528	PO Box 221303, Carmel, CA 93923
FEDERAL AGENCIES					
NOAA Fisheries	West Coast Region	Joel Casagrande	joel.casagrande@noaa.gov	(707) 575-6016	777 Sonoma Avenue, Room 325 Santa Rosa, CA 95404
USDA Natural Resources Conservation Service	Monterey County	Robert LaFleur, District Conservationist	robert.lafleur@ca.usda.gov	(831) 424-1036 x 101	744 LaGuardia Street, Bldg A, Salinas, CA 93905
USFWS	Salinas Service Center	Chad Mitcham	Chad_Mitcham@fws.gov	805-644-1766	744 LaGuardia Street, Bldg A, Salinas, CA 93905
USFWS Coastal Program	Salinas Service Center	Shawn Milar	Shawn_Milar@fws.gov	(831) 648-0623	744 LaGuardia Street, Bldg A, Salinas, CA 93905
US Army Corps	San Francisco Division, Ecosystem Restoration Projects	Unable to contact	N/A	(415) 503-6725	1455 Market Street, San Francisco, CA 94103

TABLE 3. Permitting Information (regulatory agencies only)

Entity Name	Comments	Permitting Information Plans, policies, mandates & regs	Forms/permits needed	More information
Local Agencies				
City of Salinas (Bldg, Planning, Environmental Health, and Public Works)	Permit type depends on type of project, but most City permits are ministerial, not discretionary	Jurisdiction within City of Salinas limits; ditches running through city not within City's jurisdiction - most are County WRA. City stormwater and development ordinances would apply. City already applies LID strategies to all development projects.	Depends on type of project	http://www.ci.salinas.ca.us/services/engineering/planning/permit_forms.cfm
Monterey County Environmental Health	N/A	State laws pertaining to septic systems and water quality	Depends on type of project	http://www.mtyhd.org/index.php/environmental-health/environmental-health-news/administration-news/item/environmental-health-fees-for-health-permits-and-services
Monterey County Resources Mgmt Agency (Planning, Bldg, Public Works)	Often works with Coastal Commission on alignment.	County ordinances	Permit type depends on type of project	http://www.co.monterey.ca.us/rma/
Monterey Bay National Marine Sanctuary	IRWMP projects are unlikely to require a Sanctuary permit. Discharges are regulated through RWQCB, and Sanctuary is an authorizing agency, signing off and providing mitigation or requests for information. Examples of activities requiring a permit: construction, discharge, sediment collection, rock removal, moorings and buoys, temporary placement of objects.	US Code of Federal Regulations, Title 15, Part 922, National Marine Sanctuary Program Regulations.	NOAA National Marine Sanctuaries Permit Application OMB#0648-0141	On regulations and boundaries: http://montereybay.noaa.gov/resourcepro/regs-boundry.html; On permitting: http://montereybay.noaa.gov/resourcepro/permit/permits_need.html; http://montereybay.noaa.gov/intro/mp/regs.html#prohibitions
Moss Landing Harbor District	N/A	Jurisdiction Elkhorn Slough and Moss Landing and 2000 ft out to Ocean	Facilities Use Permit Application	http://www.mosslandingharbor.dst.ca.us/downloads/Facilities%20Use%20Permit%20Application%20-%20Master%20Form%20-%202013JUL01.pdf
State Agencies				
State Water Resources Control Board /Regional Water Quality Board	RWQCB regulates all projects with point discharges to surface water or land. Non-point discharges (including ag runoff, even from tile drains or ditches) not regulated; have close relationship working with Monterey County Dept of Public Health and Dept of Pesticide Regulation on projects affecting drinking water. Also coordinate regularly with USEPA on NPDES permits. Permits required for dicharge of waste to surface waters via discrete conveyances such as ditches, pipelines (called point source pollution). Individual permits are tailored for specific discharges where as general permits cover multiple facilities within a single category like storm water point sources)	Discharges regulated under CA Water Code. Additionally, discharges to surface waters are regulated also under Clean Water Act and 40 Code of Federal Regulations (CFR).	Form 200/Waste Discharge Requirements; NPDES Permit, Form 1, 2A-F depending on type of discharge (see Application Q & A)	Discharges to land: Report of Waste Discharge (WDR)/Form 200: http://www.waterboards.ca.gov/publications_forms/forms/docs/form200.pdf; Discharges to surface water: NPDES permit plus WDR: http://www.waterboards.ca.gov/water_issues/programs/npdes/#individual; http://www.waterboards.ca.gov/board_decisions/adopted_orders/index.shtml http://www.waterboards.ca.gov/centralcoast/ http://www.waterboards.ca.gov/centralcoast/board_decisions/adopted_orders/index.shtml
California Coastal Commission, Central Coast District Office	They do not "align" (nor are interested in aligning) with other agencies' permitting processes.	PRC Sections 30000-30900, and subject to Permit Streamling Act (180 days for project decision after application deemed complete)	Application for Coastal Development Permit (same permit for all projects)	http://www.coastal.ca.gov/cdp/CDP-ApplicationForm-cc.pdf
California Dept of Fish & Wildlife	N/A	California Code of Regulations (CCR), Title 14 (Natural Resources); California Endangered Species Act	Streambed Alteration Agreement; CESA take permits; CEQA review; Application for Governmental Entity, Special District, or Nonprofit Organization Requesting to Hold or Manage Mitigation Land; Special Permits for Scientific Collecting	http://www.dfg.ca.gov/habcon/envirRevPermit/; http://www.dfg.ca.gov/licensing/specialpermits/
Federal Agencies				
NOAA Fisheries	N/A	Magnuson Fishery Conservation Act, Marine Mammal Protection Act, Endangered Species Act	Permits for Incidential Take of Endangered or Threatened Species; NOAA Community-Based Restoration Program Progress Reports; Estuary Restoration Act Database Projects	http://www.nmfs.noaa.gov/gpea_forms/

TABLE 3. Permitting Information (regulatory agencies only)				
			Permitting Information	
US Fish & Wildlife Service	N/A	Endangered Species Act, CITES, Marine Mammal Protection Act, Migratory Bird Treaty Act, Wild Bird Conservation Act, Bald and Golden Eagle Protection Act	Incidental take permit, transport permit	http://www.fws.gov/permits/ApplicationForms/ApplicationA.html, http://www.fws.gov/permits/ltr/ltr.html
US Army Corps	Standard permits required for individual projects that are likely to have a significant impact; general permits are for projects that fall within certain common categories or would have a minimal impact; LOPs are types of individual permits for an abbreviated permitting procedure	Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the obstruction or alteration of navigable waters of the United States without a permit from the Corps of Engineers; Section 404 of the Clean Water Act (33 U.S.C. 1344): Section 301 of this Act prohibits the discharge of dredged or fill material into waters of the United States without a Section 404 permit from the Corps of Engineers; Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413) authorizes the Corps of Engineers to issue permits for the transportation of dredged material for the purpose of dumping it into ocean waters.	Regulates the discharge of dredged and fill material into waters of the United States, including wetlands.	http://www.spn.usace.army.mil/Missions/Regulatory/HowtoApplyforaPermit.aspx; http://www.spn.usace.army.mil/Portals/68/docs/regulatory/engform_4345_2012oct.pdf

Table 4. WRPC Project Integration Matrix

		Type									Location						Issues Addressed: Water Quality						Water Use/Supply		Flooding		Climate Change									
Applicant	**Title**	**PL**	**CNST**	**RST**	**STDY**	**MTR**	**BMP**	**ACQ**	**EDU**	**DMO**	**Ag**	**Bay**	**Slghs/dtchs**	**Urban**	**Wtrshd-level**	**Other**	**Nutrient mgmt**	**Ag runoff**	**Urban runoff**	**Sltwtr intrusion**	**Sewage overflow**	**Sediment / Erosion**	**Ag**	**Urban**	**Ag**	**Urban**	**Sea level/ rise**	**Storm surge**	**Grdwater Recharge**	**Coastal erosion**	**Rec**	**Hab Impvmt / Restoratn**	**Cons / Open Space**	**Tracking IRWMP projects**	**WW trmt**
Big Sur Land Trust, City of Salinas, CSUMB Watershed Institute and RON	Carr Lake Property Acquisition			X wtlds & riparn			X strmwtr det	X						X Salinas					X			X													
Central Coast Wetlands Group (CCWG)	Sustainable Agriculture and Sustainable Development – Field Station and Demonstration Area				X	X		X		X	X						X	X				X	X		X									
CCWG	Development and Evaluation of Climate Change Response Strategies	X		X											major wtrshds												X	X		X					
CCWG	Coastal Confluence Monitoring					X											X	X	X			X													
CCWG	Coastal Wetland Erosion Control and Dune Restoration			X wtlnds & sand dunes								X dunes @ Moss Ldg								X										X						
CCWG	Water Quality Enhancement of the Tembladero Slough Phase II	X	X	X			X				X		X	X Castroville			X	X	X			X			X	X					X				
CCWG	Historic and Existing Drainage Network Mapping Project: Phase 1				X										major wtrshds										X	X									
CCWG	Study of environmental services from nutrient reducing BMPs				X		X				X						X	X				X													
CCWG	Northern Gabilan Mountain Watershed Management Project	X		X	X					X	?				X		X	X					X								X				
Central Coast RWQCB	Healthy Functioning Watersheds: Green Infrastructure and the preservation and protection of hydrologic processes	X					X							X					X					X		X			X		X				
Central Coast RWQCB	Healthy Functioning Watersheds: Irrigation efficiency and nutrient management on aericultural lands						X		X		X						X	X				X	X									X				
City of Salinas	Replacement Raw Sewage Pipeline to Monterey Regional WWTP and City of Salinas Industrial Wastewater Treatment System Expansion		X											X																					X
City of Salinas	Integrated Industrial Wastewater Conveyance and Treatment Facility Improvements		X											X						X			X	X					X						X
City of Salinas	Dry Weather Runoff Diversion Program	X	X											X					X				X	X												
Coastal Watershed Council	Community-based Water Research and Education	X			X				X						X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X			X
CSUMB Return of the Natives	Return of the Natives Restoration Education Project – an IRWMP partner			X					X					X	X																X				
CSUMB Watershed Institute	Monitoring Water Quality Improvements (of IRWMP projects)					X									X		X	X	X	X		X												X	
Ecology Action	Green Gardener Project								X					X					X					X											
Marina Coast Water District	Monterey Bay Regional Desalination Project		X									X												X											
Monterey Bay Sanctuary Foundation	Making Monitoring Count	X				X									X																			X	
Monterey Coastkeeper	Maintenance and Flood Control Planning for the Old Salinas River Channel and Reclamation Ditch	X		?			X		X				X				X	X							X						X				
Monterey County Public Works	Moss Landing County Sanitation District Wastewater System Upgrade Project		X									X									X														X
Monterey County Public Works	SCADA Project					X								X							X														
Monterey County Public Works	Boronda County Sanitation District Guide Rail Upgrade Project		X											X							X														
Monterey Co Water Resources Agency	Coastal Dedicated Monitoring Well Drilling		X			X						?				Wells thru Co	?			X			X	X											
Monterey Co Water Resources Agency	Implement Reclamation Ditch Improvement Plan Advisory Committee Recommendations	X	X									X - Pinto lldegates	X									X			X										
Monterey Co Water Resources Agency	Portrero Road Tidegates Construction Project											X										X				X									
RCD of Mont Co	Monterey County Integrated Watershed Restoration Proeram	X		X											X							X from road erosion										X				
RCD of Mont Co	Rural Roads Erosion Assistance Program for Monterey County						X		X							Rural roads						X from road erosion													
RCD of Mont Co	Livestock and Land: Rangeland and Livestock Facility Water Quality, Vegetation Management and Wildlife Enhancement Program		X	X			X		X		X						X	X				X									X				
RCD of Mont Co	Monterey County Farm Water Quality Assistance Program				X				X		X						X	X				X	X													
Rural Community Assistance Program	Greater Monterey Bay Disadvantaged Community Wastewater Management Pilot Proram	X				X				X						Rural areas					X															
Save Our Shores	Save Our Shores Watershed Protection Program – Annual Coastal Cleanup Day in Monterey County			X								X																			X	X			

Legend: PL = Planning, FC = Facility Construction, RES = Restoration, S/A = Study/Assessment, MTR = Monitoring, EDU = Education/Training
BMP = Best Management Practices, ACQ = Acquisitions, DMO = Demonstration/Pilot Project

TABLE 5. 2012 WRPC Project List Sorted by Program

								all	All programatic areas
				Implementation	concept	Total		UW	Upper Watershed
			Could fall in Gabilan	5	8	13		SV	Valley Floor/Reclamation Ditch
								CR	coastal resilience
			In the Gabilan	11	10	21		/M	module
						34			

	Project Category	Project Applicant	Project Title	Primary Contact	Email	Phone	Implementation or Concept Proposal?	STATUS FOR 2011 PROJECT LIST	PROJECT SUMMARY
1	ALL	Central Coast Wetlands Group	Sustainable Agriculture and Sustainable Development - Field Station and Demonstration Area	Kevin O'Connor, CCWG	koconner@mlml.calstate.edu	831-771-4495	Concept	Keep in IRWMP	This project proposes to establish a large acreage (100-640 acres) sustainable agriculture and sustainable development field research station to develop innovative sustainable land use practices for agriculture, residential and commercial development on a landscape scale. The site will provide continuous monitoring of practices to ensure that the desired outcomes are achieved, establish long term data sets and allow for new innovations and practices to be developed. The field station will also provide a demonstration area that can be reviewed and studied by other land owners and land managers to determine applicability to their individual projects or farms. The primary goal of this project is to improve water resources on and offsite in the context of modern land use.
2	ALL / I	Rural Community Assistance Corporation (RCAC)	Greater Monterey Bay Disadvantaged Community Wastewater Management Pilot Program	Karen McBride	karenm@rcac.org	(916) 447-9832 ext. 1012	Implementation	New project!	Too often we read about septic effluent influencing our agricultural lands and creating public health and other environmental hazards. If these disadvantaged communities had the opportunity to create an Inspection and Monitoring Program for their community onsite wastewater systems, they would be successful in limiting public health hazards and environmental pollution. The Greater Monterey Bay Disadvantaged Community Wastewater Management Pilot Program will form a collaboration of experts, students, community leaders and local government to implement an Inspection and Monitoring program of community onsite wastewater systems. This program will include creating a local entity to manage multiple systems to ensure the systems are operating properly. The program will create an on-going operation and maintenance program, including ground water monitoring, for selected disadvantaged communities that are served by individual septics that may not afford traditional sewer systems.
3	ALL / M	Central Coast Wetlands Group	Development and Evaluation of Climate Change Response Strategies in the Elkhorn Slough, Gabilan and Salinas River Watersheds.	Ross Clark			Implementation	New project!	This project implements key steps in climate change planning outlined by the DWR 2011 Climate Change Handbook for Regional Water Planning. This project will further and more accurately investigate regional climate change impacts and seeks to recommend adaptation response strategies (a priority action defined within the TAC driven climate adaptation chapter of the GMCIRWMP) to address the impacts of sea level rise, storm surge, coastal inundation and coastal erosion for the Elkhorn Slough, Gabilan, and Salinas River Watersheds. The first phase of the project focuses on collecting and compiling data to further evaluate coastal inundation threats and responses in these watersheds. This data includes an inventory of water control structures that manage current flood control conveyance and topographic data using Light Detection and Ranging technology (LiDAR). The second phase of this project focuses on creating a climate change adaptation and response strategy plan followed by an economic evaluation of these different strategies. The outcome of this project will be a comprehensive report recommending feasible and long-term adaptation and response strategies to climate change impacts, necessary to prepare for future threats rather than respond to emergencies. This project will help support the climate change planning efforts of multiple stakeholders in the GMC IRWMP region. We intend to seek separate grant funds suggested by DWR available for climate planning.
4	ALL / M	Resource Conservation District of Monterey County	Monterey County Integrated Watershed Restoration Program	Paul Robins, Executive Director, RCD	paul.robins@rcdmonterey.org	831-424-1036, ext. 124	Concept	Keep in IRWMP	The Integrated Watershed Restoration Program (IWRP) for Monterey County is modeled after the IWRP pioneered in Santa Cruz County. The flagship component of IWRP is the creation of an interagency process to identify, design, and permit high priority water quality, fish passage, and wetland restoration projects. The Santa Cruz County IWRP partner organizations and agencies recognized that implementing the recommendations of multiple assessments and plans is best accomplished by bringing together federal, state, and local resource and permitting agencies to identify the highest priority projects and assisting with locating funding sources, providing technical assistance, and facilitating permitting. While in many ways this sounds potentially redundant with the mission of the Greater Monterey County IRWMP, the key distinctions with IWRP are 1) the focus on restoration projects, 2) the closely involved role of regional Coastal Conservancy staff in supporting the IWRP process and projects, and the participation of state and federal (along with local) agency representatives in the IWRP Technical Advisory Committee for a more vertically-integrated approach to facilitating, directing and supporting selected projects. As such, IWRP can be a critical asset for supporting GMCIRWMP restoration-focused projects, and it could facilitate coordination between neighboring IRWMP regions. Typical IWRP restoration projects can include rural road erosion reduction, fish passage improvement, and wetland and lagoon restoration. The individual watershed projects will be identified by the IWRP Technical Advisory Committee based on recommendations in local watershed plans, including the Coho and steelhead recovery plans developed by DFG and NMFS, or otherwise supported by state or federal resource agencies or local watershed groups. The IWRP will also support a number of potential projects recommended in other Monterey County IRWMPs for the Pajaro River and the Carmel Valley and Monterey Peninsula.
5	ALL / M	Resource Conservation District of Monterey County	Rural Roads Erosion Assistance Program for Monterey County	Paul Robins, Executive Director, RCD	paul.robins@rcdmonterey.org	831-424-1036, ext. 124	Concept	Keep in IRWMP	RCDMC will serve as the program lead with regular guidance from a Rural Roads Technical Advisory Committee, in providing education and training on rural roads drainage techniques, on-site technical assistance, and funding for road erosion assessments, project design and permitting, and road drainage project implementation. The outreach aspects of the program will include demonstration workshops and trainings, outreach material development and public communications. The TAC will help to develop and review criteria to select road association projects that will receive funding as well as assess program success. Road association projects that are selected will require 50% of the project costs to be contributed by the road association. This match share will be from in-kind services and/or cash contributions. In addition to the match share, a long-term maintenance agreement will be required as part of the project. Success will be measured by the amount of reduction in sedimentation coming from rural unsurfaced roads and from surfaced roads that are not maintained.
6	ALL / M	Resource Conservation District of Monterey County	Livestock and Land: Rangeland and Livestock Facility Water Quality, Vegetation Management and Wildlife Enhancement Program	Paul Robins, Executive Director, RCD	paul.robins@rcdmonterey.org	831-424-1036, ext. 124	Implementation	New project!	The purpose of this program is to achieve immediate and lasting reductions in nutrient, sediment and pathogen pollution to surface and ground waters and enhance wildlife habitat through implementation of BMPs on livestock facilities and rangelands in the Greater Monterey County IRWM region. The proposed program utilizes an incentives-based approach to achieve the cultural change needed for livestock facilities to voluntarily adopt management measures that improve the healthy functioning of watersheds. Projects are implemented in high priority areas identified by the TMDLs and other regional and local plans. Water quality and wildlife goals will be achieved through implementation projects, project design, technical assistance, recruitment and training. We will employ a systematic evaluation process to measure program effectiveness through participant surveys, before and after site load reduction modeling and site-specific erosion and runoff assessments.
7	ALL / M	CSUMB Watershed Institute	Monitoring Water Quality Improvements with BMPs	Marc Los Huertos, Watershed Institute	mloshuertos@csumb.edu	831-582-3209	Concept (Could be a component of an Implementation Project)	Keep in IRWMP	The Watershed Institute is offering to conduct monitoring for IRWMP projects, as requested and as needed, to test water quality as a result of urban, suburban, rural, and agricultural management practices.
8	ALL / M	Central Coast Wetlands Group	Coastal Confluence Monitoring	Ross Clark, CCWG	rclark@mlml.calstate.edu	831-771-4463	Implementation	New project!	We anticipate that the cumulative results of regional water quality enhancement efforts will lead to improvements in water quality of receiving waters. We currently do not have the robust monitoring systems in place to successfully document these improvements. This project aims to expand the coverage of the continuous monitoring LOBO (Land/Ocean Biogeochemical Observatory) buoy monitoring array from the current location at the end of the Gabilan/Old Salinas River Channel (and several within the Elkhorn receiving waters) to the two additional priority coastal confluence locations that drain significant portions of the Salinas Valley (the Moro Cojo Slough and Salinas River mouth). Additional less costly nutrient monitoring equipment will be installed at the confluence of multiple sub-drainages in order to further document the cumulative effects of nutrient management strategies within the sub-drainages of each watershed. Funds will support the construction of a new LOBO bouy for the Salinas River and the refurbishment of a buoy currently being used within the Elkhorn Slough which will be redeployed within the Moro Cojo Slough. Funds will also support three years of half time staff and student support for the LOBO system including one station currently deployed within the Elkhorn Slough. This will document the enhancement of water quality within receiving waters due to watershed management practices.
9	ALL / M	Monterey Bay Sanctuary Foundation	Making Monitoring C	Bridget Hoover	bridget.hoover@noaa.gov	(831) 647-4217	Implementation	Keep in IRWMP	This project is necessary to document the IRWMP efforts and their effectiveness throughout the Greater Monterey County region. This project will implement the tracking system developed to inventory projects designed to address the goals of improved water quality, water supply, flood control and environmental protection outlined in the IRWMP. The Monterey Bay National Marine Sanctuary's Synthesis, Analysis and Management (SAM) program initiated this effort in 2006 by conducting an initial compilation and assessment of water quality data collected on the Central Coast. This effort led to the development of the *Strategic Plan for Central Coast Water Quality Monitoring Coordination and Data Synthesis*. This project will further the tasks described in that plan by developing a framework for improving regional capacity to coordinate monitoring, synthesize information, communicate more effectively between key groups, understand environmental changes, and respond to changes and new knowledge with adaptive management. Water quality data have historically been stored in disparate formats at diffuse locations throughout the region, making them difficult to use collectively. Combining this with tools developed in the Tahoe Basin to measure effectiveness of practices and load reductions will be extremely valuable to the IRWM process

TABLE 5. 2012 WRPC Project List Sorted by Program

								all	All programatic areas
				Implementation	concept	Total		UW	Upper Watershed
			Could fall in Gabilan	5	8	13		SV	Valley Floor/Reclamation Ditch
								CR	coastal resilience
			In the Gabilan	11	10	21		/M	module
						34			

	Project Category	Project Applicant	Project Title	Primary Contact	Email	Phone	Implementation or Concept Proposal?	STATUS FOR 2011 PROJECT LIST	PROJECT SUMMARY
10	ALL/M	Coastal Watershed Council	Community-Based Water Research & Education	Greg Pepping, Coastal Watershed Council	gpepping@coastalws.org	(831) 464-9200	Concept	Keep in IRWMP	This project involves Community-Based Participatory Research (CPBR) with a goal of engaging diverse individuals and groups in future discussions of water supply, water quality, and other environmental issues. This approach lends greater legitimacy to future plans and actions by ensuring community involvement and has a proven track record of producing results. Outcomes from this research will help elected officials and water agency boards to best serve their constituents and establish connections that will benefit all future planning and implementation efforts. This process further benefits the entire region, as it empowers and engages the public in crucial water issues where they might not otherwise be informed or active. The Coastal Watershed Council will lead the efforts to administer the CPBR on a specific watershed by watershed basis. Ultimately, this approach could foster the creation of specific watershed management and/or restoration plans, filling a noticeable void within the region. The holistic approach of this CBPR project would also address numerous objectives in all seven goals outlined in the region's IRWM Plan.
11	ALL/M	CSUMB Return of the Natives	Return of the Natives Restoration Education Project—an IRWMP partner	Laura Lee Lienk, RON	llienk@csumb.edu	831-582-3689	Concept (Could be a component of an Implementation Project)	Keep in IRWMP	The Return of the Natives Restoration Education Project (RON) is the education and outreach branch of Watershed Institute of the California State University Monterey Bay. For this IRWMP proposal, RON would like to present their organization as a partner to other IRWMP projects. They offer to bring the marriage of native plant restoration and community engagement which has become known as "community based habitat restoration" to IRWMP projects. RON's social goal is to bring people and nature together on restoration and garden projects in the watersheds of the Monterey Bay. RON's partnership has the capacity to bring tens of thousands of native grasses, forbes, shrubs, and trees to restoration projects. The plants grown by volunteers and RON staff and CSUMB students are eventually planted by these same volunteers on restoration sites. RON has the capacity to grow and out-plant from 25,000 to 50,000 native plants annually.
12	ALL/M	Ecology Action	Green Gardener Project						The Monterey Bay Green Gardener Certification Program provides bilingual, hands-on training in ecological landscaping methods for landscaping industry professionals, public agency landscape maintenance staff, and home gardeners. Green Gardener graduates are trained to be watershed stewards who are actively reducing landscape water demand and preventing urban non-point source pollution in the watersheds of the Monterey Bay National Marine Sanctuary. Individual graduates with business and/or contractors licenses are promoted to the community on www.green-gardener.org. To date, the Monterey Bay Green Gardener Program has matriculated 422 graduates, 225 of whom graduated from certification-level courses held at the Salinas Adult Education Center. In partnership with California Water Service Company, the Mission Trails Regional Occupation Program (ROP), and Hartnell College Center for Sustainable Construction, the project would: 1) Expand Green Gardener training beyond the Gabilan watershed and City of Salinas to the communities of Gonzales, Soledad, and King City. 2) Incorporate hands-on training experiences at water-wise demonstration sites on both public and private properties. Ecological landscape practices reinforced at demonstration sites include strategies for turf replacement with low-water use plants, irrigation system efficiency retrofits, graywater irrigation design, installation and maintenance, rainwater harvesting systems, and stormwater management with low-impact design methods.
13	CR	Monterey County Water Resources Agency	Potrero Road Tide Gates Construction Project	Manuel Quezada, MCWRA	quezadam@co.monterey.ca.us	(831) 755-4860	Concept	Keep in IRWMP	The Reclamation Ditch Improvement Plan by the Reclamation Ditch Improvement Plan Advisory Committee (RDIPAC) addresses the flooding, erosion, and sediment issues impacting the Reclamation Ditch system. The Potrero Road Tide Gates Project submitted here will implement recommendations by the RDIPAC. The Potrero Road Tide Gates Project will reduce the risk of flooding in the City of Salinas and surrounding areas from current and future flow rates in the system, minimizing crop damage and reducing erosion and sedimentation from widened channel sections in the Reclamation Ditch watershed.
14	CR	Central Coast Wetlands Group	Coastal Wetland Erosion Control and Dune Restoration	Cara Clark, CCWG	cclark@mlml.calstate.edu	(831) 771-4428	Implementation	Keep in IRWMP	Our proposed project will enhance and restore wetland and sand dune ecosystems in central Monterey Bay, and control erosion in salt marshes directly behind the dunes around Moss Landing. These marshes are critical buffers to prevent salt water from entering surrounding farmland, especially the Salinas Valley, yet they are eroding away at accelerating rates. Sand dunes help retain fresh water at the coast, recharge groundwater, retard saltwater intrusion, and minimize storm damage from the sea. Currently much of the physical dune structure around Monterey Bay is fairly intact, but is also highly degraded with invasive non-native plants, which continue to spread. Monterey Bay is the largest indentation widely open to the sea on the Pacific Coast of the US, with correspondingly large and ecologically important dune systems, and is the core area of the Monterey Bay National Marine Sanctuary. The target area for this project, the central Monterey Bay, has the lowest and most degraded sand dunes in the region. They will be the first to fail as sea level rises from storms, El Nino cycles, and climate change. Should they fail, salt water will overflow into the Salinas Valley, compromising one of the nation's most productive agricultural centers.
15	CR	Central Coast Wetlands Group	Water quality enhancement of the Tembladero Slough Phase II	Ross Clark	rclark@mlml.calstate.edu	(831) 771-4411	Implementation	New project!	This project is Phase II of *Water quality enhancement of the Tembladero Slough and Coastal Access for the Community of Castroville*, Phase I of which has been funded by the IRWMP Round 1. During Phase I, CCWG will work with County agencies, agricultural land owners and the community of Castroville for design and permitting of a select set of Water Quality/wetland management structures. These projects will utilize a variety of water quality management innovations including the treatment train approach (i.e. detention/sedimentation features, pollutant filtration/ biological degredation of pollutants and water polishing areas). During Phase II of this project, twenty acres in total (approximately six projects) will be constructed based on the plans from Phase I that support and integrate the multiple objectives of the GMCIRWMP, emphasizing urban and agricultural water quality enhancement, flood management, habitat restoration and support of various watershed planning and permit processes. Features are selected based on available space, hydrologic requirements, and adjacent land owner concerns, but preferentially support projects that enhance habitat and open space features as well as improving water quality.
16	CR/I	Monterey County Public Works	Moss Landing County Sanitation District Wastewater System Upgrade Project	Dirk J. Medema	medemad@co.monterey	(831) 784-5647	Concept	New project!	MOSS LANDING COUNTY SANITATION DISTRICT GUIDE RAIL: The goal is to improve the T-rail system and replace it with the guide rail system. This project will be under the Department of Public Works. This project is already in process however it is at the beginning stage. Planning is underway between the Wastewater Collection crew and the Bridge crew to complete the project in a timely manner. This guide rail system will last as long as the T- rail system if properly maintained. It is an affective way to ensure that pump has a good seal and the flow is diverted with out seepage. Estimated project completion is within 90 days with proper planning. This project will minimize the pump seepage and reduce the amount of Sewer System Overflow occurrences.
17	CR/I	Monterey County Public Works	SCADA Project	Dirk J. Medema	medemad@co.monterey	(831) 784-5647	Concept	New project!	SCADA -program for all County Sanitation Systems which ensures accurate monitoring for the Sanitary Sewer System. Implementing this project will be an effective way to reduce the amount of man hours as well as efficiently monitoring the system performance and avoid emergency events.
18	CR/M	Save Our Shores	Save Our Shores Watershed Protection Program - Annual Coastal Cleanup Day in Monterey County	Laura Kasa, Executive Director, Save Our Shores	lkasa@saveourshores.org	(831) 462-5660 ext. 8#	Implementation	Keep in IRWMP	Save Our Shores (SOS) has been coordinating Annual Coastal Cleanup Day (ACC) in Santa Cruz since 2007 and has grown the event from 1,929 volunteers and 42 beach sites to 3,800 volunteers and 52 beach and river sites, in just two years. While SOS has been running ACC in Santa Cruz, California State Parks had been running ACC in Monterey since 2001 and no longer had the staff or resources to continue running this event after 2009. Because of the success that SOS has had in expanding the event in Santa Cruz, State Parks and the Coastal Commission asked SOS to take over this responsibility in Monterey in 2010. SOS ran the program in Monterey based on best practices from Santa Cruz and increased the number of volunteers from the previous 1,400 average to over 2,000 the first year and increased the number of sites by including river cleanups through our partnership with Return of the Natives, and involving businesses through sponsorship and employee participation. In the coming years, volunteers will continue to gain a valuable experience in understanding the problem of marine debris and learning ways that they can help solve the problem, and the thousands of visitors that Monterey beaches attract will benefit by experiencing cleaner beaches.
19	I	Marina Coast Water District	Monterey Bay Regional Desalination Project	Jim Heitzman, MCWD	jheitzman@mcwd.org	831-883-5938	Concept	Keep in IRWMP (but changed from implementation to concept proposal)	The Regional Desalination Project will provide approximately 10,500 AFY of potable water on an average annual basis to both the California American Water Company (CalAm) and Marina Coast Water District (MCWD) service areas. The Regional Desalination Project generally consists of a reverse osmosis desalination plant to treat a mix of seawater and brackish groundwater water extracted from the seawater-intruded 180-Foot Aquifer of the Salinas Valley Groundwater Basin to produce 10 million gallons per day (mgd) of product water. Intake facilities include intake wells and an intake pipeline that will convey the extracted water to the desalination plant for treatment. The use of wells to produce the intake water has several advantages over other intake options; the subsurface intake eliminates impingement and entrainment of marine organisms, reduces the pretreatment requirements due to the improved water quality, and minimizes plant energy requirements through the use of brackish water in place of pure seawater as an intake supply. The desalination facilities will include a pretreatment system, the RO system, a post-treatment system, clearwell tanks, and brine disposal. The brine from the desalination plant will be blended with treated effluent from the Monterey Regional Water Pollution Control Agency's (MRWPCA's) Regional Treatment Plant) and disposed of via MRWPCA's existing ocean outfall. Distribution pumping and a transmission pipeline will convey the desalinated (product) water to MCWD's and CalAm's service area for potable use. The existing aquifer storage and recovery (ASR) system operated by Monterey Peninsula Water Management District (MPWMD) will be expanded as part of the project to provide additional storage capacity for the desalinated water produced by the Regional Desalination Project. The ASR facilities will be operated to provide storage capacity in the winter and peak water supply in the summer. During the wet season, water will be delivered to ASR from the desalination plant and/or the Carmel River; water from the desalination plan will be conveyed to the Terminal Reservoir and then pumped by a new ASR pump station to the wells via a new ASR pipeline. A portion of the facilities will be powered by Monterey Regional Waste Management District's cogeneration facility, reducing the carbon footprint of the Regional Desalination Project and greenhouse gas emissions.

TABLE 5. 2012 WRPC Project List Sorted by Program

								all	All programatic areas
				Implementation	concept	Total		UW	Upper Watershed
			Could fall in Gabilan	5	8	13		SV	Valley Floor/Reclamation Ditch
								CR	coastal resilience
			In the Gabilan	11	10	21		/M	module
						34			
	Project Category	Project Applicant	Project Title	Primary Contact	Email	Phone	Implementation or Concept Proposal?	STATUS FOR 2011 PROJECT LIST	PROJECT SUMMARY
20	SV	Big Sur Land Trust, City of Salinas, CSUMB Watershed Institute & RON	Carr Lake Property Acquisition	Donna Meyers, Big Sur Land Trust	dmeyers@bigsurlandtrust.org	831 625 5523 x 105	Concept	Keep in IRWMP (but changed from implementation to concept proposal)	The goal of this project is the acquisition of the 450-acre Carr Lake basin, and its conversion into parkland for the multiple uses of recreation, restored wetlands and riparian wildlife habitat, storm water detention, open space, and water quality enhancement for downstream areas including the Reclamation Ditch and the Monterey Bay National Marine Sanctuary. The restored Carr Lake Regional Park will connect via trails to Natividad Creek Park, which lies immediately upstream. Re-creation of wetlands and floodwater detention areas will provide reduction of flood impacts to the City of Salinas and to downstream agricultural and community lands. Water quality will also improve due to restored wetlands and natural vegetation, via sediment capture and the biological treatment of constituent chemicals.
21	SV / I	Monterey County Water Resources Agency	Implement Reclamation Ditch Improvement Plan Advisory Committee Recommendations	Manuel Quezada, MCWRA	quezadam@co.monterey.ca.us	(831) 755-4860	Concept	Keep in IRWMP	The Reclamation Ditch Improvement Plan was developed by the Reclamation Ditch Improvement Plan Advisory Committee (RDIPAC) to address the flooding, erosion, and sediment issues impacting the Reclamation Ditch system, a 157 square mile watershed. The desired project types submitted here will implement recommendations by the RDIPAC. Some of the recommendations include the following: Replace Potrero Tide Gates, Increase channel capacity and embankment stabilization (various locations), Bridge Replacements (12), Modify Main Street box culvert, Increase pumping capacity at pump stations (2), Comprehensive watershed assessment and management plan, Survey of existing right-of-ways.
22	SV / I	City of Salinas	Replacement Raw Sewage Pipeline to Monterey Regional WWTP and City of Salinas Industrial Wastewater Treatment System Expansion	Michael Ricker	mikeri@ci.salinas.ca.us	(831) 758-7233	Concept	New project!	The City has identified two potential projects at a conceptual development level—expanding the City's capacity to treat and reuse industrial wastewater and increasing conveyance capacity for transferring raw sewage from the City to the Monterey Regional Water Pollution Control Agency (MRWPCA) wastewater treatment plant (WWTP), for treatment, followed by reuse or disposal.
23	SV / I	Monterey County Public Works	Boronda County Sanitation District Guide Rail Upgrade Project	Dirk J. Medema	medemad@co.monterey	(831) 784-5647	Concept	New project!	The goal is to replace the T-rail system and replace it with dual tube guide rail system. This project will be under the Department of Public Works. This project is through the beginning stage. Planning is underway between the Wastewater Collection crew and the Bridge crew to complete the project in a timely manner. This guide rail project will significantly improve performance. It is an affective way to ensure that pump has a good seal and the flow is diverted with out seepage. Estimated project completion is within 90 days with proper funding. This project will minimize the pump seepage and reduce the amount of Sewer System Overflow occurrences.
24	SV / I	City of Salinas	Integrated Industrial Wastewater Conveyance and Treatment Facility Improvements	Michael Ricker	mikeri@ci.salinas.ca.us	(831) 758-7233	Implementation	New project!	This project will include new gravity sewers with capacity to collect more of the City's industrial wastewater and convey it to the IWTF, upgrades to the IWTF to treat increased industrial flows (expanded electrical system and aeration treatment and related upgrades), and a system to filter the IWTF effluent through soil at the IWTF. After extraction the water would be available for reuse. New monitoring points around the soil bed filtration system will monitor system efficiency and assess its performance and success, such as producing high quality water with low suspended solids. The City has identified multiple potential beneficial uses for treated water including the following: 1) Encourages ground water re-charge. 2) Combats saltwater intrusion. 3) Transfer to the Monterey Regional Water Pollution Control Agency for high quality diluent in its groundwater recharge project. 4) Use as low-salt feed water for potential upgrade to potable water for the City of Salinas. 5) Use after some desalting for agricultural irrigation or without desalting for non-agricultural irrigation water (golf course, playing fields, etc.). 6) Discharge to the Salinas River for reuse by others when withdrawn at the inflatable dam. The potential quantity of water now exceeds about 2,500 acre feet annually and could increase to several times that amount as the IWS grows. The water quality would be substantially improved since the effluent had filtered through the soil column, removing algae and other suspended solids and some trace constituents. For the IWS, such withdrawal would enhance both disposal pond and the percolation bed percolation rate, effectively increase effluent disposal capacity, and hence, treatment capacity.
25	SV / I	Monterey County Water Resources Agency	Coastal Dedicated Monitoring Well Drilling	Kathleen Thomasberg	thomasbergk@co.monterey.ca.us	831-755-4860	Implementation	New project!	The twelve dedicated monitoring wells will be drilled under the oversight of a Professional Geologist (PG). The four inch diameter wells will be drilled using Sonic drilling method that allows discrete evaluation of geology to determine where well perforations will be placed. The wells will be strategically placed in Monterey County Right-of-Way locations with the goal to fill water quality and water level data gaps in front of and behind the 2009 500 mg/L chloride seawater intrusion fronts for the Pressure 180-Ft. and Pressure 400-Ft. aquifers.
26	SV / I	City of Salinas	Dry Weather Runoff Diversion Program						The proposed project includes two phases. Both phases would protect receiving water quality, and provide water supply for reuse. The proposed project would also serve as a model of a collaborative water reclamation effort that meets Federal Clean Water Act requirements and State of California DWR IRMP goals and objectives. In Phase 1 the City would divert dry weather urban surface water discharge from south Salinas (see Figures 1 and 2) into the City's Blanco Detention Basin. Water from the Detention Basin would then be sent to the Monterey Regional Water Pollution Control Agency (MRWPCA) regional wastewater treatment plant, or to another location. The City would install a shunt at the City's former wastewater treatment plant site (TP1, see Figure 2) to connect the two existing systems. Water in the basin will settle (to remove suspended solids) and filter through the soil as a pretreatment, then flow into a junction point for transfer to the MRWPCA-operated conveyance system. Shoulder-season wet weather events could be similarly diverted, provided flows do not exceed MRWPCA capacity benchmarks. All diversions would reduce the amount of pollutants entering the Salinas River. Once reclaimed, diverted water could be used for dry-season water supply (e.g., as agricultural irrigation water). 2 In the future as part of Phase 2, dry-weather surface water runoff from the City's northern neighborhoods (North Salinas), would be similarly diverted for reuse. Surface water runoff that currently flows into the Reclamation Ditch (Rec Ditch, which flows to Monterey) would be diverted and reclaimed. This phase includes using existing water quality data for the City's stormwater outfalls (possibly supplemented with new sampling if required) and determining flow volumes from the largest sub-watershed within the City--the Rec Ditch. The City would develop site planning, design, and construction of Rec Ditch diversion facilities later as resources permit. This project also would reduce pollution to downstream receiving waters, and potentially add to recycled water supplies.
27	SV / M	Central Coast Wetlands Group	Historic and Existing Drainage Network Mapping Project: Phase 1	Kevin O'Connor, CCWG	koconner@mlml.calstate.edu	831-771-4495	Concept	Keep in IRWMP (but changed from implementation to concept proposal)	This project proposes to utilize available public domain digital elevation models and orthophotography as a base for a GIS based mapping of drainage networks in the Salinas River, Elkhorn Slough, and Moro Cojo watersheds with two primary goals. The first, to recreate the pre-development drainage network of the subject area watersheds based on existing topography, historical records and field verification to determine historical surface drainage conditions. Secondly, to map the existing drainage network of the subject watersheds based on existing topography and drainage infrastructure.
28	SV / M	Monterey Coastkeeper / The Otter Project	Maintenance and Flood Control Planning for the Old Salinas River Channel and Reclamation Ditch	Steve Shimek	steve@montereycoastkeeper.org	831/646-8837 x114	Concept	Keep in IRWMP	It is very likely that the Old Salinas River Channel and the Reclamation Ditch have been dredged and further modified without permit. It is also possible that riparian vegetation has been removed without permit or Section 7 consultation. Continued dredging and riparian removal without appropriate permits is not a sustainable practice over the long run. A facilitated stakeholder process is proposed to bring people together to find common ground. Various visions for these highly modified waterways may require iterative review by consultants knowledgeable about the area and skilled in hydrology and geomorphology. Agencies such as the US EPA, RWQCB, MCWRA, NMFS, and DFG should be involved. Growers and landowners should be involved. And stakeholders such as Sierra Club, Surfrider Foundation, CA Native Plant Society, Audubon, and Monterey Coastkeeper should be involved. Such a process is the only way to bring people together, find common ground, maintain the waterways, and provide flood control. Deliverables from the process will be a 401 permit application and a Channel Maintenance Technical Memorandum.
29	SV / M	Central Coast RWQCB	Healthy Functioning Watersheds: Green infrastructure and the preservation and protection of hydrologic processes	Katie McNeill	Kmcneill@waterboards.ca.gov	805 549-3336	Concept	Keep in IRWMP	The RWQCB's Vision of Healthy Watersheds calls for watershed protection in part through the use of green infrastructure. Green infrastructure is the set of practices that mimic natural processes to retain and use stormwater. Through infiltration, evapotranspiration, and harvesting stormwater throughout the landscape, green infrastructure preserves and restores the natural water balance of a watershed. Environmental benefits include reducing flooding, improving water quality, providing habitat, reducing the urban heat island effect, mitigating global warming and increasing groundwater recharge. Healthy sustainable watersheds supported by green infrastructure use less energy for imported water, have fewer greenhouse gas emissions, and a lesser carbon footprint than unhealthy watersheds. The Water Board's goal of Healthy Watersheds is compatible, supportive, and in coordination with the larger issue (beyond water quality) of sustainability and the State's Global Warming Solutions Act. With this concept proposal the RWQCB is encouraging organizations to implement green infrastructure projects.

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30	SV/M	Central Coast RWQCB	Healthy Functioning Watersheds: Irrigation efficiency and nutrient management on agricultural lands	Katie McNeill	Kmcneill@waterboards.ca.gov	805 549-3336	Concept	Keep in IRWMP	With this concept proposal the RWQCB is encouraging organizations to work with farmers to implement irrigation and nutrient management projects. The RWQCB's Vision of Healthy Watersheds calls for watershed protection through the implementation of irrigation efficiency, and nutrient as well as pesticide and sediment management on agricultural lands. This includes conducting irrigation evaluations and corresponding actions designed to address pollutant loading from tailwater, creating un-farmed buffers that improve water quality (e.g. filter and infiltrate runoff), and protecting or improving habitat (e.g. stabilize streambanks and shade streams) between intensive agriculture and wetland/riparian areas. The Central Coast Water Board has prioritized implementation in the Salinas watershed and other impaired waterbodies included in the Greater Monterey County. Irrigation and Nutrient Management, especially related to protection of shallow domestic drinking water wells continues to be one of the Water Board's highest priorities. Implementation would be carried out via various partnering organizations in collaboration with growers.
31	SV/M	Central Coast Wetlands Group	Study of environmental services from nutrient reducing BMPs	Kevin O'Connor, CCWG	koconner@mlml.calstate.edu	831-771-4495	Implementation	New project!	The SWRCB, CCC, and other State agencies have identified management measures (MMs) to address agricultural nonpoint sources of pollution that affect State waters. The agricultural MMs include practices and plans installed under various programs in California, called Best Management Practices (BMPs). These BMPs range in action from on-farm nutrient management to cover crops to constructed treatment wetlands. To be effective, BMPs should be targeted by location and type; however, we currently lack the information necessary for precise targeting. This project is intended to fill existing economic and ecological gaps in knowledge about select nutrient load reducing BMPs, supporting current conservation programs, and to explore innovative Payment for Environmental Services (PES) potential. Tasks include an ecosystem service assessment to identify the location and size of existing nutrient reducing BMPs; nutrient reduction research to address gaps in the understanding of the effectiveness of selected BMPs at load reduction; ecosystem service valuation to economically assess the multiple benefits of BMPs; and an ecosystem services analysis to determine if PES is feasible. The results of the project will be beneficial to many different users. In particular, the ecosystem service valuation will have widespread utility in cost benefit assessments of environmental projects, and the load reduction study will help farmers, conservation groups and regulators.
32	SV/M	Resource Conservation District of Monterey County	Monterey County Farm Water Quality Assistance Program	Paul Robins, Executive Director, RCD	paul.robins@rcdmonterey.org	831-424-1036, ext. 124	Implementation	Keep in IRWMP	The RCD of Monterey County, in close partnership with University of California Cooperative Extension Crop Advisors and USDA Natural Resources Conservation Service, will provide a bilingual on-farm erosion, irrigation, and nutrient management evaluation program for Monterey County farmers. The service will 1) evaluate erosion potential, irrigation system and application efficiency, and nutrient budgeting; 2) develop recommendations as needed for field configuration, soil stabilization, and refined water and nutrient applications; and 3) assist growers' voluntary implementation of those recommendations to help reduce excess soil, water and nutrient movement off area farms while optimizing farm productivity. This work is already underway on a smaller scale, and incorporation into the GMCIRWMP and the requested funding would support development of a full program for the next three years.
33	SV/M	UC Davis Marine Pollution Studies Lab	Evaluation of Potential for Stormwater Toxicity Reduction by Low Impact Development (LID) Treatment Systems	Katie Siegler	csiegler@ucdavis.edu	(831) 624-0947	Implementation	IMPLEMENTED through Round 1. Remove from list.	This project will evaluate the efficacy of Low Impact Development (LID) treatment components in the greater Salinas area and other areas of Monterey County in reducing the concentrations of contaminants that contribute to stormwater toxicity. Toxicity will be assessed using established U.S. EPA toxicity testing protocols. The study will (1) Evaluate toxic effects of stormwater runoff to aquatic organisms prior to treatment by bioswales or other treatment systems; (2) Evaluate efficacy of bioswales or other treatment systems to reduce stormwater runoff toxicity to aquatic organisms; (3) Determine stormwater load reduction through infiltration in LID design components; (4) Determine stormwater pollutant load reduction using a number of existing LID design components in established projects; and (5) Provide data to stormwater agencies, water quality managers, LID engineers, and others to be incorporated into future planning and management decisions to protect the Salinas River Watershed.
34	UW	Central Coast Wetlands Group	Northern Gabilan Mountain Watershed Management Project	Kevin O'Connor, CCWG	koconner@mlml.calstate.edu	831-771-4495	Implementation	New project!	The project consists of three phases to restore a sub-watershed within the upper Gabilan watershed, and serve as a model for restoration of watersheds within the central coast. Phase I provides the foundational watershed characterization and process analysis necessary to develop meaningful and effective watershed management. It includes a review of previous relevant studies and preparation of original analysis along with a compilation of spatial data and key watershed processes. Analysis will be integrated with research and planning projects done by others. The synthesis of this information will be used to target planning and restoration for one sub-watershed. This will be accomplished by addressing the changes in the watershed functions and processes (physical, chemical and biological) that are caused by agriculture and urban activity that affect watershed health. Additionally, we will conduct a community-based engagement process to review Phase I information and watershed management options. Phase I will result in a management methodology and a master restoration plan for one of three sub-watersheds. Phase II will develop site design for prioritized restoration locations within the chosen sub-watershed and Phase III will implement those designs.