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Agricultural Expert Panel
Reduction of Nitrates in Groundwater

DRAFT Final Report

California State Water Resources Control Board

June 2014

IRRIGATION TRAINING & RESEARCH CENTER

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Irrigation Training & Research Center
June 2014

ACKNOWLEDGEMENTS

If any acknowledgements, list them here.

EXECUTIVE SUMMARY

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1 BACKGROUND

1.1 Call for an Expert Panel

Chapter 1 of the Second Extraordinary Session of 2008 (SBX2 1, Perata), required the State Water Board to develop pilot projects focusing on nitrate in groundwater in the Tulare Lake Basin and Salinas Valley, and to submit a report to the Legislature on the scope and findings of the pilot projects, including recommendations. The State Water Board made 15 recommendations in 4 key areas to address the issues associated with nitrate contaminated groundwater. The key areas to address these issues are:

1. Providing safe drinking water.
2. Monitoring, notification, and assessment.
3. Nitrogen tracking and reporting.
4. Protecting groundwater.

Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater quality.

The State Water Board in its subsequent adoption of Order WQ 2013-0101 also tasked the Expert Panel with certain issues related to impacts of agricultural discharges on surface water.

1.1.1 Regulatory Context

The charge and questions below directed to the Agricultural Expert Panel were done so in the context of the State Water Resources Control Board's Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program, May 20, 2004, and Regional Water Quality Control Boards' Irrigated Lands Regulatory Programs as implemented through various separate orders.

1.1.2 Charges to the Expert Panel

Assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater quality. (Recommendations Addressing Nitrates in Groundwater, State Water Board's Report to the Legislature, February 20, 2013)

- and –

Provide a more thorough analysis and long-term statewide recommendations regarding many of the issues implicated in State Water Board Order WQ 2013-0101, including indicators and methodologies for determining risk to surface and groundwater quality, targets for measuring reductions in risk, and the use of monitoring to evaluate practice effectiveness.

1.2 Expert Panel

Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater supply quality. The State Water Board contracted with the Irrigation Training and Research Center (ITRC) to assemble the Expert Panel of up to 10 persons. Recommended Expert Panel types were to include, but not be limited to:

- Irrigation Specialist /Ag Engineer–specializing in irrigation systems including drip, sprinkler, furrow, and flood irrigation systems and the use of fertigation.
- Soil Scientist–specializing in soil conservation, soil fertility management and movement
- of water and nitrogen through the soil.
- Hydrogeologist–specializing in aquifer contamination and contaminate movement within groundwater.
- Certified Crop Advisor–specializing in the application of synthetic and organic fertilizers.
- UC Cooperative Extension Farm Advisor– specializing in annual and perennial crops.
- Grower–experience in both annual and perennial crops
- Agronomist–specializing in California agricultural production, nutrient uptake and yields.
- Agricultural Economist–specializing in economic analysis of California agriculture with some experience in the economic analysis of air and water quality regulations.

1.2.1 Role of Expert Panel

The role of Expert Panel Members is as follows:

- Review the Water Boards' Irrigated Lands Regulatory Program.
- Evaluate ongoing agricultural control measures that address nitrate in groundwater and surface water.
- Evaluate and address other risks to water quality posed by agricultural practices.
- Address questions posed by the State Water Board in its order regarding the petitions of the Central Coast Water Board.
- Address questions developed by an Advisory Committee, other agencies and the public as approved by the State Water Board.
- Propose new agricultural control measures, if necessary.
- Hold meetings with the Advisory Committee as necessary.
- Conduct three public meetings to take public comment.
- Prepare Final Report on findings and summary of project discoveries and Recommendations

1.2.2 Panel Members

The Expert Panel is made up of eight members with the qualifications requested by the State Water Board. A brief biography of each panel member is provided in **Appendix A**.

- Dr. Charles Burt (Panel Chairman), California Polytechnic State University, San Luis Obispo, Irrigation Training & Research Center
- Dr. Robert Hutmacher, Soil Scientist, Westside Research and Extension Center
- Dr. Till Angermann, Hydrogeologist, Luhdorff & Scalmanini Consulting Engineers

- Bill Brush, Certified Crop Advisor, Almond Board of California, East San Joaquin Water Quality Control Board
- Daniel Munk, UC Cooperative Extension, USBR San Joaquin River Restoration Project Technical Feedback Group, UC/CDFA Nitrate Curriculum Development Program
- James duBois, Reiter Affiliated Companies, Central Coast Region
- Mark McKean, Grower, Central Valley Region (Riverdale)
- Dr. Lowell Zelinski, Precision Ag Consulting

1.3 Public Meetings

On May 5-9, the Agricultural Expert Panel called by the California State Water Board held a series of three meetings over four days to invite and hear public comment on nitrate groundwater issues. The Panel was tasked with collecting input and information that centered on 13 previously developed questions that the Panel has been asked to address. The meetings were held in San Luis Obispo (May 5-6), Tulare (May 7), and Sacramento (May 9) to facilitate public access. The meeting sessions were videotaped and posted online at www.itrc.org/swrcb/ in accordance with the Brown Act.

Details regarding the Expert Panel meeting schedule, background information, reports, relevant agency contacts, and other notices are maintained by ITRC on a public website at www.itrc.org/swrcb/. Agendas and speaker lists for all meetings are included as **Appendix D** of this document.

2 QUESTIONS FOR THE PANEL

2.1 Vulnerability and Risk Assessment

Regulatory programs are most effective when they are able to focus attention and requirements on those discharges or dischargers (i.e. growers) that pose the highest risk or threat because of the characteristics of their discharge or the environment into which the discharge occurs. The various Irrigated Lands Regulatory Program (ILRP) orders issued throughout the state by the Regional Water Boards have taken different approaches in their prioritization schemas, some using specific criteria or methodologies, others utilizing measurements of previous known impacts.

1. How can risk to or vulnerability of groundwater best be determined in the context of a regulatory program such as the ILRP?
2. Evaluate and develop recommendations for the current approaches taken to assessing risk to or vulnerability of groundwater:
    a. Nitrate Hazard Index (as developed by the University of California Center for Water Resources, 1995),
    b. Nitrate Loading Risk Factor (as developed by the Central Coast Regional Water Quality Control Board in Order R3-2012-0011),
    c. Nitrogen Consumption Ratio,
    d. Size of the farming operation,
    e. High Vulnerability Areas Methodology (as developed by the Central Valley Regional Water Board in a series of Waste Discharge Requirements issued to agricultural coalitions in the ILRP).
3. How can risk to or vulnerability of surface water best be determined in the context of a regulatory program such as the ILRP?
4. Evaluate and develop recommendations for the current approaches taken to assessing risk to or vulnerability of surface water:
    a. Proximity to impaired water bodies.
    b. Usage of particular fertilizer or pesticide materials.
    c. Size of farming operation.
    d. High Vulnerability Areas Methodology (as developed by the Central Valley Regional Water Board in a series of Waste Discharge Requirements issued to agricultural coalitions in the ILRP)

2.2 Application of Management Practices

The application and use of management practices for the control of nonpoint source pollution is a fundamental approach taken by many Water Board orders, and considered a key element in the State Water Board's Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program, May 20, 2004. Management practices that are cost-effective and are easy to implement have the best chance of being adopted and successful. However, when comparing management practices, consideration should also be given to the likelihood that a management practice will be effective in reducing nitrogen loading to surface and groundwater. The Regional Water Boards have included specific management practices in their various orders, as well as requiring the growers to identify and implement management practices on their own.

5. What management practices are expected to be implemented and under what circumstances for the control of nitrogen?
6. What management practices are recommended for consideration by growers when they are selecting practices to put in place for the control of nitrogen?
7. Evaluate and make recommendations regarding the usage of the following management practices:
    a. Nitrogen mass balance calculations and tracking of nitrogen applied to fields. This should include consideration of measuring and tracking Nitrogen:
        i. Applied to crops or fields.
        ii. In soil.
        iii. In irrigation water.
        iv. Removed from field.
        v. Estimation of losses.
    b. Templates for determining nitrogen balance.
    c. The usage of nitrogen balance ratios.
    d. Nutrient management plans.
8. Evaluate and make recommendations regarding the most effective methods for ensuring growers have the knowledge required for effectively implementing recommended management practices. Consider the following:
    a. Required training.
    b. Required certifications.
    c. Workshops sponsored by third parties such as: CDFA, County Agricultural Commissioners, Farm Bureau, UC Cooperative Extension.
    d. Usage of paid consultants – e.g., CCAs/PCAs.
    e. UC Cooperative Extension specialists.

2.3 Verification Measures

Utilization of verification measures to determine whether management practices are being properly implemented and achieving their stated purpose is another key element to the success of a nonpoint source control program. Because of the nature of nonpoint source discharges, direct measurements are often difficult or impossible to obtain and other means of verifications may be required.

9. What measurements can be used to verify that the implementations of management practices for nitrogen are as effective as possible?
10. Evaluate and make recommendations regarding the usage of the following verification measurements of nitrogen control:
    a. Sampling first encountered groundwater via shallow monitoring wells.
    b. Direct sampling of groundwater from existing wells, such as an irrigation well or domestic drinking water well, near the field(s) where management practices for nitrogen are being implemented.
    c. Sampling of the soil profile to determine the extent to which nitrogen applied to a field moved below the root zone.
    d. Representative sampling of a limited area and applying the results broadly.
    e. Sampling water in surface water containment structures for their potential discharge to groundwater.
    f. Estimating discharge to groundwater based on nitrogen balance model and

measured irrigation efficiency.

11. Evaluate the relative merits, and make recommendations regarding the usage of, surface water measurement systems derived from either receiving water or a discharge monitoring approach to identify problem discharges.

2.4 Reporting

The ILRP orders issued by the Regional Water Boards require reporting to both determine compliance and inform overall management of the discharges associated with agriculture. Also, specifically in regards to nitrogen, the California Department of Food and Agriculture convened the Nitrogen Tracking and Reporting System Task Force, called for by Recommendation 11 of the State Water Board's report to the Legislature, which makes recommendations on a potential reporting system.

12. Evaluate and make recommendation on how best to integrate the results of the Nitrogen Tracking and Reporting System Task Force with any above recommendation regarding management practices and verification measures.
13. Evaluate and make recommendations on the reporting requirements to report budgeting and recording of nitrogen application on a management block basis versus reporting aggregated numbers on a nitrate loading risk unit level. (Definitions of "management block" and "nitrate loading risk unit" are contained in State Water Board Order WQ 2013-0101.)

3 PANEL'S FINDINGS

3.1 Overview

The Expert Panel would prefer to provide definitive, science-based recommendations. However, it is clear that the science is incomplete. Therefore, the Expert Panel was deliberately composed of persons who understand not only the various aspects of the science involved, but also the levels of uncertainty, the limitations in various measures of verification, and the practical limits to implementing, organizing, and gathering information.

The Expert Panel benefited from panel members' individual backgrounds, testimony during public hearing, and written background material. The Expert Panel questioned many of the speakers in great detail. The Panel understands that the challenges to the State Water Board and the Regional Boards are significant.

Testimony (both invited and volunteer) often provided solid technical information. The Expert Panel also heard ample other statements such as:

1. Farmers will never apply more fertilizer than needed.
2. The environment is toxic, people are in immediate danger, and the problem must be solved immediately whatever the cost.
3. It is impossible to have any meaningful monitoring.
4. Until the State Water Board can be 100% certain that everything it tries is correct, nothing should be done.
5. A program can only be properly developed if the state invests millions of dollars developing models of small details such as soil variability to target areas of vulnerability.

The Expert Panel believes that:

1. There are high levels of nitrate in many groundwater wells.
2. The State Water Board has a responsibility to protect water quality.
3. There are many scientific unknowns regarding nitrate.
4. The details of the nitrogen cycle within a crop root zone are complex and difficult to evaluate on a crop-by-crop, seasonal basis.
5. No one size fits all; growing almonds on large fields in the arid western side of the southern San Joaquin Valley has completely different complexities as compared to growing 2.5 crops per year of shallow-rooted produce crops in Santa Maria.
6. Dealing with a non-point pollution problem is challenging, and is inherently different from point-source pollution.
7. It is important for California, the US, and the world that California's agricultural economy be healthy.
8. Significant nitrate-related improvements have been made in some portions of California's agriculture in the last two decades.
9. There is often a huge lag time (decades) between changes in nitrate deep percolation in a crop root zone, and the appearance of changes in the groundwater. Therefore, the impacts of many of the agricultural irrigation and nutrient management changes are not yet detectable.

10. All data requested by the State and Regional Water Boards should meet the following criteria:
    a. The Boards must have defined the minimum data necessary to achieve reasonable results.
    b. It must clear why the data are essential (as opposed to being "helpful") in solving specific (carefully defined) sub-goals and objectives.
    c. The detailed numerical, graphical, etc. processes that will be used to organize, evaluate, and disseminate the data must be defined and developed in advance.
    d. Whenever possible, existing public data sources should be used. For example, total fertilizer sales, cropped acreages, and average crop yields are available. While all such numbers suffer from inaccuracies, they are usually sufficient for defining trends. The argument might be made that if trends cannot be determined from such data, the trends are likely inconsequential.
    e. Whenever there is a choice between simplicity and complexity, and it is reasonable to assume that the results will be of similar value, simplicity must be selected.

Important principles that apply to the agricultural nitrate issues include:

Right time
Right place
Right form
Right amount
For water and nitrogen.

1. While the details of nitrogen conversion in the root zone (e.g., timing, types) are complex, over the course of 2-3 years those nitrogen complexities are likely to balance out due to the fact that if more nitrogen is applied than is harvested or volatilized, the remaining nitrogen will either stay in the root zone or be deep percolated as nitrate. With drip/micro on trees and vines, the irregular pattern of water movement in arid soils may cause half or more of the residual nitrate that would otherwise deep percolate to remain in the soil at the fringes of the wetted patterns.
2. While appropriate hardware is very important for achieving good nitrogen and water efficiencies, there must also be a reasonable customized management plan.
3. It is impossible to have long-term agriculture without some leaching of water beyond the root zone. Therefore, if there is nitrate in the root zone, deep percolation of some nitrate is inevitable.
4. Farmers will always face considerable uncertainty regarding rainfall, yields, disease problems, weather, labor availability, human acceptance of instructions, and many other factors that influence the amount of nitrogen that can deep percolate. While we may eventually understand the science precisely, agriculture will never be able to control the processes perfectly.

3.2 Surrounding Concepts

The Expert Panel has attempted to provide explicit recommendations. Those recommendations are influenced by the Expert Panel's interpretation and understanding of many surrounding issues which together create a picture of what is reasonable and proper. Some of those issues are noted below, often with elaboration of points made earlier.

1. Just collecting data does not necessarily improve or help clarify the situation. This was heard repeatedly during the public hearings.

2. Dr. John Letey, in discussing Board "Recommendations Addressing Nitrates in Groundwater, Report to the Legislature" (20 Feb 2013), provides a grim view of traditional nitrogen data collection at the field level:
    a. "*… there was no significant correlation between the N concentration in the soil-water with either the drainage volume or the amount of N applied. The significance of this is that there is no value gained by measuring the N concentration in the soil-water. The concentration neither reflects the N load to groundwater nor the quality of the farm management. Indeed, as will be supported later, erroneous conclusions can be drawn from these data.…*
    b. *The amount of N leached is far greater for the higher irrigation (low N concentration) than the lower irrigation (higher N concentration). The amount of N leached is directly related to the water flux at the bottom of the root zone. This flux cannot be practically measured (tracked) in the field, especially for the great variation with time and location. Tracking the N load migrating to groundwater, and not concentration, is the most important factor to track, and it is impossible to track.…*
    c. *…efforts today should be directed toward reducing the future N loads to groundwater. The load is dictated by farmer management; and therefore, the approach should be directed toward inducing good farm management, not merely tracking and reporting what is being done. This is particularly true when some of the costly tracking information is, at best, of useless value.*"

3. Collecting data on changing nitrate levels in the groundwater, to indicate success or failure of on-surface N management practices, is problematic at best. While there is no doubt that with shallow water tables (e.g., less than 7 feet) there will be a rapid response to deep percolation (below the root zone) water and nitrate flows, it becomes almost impossible to get good numbers from deeper zones. The following points were repeatedly made:
    a. Lag times between deep percolation of nitrates and the nitrates reaching the top of the aquifer typically range from a few years to up to extremes of several hundred years.
    b. While there can always be exceptions, there is very little direct correlation between deep percolation water qualities and the aquifer immediately below that agricultural surface. Instead, many explanations and examples were given regarding the mixing of aquifer flows, and the heterogeneous nature of the subsurface.
    c. Groundwater simulation model results are approximate even on very large scales.

d. California aquifer physical characteristics are very complex and even with large studies are poorly defined. As an example, Figure 1 shows a single transect of the Modesto area aquifer.

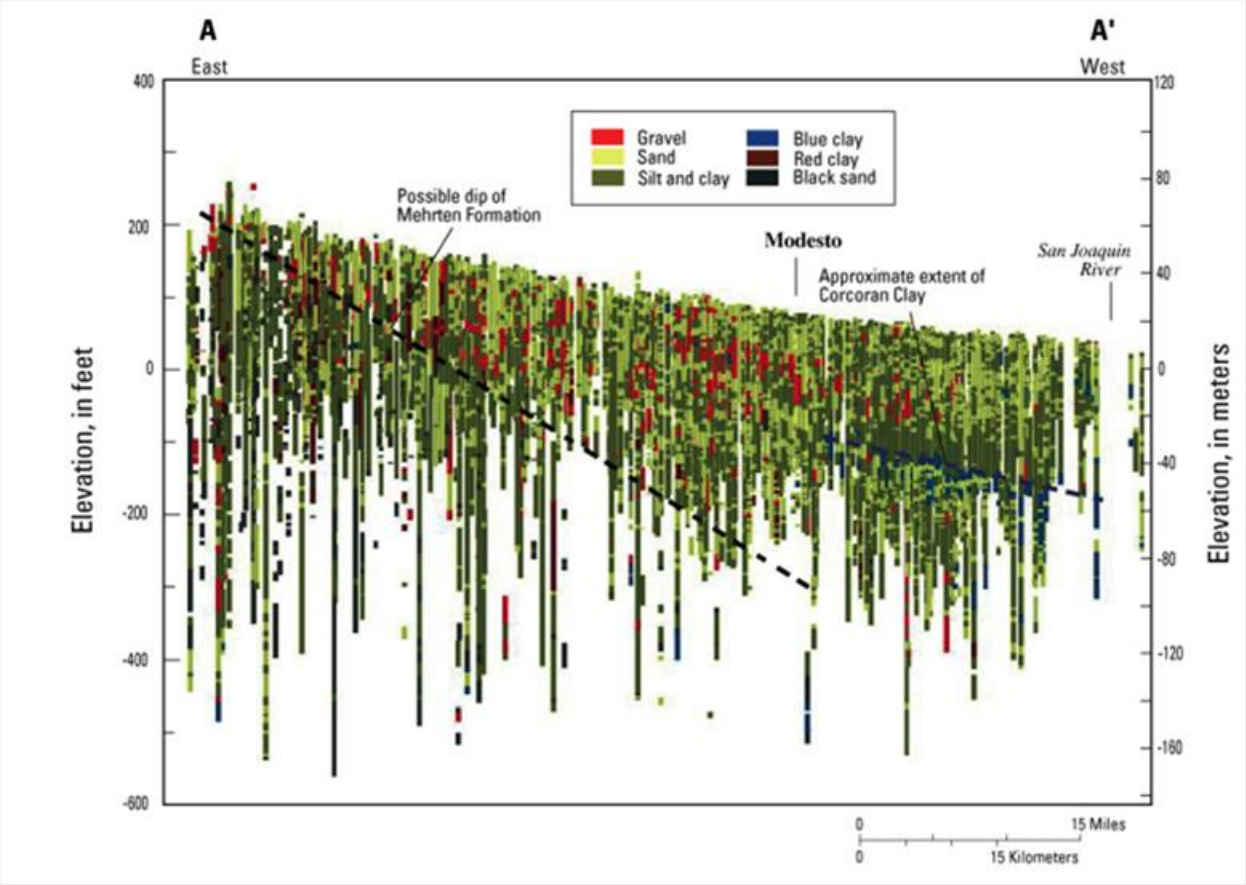

Figure 1. Cross-sectioned view of lithologic well-log data along azimuth of 50 degrees between Stanislaus and Tulolumne Rivers[1]

4. What will be seen in the groundwater for the next 20 years, on the average in the Tulare Basin, are the results of historical management practices – not the result of today's irrigation/fertilizer practices.

   The graphs in Figure 2, provided in testimony by Dr. Joel Kimmelshue, illustrate how things have changed in 20 years in North Kern Water Storage District. The point was that today what is seen in groundwater nitrate changes has little or no relationship to today's conditions.

[1] Figure 10 from Hydrogeologic Characterization of the Modesto Area, San Joaquin Valley, California, USGS Scientific Investigations Report 2004-5232, K.R. Burrow et al.

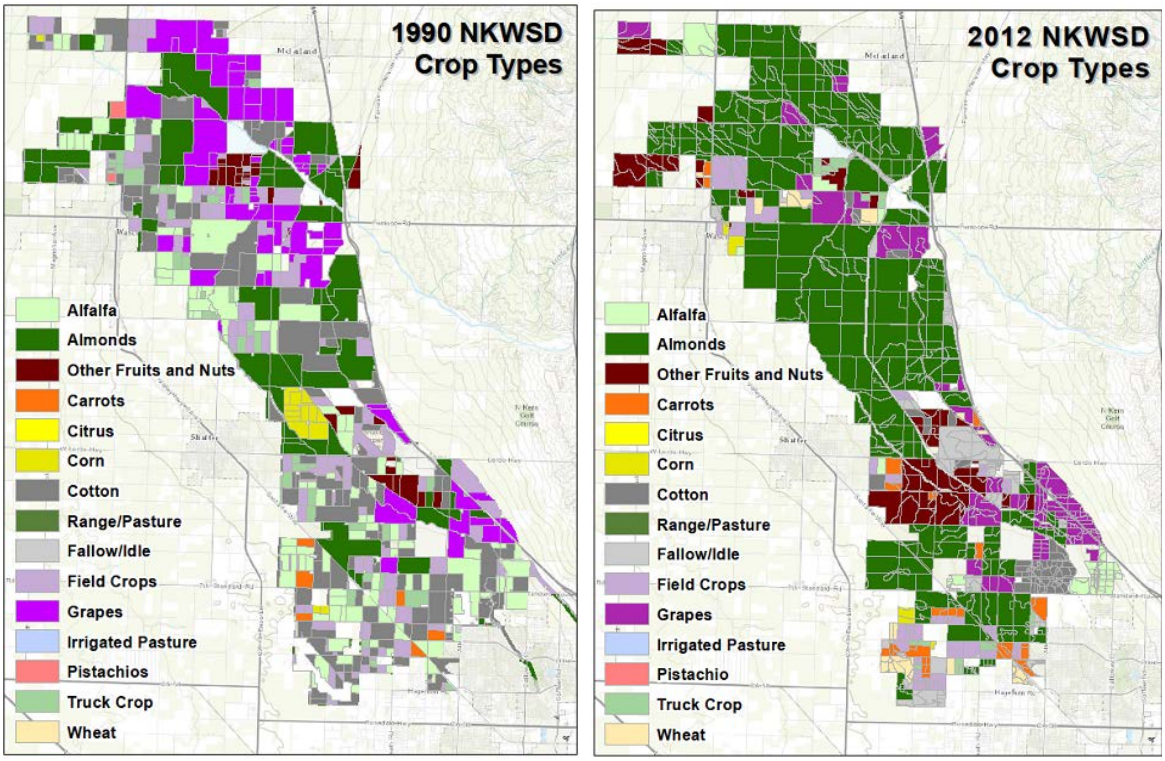

Figure 2. Crop type maps of North Kern Water Storage District, 1990 and 2012. Provided by Dr. Joel Kimmelshue

a. On a broader geographic scale, there have been major changes in cropping patterns in recent years. Figure 3 through Figure 5, developed from CDFA reports, illustrate some of the major changes in the southern San Joaquin Valley. Pistachio, almond, and tomato acreages have increased, and the yields for all three crops (lb/acre) have also increased. The major changes in both acreage and yields have occurred in the last 10-15 years.

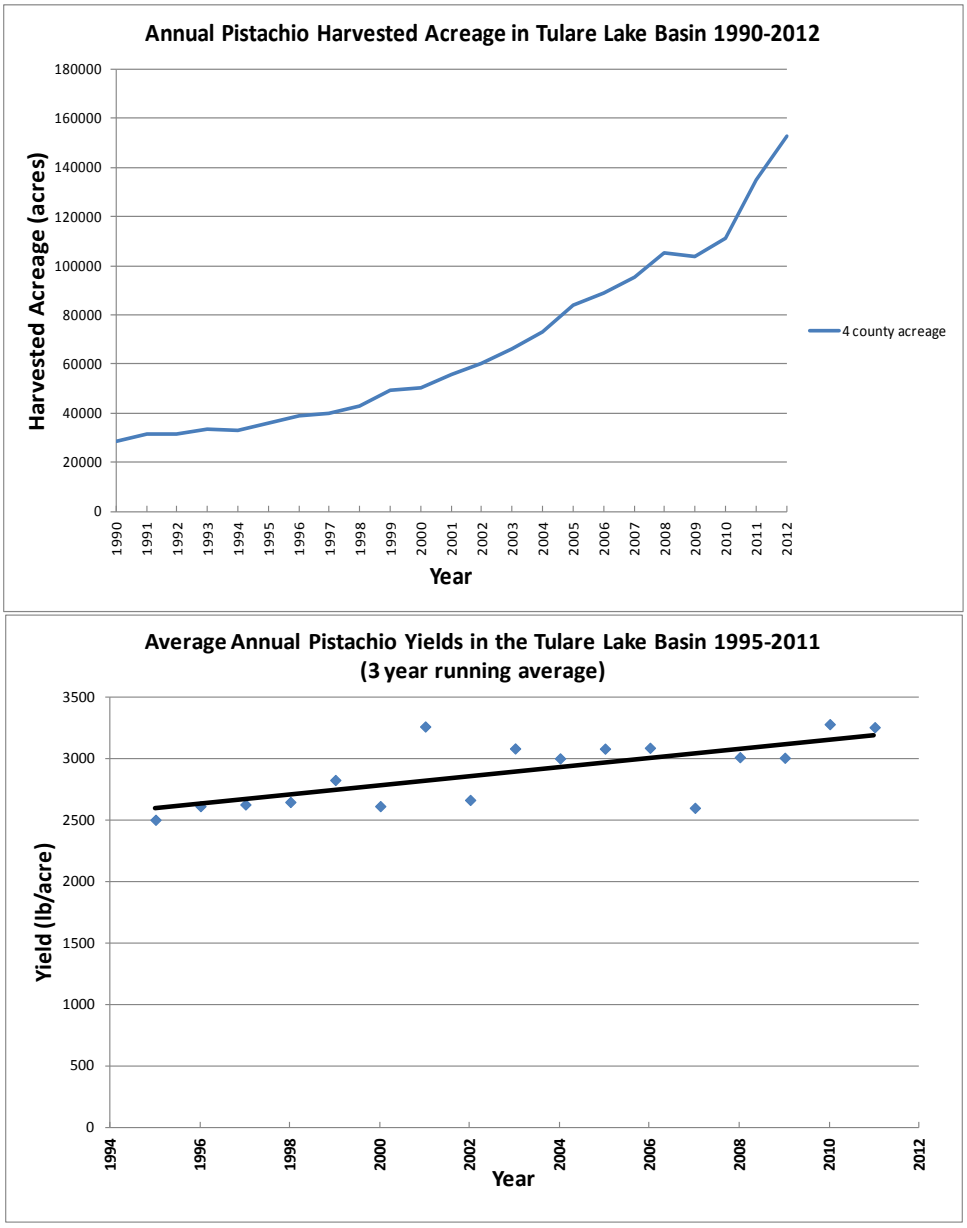

Figure 3. Graphs of major changes in pistachio acreages and yield in the Tulare Lake Basin (*from CDFA*)

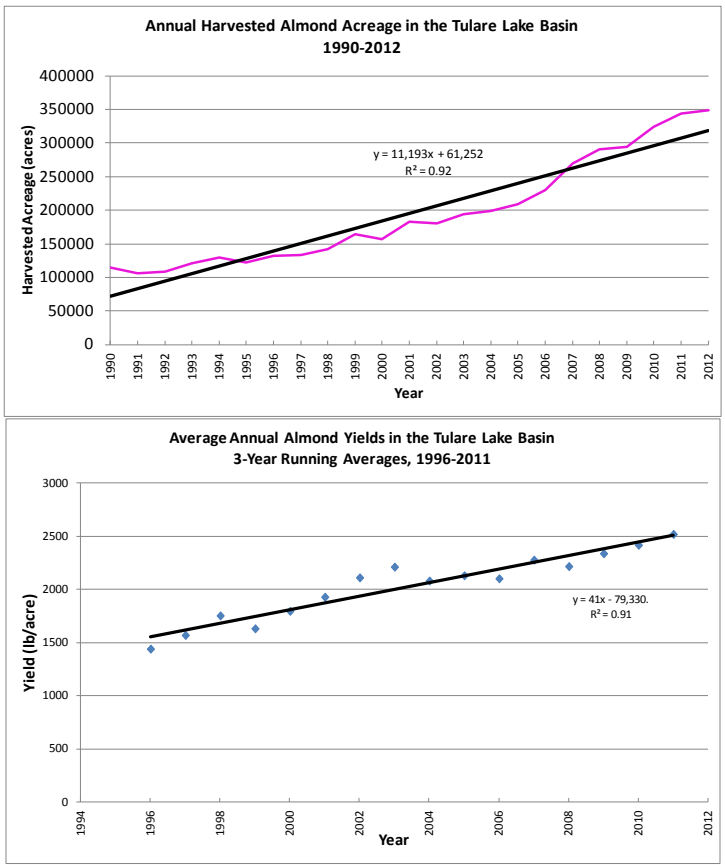

Figure 4. Graphs of major changes in almond acreages and yield in the Tulare Lake Basin (*from CDFA*)

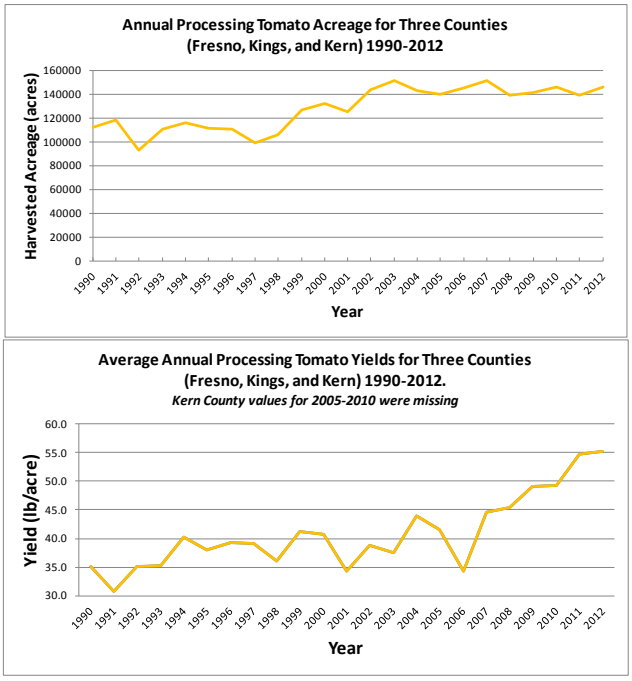

Figure 5. Graphs of major changes in tomato acreages and yield in Fresno, Kings, and Kern Counties (*from CDFA*)

b. Irrigation methods have also changed dramatically. While drip/micro systems have been widely used since the late 1970's in the San Joaquin Valley, it is now difficult to find pistachio, almond, or tomato fields that are not drip-irrigated. The big shift from surface irrigation (furrows and border strip) has occurred in the last 10-15 years.
c. Meanwhile, reported nitrogen fertilizer sales are about the same in the Southern San Joaquin Valley, but have reportedly dropped in California (see Figure 6 and Figure 7).

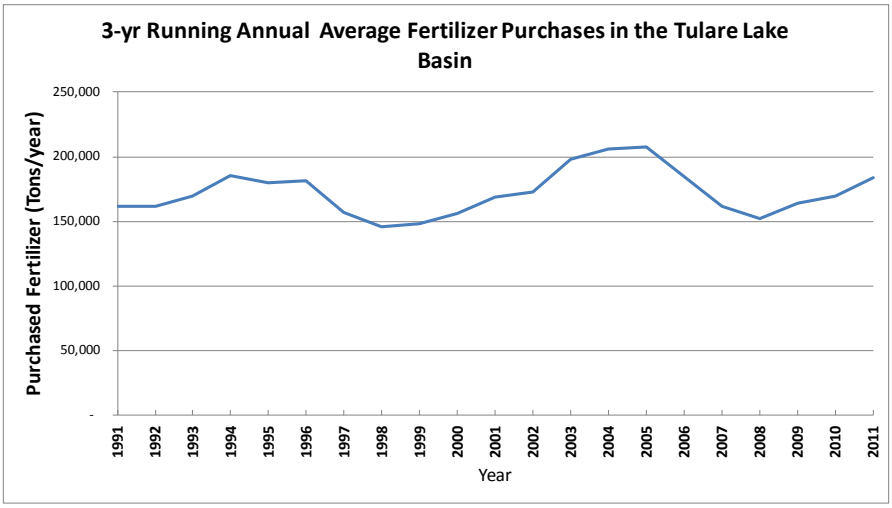

Figure 6. Three-year running annual average fertilizer purchases in the Tulare Lake Basin, 1991-2011

State	Fertilizer purchased in 2003 (1000 kg of N)	Fertilizer purchased in 2005 (1000 kg of N)	Fertilizer purchased in 2007 (1000 kg of N)	Fertilizer purchased in 2009 (1000 kg of N)	Fertilizer purchased in 2011 (1000 kg of N)	% change from 2002–2006 to 2007–2011*
Alabama	90,956	114,387	106,729	60,319	68,225	-19%
Alaska	2,741	2,741	2,741	2,501	2,817	-2%
Arizona	96,855	89,720	71,420	89,747	60,041	-23%
Arkansas	265,684	227,586	297,798	213,021	223,361	-3%
California	792,148	694,217	670,619	609,774	672,302	-8%
Colorado	110,324	115,719	130,718	121,902	152,647	16%
Connecticut	10,791	8,284	10,634	8,889	8,480	-15%

Figure 7. Total nitrogen mass in commercial fertilizer purchased in California and other states for 2003 to 2011[2]

5. An increase in nitrate concentrations at the very upper surface of an aquifer may indicate better nitrate management rather than poorer nitrate management. This is because with less leaching of irrigation water, the concentrations of nitrate may increase even though the load decreases.

[2] Source: Commercial Fertilizers annual data, 2002–2011, maintained by the Association of American Plant Food Control Officials for The Fertilizer Institute: http://www2.epa.gov/nutrient-policy-data/commercial-fertilizer-purchased#table1

6. The data that is currently available regarding nitrate levels in groundwater often comes from poor quality data sources. Samples come from wells for which there is often little information available regarding the depth of casing perforations, the depth of the well itself, the relative transmissivity of various zones in the aquifer, mixing between upper and lower aquifers, etc.

7. Complete nitrate balances are very difficult to construct, on a seasonal basis, for many crops. There are numerous unknowns. A wide variety of papers and testimony (such as the earlier quotes by Letey) discuss how it is almost impossible to quantify many of the N conversion details regarding mineralization, volatilization, nitrification, denitrification, etc. as related to both synthetic and organic sources of nitrogen. The difficulties for experts are tremendous, and are therefore unrealistic expectations for farmers.

8. Even on a large scale, which should be considerably easier than on an individual field scale, there are challenges in exhibiting a proper nitrogen balance. For example, Figure 3 from the Harter Report is seen below.

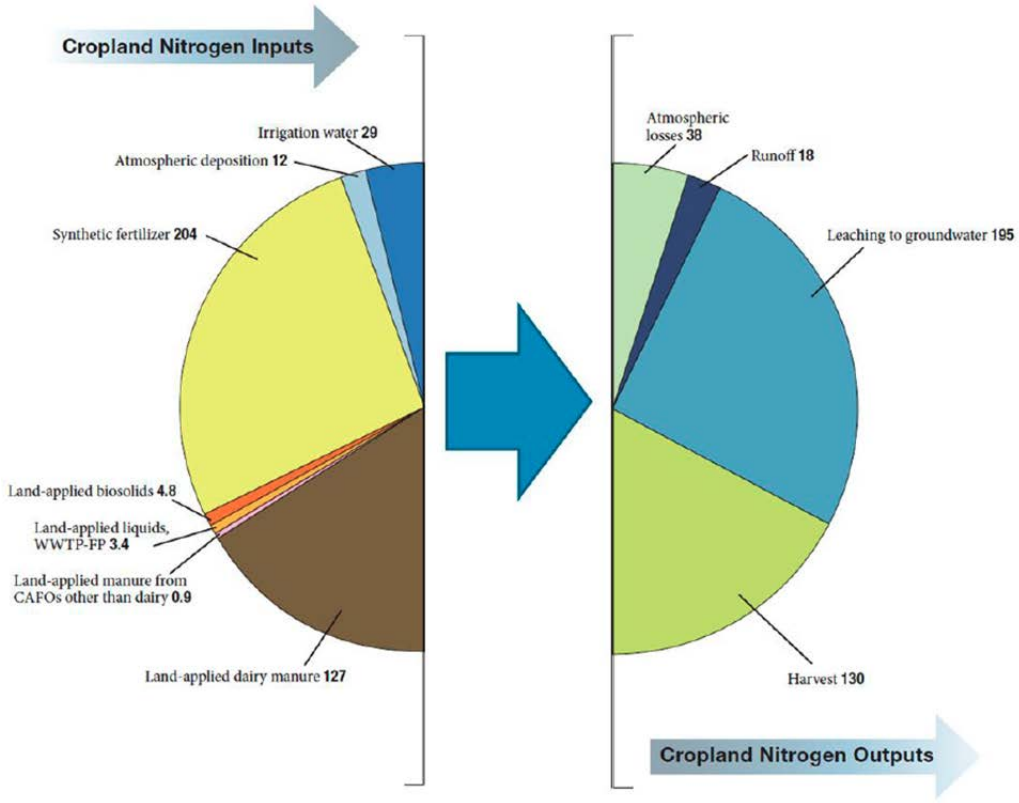

Figure 8. Mass balance of cropland nitrogen[3]

In the mass balance above, the "leaching to groundwater" is a mathematical remainder term, where
Leaching = (everything on the left) – (everything else but leaching on the right)

[3] Source: Figure 3 in "Addressing Nitrate in California's Drinking Water" (2012), by Harter and Lund.

While can be desirable to provide simple depictions such as this, a logical question is: Why does the harvested nitrogen equal the N in land-applied dairy manure? Surely some of the harvested nitrogen was destined to something other than manure. The study has numerous assumptions (which all studies must have) – one of which is that all harvested alfalfa received all of its nitrogen from the atmosphere. However, alfalfa is generally in planted in a rotation with other crops, and alfalfa will use readily available soil N before it fixes atmospheric N for its use. And on a macro level, just the nitrogen in milk in the area of the pie-chart is about 58,000 ton/yr of N – accounting for a significant part of the harvested N. In other words, the depiction of a simple conceptual nitrogen balance for one intensively studied area as a product of a multi-million dollar effort, suffers from lack of clarity. The development of complex nitrogen budgets for individual fields has similar challenges – multiplied thousands of times and without nearly the equivalent budget and level of expertise to support them.

Also, the graph above does not cleary indicate that on the central coast, very little manure is applied.

9. Graphs and figures regarding the nitrate issues rarely delineate the uncertainties in the data. For example, each component of the pie-chart basin nitrogen depiction (which is not really a balance because all major components are not included) has a level of uncertainty.

10. The data which have been cited in many reports, such as the "Harter Report", are dated. This is not a criticism of that report - it instead points out the importance of using current, relative data/indicators to direct policy. The "Harter Report used crop data and fertilizer data from the 2000 – 2005 time period, for example.

11. Due to human nature, varying abilities of people to assimilate new information of various complexity, difficulty of properly communicating instructions, lack of information, etc., some changes in practices and procedures and behavior cannot be successfully accomplished in a couple of years.

    Testimony from Parry Klassen (East San Joaquin Water Quality Coalition) showed that there is a challenge in having farmers submit meaningful data on even simple details such as field locations. It did not appear that this challenge was because of reluctance to respond – but rather because it is a new task, requiring information from unknown sources, using unfamiliar procedures, with instructions that may not be crystal clear.

    Because of the combination of scientific uncertainties plus the human element, it is essential to start slowly with attainable and meaningful steps. It may be determined later that these simple steps are sufficient in themselves.

12. There are major differences between individual perceptions regarding the ease and quality of available data. As an example, one might consider the tonnage of nitrogen that is removed annually via crop harvest.

a. Almonds, with many years of focused research and simple cropping systems, have good and readily available information regarding harvested yield (meat, husks, plus shells) and removed nitrogen, plus an estimate of annual nitrogen uptake for wood growth.
b. A very similar crop – pistachios – has similar information. But that information is not readily available to the public.
c. The members of the Expert Panel do not have readily available, easily usable information regarding harvested nitrogen/acre for a wide range of crops. This is especially true of produce crops (broccoli, lettuce, cauliflower) which have widely different pack-out rates, in which yield is expressed as boxes per acre rather than tons/acre, seasons are highly variable in duration, and the percentage of vegetative matter that is harvested can change drastically depending upon the market.
d. For most crops, farmers have little-or-no idea of the tonnage of harvested nitrogen. Rather, they are accustomed to a completely different way of thinking. Typical extension service recommendations are based on the amount of nitrogen needed to produce a crop – rather than on harvested nitrogen rates. Or, recommendations may be based on some type of leaf or petiole sample results at specific growth stages. Reporting or accounting for harvested nitrogen is a completely new concept for farmers of a much higher difficulty than what they are currently doing.
e. The further one moves from the field into research and academia, testimony indicates that the idea of accounting for harvested nitrogen sounds more and more simple.

4 REFERENCES

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APPENDIX A
Expert Panel Members

Appendix A
Expert Panel Members

Dr. Charles Burt (Panel Chairman) – *Irrigation Specialist/Ag Engineer*
Dr. Burt is a Professor Emeritus of Irrigation, and Chairman and Founder of the Irrigation Training & Research Center (ITRC) at California Polytechnic State University, San Luis Obispo, California. Experiences include professional work in 25 countries, three tours in Vietnam as a combat demolition specialist, work as a farm laborer in the San Joaquin Valley as a youth, designer/sales/installation in a major irrigation dealership in Fresno, partner in a consulting agricultural engineering firm, and 36 years at Cal Poly where he previously taught core irrigation classes while also leading the ITRC. Dr. Burt now focuses on applied technical assistance (with some research) through ITRC. He has written and has extensive field experience regarding on-farm irrigation system design, fertigation, water balances, irrigation efficiency, the energy-water nexus, canal automation, and irrigation project modernization.

Dr. Robert Hutmacher – *Soil Scientist*
Area of Expertise: Plant water status responses, nutrient uptake, growth responses to irrigation and nutrient management. Further expertise in cotton research and variety evaluations, interactions between production practices and pest management, alternative cropping systems including evaluations of double row planting and reduced tillage management, crop responses to and potential nitrogen losses under a range of nitrogen management practices in cotton.
Qualifications: 30+ years in the areas of agricultural research. Extensive research background on plant physiology, production practices, and nutrient uptake. UCCE State Cotton Specialist and Director of the West Side Research and Extension Center in Five Points, CA

Till Angermann – *Hydrogeologist*
Mr. Angermann is a Principal Hydrogeologist at Luhdorff & Scalmanini Consulting Engineers. His fifteen years of professional experience and expertise include (i) research methodology and conceptualization of hydrogeologic systems, (ii) groundwater hydraulic, hydrologic, hydrogeologic, hydrochemical, and statistical analysis and computations, (iii) assessment of surface water/groundwater interactions, infiltration and runoff processes, (iv) data quality objectives, sampling and testing protocols, (v) nitrogen cycling, irrigated agriculture and subsurface loading. Mr. Angermann served as lead technical expert to Western United Dairymen for the testing and implementation of a measurement-supported water balance method to determine seepage rates of working liquid dairy manure storage lagoons with quantified uncertainty, including preparation of a technical guidance manual. He was a key contributor to the conceptualization and implementation of the Representative Groundwater Monitoring Program (RMP) in response to the Dairy General Order and Technical Program Manager (TPM) to the Central Valley Dairy Representative Monitoring Program (CVDRMP) since its inception in 2010. As TPM, Mr. Angermann is responsible for all aspects of monitoring well design and design of a network of over 430 monitoring wells, data collection efforts and data management, analyses and interpretation, special

studies, coordinating and leading the external Multidisciplinary and Groundwater Technical Advisory Committees, interaction and coordination with dairy producers, services providers, and subcontractors, presentations/outreach to stakeholders, and adherence to budgets and schedules. He is the author of refereed journal articles and has reviewed manuscripts for the American Geophysical Union's Water Resources Research and the American Society of Civil Engineers' Journal of Hydrologic Engineering.

Bill Brush – *Certified Crop Advisor*

Mr. Brush has been a certified crop advisor since 1996, a pest control advisor since 1990, serves on the Almond Board of California, and the East San Joaquin Water Quality Coalition Board. Mr. Brush is an expert in soil fertility and water management, and has presented on soil fertility issues all over the world, including in the United States, South Africa, Australia, and in the Philippines. Mr. Brush currently consults on more than 100 different crops around the world, and, in California, provides consulting services on tree crops, field crops, vegetables, berries, and alfalfa. Mr. Brush also has experience with conventional as well as organic farming systems.

Daniel Munk – *UC Cooperative Extension*

Mr. Munk, M.S. has been a UC Cooperative Extension Farm Advisor for the past 23 years working in the area of irrigation, soils and cotton production. He spent his early career evaluating soil and management factors influencing water infiltration rates in San Joaquin Valley soils. He began investigating cropping systems research in the late 1990's and is currently involved in several conservation tillage projects focusing on short and long term water management elements in annual cropping systems. Mr. Munk has lead numerous deficit irrigation studies working to understand the impacts that reduced water supplies have on crop yield, crop quality and soil quality. More recently, his research and education program has been directed towards crop water use projects in almonds, processing tomatoes, and Pima cotton. He was appointed in 2012 to the Peer Review Committee for the USBR San Joaquin River Restoration Project Technical Feedback Group and serves on the steering committee for the UC/CDFA Nitrate Curriculum Development Program.

James duBois – *Grower, Central Coast Region*

Mr. duBois studied Environmental Resource Science at the University of California, Davis. He spent three years farming and supervising production research and development in the water scarce areas of Baja California. During this time, he facilitated technology exchange between growers in Spain and the US/Mexico to develop knowledge within Reiter Affiliated Companies (RAC) on Reverse Osmosis water treatment and soilless media production systems. In 2007, James relocated to Ventura County to work on various water projects throughout RAC's global enterprise. His work included collaboration with growers to increase irrigation efficiency, research on salinity management, development of recycled water sources, and co-development of soil moisture monitoring technology with external companies. His work has greatly influenced the amount of water usage and discharge in RAC's operations in coastal California (which span several thousand acres from Oxnard to Watsonville) and their global operations. Mr. duBois spearheaded a recent water technology and resource management exchange and visit to Israel involving US

and Mexico growers, Panoche Water District Management, and the Israeli government. Recently, James has collaborated with regional water districts and the ag community in the development of drought water management policy and recycled source development

Mark McKean – *Grower, Central Valley Region*

Mark McKean is a third-generation farmer from Riverdale, CA. Mark owns and operates a diversified production agricultural operation. Mark graduated from Cal Poly in 1979 with a B.S. degree and later completed a master's degree at Colorado State University, Fort Collins. McKean is the president of the Reed Ditch Company, president of the Crescent Canal Company, a director of the Murphy Slough Association, the chairman for Kings River Conservation District (KRCD) Board of Directors, a graduate of the California Ag Leadership Class XX and the president of the West Hills Community College Board. McKean has taken a leadership role as the Chairman of the Kings Basin Water Quality Coalition, which is implementing the Irrigated Lands Regulatory Program. These leadership roles have included on farm presentations to State and Regional Water Resources Control Board members. Through these experiences, McKean has become knowledgeable in modern agricultural production techniques.

Dr. Lowell Zelinski – *Agronomist*

Lowell Zelinski, Ph.D. is a well-respected agricultural leader who has worked in the ag industry for over 30 years. He earned his doctorate degree in Soil Science and his bachelor's degree in Soil and Water Science from UC Davis. He also holds a master's degree in Agricultural Science from Cal Poly, San Luis Obispo. Dr. Zelinski began his career as a farm advisor for the University of California Cooperative Extension in Fresno County specializing in soil and water management and cotton production. Dr. Zelinski has now been a private agricultural consultant for over 20 years and currently owns his own business, Precision Ag Consulting, which focuses on soils, irrigation, water quality compliance issues on the Central Coast and vineyard management. He has taught at four California State University campuses: San Luis Obispo, Pomona, Fresno and Bakersfield, and is well-known for his teaching and speaking abilities. He is currently teaching Grapevine Physiology at Cal Poly SLO. He is the creator of the Central Coast VINE Symposium, which has turned into the renowned WiVi Central Coast.

APPENDIX B
Information Given to Expert Panel

Appendix B
Information Given to Expert Panel

In April of 2014, the Expert Panel was provided with a lengthy clarification of what the Expert Panel was expected to address, and what it was not expected to address. Key points include:

- The focus was on nitrates, rather than sediment, pesticides, etc.
- Groundwater was the main issue, although several questions for the Expert Panel were related to surface water monitoring.
- The Expert Panel was expected to address questions related to:
    - Proper establishment of "risk" or "vulnerability" categories for large geographic areas, fields, crop types, or farms.
    - The type of above-groundwater data collection and computations that are needed for compliance, or to estimate impacts of practices.
    - Effectiveness of management practices that have been recommended for agricultural irrigators, which might affect nitrate leaching into the groundwater.

Waste Discharge Requirements (WDRs) and Conditional Waivers to WDRs

Under the California Water Code (CWC), anyone who discharges waste (other than community water systems) that affects waters of the state must file a Report of Water Discharge (ROWD) with their Regional Water Quality Control Board (Regional Water Board). The CWC requires that the Regional Water Board prescribe the Waste Discharge Requirements (WDRs) or waive the WDRs (called a "Conditional Waiver") to anyone who is determined to be a "discharger" of waste.

Definitions:

WDR (Waste Discharge Requirement) – For the Irrigated Lands Regulatory Program (ILRP) this is a permit issued by the Regional Water Boards to geographic areas or to groups of growers of identical crops. It requires certain water quality monitoring and reporting.

Conditional Waiver – A permit issued by the Regional Water Boards. It was originally intended to serve as a precursor to the issuing of a WDR. In some regions, the "Conditional Waiver" has the same status as a WDR.

Ag Waiver/Agricultural Order – Synonyms for Conditional Waivers and WDRs that have been adopted specifically to address agricultural discharges from irrigated lands.

Names and Locations

1. NORTH COAST REGION (1)
2. SAN FRANCISCO BAY REGION (2)
3. CENTRAL COAST REGION (3)
4. LOS ANGELES REGION (4)
5. CENTRAL VALLEY REGION (5)
6. LAHONTAN REGION (6)
7. COLORADO RIVER BASIN REGION (7)
8. SANTA ANA REGION (8)
9. SAN DIEGO REGION (9)

Figure B-1. California regional water board locations

Conditional Waivers and WDRs are documents that serve as a type of permit that formalize regulatory actions taken by the Regional Water Boards. Typically, a Conditional Waiver or WDR includes a list of findings establishing the need for action, followed by a list of required actions. For the ILRP, the Conditional Waivers or WDRs allow for the formation of third-party representatives, commonly referred to as "coalitions", to represent farmers as a group to meet compliance requirements.

Through a series of events related to the passage of Senate Bill 390 (Alpert), the ILRP originated in 2003. Initially, the ILRP was developed for the Central Valley Regional Water Quality Control Board. As the Central Valley Water Board ILRP progressed, a groundwater quality element was added to the filing requirement for agricultural lands that had previously only been subjected to surface water discharge concerns. As of April 2014, all nine Regional Water Boards in the state were in different stages of the Irrigated Lands Regulatory Program as described briefly below:

- The North Coast and San Francisco Regional Water Quality Control Boards (Regions 1 and 2 respectively) were in the process of developing agricultural discharge permits (i.e., either WDRs or Conditional Waivers of WDRs).
- The Lahontan Regional Water Quality Control Board (Region 6) had not begun developing an ILRP, but will do so as agricultural-related TMDLs are implemented.
- The Santa Ana Regional Water Quality Control Board (Region 8) was working on a proposed Conditional Waiver of Waste Discharge Requirements for the Agricultural Discharges Program for Growers in the San Jacinto River Watershed.
- The Los Angeles and San Diego Regional Water Quality Control Boards (Regions 4 and 9 respectively) operated under Conditional Waivers, but these Regional Water Boards were not addressing groundwater quality, and their respective Conditional Waivers ***did not*** include groundwater-specific requirements or actions.
- The Colorado River Regional Water Quality Control Board (Region 7) had a variety of situations. Most of the region was not covered by Conditional Waivers.
    a. In 2012, Region 7 adopted a Conditional Waiver for the Palo Verde portion of the region that includes both groundwater and surface water requirements. Palo Verde

Irrigation District serves as the third-party (coalition) for the Palo Verde Conditional Waiver.

b. In 2013, Region 7 adopted a Conditional Waiver for a separate part of the region for the Bard Unit of Reservation Division in Imperial County.

- The Central Coast Regional Water Quality Control Board (Region 3) issued a new conditional waiver in 2012 for the entire region that ***did*** include groundwater. The Region 3 conditional waiver allowed the use of a monitoring group to conduct monitoring and manage fees. The 2012 conditional waiver included a provision for the use of approved third-party certification groups. There were no other coalitions for this region.
- In the Central Valley (Region 5), seven out of eight planned Waste Discharge Requirements (geographically-based) had been adopted by the Central Valley Regional Water Board as of March 20, 2014, all of which consider groundwater. Sometimes multiple coalitions were covered by the same WDR.
    a. Only one of the Region 5 coalitions (East San Joaquin Water Quality Coalition) had a Groundwater Quality Assessment Report (GAR) that had been adopted (approved) by the Regional Board. The GAR was the first work product related to groundwater that was required in the WDRs.
    b. The California Rice Commission developed a GAR at the same time it was working with the Regional Board to develop its WDR. It is unclear when the GAR will be approved.

For reference, the process used in Region 5 is outlined in **Figure B-2** on the next page. The groundwater compliance requirements for Region 5 that will be addressed by the Expert Panel are highlighted in yellow.

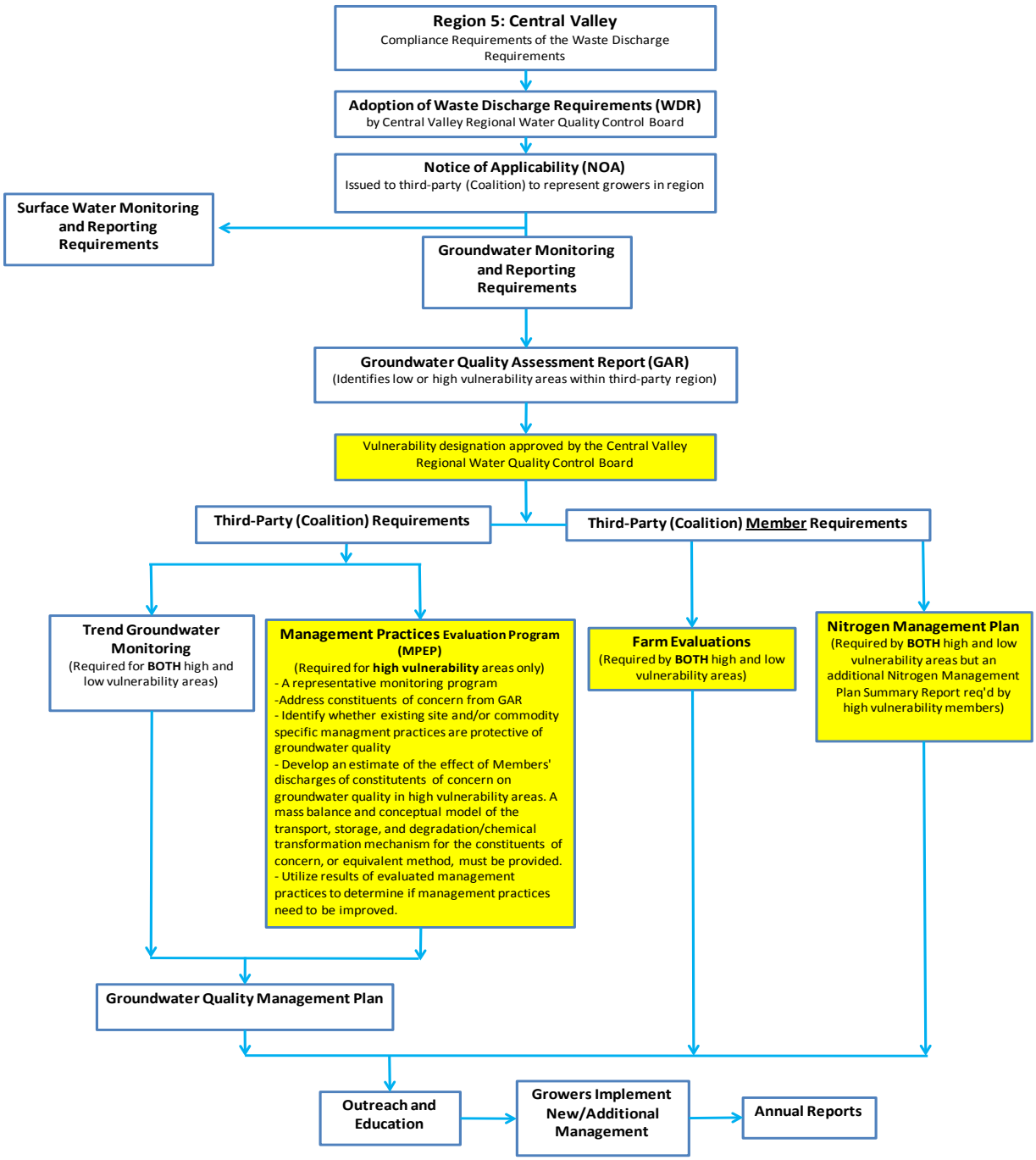

Figure B-2. Outline of groundwater portion of the WDR process for Region 5. Region 5 stresses a coalition-based approach. Only two coalitions have completed the GAR step, in which they provide a "groundwater vulnerability designation" of "high" or "low" to areas within their coalition. The highlighted boxes indicate the areas for which questions will be asked of the Expert Panel.

Major Differences between Region 3 and 5 Approaches

Most of the actions (and controversy) with groundwater requirements have taken place in Region 5 (Central Valley) and Region 3 (Central Coast). The two Regional Water Boards have taken very different approaches toward compliance requirements.

APPENDIX C
Definitions and Clarifications for Expert Panel

Appendix C
Definitions and Clarifications for Expert Panel

General Intent

All of the adopted Waste Discharge Requirements for the Central Valley Region (Region 5) contain the following excerpt that addresses the purpose of the Expert Panel:

> *"The Expert Panel will evaluate ongoing agricultural control measures that address nitrate in groundwater, and will propose new measures, if necessary. In its assessment of existing agricultural nitrate control programs and development of recommendations for possible improvements in the regulatory approaches being used, the Expert Panel will consider groundwater monitoring, mandatory adoption of best management practices, tracking and reporting of nitrogen fertilizer application, estimates of nitrogen use efficiency or a similar metric, and farm-specific nutrient management plans as source control measures and regulatory tools." (Central Valley Regional Water Board, 2012).*

Specifically, the Expert Panel was asked to answer a number of questions provided by the State Water Board. It was the intent of the State Water Board that the Expert Panel's responses to these questions provide guidance to the Regional Water Boards as they continue to develop the requirements in their ILRPs.

It was understood that high nitrate levels in the groundwater cannot be lowered immediately, and that the proper management practices and evaluation techniques have uncertainties and costs. The Expert Panel was, however, expected to provide answers that would help regulators improve the likelihood that:

1. Nitrate contamination occurs less frequently than it would have without any changes to management practices of today.
2. The nitrate contamination that does occur is less than, and occurs more slowly than, it would have been without any changes to management practices of today.

The Expert Panel focused on what can (and cannot) be done today "on the surface" to reduce nitrate discharges to both surface water and groundwater.

It was not within the scope of the Expert Panel's assignment to:

1. Develop criteria that will result in clean drinking water in some specified number of years.
2. Address questions regarding methods for treating nitrates in surface water or groundwater to bring it to drinking water quality.
3. Address the question of whether it is possible to bring the groundwater quality to drinking water quality.

Furthermore, the Expert Panel was expected to provide answers and recommendations that are pragmatic and essential. Specifically, the Expert Panel was asked to weigh all recommendations in light of the fact that the requirements within the WDRs are not meant to:

1. Answer scientific questions or uncertainties, such as the details of the nitrogen cycle with dairy effluent disposal.

2. Collect data that is only useful for creating statistics.
3. Serve as research projects.

The following sections explain some terms, and provide background for specific questions.

Vulnerability and Risk

The exact definitions of "vulnerability" and "risk" are somewhat fuzzy when one compares Region 5 and Region 3 in light of requirements as of April 2014.

In regards to the term "**vulnerability**":

1. The term is generally intended to distinguish large areas that already have "high" or "low" nitrate levels in the groundwater.
2. In Region 5, areas that have a "high" vulnerability to groundwater nitrates have special requirements for the coalitions (identified as "Management Practices Evaluation Program, MPEP" in Figure 2).
3. In Region 3, there are no special requirements for coalitions because:
   a. There are no coalitions that administer programs (there are two coalitions of a different type, which are organized only to sample and analyze data).
   b. The entire region was classified as "high" vulnerability.

The two regional approaches used to designate the "vulnerability" of groundwater bodies in regards to nitrates have been:

- Region 5 allows the individual coalitions to define the "low" and "high" vulnerable areas in their areas. The Region 5 Regional Water Board works with the coalitions to determine the criteria that will be used locally. As an example, the Rice Growers Association, in its proposed GAR, submits the argument that because rice fields are flooded and nitrogen fertilizer is exclusively ammonia-based, there will be no conversion to nitrate and therefore all the groundwater under rice fields is a "low" vulnerability classification.
- Region 3's Regional Water Board staff determined that the complete Region 3 is "highly" vulnerable. There was no joint effort with formal coalitions; it was a unilateral decision by the Regional Board staff that did include input at public meetings.

In regards to the term "**risk**":

1. The term is used to describe the relative likelihood of serious nitrate loading into the groundwater by a field or farm.
2. *Risk assessment categorization is the basis for the prescription of best management practices for individual fields or farms*.
3. Region 3 has four established procedures for assessing "risk" (only one of which is selected by an individual farmer).
4. The level of "risk" in Region 3 is assigned using a tiering system where individual fields are categorized into one of three "tiers". Each tier requires a different level of monitoring, reporting, and best management practices.

It was not the mandate of the Expert Panel to determine, designate, or map vulnerability areas. However, the Expert Panel was asked questions regarding how risk can best be determined.

Management Practices (MPs) and Data Collection

Currently Regional Water Quality Control Boards and/or coalitions (various regions) prescribe agricultural actions to farmers in their regions that have been deemed "management practices" (MPs). In general, the MPs that are prescribed to farmers were developed by the UC Cooperative Extension.

The MPs of interest to the Expert Panel are only those that pertain to nitrate application and control. The Expert Panel will assess existing MPs and may recommend others if desired.

As an example, a requirement of the WDRs adopted in the Central Valley is the Management Practices Evaluation Program (MPEP). The MPEP will include evaluation studies of management practices to determine whether those practices are protective of groundwater quality for identified constituents of concern under a variety of site conditions.

The Expert Panel was asked to recommend a "suite" of management practices that should be tried to complete the requirements of the MPEP. MPs might be related to flow measurement, irrigation system Distribution Uniformity, ET-based irrigation scheduling, fertigation, or other topics. However, the Expert Panel may decide that if it can be demonstrated that only a small amount (e.g., 10%) of nitrogen is applied, above what is removed from a field during harvest, there is no need to go into the details of irrigation and other practices.

Reporting

Definitions:

- **Reporting** – This term is used by regulatory agencies to designate information that must be officially reported to the agency.
- **Data Collection and Analysis** – Sometimes regulatory agencies require that data be collected and analyzed, but not officially reported. The result to farmers is still often the same: there is an expense to set up a monitoring system, collect data, and possibly analyze the importance of the data.

Per the mandate of the State Water Board, the California Department of Food and Agriculture (CDFA) convened the Nitrogen Tracking and Reporting Task Force to address the outcomes and benefits of a nitrogen mass balance tracking system. A report (referred to in this memo as the "CDFA Report") was completed in the summer of 2013 (CDFA, 2013).

While the Expert Panel was not intended to focus on the "reporting" that is addressed in the CDFA Report, there is a definite linkage. For example, the Expert Panel may decide that certain types of data are interesting for statistics and reports, but they may not be economically (or practically) beneficial to significantly helping achieve the ultimate goal of reducing nitrate loading.

As an example, a variety of nitrogen computations have been proposed to be included in monitoring, identifying risk, and as BMPs. The Expert Panel assessed the relative importance of using field-level nitrogen computations such as those described below.

1. Nitrogen mass balance – The general idea is to have a spreadsheet or model which incorporates all nitrogen inputs to a field, along with extractions. In general, the deep percolation of nitrates is a mathematical "remainder". Differences between various "mass balance" computations enter when one integrates factors such as:
    a. Nitrogen transformation rates
    b. Volatilization
    c. Crop removal – measured or estimated?
    d. Carry-over between crops
    e. Details of leaching factors, such as frequency and intensity of rainfall.
2. Ratio of [(Nitrogen In)/(Nitrogen Removed by the Crop)] – Again, there can be differences between the technique used to determine the "nitrogen removed". There are also questions regarding what ratio might be acceptable. The applicability of this type of ratio may depend upon factors such as:
    a. The type of crop. For example, trees versus vines versus leafy greens.
    b. The amount of rainfall.

Groundwater Monitoring

Definitions:

- **Trend monitoring** – Designates some type of groundwater monitoring on a regional scale.

The Expert Panel did not address trend monitoring.

- **Representative monitoring** – The "sampling" of techniques. Monitoring may be done on a "representative field", but not on all fields, if the results from that "representative field" can provide conclusions for many similar fields.
- **Individual monitoring** – Generally indicates that discharges from every field or farm must be measured.

While all three types of monitoring are common with surface water, there are questions regarding the value of using any or all of these monitoring techniques to assess groundwater nitrate loading.

The Expert Panel assessed whether or not it is reasonable to expect that groundwater monitoring will accurately assess agricultural management practice performances on individual fields.

Surface Water Monitoring

Definitions:

- **Discharge water monitoring** – Monitoring of the water quality and/or quantity at individual discharge points from fields, farms, etc. to creeks and other surface water bodies.
- **Receiving water monitoring** – Monitoring of the water quality and/or quantity in the creeks or other surface water bodies that receive water from farms or fields.

Two approaches have been taken to monitoring surface water. Region 3 has taken the approach of discharge water monitoring to surface water while Region 5 has taken the approach of receiving water monitoring.

The Expert Panel was asked to address a question regarding the value of both receiving water and discharge water monitoring regarding surface water monitoring (both receiving water and individual discharge).

APPENDIX D
Meeting Agendas

Appendix D
Meeting Agendas

Three public meetings were held during the month of May. During the first meeting on May 5, only invited speakers addressed the Panel, although any member of the public was allowed to attend. On May 6, 7, and 9, public comment was invited. Attendees were asked to fill out a speaker card in order to request an audience with the Panel, and their names were called in the order in which the cards were submitted. Invited speakers were given 30 minutes for their presentations, and public commenters we allowed 5 minutes each. Panel members were allowed to ask questions of the presenters after they had finished their statements.

Monday, May 5

- Welcome by Dr. Charles Burt (Panel Chair), Introduction and Presentation of Charge by Darrin Polhemus, SWRCB
- Invited Speakers:
    - Clay Rodgers and Joe Karkoski, Central Valley RWQCB and Angela Shroeter, Central Coast RWQCB
    - Dr. Amrith Gunasekara and Dr. Amadou Ba, California Department of Food and Agriculture
    - Parry Klassen, East San Joaquin Water Quality Coalition
    - Dr. Joel Kimmelshue, Land IQ
    - Chris Kapheim, Alta Irrigation District
    - Dr. Ken Baerenklau, UC Riverside
    - Butch Massa, Comgro Soil Amendments
    - Hung Le, Paramount Farming Company
    - Richard Smith, UC Cooperative Extension
    - Paul Giboney, M. Caratan Inc/Columbine Vineyards
    - George Adam, Innovative Produce
    - Dr. Robert Mikkelson, International Plant Nutrition Institute

Tuesday, May 6

- Introduction by Expert Panel and Review of Charge of the Panel by Darrin Polhemus, SWRCB
- Invited Speakers:
    - Roy Killgore, San Ysidro Farms
    - Mark Mason, Salinas Valley Grower
- Public Comments:
    - Steve Shimek, Otter Project/Monterey Coastkeeper
    - Dr. Jean-Pierre Wolff, Central Coast Regional Water Quality Control Board
    - Claire Wineman, Growership Association of SB and SLO Counties
    - Kirk Schmidt, Central Coast Water Quality Preservation, Inc.
    - John Schaap, Kern River Watershed Coalition Authority
    - Kay Mercer, KMI
    - Pearl Kan, California Rural Legal Assistance League
    - Abby Taylor-Silva, Grower-Shipper Association of Central California
- Darrin Polhemus, SWRCB, Explanation of Brown Act

- Angela Schroeter, Region 3 Central Coast Water Quality Control Board
- Expert Panel Discussion

Wednesday, May 7

- Introduction by Expert Panel
- Invited Speakers:
  - Joe Karkoski, Central Valley Regional Water Quality Control Board
  - Clay Rodgers, Central Valley Regional Water Quality Control Board
- Public Comments:
  - Casey Creamer, Kings River Water Quality Coalition
  - Keith Freitas, Lemon Farmer
  - Stephen Pavich, Famer and Agricultural Consultant
  - Darlene Din, Ag Land Use Consultant
  - Abby Taylor-Silva, Grower-Shipper Association of Central California
  - Kay Mercer, KMI
  - Parry Klassen, East San Joaquin Water Quality Coalition
  - John Schaap, Kern River Watershed Coalition Authority
- Expert Panel Discussion

Friday, May 9

- Introduction by Expert Panel
- Invited Speakers:
  - Dr. Thomas Harter, UC Davis
  - Brock Taylor, Certified Crop Advisor
  - Dr. Toby O'Geen, UC Davis
- Public Comments:
  - John Dickey, PlanTierra LLC
  - Bob Blakely, Citrus Grower
  - Bud Heokstra, Berry Blest Organic Farm
  - Patrick Brown, UC Davis
  - Bill McKinney, East San Joaquin Water Quality Control Board
  - Jim Parsons, Farmer
  - Dr. Karl Longley, Central Valley Regional Water Quality Control Board
  - Tim Johnson, California Rice Commission
  - Steve Shimek, The Otter Project
  - Jennifer Clary, Clean Water Action
  - J. P. Cativiela, Dairy Cares
- Clay Rodgers, Central Valley Regional Water Quality Control Board
- Expert Panel Discussion with Darrin Polhemus, SWRCB

Agricultural Expert Panel Public Meeting #1

Monday May 5, 2014 – 9:00 AM (Convene Panel and Invited Testimony)
Tuesday May 6, 2014 – 8:30 AM (Invited Testimony and Public Comment)

Locations different for each day:
May 5: Irrigation Training and Research Center
California Polytechnic State University, SLO
1 Grand Ave, Building 08A, Room 022
San Luis Obispo, CA 93405
May 6: The Monday Club
1815 Monterey Street
San Luis Obispo, CA 93401

THIS MEETING IS A CONTINUATION OF THE EFFORTS ASSOCIATED WITH THE STATE WATER RESOURCES CONTROL BOARD CHAPTER 1 OF THE SECOND EXTRAORDINARY SESSION OF 2008 (SBX2 1, PERATA) REPORT TO THE LEGISLATURE – RECOMMENDATION 14, EXPERT PANEL AND ADVISORY COMMITTEE FORMATION. THE MEETING WILL BE CONDUCTED BY THE EXPERT PANEL. A QUORUM OF STATE WATER BOARD MEMBERS MAY BE IN ATTENDANCE, BUT NO BOARD ACTION WILL BE TAKEN AT THIS MEETING.

AGENDA (rev. 1)

May 5

I. Call the meeting to order

II. **Declaration of a quorum**
Dr. Charles Burt, Panel Chair; Dr. Robert Hutmacher; Till Angermann; Bill Brush; Daniel Munk; James duBois; Mark McKean; Dr. Lowell Zelinski

III. Housekeeping announcements

IV. Panel Introduction and opening remarks by panel members

V. Review Agenda

VI. Review the Charge of the Panel and take invited speaker comments (public comments will not start until after 8:30 am on Tuesday May 6)

- Presentation of charge to the panel and specific questions – Darrin Polhemus, State Water Resources Control Board
- Region Water Quality Control Boards panel
  - Angela Schroeter, Central Coast Regional Water Quality Control Board
  - Clay Rodgers, Central Valley Regional Water Quality Control Board
  - Joe Karkoski, Central Valley Regional Water Quality Control Board
- Nitrate Tracking and Reporting System Task Force – Dr. Amrith Gunasekara and Dr. Amadou Ba, California Department of Food and Agriculture
- Parry Klassen, East San Joaquin Water Quality Coalition
- Dr. Joel Kimmelshue, Land IQ
- Chris Kapheim, Alta Irrigation District
- Dr. Ken Baerenklau, UC Riverside

- Paul Giboney, M. Caraten Inc/Columbine Vineyards
- Butch Massa, Comgro Soil Amendments
- Hung Le, Paramount Farming Company
- Richard Smith, UC Cooperative Extension
- Dr. Robert Mikkelsen, International Plant Nutrition Institute
- George Adam, Innovative Produce

VII. Adjourn for the Day

May 6

I. Call the meeting to order

II. Declaration of a quorum
Dr. Charles Burt, Panel Chair; Dr. Robert Hutmacher; Till Angermann; Bill Brush; Daniel Munk; James duBois; Mark McKean; Dr. Lowell Zelinski

III. Housekeeping announcements

IV. Review Agenda

V. Panel Introduction and opening remarks by panel members

VI. Review the Charge of the Panel and take invited and public comments (this item is continued from the previous day)

- Roy Killgore Jr., San Ysidro Farms
- Salinas Valley Grower
- Public Comment (Any member of the public may present comments or remarks to the Panel. Commenters will be limited to 5 minutes or otherwise at the discretion of the Chair. Commenters will be asked to fill out a speaker card if they wished to be called to speak. Written comments are due by May 14, 12:00 pm noon.)

VII. Panel Discussion

VIII. Adjournment

Background
Chapter 1 of the Second Extraordinary Session of 2008 (SBX2 1, Perata), required the State Water Resources Control Board (State Water Board) to develop pilot projects focusing on nitrate in groundwater in the Tulare Lake Basin and Salinas Valley, and to submit a report to the Legislature on the scope and findings of the pilot projects, including recommendations. The State Water Board made 15 recommendations in 4 key areas to address the issues associated with nitrate contaminated groundwater. The key areas to address these issues are:

1. Providing safe drinking water.
2. Monitoring, notification, and assessment.
3. Nitrogen tracking and reporting.
4. Protecting groundwater.

Expert Panel
Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater supply quality. The State Water Board has contracted with the Irrigation Training and Research Center (ITRC), a center established within the BioResource and Agricultural Engineering Department of the California Polytechnic State University, San Luis Obispo to assemble the expert panel of up to 10 persons. The Expert Panel members have been selected and information about the panel members is available on the ITRC website at http://www.itrc.org/001/swrcb.htm . Questions to be presented to the Expert Panel for consideration are provided below.

Written Public Comments
The State Water Board will accept written comments from the public for the Expert Panel's consideration. Comments and remarks must be received by **12:00 noon on Wednesday, May 14, 2014** and addressed to:

Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Comments and remarks may be submitted electronically, in pdf text format (if less than 15 megabytes in total size), to the Clerk to the Board via e-mail at commentletters@waterboards.ca.gov.

If the file is greater than 15 megabytes in total size, then the document(s) may be submitted by fax at (916) 341-5620. Please indicate in the subject line: **"Agricultural Expert Panel Comments."**

Couriers delivering hard copies of documents must check in with lobby security personnel, who can contact Jeanine Townsend at (916) 341-5600.

Schedule (some dates may be changed at a later date and all changes will be noticed).

Date	Event	Location
Completed	Advisory Committee Kickoff Meeting	Cal/EPA Building Sierra Hearing Room, Sacramento
May 5th-6th, 2014*	Expert Panel Public Meeting #1	San Luis Obispo 5th: Irrigation Training and Research Center 6th: Monday Club
May 7th, 2014	Expert Panel Public Meeting #2	SCE Energy Education Center, Tulare
May 9th, 2014	Expert Panel Public Meeting #3	Cal/EPA Building Byron Sher Auditorium, Sacramento
June 30th, 2014	Expert Panel Draft Report Released	N/A
July 1st – July 30th, 2014	Public Comment Period on Expert Panel Draft Report	N/A
July 18th, 2014	Expert Panel Public Meeting on Draft Report	Cal/EPA Building Byron Sher Auditorium, Sacramento
July 28th, 2014	Advisory Committee Meeting	Cal/EPA Building Sierra Hearing Room, Sacramento
September 23rd, 2014	Expert Panel presents Final Report at Board Meeting	Cal/EPA Building Coastal Hearing Room, Sacramento

Project Tools and Information

Project information, including meeting notices, agendas, meeting minutes, and other pertinent material/documents will be posted online at http://www.itrc.org/001/swrcb.htm and at http://www.waterboards.ca.gov/water_issues/programs/agriculture/.

To receive updates by email, please subscribe to our email list: Nitrate Project - SBX2 1 - Expert Panel. (Located in the "Water Quality Topics" section at http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml.)

Please direct any questions about this agenda to Johnny Gonzales at (916) 341-5510 or Ashley Zellmer at (916) 341-5911.

Agricultural Expert Panel Public Meeting #2

Wednesday May 7, 2014 – 8:30
(Invited Testimony and Public Comment)
Southern California Edison Energy Education Center
4175 South Laspina Street
Tulare, CA 93274

THIS MEETING IS A CONTINUATION OF THE EFFORTS ASSOCIATED WITH THE STATE WATER RESOURCES CONTROL BOARD CHAPTER 1 OF THE SECOND EXTRAORDINARY SESSION OF 2008 (SBX2 1, PERATA) REPORT TO THE LEGISLATURE – RECOMMENDATION 14, EXPERT PANEL AND ADVISORY COMMITTEE FORMATION. THE MEETING WILL BE CONDUCTED BY THE EXPERT PANEL. A QUORUM OF STATE WATER BOARD MEMBERS MAY BE IN ATTENDANCE, BUT NO BOARD ACTION WILL BE TAKEN AT THIS MEETING.

AGENDA

I. Call the meeting to order

II. Declaration of a quorum
Dr. Charles Burt, Panel Chair; Dr. Robert Hutmacher; Till Angermann; Bill Brush; Daniel Munk; James duBois; Mark McKean; Dr. Lowell Zelinski

III. Housekeeping announcements

IV. Review Agenda

V. Panel Introduction and opening remarks by panel members

VI. Review the Charge of the Panel and take invited and public comments

- Presentation of charge to the panel and specific questions – Darrin Polhemus, State Water Resources Control Board
- Public Comment (Any member of the public may present comments or remarks to the Panel. Commenters will be limited to 5 minutes or otherwise at the discretion of the Chair. Commenters will be asked to fill out a speaker card if they wished to be called to speak. Written comments are due by May 14, 12:00 pm noon.)

VII. Panel Discussion

VIII. Adjournment

Background
Chapter 1 of the Second Extraordinary Session of 2008 (SBX2 1, Perata), required the State Water Resources Control Board (State Water Board) to develop pilot projects focusing on nitrate in groundwater in the Tulare Lake Basin and Salinas Valley, and to submit a report to the Legislature on the scope and findings of the pilot projects, including recommendations. The State Water Board made 15 recommendations in 4 key areas to address the issues associated with nitrate contaminated groundwater. The key areas to address these issues are:

5. Providing safe drinking water.
6. Monitoring, notification, and assessment.
7. Nitrogen tracking and reporting.
8. Protecting groundwater.

Expert Panel
Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater supply quality. The State Water Board has contracted with the Irrigation Training and Research Center (ITRC), a center established within the BioResource and Agricultural Engineering Department of the California Polytechnic State University, San Luis Obispo to assemble the expert panel of up to 10 persons. The Expert Panel members have been selected and information about the panel members is available on the ITRC website at http://www.itrc.org/001/swrcb.htm . Questions to be presented to the Expert Panel for consideration are provided below.

Written Public Comments
The State Water Board will accept written comments from the public for the Expert Panel's consideration. Comments and remarks must be received by **12:00 noon on Wednesday, May 14, 2014** and addressed to:

Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

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Please direct any questions about this agenda to Johnny Gonzales at (916) 341-5510 or Ashley Zellmer at (916) 341-5911.

Agricultural Expert Panel Public Meeting #3

Friday May 9, 2014 – 8:30

(Invited Testimony and Public Comment)

Joe Serna Jr. – Cal/EPA Headquarters Building
Byron Sher Auditorium
1001 I Street, Second Floor
Sacramento, CA 95814

THIS MEETING IS A CONTINUATION OF THE EFFORTS ASSOCIATED WITH THE STATE WATER RESOURCES CONTROL BOARD CHAPTER 1 OF THE SECOND EXTRAORDINARY SESSION OF 2008 (SBX2 1, PERATA) REPORT TO THE LEGISLATURE – RECOMMENDATION 14, EXPERT PANEL AND ADVISORY COMMITTEE FORMATION. THE MEETING WILL BE CONDUCTED BY THE EXPERT PANEL. A QUORUM OF STATE WATER BOARD MEMBERS MAY BE IN ATTENDANCE, BUT NO BOARD ACTION WILL BE TAKEN AT THIS MEETING.

AGENDA

I. Call the meeting to order

II. Declaration of a quorum

Dr. Charles Burt, Panel Chair; Dr. Robert Hutmacher; Till Angermann; Bill Brush; Daniel Munk; James duBois; Mark McKean; Dr. Lowell Zelinski

III. Housekeeping announcements

IV. Review Agenda

V. Panel Introduction and opening remarks by panel members

VI. Review the Charge of the Panel and take invited and public comments

- Presentation of charge to the panel and specific questions – Darrin Polhemus, State Water Resources Control Board
- Dr. Thomas Harter, UC Davis
- Brock Taylor, Certified Crop Advisor
- Dr. Melanie Harrison, NOAA National Marine Fisheries Service
- Public Comment (Any member of the public may present comments or remarks to the Panel. Commenters will be limited to 5 minutes or otherwise at the discretion of the Chair. Commenters will be asked to fill out a speaker card if they wished to be called to speak. Written comments are due by May 14, 12:00 pm noon.)

VII. Panel Discussion

VIII. Adjournment

Background
Chapter 1 of the Second Extraordinary Session of 2008 (SBX2 1, Perata), required the State Water Resources Control Board (State Water Board) to develop pilot projects focusing on nitrate in groundwater in the Tulare Lake Basin and Salinas Valley, and to submit a report to the Legislature on the scope and findings of the pilot projects, including recommendations. The State Water Board made 15 recommendations in 4 key areas to address the issues associated with nitrate contaminated groundwater. The key areas to address these issues are:

9. Providing safe drinking water.
10. Monitoring, notification, and assessment.
11. Nitrogen tracking and reporting.
12. Protecting groundwater.

Expert Panel
Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater supply quality. The State Water Board has contracted with the Irrigation Training and Research Center (ITRC), a center established within the BioResource and Agricultural Engineering Department of the California Polytechnic State University, San Luis Obispo to assemble the expert panel of up to 10 persons. The Expert Panel members have been selected and information about the panel members is available on the ITRC website at http://www.itrc.org/001/swrcb.htm . Questions to be presented to the Expert Panel for consideration are provided below.

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Please direct any questions about this agenda to Johnny Gonzales at (916) 341-5510 or Ashley Zellmer at (916) 341-5911.

State Water Resources Control Board

Agricultural Expert Panel Public Meeting #4

Monday June 9, 2014 – 8:00 AM
Irrigation Training and Research Center
California Polytechnic State University, SLO
1 Grand Ave, Building 08A, Room 022
San Luis Obispo, CA 93405

THIS MEETING IS A CONTINUATION OF THE EFFORTS ASSOCIATED WITH THE STATE WATER RESOURCES CONTROL BOARD CHAPTER 1 OF THE SECOND EXTRAORDINARY SESSION OF 2008 (SBX2 1, PERATA) REPORT TO THE LEGISLATURE – RECOMMENDATION 14, EXPERT PANEL AND ADVISORY COMMITTEE FORMATION. THE MEETING WILL BE CONDUCTED BY THE EXPERT PANEL. A QUORUM OF STATE WATER BOARD MEMBERS MAY BE IN ATTENDANCE, BUT NO BOARD ACTION WILL BE TAKEN AT THIS MEETING.

AGENDA

I. **Call the meeting to order**

II. **Declaration of a quorum**
Dr. Charles Burt, Panel Chair; Dr. Robert Hutmacher; Till Angermann; Bill Brush; Daniel Munk; James duBois; Mark McKean; Dr. Lowell Zelinski

III. **Housekeeping announcements**

IV. **Panel introduction and opening remarks by panel members**

V. **Review Agenda**

VI. **Public Comments** (Any member of the public may present comments or remarks to the Panel. Commenters will be limited to 2 minutes or otherwise at the discretion of the Chair. Commenters will be asked to fill out a speaker card if they wished to be called to speak.)

VII. **Panel discussion on questions presented to the panel and formulation of recommendations**

VIII. **Adjournment**

Felicia Marcus, chair | Thomas Howard, executive director

1001 I Street, Sacramento, CA 95814 | Mailing Address: P.O. Box 100, Sacramento, Ca 95812-0100 | www.waterboards.ca.gov

RECYCLED PAPER

Background

Chapter 1 of the Second Extraordinary Session of 2008 (SBX2 1, Perata), required the State Water Resources Control Board (State Water Board) to develop pilot projects focusing on nitrate in groundwater in the Tulare Lake Basin and Salinas Valley, and to submit a report to the Legislature on the scope and findings of the pilot projects, including recommendations. The State Water Board made 15 recommendations in 4 key areas to address the issues associated with nitrate contaminated groundwater. The key areas to address these issues are:

1. Providing safe drinking water.
2. Monitoring, notification, and assessment.
3. Nitrogen tracking and reporting.
4. Protecting groundwater.

Expert Panel

Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater supply quality. The State Water Board has contracted with the Irrigation Training and Research Center (ITRC), a center established within the BioResource and Agricultural Engineering Department of the California Polytechnic State University, San Luis Obispo to assemble the expert panel of 8 persons. The Expert Panel members have been selected and presented with questions for their consideration. Information about the panel members and their charge is available on the ITRC website at http://www.itrc.org/001/swrcb.htm .

Schedule (some dates may be changed at a later date and all changes will be noticed).

Date	Event	Location
Completed	Advisory Committee Kickoff Meeting	Cal/EPA Building Sierra Hearing Room, Sacramento
Completed	Expert Panel Public Meeting #1	San Luis Obispo Day 1: Irrigation Training and Research Center Day 2: Monday Club
Completed	Expert Panel Public Meeting #2	SCE Energy Education Center, Tulare
Completed	Expert Panel Public Meeting #3	Cal/EPA Building Byron Sher Auditorium, Sacramento
June 9th, 2014	Expert Panel Discussion Meeting	Irrigation Training and Research Center, San Luis Obispo
June 23rd, 2014	Expert Panel Discussion Meeting	Irrigation Training and Research Center, San Luis Obispo
June 30th, 2014	Expert Panel Draft Report Released	N/A
July 1st – July 30th, 2014	Public Comment Period on Expert Panel Draft Report	N/A

July 18th, 2014	Expert Panel Public Meeting on Draft Report	Cal/EPA Building Byron Sher Auditorium, Sacramento
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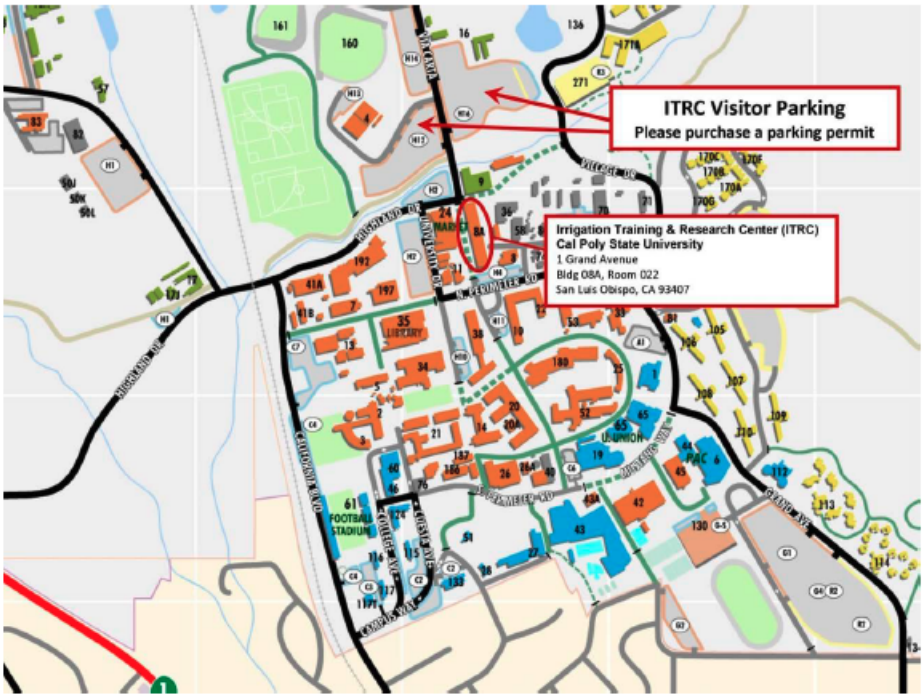
Please direct any questions about this agenda to Johnny Gonzales at (916) 341-5510 or Ashley Zellmer at (916) 341-5911.

Expert Panel Public Meeting Location Map

June 9 & 23, 2014: Irrigation Training and Research Center, Cal Poly, San Luis Obispo



Building Accessibility

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California Water Boards

Edmund G. Brown Jr. Governor

Matthew Rodriquez Secretary for Environmental Protection

State Water Resources Control Board

REVISED

Agricultural Expert Panel Meeting #5

Monday June 23, 2014 – ~~8:00~~ 8:30 AM

Meeting Location:
Irrigation Training and Research Center
California Polytechnic State University, SLO
1 Grand Ave, Building 08A, Room 022
San Luis Obispo, CA 93405

Teleconference Location:
Luhdorff & Scalmanini Consulting Engineers
500 First Street
Woodland, CA 95695

Teleconference Location: At least one member of the expert panel will participate in the meeting from the remote teleconference location identified above. The teleconference location is also open to the public. Members of the public are welcome to listen to the meeting from the teleconference location, and will be given an opportunity to present comments to the expert panel during the meeting's public comment period.

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AGENDA

I. **Call the meeting to order**

II. **Declaration of a quorum**
Dr. Charles Burt, Panel Chair; Dr. Robert Hutmacher; Till Angermann; Bill Brush; Daniel Munk; James duBois; Mark McKean; Dr. Lowell Zelinski

III. **Housekeeping announcements**

IV. **Panel introduction and opening remarks by panel members**

V. **Review Agenda**

VI. **Public Comments** (Any member of the public may present comments or remarks to the Panel. Commenters will be limited to 2 minutes or otherwise at the discretion of the Chair. Commenters will be asked to fill out a speaker card if they wished to be called to speak.)

VII. **Panel discussion on questions presented to the panel and formulation of recommendations**

VIII. **Adjournment**

Background
Chapter 1 of the Second Extraordinary Session of 2008 (SBX2 1, Perata), required the State Water Resources Control Board (State Water Board) to develop pilot projects focusing on nitrate in groundwater in the Tulare Lake Basin and Salinas Valley, and to submit a report to the Legislature on the scope and findings of the pilot projects, including recommendations. The State Water Board made 15 recommendations in 4 key areas to address the issues associated with nitrate contaminated groundwater. The key areas to address these issues are:

1. Providing safe drinking water.
2. Monitoring, notification, and assessment.
3. Nitrogen tracking and reporting.
4. Protecting groundwater.

Expert Panel
Recommendation 14 of the State Water Board's report to the Legislature was to convene a panel of experts to assess existing agricultural nitrate control programs and develop recommendations, as needed, to ensure that ongoing efforts are protective of groundwater supply quality. The State Water Board has contracted with the Irrigation Training and Research Center (ITRC), a center established within the BioResource and Agricultural Engineering Department of the California Polytechnic State University, San Luis Obispo to assemble the expert panel of 8 persons. The Expert Panel members have been selected and presented with questions for their consideration. Information about the panel members and their charge is available on the ITRC website at http://www.itrc.org/001/swrcb.htm .

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Schedule (some dates may be changed at a later date and all changes will be noticed).

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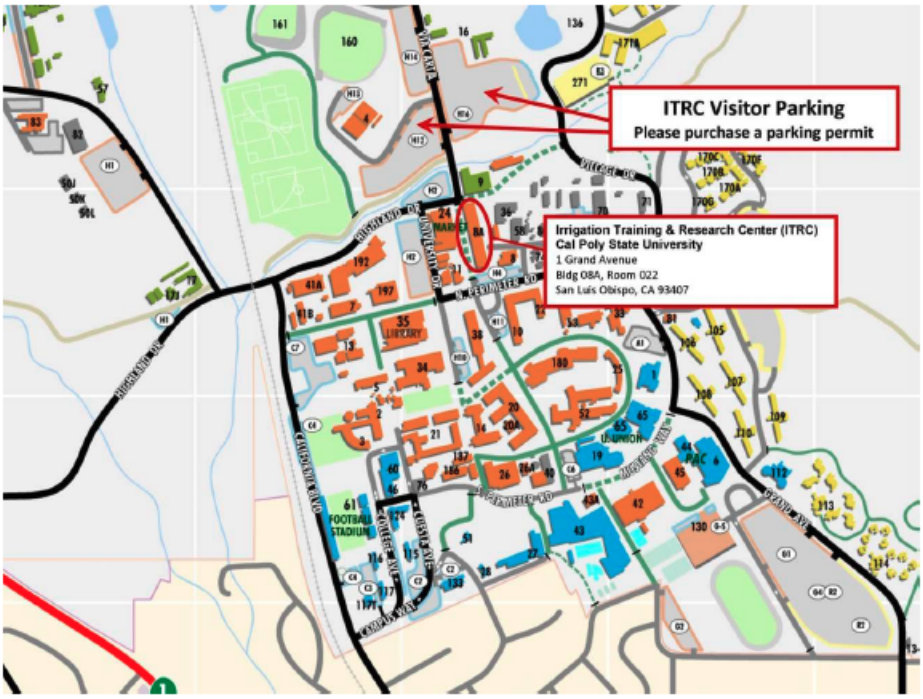
~~May 7th, 2014~~ Completed	Expert Panel Public Meeting #2	SCE Energy Education Center, Tulare
~~May 9th, 2014~~ Completed	Expert Panel Public Meeting #3	Cal/EPA Building Byron Sher Auditorium, Sacramento
~~June 9th, 2014~~ Completed	Expert Panel Meeting #4	Irrigation Training and Research Center, San Luis Obispo
June 23th, 2014	Expert Panel Meeting #5	Meeting Location: Irrigation Training and Research Center, San Luis Obispo Teleconference Location: Luhdorff & Scalmanini, Woodland
July 1st, 2014	Expert Panel Meeting #6	Meeting Location: Irrigation Training and Research Center, San Luis Obispo Teleconference Location: BerryMex SA de CV, Mexico
~~June 30th, 2014~~ July 7th, 2014	Expert Panel Draft Report Released	N/A
~~July 1st – July 30th, 2014~~ July 7th – August 7th, 2014	Public Comment Period on Expert Panel Draft Report	N/A
July 18th, 2014	Expert Panel Public Meeting #7 on Draft Report	Cal/EPA Building Byron Sher Auditorium, Sacramento
July 28th, 2014	Advisory Committee Meeting	Cal/EPA Building Sierra Hearing Room, Sacramento
August 20th, 2014	Expert Panel Meeting #8	Irrigation Training and Research Center, San Luis Obispo
September 23rd, 2014	Expert Panel presents Final Report at Board Meeting	Cal/EPA Building Coastal Hearing Room, Sacramento

Expert Panel Report Drafting Public Meeting Location Maps
June 23, 2014: Irrigation Training and Research Center, Cal Poly, San Luis Obispo



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California Water Boards

Edmund G. Brown Jr. Governor

Matthew Rodriquez Secretary for Environmental Protection

State Water Resources Control Board

Agricultural Expert Panel Meeting #6

Monday July 1, 2014 – 8:30 AM

Meeting Location:
Irrigation Training and Research Center
California Polytechnic State University, SLO
1 Grand Ave, Building 08A, Room 022
San Luis Obispo, CA 93405

Teleconference Location:
BerryMex SA de CV
Av. Benito Juarez Sur 713-B
Colonia Vicente Guerrero
Ensenada, Baja California, Mexico 22920

Teleconference Location: At least one member of the expert panel will participate in the meeting from the remote teleconference location identified above. The teleconference location is also open to the public. Members of the public are welcome to listen to the meeting from the teleconference location, and will be given an opportunity to present comments to the expert panel during the meeting's public comment period.

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AGENDA

I. **Call the meeting to order**

II. **Declaration of a quorum**
Dr. Charles Burt, Panel Chair; Dr. Robert Hutmacher; Till Angermann; Bill Brush; Daniel Munk; James duBois; Mark McKean; Dr. Lowell Zelinski

III. **Housekeeping announcements**

IV. **Panel introduction and opening remarks by panel members**

V. **Review Agenda**

VI. **Public Comments** (Any member of the public may present comments or remarks to the Panel. Commenters will be limited to 2 minutes or otherwise at the discretion of the Chair. Commenters will be asked to fill out a speaker card if they wished to be called to speak.)

VII. **Panel discussion of draft report**

VIII. **Adjournment**

Background
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~~June 9th, 2014~~ Completed	Expert Panel Meeting #4	Irrigation Training and Research Center, San Luis Obispo
June 23th, 2014	Expert Panel Meeting #5	Meeting Location: Irrigation Training and Research Center, San Luis Obispo Teleconference Location: Luhdorff & Scalmanini, Woodland
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July 7th – August 7th, 2014	Public Comment Period on Expert Panel Draft Report	N/A
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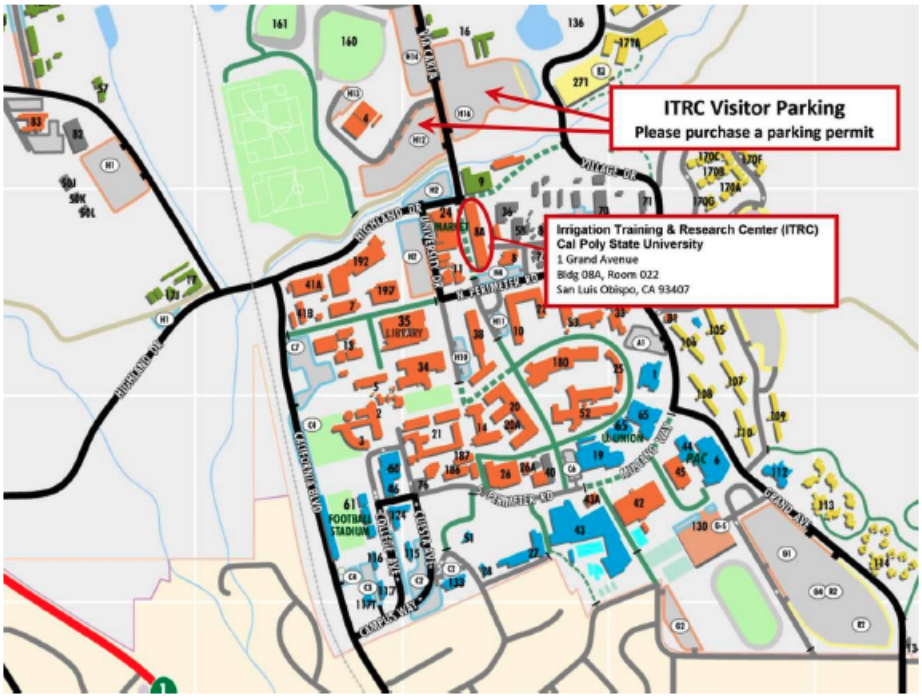
September 23rd, 2014	Expert Panel presents Final Report at Board Meeting	Cal/EPA Building Coastal Hearing Room, Sacramento

Expert Panel Report Drafting Public Meeting Location Map
July 1, 2014: Irrigation Training and Research Center, Cal Poly, San Luis Obispo



Building Accessibility
Meeting locations are accessible to people with disabilities. Individuals who require special accommodations, including real-time translation services, at the meeting are requested to contact Ashley Zellmer at (916) 341-5911.