Management Practices Evaluation Program (MPEP) Technical Meeting

Irrigated Lands Regulatory Program

Tuesday, March 28, 2017 ● 3 p.m. ● Kern Ag Pavilion, Bakersfield, California

Presentation by:

- Casey Creamer, Coalition Coordinator, Kings River Water Quality Coalition
- Till Angermann, Hydrogeologist, Luhdorff & Scalmanini Consulting Engineers
- John Dickey, PlanTierra LLC

Agenda Discussion:

- Overview of discussions on MPEP during negotiations of the General Order
- Overview of the Southern San Joaquin Valley (SSJV) MPEP Committee
- Overview of the SSJV MPEP Request for Qualifications process
- MPEP Workplan Status Update
- What is the MPEP and what does it have to do with the ILRP?
- What will the MPEP do for growers?
- How will it work and what will it produce?
- Overview of management tools and information for growers

This meeting is for members of the Kern River Watershed Coalition Authority, Buena Vista Coalition, Cawelo Water District Coalition, and Westside Water Quality Coalition.

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Dairy Representative Monitoring Program

- A regulatory compliance monitoring program
- An alternative to site-by-site monitoring of ~1,130 dairies
- Collects data on a subset of dairies representative of the industry and pertinent site conditions since 2012
- April 2019 summary report: To identify dairy management practices (MPs) that are protective of groundwater quality
- If MPs are found not to be protective of groundwater quality then 'must propose solutions and upgrades that will result in compliance'
- 'Implementation of the identified MPs must be as soon as practicable, supported with appropriate technical or economic justification and in no case may time schedules extend beyond 10 years from the date that the summary report is approved by the Executive Officer'

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Dairy RMP Representativeness

Take Advantage of Similarities, Capture Differences

- RMP benefits from a relative homogeneity within the dairy community
  - Manure generation and pathways
  - Corrals, fields, lagoons
  - Forage crops (mainly corn, cereals, alfalfa)
  - Irrigation methods
- Soils (from sand to clay soils)
- Climate (semi-arid Mediterranean)

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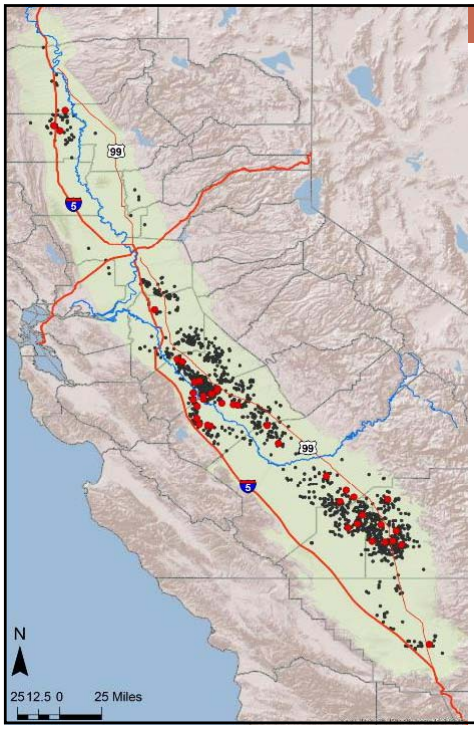

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Dairy RMP Basics

- 42 monitored dairies
- 443 dedicated monitoring wells
- Monthly GW level monitoring
- Groundwater quality monitoring
  - quarterly: 9 constituents
  - annual: 22 constituents
- Recordation/tracking of key information excerpted from dairy's Annual Reports and more

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"…it is becoming increasingly apparent that groundwater monitoring will likely not be the primary tool to evaluate on-farm management practices."

"It is expected that (CVDRMP's Special Studies) will contribute substantially to the development of industry recommendations."

CVDRMP's Year 4 Annual Report (LSCE, 2016)

CVDRMP Special Studies

- Lagoon seepage studies (since 2008)
- Nitrogen use efficiency projects (data-intensive field-scale studies)
- Corral subsurface investigations

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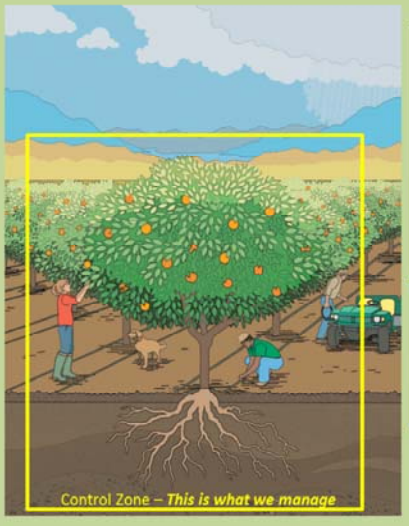

Southern San Joaquin Valley Management Practices Evaluation Program (or MPEP)

Discussions with Coalition Membership

March 2017

Southern San Joaquin Valley Management Practices Evaluation Program Committee

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The MPEP is part of the Irrigated Lands Regulatory Program (ILRP)

- Previous coalition meetings have covered key parts of the ILRP

Agenda

1. Overview
2. Farm Evaluation
3. Nitrogen Management Plan (NMP)
4. NMP Summary Report
5. Citrus Harvest Timelines
6. Sediment & Erosion Control Plan
7. Grower Questions

- In this meeting, 7 coalitions' joint work to assess management practices is the main topic
- This is another ILRP requirement, in addition to farm evaluations, nitrogen management planning, etc.

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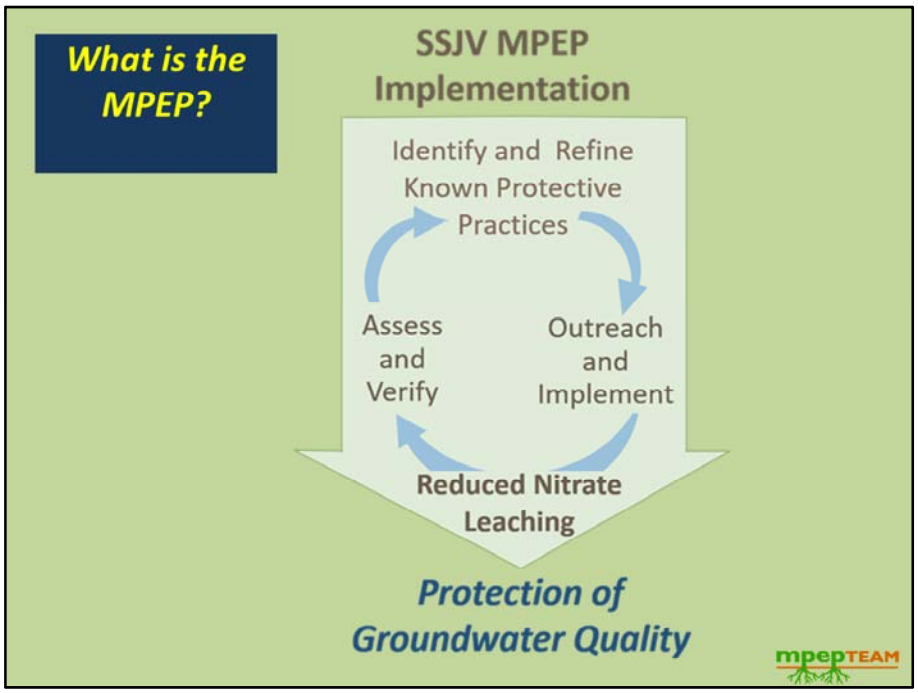
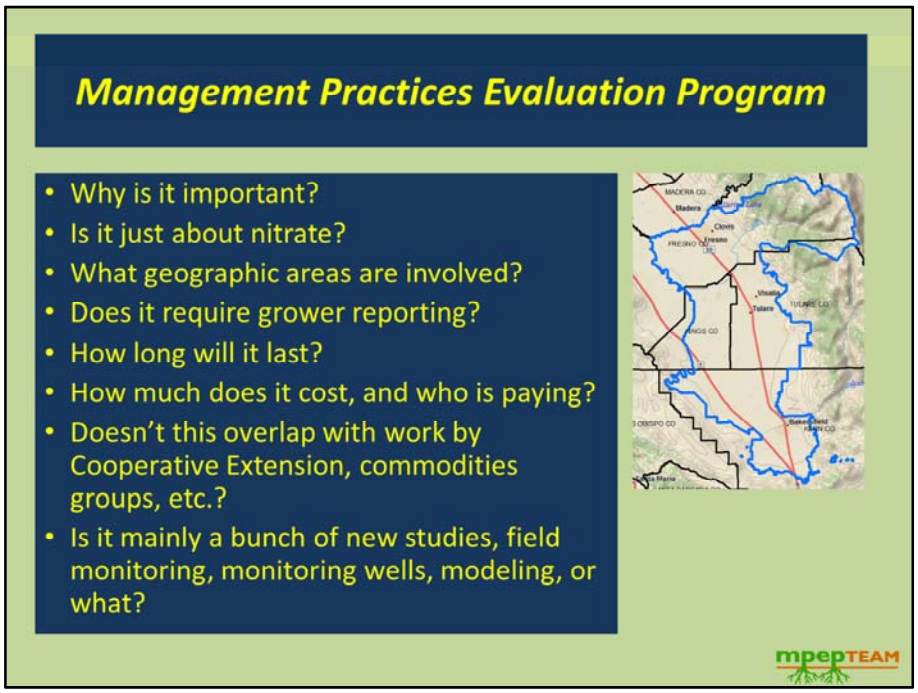


What is the MPEP?

The Management Practices Evaluation Program, or MPEP, is a required component of the Central Valley Regional Water Quality Control Board Irrigated Lands Regulatory Program. The MPEP will evaluate and demonstrate which agricultural management practices are effective in protecting water quality, and how these practices have been or will be implemented to minimize nitrate leaching to groundwater.



Why is the MPEP important?
The Central Valley Regional Water Quality Control Board is obligated by law to develop and issue permits (referred to as Waste Discharge Requirements) to potential sources of water pollution, in order to protect those waters for specified uses (including drinking water and irrigation of crops). The MPEP is one of several required actions in the permits issued to Central Valley irrigators. The penalties for failing to comply with these permits vary, but they include large fines and/or orders to cease operations.
On the positive side, the MPEP is the part of the permit that allows growers to demonstrate that they are protecting water quality as part of their operations, and (as a result) to avoid more cumbersome requirements that are designed to curb ongoing, unabated pollution. This type of demonstration is the main goal of the MPEP, and should limit the long-term costs to comply with these permits.
Is the MPEP just about nitrate?
The current focus is on minimizing nitrate leaching, but the overall Irrigated Lands Regulatory Program also pertains to other constituents that could be construed as pollutants (e.g., sediment in runoff, salts). If at some point other constituents need to be addressed by growers, the MPEP would likely serve the same functions for those constituents.
What geographic areas are involved?
The Southern San Joaquin Valley MPEP includes areas within the Buena Vista Coalition, Cawelo Water District Coalition, Kaweah Basin Water Quality Association, Kern River Watershed Coalition Authority, Kings River Watershed Coalition Authority, Tule Basin Water Quality Coalition, and Westside Water Quality Coalition. These coalitions are organized as the SSJV MPEP Committee (Committee). The Committee is also working with other water quality coalitions implementing an MPEP in other areas of the Central Valley. At the moment, the MPEP is only required to be carried out in high-vulnerability areas, but results are applicable on all irrigated lands.
Does the MPEP require grower reporting?
No, the MPEP has no specific grower reporting requirement. The MPEP may, however, use anonymous information collected as part of the Nitrogen Summary Report and Farm Evaluation to make sure that growers' operations are correctly represented.

How long will the MPEP continue?
The permit allows 8 years for development of the MPEP, including 2 years for workplanning and 6 years for implementation of the first phase. This timeframe began in January 2016. While this appears to be a long period, it is worth noting that most growers select practices annually, so modifications often take a year to implement and more time to assess. Over a duration of only 6 to 8 growing seasons, substantial planning, investigation, interpretation, outreach, and implementation must occur. In addition, implementation progress is required to be assessed and reported.
How much does the MPEP cost and who is paying for it?
The MPEP is a grower-directed program, so program activities and therefore the cost, will depend on what the coalitions decide is

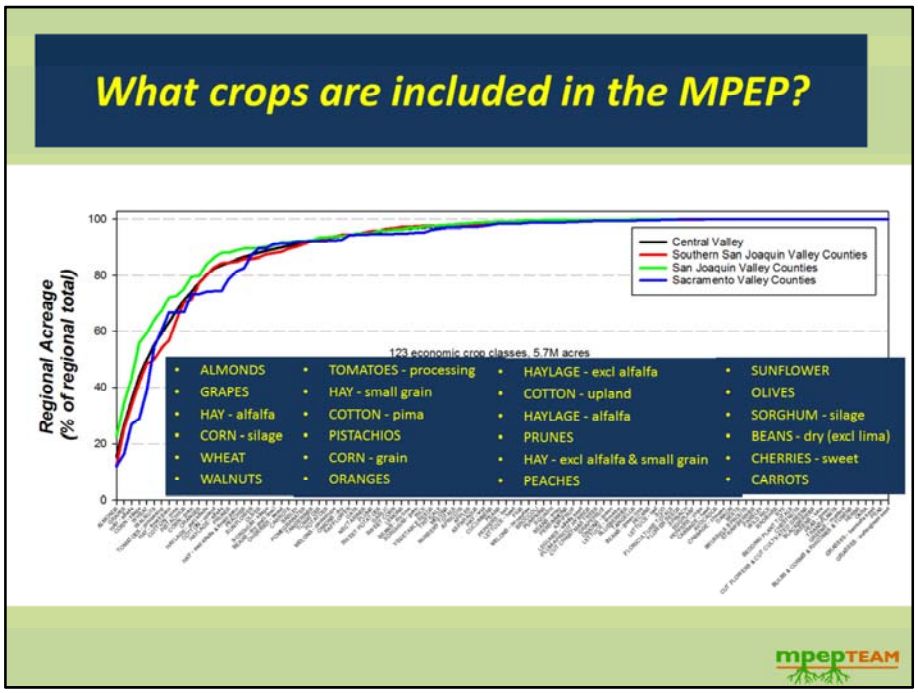
necessary and helpful to their growers. In pennies per acre, the MPEP costs grower-members about 8 cents/acre-year. However, the coalitions were recently awarded $2M through a USDA NRCS Conservation Innovation Grant. This grant award, combined with match contributions exceeding $2M, provides part of the funding necessary for successful implementation of the MPEP. In addition, the coalitions are pursuing funding from other sources, including the CDFA Fertilizer Research and Education Program (FREP).

What technical partners are supporting the MPEP?

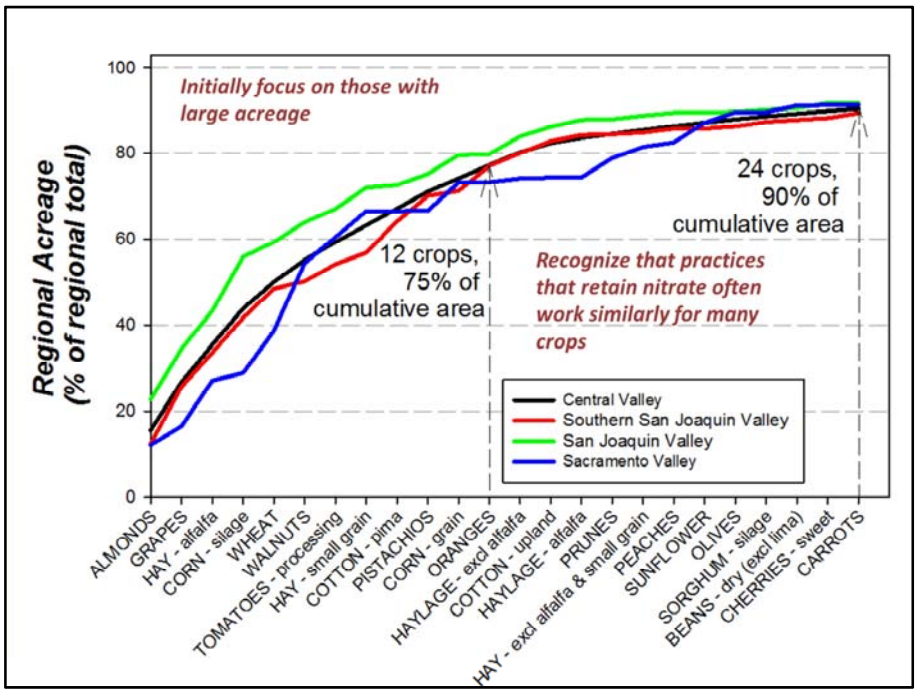
The coalitions are collaborating with several technical partners, including the USDA NRCS, the CA Department of Food and Agriculture, and the University of California Cooperative Extension. These partners will help to plan technical approaches, identify known, protective practices, assess and quantify fate and transport through modeling, work with cooperating growers, perform focused field studies, explain sound practices to growers and their advisors, and develop information and tools that facilitate application of practices that protect groundwater quality.

Is it mainly a bunch of new studies, field monitoring, monitoring wells, modeling, or what?

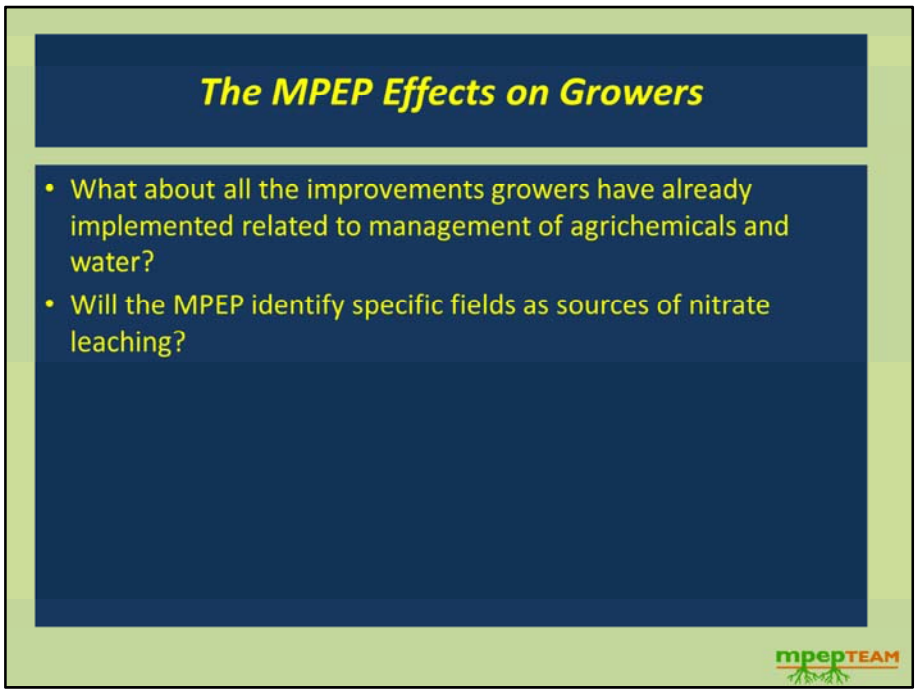
The schedule does not allow us to depend completely on new studies, since they take several years to develop and complete. Fortunately, FREP, UCCE, commodities groups, USDA, and many others have been studying efficient use of N fertilizer for some years. The focus will be on ensuring that this knowledge is available and useful, on encouraging or doing high-priority new work, and on using available information to assess how practices affect groundwater. And yes, the assessment will involve modeling that is rigorously checked against field observations. Where groundwater quality data are needed, observations from existing wells will be used to the maximum extent possible, but some new monitoring wells may also be needed.



What crops are included in the MPEP?
All crops irrigated for commercial purposes are included in the MPEP, except for those included under other permits, such as rice, alfalfa hay and silage. The MPEP will prioritize groups of crop, soil, and groundwater conditions, focusing on situations with the greatest potential to minimize nitrate leaching.

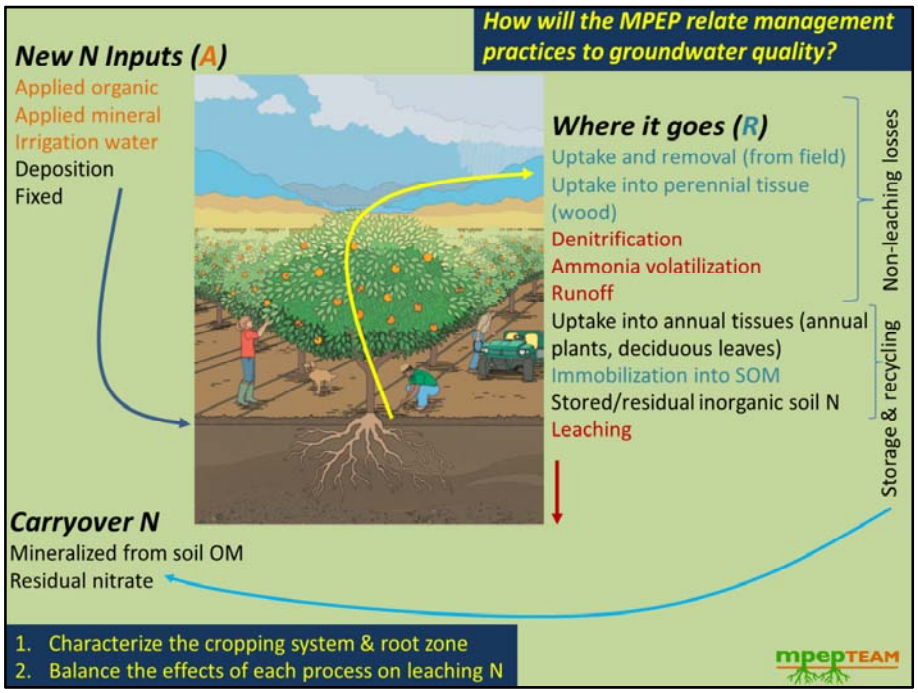


The larger acreage crops won't be an exclusive focus, but they will be emphasized early on to ensure we have a handle on the larger acreages. Developing accurate models of these crops is particularly important. Getting available management practice information out on all crops is a priority.

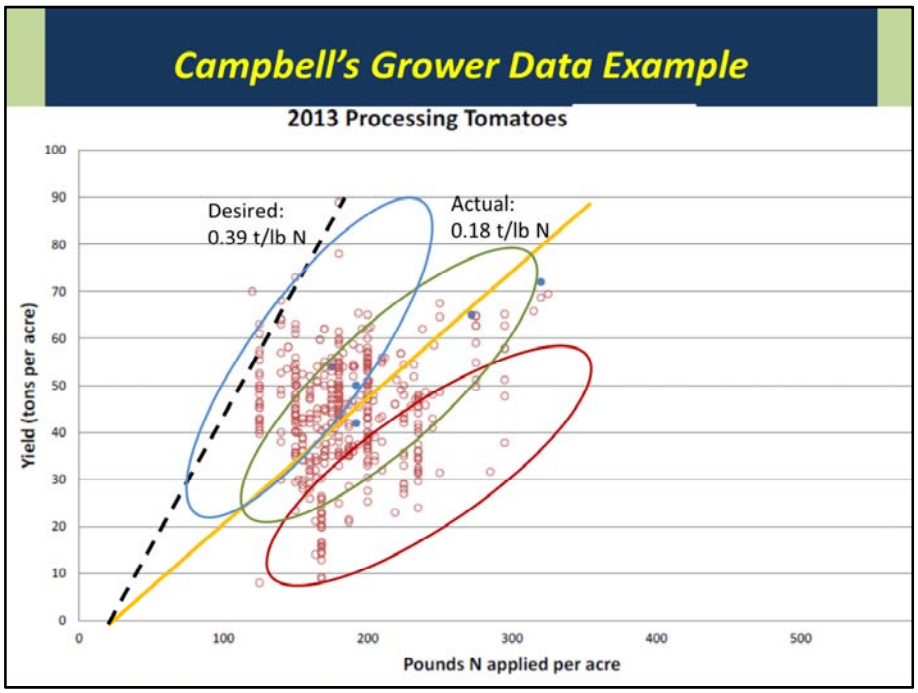


What about all the improvements growers have already implemented related to management of agrichemicals and water?
The MPEP recognizes that existing management practices already include the careful use of crop and soil information to determine appropriate nitrogen rates, and careful handling and application of fertilizer to ensure that it is taken up by the crop. A major goal of the MPEP is to understand and include these approaches in the required performance assessments. This should result in recognition of existing cropping systems that are already protective of groundwater, and expansion of these approaches where this could provide even broader benefit.

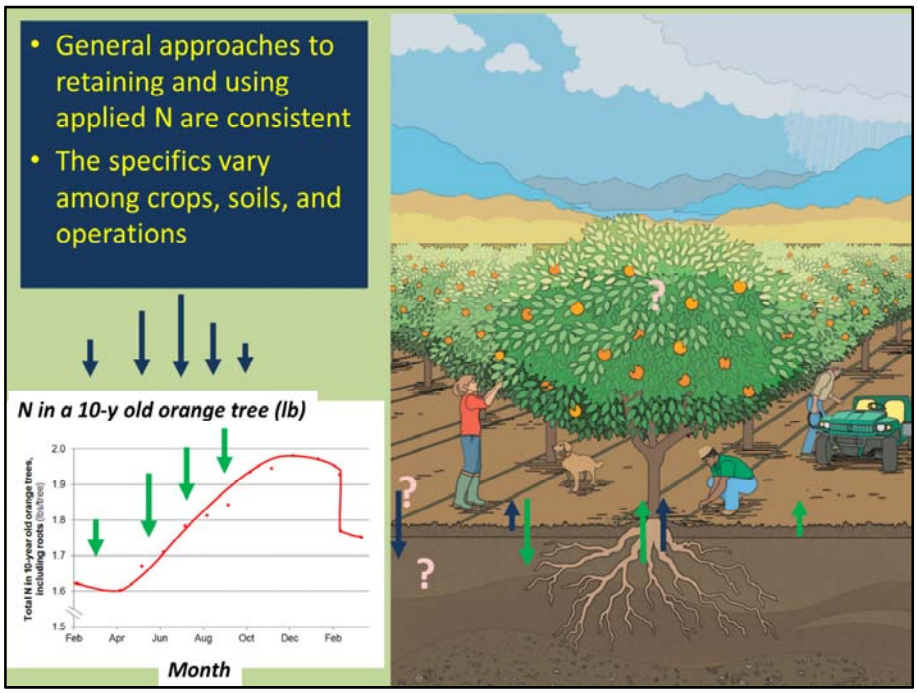
Will the MPEP identify specific fields as sources of nitrate leaching?
No. The MPEP is not focused on assessing individual fields, but rather on assessing the performance of classes of management practices, crop, and soil combinations over time. The results of these assessments will be made available to growers to help them to assess their own performance. If these large-scale assessments suggest that the combination of management practice, crop, and soil that comprise your field tends to produce more nitrate leaching than alternatives, then you will be able to compare these results to several alternative suites of practices.



Breaking the pathways N can take through fields is the only way to get a handle on where it is going, and why. Every year, some new inputs are added. The ones we apply as part of the farming operation are considered “Applied”. As the season proceeds, some is taken up by plants or microbes, and either removed from the field, or stored in wood or stable organic matter, and is considered “Removed”. The difference between these two is POTENTIALLY leachable to groundwater, but it may also be stored in the soil, or lost in other ways. The Regional Water Board focuses on the ratio of A/R, which gets to the same idea: making the ratio smaller generally reduces the chances of leaching a lot of nitrate, but the other loss processes mean that the ratio will practically never be, nor need it be, as low as 1. The items in red are all losses that can have negative environmental consequences.

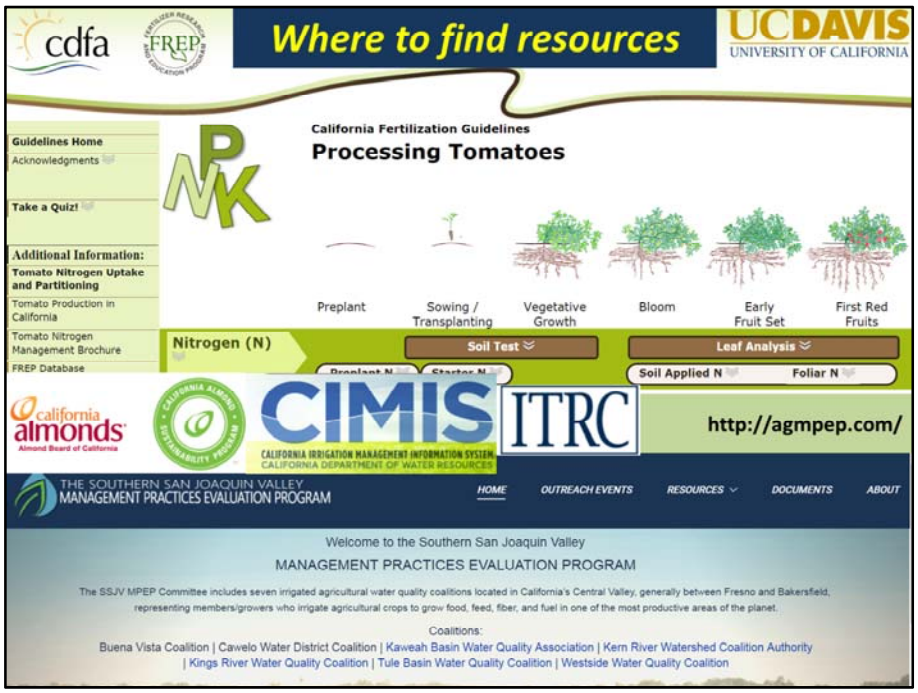


This simple example of actual grower yields and N application rates illustrates the challenge and opportunity of improving N management. The potential for recovering applied N is affected by many factors. The key is to identify those that the grower can practically manipulate to shift fields upward and to the left. When growers do this, the yield and value produced per unit N grows, and risks to groundwater diminish. Everybody wins. A major goal of the MPEP is to facilitate this shift.

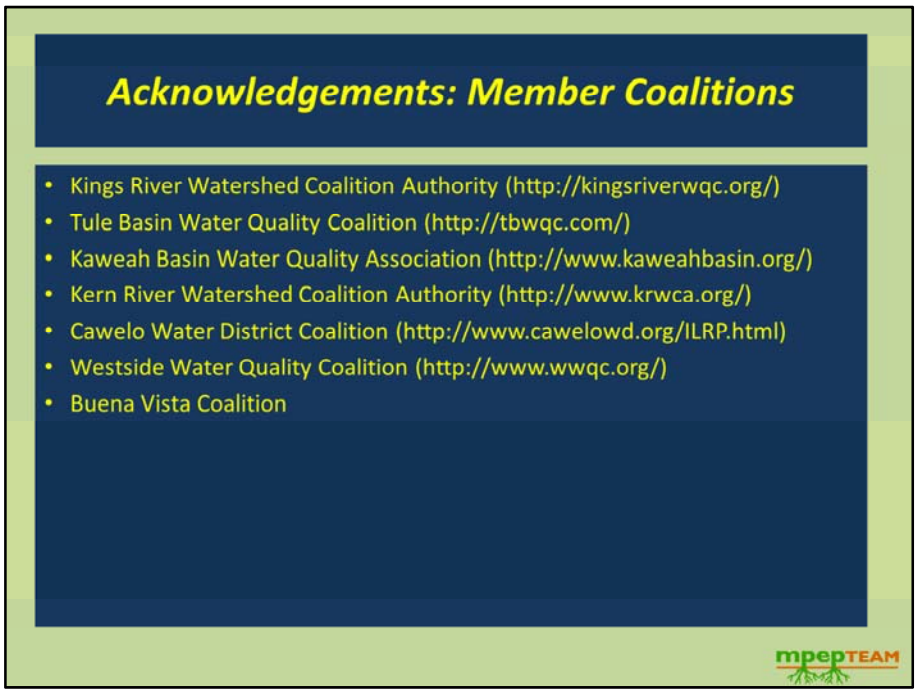


In general, tools and approaches to getting applied N into crops, and keeping it out of groundwater, fall into well-known categories:

- N balance → N rate, deplete before leaching events
- Tissue → adjust N rate
- Site-specific/precision ag (historic yield or soil conditions → N rate adjustment)
- Place N (e.g., in root zone)
- Provide N when needed – split → continuous applications; scale to pattern of uptake/use
- Select appropriate form of N
- Schedule irrigation to match ET; avoid untimely leaching events
- Evaluate and improve irrigation distribution uniformity
- High-freq., low-rate (drip, microspray)
- Cover crop to retain N in plant/root system
- Holistic improvement of "soil health" to improve soil's retention of water, nutrients, & sediment



There are many printed and online resources, including a dozen or so on the tables near the door. Some are linked to the coalitions websites (next slide), and all are available through the MPEP website resources page. The MPEP website also has a management practices event calendar that can be sorted by geographic area or degree of relevance to N management. It also has tools for estimating N removed from crop yield. We've tried to centralize as much information on N management as possible, and will continue to develop this resource. We are coordinating with CDFA/FREP, and it is possible that they will absorb parts of the website into their system.



The MPEP Team is directed and guided by the Committee, which in turn composed of these coalitions. They provide leadership and oversight to ensure that the work aligns with the needs of their grower members. The process provides the coalitions and their members a shared, viable, and efficient MPEP.

The Committee applied for and was granted the largest USDA/NRCS Conservation Innovation Grant in history ($2M, to be matched in kind at least 1:1). But that only happened because of the broad support and collaboration from many other agencies, public research institutions, commodities groups, and growers. We are doing our best to deliver something innovative and valuable to growers, that contributes significantly to the overlapping missions of the Committee and the NRCS, namely, expanded and improved access to usable tools to control the fate of applied N, to route more of it to plants, and less to groundwater.

Questions, comments, suggestions?
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