

UCDAVIS

AGRICULTURAL SUSTAINABILITY INSTITUTE

California Nitrogen Assessment

Information and Progress



2010

nitrogen.ucdavis.edu

What is ASI?

The Agricultural Sustainability Institute (ASI) is an interdisciplinary institute of the College of Agricultural and Environmental Sciences at UC Davis. Our mission is to ensure access to healthy food and to promote the vitality of agriculture today and for future generations. We do this through integrative research, education, communication and early action on big, emerging issues.

The California Nitrogen Assessment is a flagship project in the early stages of our new institute. It is intended to serve as a prototype for future work on similarly complex, high-stakes, and potentially-controversial topics (such as water, energy, climate change), and to show how our commitment to an integrative, responsive approach can produce useful results. This approach aims to move beyond “academic business as usual” to more effectively link science with action and to produce information that informs both policy and field-level practice.

Why is ASI conducting the California Nitrogen Assessment?

Nitrogen affects everyone and every landscape in California—and it is both complex and controversial. This assessment must account for the fact that nitrogen plays a vital role in food production and also has consequences for the environment and human health. The assessment’s role is to examine the important tradeoffs involving nitrogen. Assessment results will provide a crucial ingredient in creating informed discussion, debate and decision making on nitrogen management and policy in California.

Our researchers are working to establish a baseline of credible knowledge about nitrogen, which includes comprehensive accounting of nitrogen flows, agricultural practices, and the policies that shape these practices. They will also assess the quality of information and knowledge about these issues.

In addition to the collection and analysis of scientific data, we solicit input from a wide range of individuals to ensure the questions addressed by the assessment will be useful to our stakeholders. We want our results to be relevant to a wide range of people, and we are working to ensure that our research questions and analysis represent the diversity of perspectives involved.



Who is involved in the California Nitrogen Assessment?

Principal Investigators

The California Nitrogen Assessment is led by four UC Davis professors – Tom Tomich, Daniel Sumner, Kate Scow, and Randy Dahlgren.

Technical Advisory Committee

This nine-member expert panel provides oversight for the project, and includes the four faculty members leading the project, along with UC Davis colleagues Thomas Harter, Ermias Kebreab, Frank Mitloehner, Dan Putnam, and Johan Six.

Assessment Team

There are 3 post-doctoral fellows on the assessment team who analyze agricultural practices, economics, and biogeochemistry, along with two fellows specializing in communications and outreach, an academic coordinator, and administrative support.

Stakeholders

To ensure open access and accountability, ASI's project team has engaged in outreach with dozens of organizations, groups and individuals from a broad range of perspectives, including farmers and farm groups, scientists, environmental and health groups, and government agencies. This has been done through stakeholder forums, grower consultations, and individual contact via phone and email. Aside from these stakeholders, ASI has reached out to over 150 farm advisors and extension specialists with University of California Cooperative Extension.

Stakeholder Advisory Committee

These individuals, who represent various stakeholder groups, review in-progress documents and provide links between the assessment and important constituencies.

Stakeholder Advisory Committee

Pelayo Alvarez, California Rangeland Conservation Coalition Program Director, Defenders of Wildlife

Ted Batkin, President, Citrus Research Board

Steve Beckley, Executive Director, Organic Fertilizer Association of California (OFAC)

Don Bransford, Chairman, CA Rice Producer's Group, California Rice Commission

Cynthia Cory, Director, Environmental Affairs, California Farm Bureau Federation (CFBF)

Bob Curtis, Associate Director of Agricultural Affairs, Almond Board of California

Michael Dimock, President, Roots of Change

Allen Dusault, Program Director for Sustainable Agriculture, Sustainable Conservation

Laurel Firestone, Co-Director, Community Water Center (CWC)

Hank Giclas, Sr. Vice President, Strategic Planning, Science and Technology, Western Growers Association

Larry Glashoff, Horticultural Tech Manager, Hines Nursery

Joseph Grant, Farm Advisor, University of California Cooperative Extension (UCCE), San Joaquin County

Ian Greene, Research Programs Manager, California Strawberry Commission

Edward Hard, CDFA Fertilizer Research and Education Program (FREP)

Don Hodge, Environmental Protection Specialist, US Environmental Protection Agency (US EPA)

Tim Johnson, President-CEO, California Rice Commission

David Lighthall, Health Science Advisor, San Joaquin Valley Air Pollution Control District

Karl Longley, Coordinator of Water Resources Programs, California Water Institute

Jim Lugg, Consultant, Fresh Express/Chiquita

Paul Martin, Director of Environmental Services, Western United Dairymen

Albert Medvitz, McCormack Sheep and Grain

Rob Mikkelsen, Western Regional Director, International Plant Nutrition Institute (IPNI); Board of Directors Chair, California Certified Crop Advisers (CCA)

Belinda Morris, Regional Director for Conservation Incentives, Environmental Defense Fund (EDF)

Renee Pinel, President/CEO, Western Plant Health Association

Claudia Reid, Policy and Program Director, California Certified Organic Farmers (CCOF)

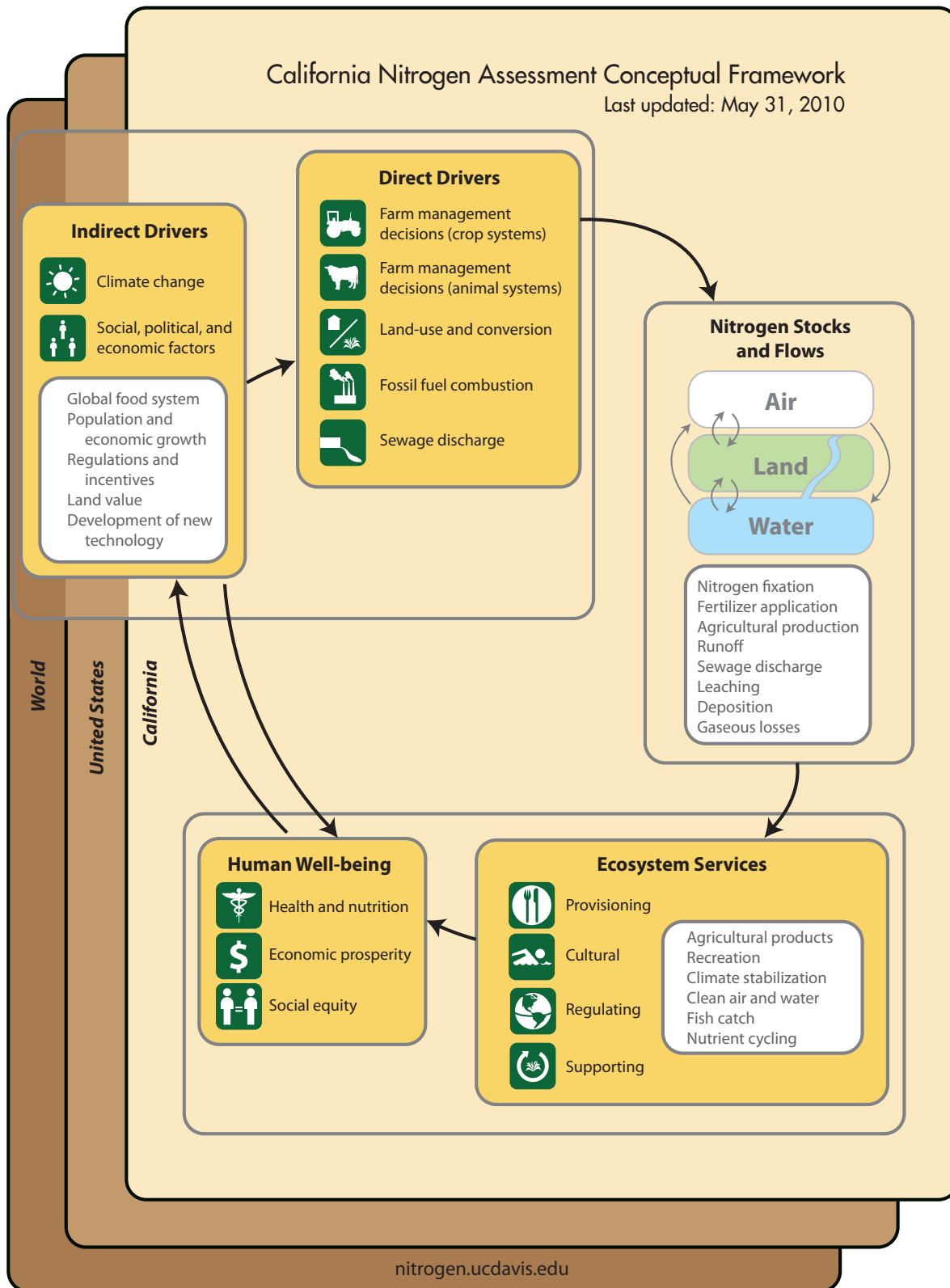
Bruce Rominger, Owner, Rominger Brothers Farms

David Runsten, Policy Director, Community Alliance with Family Farmers (CAFF)

Ann Thrupp, Manager of Sustainability and Organic Development, Fetzer/Bonterra Vineyards

Conceptual Framework

The conceptual framework is a snapshot of the big-picture approaching we are taking with the California Nitrogen Assessment. The CNA conceptual framework – like the assessment itself – is focused on the reasons that nitrogen flows the way it does. This includes the human decisions and responses that are involved, as well as the science behind how nitrogen is used and moves through California.



What will the California Nitrogen Assessment do?

Big Picture

- Integrate scientific findings and stakeholder input to produce information that informs both policy and agricultural practice.
- Quantify the relative contributions of different sectors (agriculture, sewage, industry and transportation) to nitrogen cycling in California.
- Create a series of scenarios, or “plausible stories about the future,” which will provide insights into how nitrogen will be managed in California over the next 20 years.

Agricultural Practice

- Determine the range of nitrogen use efficiency across production systems in California, and determine if current fertilizer application guidelines are appropriate and relevant across crops.
- Survey current management practices to see which ones might increase nitrogen use efficiency and reduce pollution.
- Examine tradeoffs between reduced nitrogen application and other cropping considerations such as irrigation, pest management, and product quality.

Policy

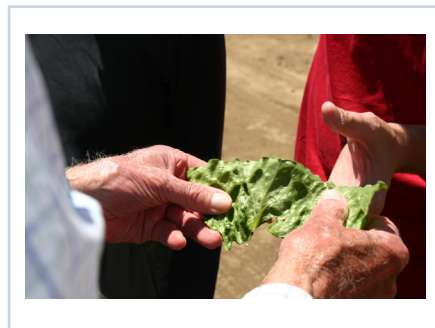
- Evaluate policies that would balance the costs and benefits of nitrogen use.
- Examine how policy changes to protect health and the environment would impact farm economics and food prices.
- Catalog the barriers to creating a coordinated and cohesive policy to manage nitrogen that spans regulatory jurisdictions.

Human Health

- Summarize the state of knowledge on the links between nitrogen pollution in air and water and human health, and point out areas where further research is needed.
- Evaluate the accuracy of measurements of gaseous losses and water contamination of nitrogen in California.

Communications

- Create media products that help the public understand the complex nature of the nitrogen cycle.
- Produce outreach tools that help decision makers at the farm and public policy level.



Frequently Asked Questions

How did you decide which areas deserve focus in your assessment?

Early in the project, stakeholders created the set of questions that cover the major issues the assessment will address. We are concentrating our focus on those issues.

Our focus is summarized on the previous page (see “What will the California Nitrogen Assessment do?”), and a full list of the stakeholder questions can be found on our website: <http://nitrogen.ucdavis.edu/n-stakeholders/stakeholder-questions>

How are you accounting for the flows of nitrogen into, out of, and within California?

The nitrogen assessment is producing a mass balance to answer the question: What are the flows of nitrogen into and out of California?

A mass balance is an efficient and scientifically rigorous method to track the flows of nitrogen in a defined area. The underlying assumption of a mass balance is that all of the nitrogen entering (inputs) the study area must be exactly balanced by the amounts of nitrogen leaving (losses) and of nitrogen retained in the study area (storage).

A mass balance is a useful tool for comparing the size of nitrogen flows and identifying the gaps in understanding about the size and directions of these flows. Often, the flows that are difficult to quantify are ones where few measurements have been made, the measured values are highly variable, or where there are no simple ways to predict the flows.

Knowledge of the relative magnitude of the flows can inform management and policy decisions for targeting nitrogen reductions.

Have you considered groundwater nitrate contamination?

Yes. We are considering it from a perspective of assessing what the science around nitrate infiltration of groundwater is, what health impacts are, what economic impacts are, and what practices and technical options are available to address groundwater nitrate contamination. Our work does not involve commitments to stakeholder action – rather, we are trying to understand the health effects of nitrates in groundwater and the science of how management practices impact nitrates and groundwater in all of California.

Will you be making policy recommendations?

The assessment will not include prescriptive policy recommendations. Instead, we will utilize an ‘if/then’ approach outlining a suite of practices and policy options

and the potential effects each would have on agriculture, the environment, and human health.

Data gathered and analyzed during the course of the assessment will provide the evidence to evaluate each set of options.

The goal of this approach is to inform sound decision-making for all stakeholders.

Why is the nitrogen assessment creating scenarios?

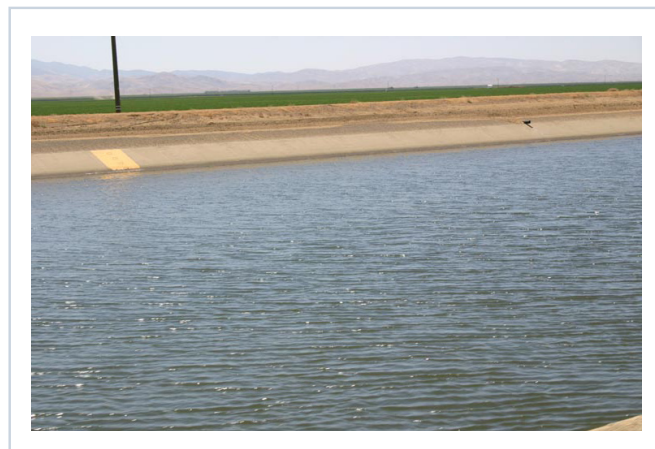
Part of ASI’s goal is to serve as a forum for constructive dialog about the future of California agriculture. To help facilitate this dialog, we are conducting scenarios workshops to stimulate discussion among a diverse range of stakeholders who care about nitrogen.

These workshops will create the framework for a set of scenarios, which are plausible stories about how the future will look. We will look at the uncertainties which could play important roles in shaping the future, and develop stories about the future which can place the findings of the assessment into a longer-term context and may also inform stakeholder decision making.

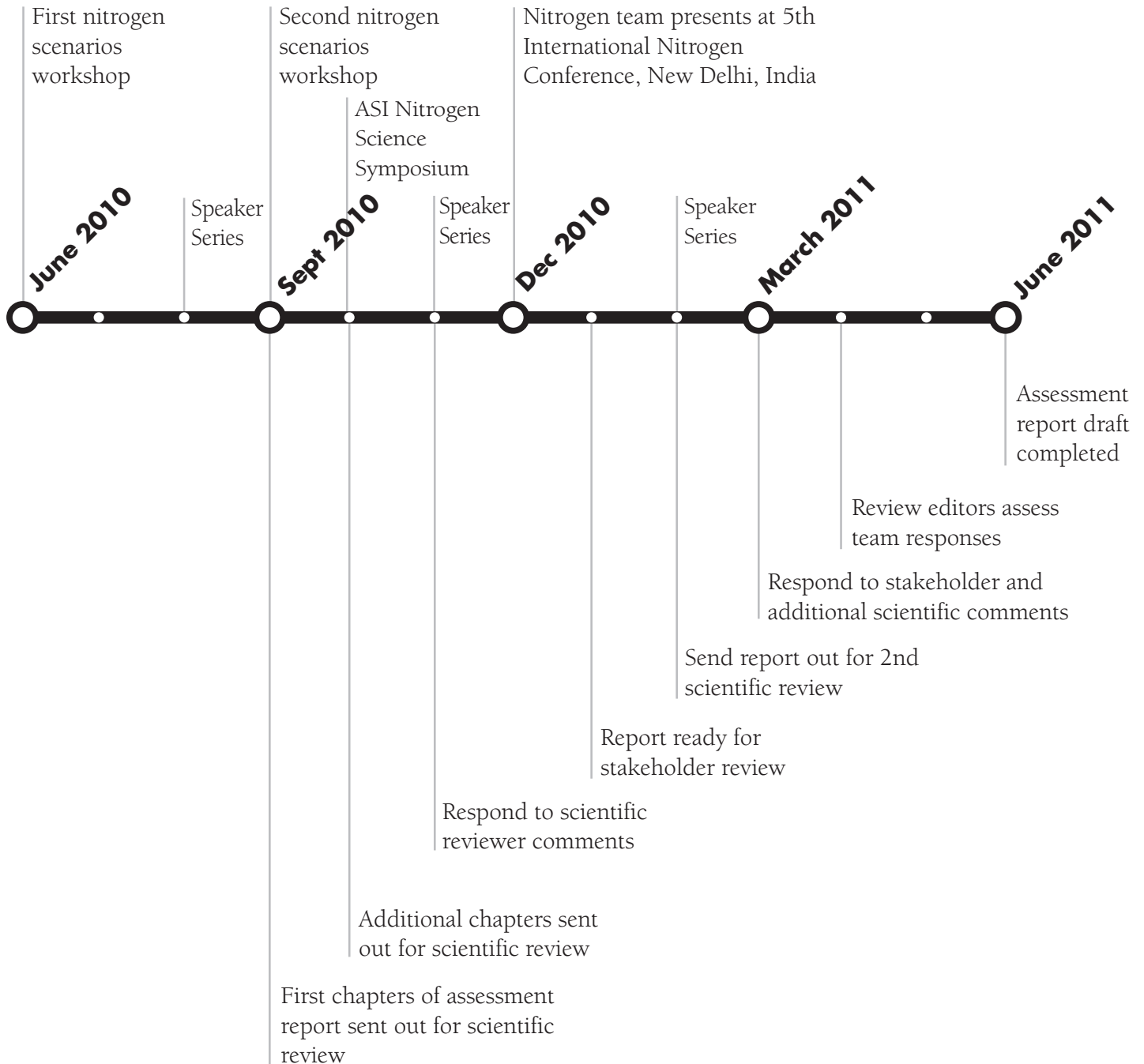
How are you dealing with uncertainty and lack of data?

There is considerable uncertainty in many of the data sets and research sources we are using for the assessment. We will evaluate the quality of the data and will note when our results are based upon very reliable data or data that are less reliable. Those areas lacking good data will be highlighted as areas where more research and record keeping are needed.

Find out the answers to many more frequently asked questions at our website: <http://nitrogen.ucdavis.edu>



Project Timeline



* **June 2009 - May 2010** Data gathering, stakeholder outreach and engagement



The California Nitrogen Assessment



California Nitrogen Assessment scientist Todd Rosenstock talks with stakeholder advisory committee member Jim Lugg about nitrogen in the Salinas Valley.



Rex Dufour and Dave Runsten discuss the future of nitrogen at the California Nitrogen Assessment scenarios workshop.

Scientific Integrity

As a University of California research project, the California Nitrogen Assessment follows the highest scientific standards in sourcing, analyzing, and presenting data. In addition, ASI and the assessment team are committed to open access to all results and information produced during the course of the assessment, and to accountability to stakeholders.

Funding Sources

Major funding for the California Nitrogen Assessment comes from the David and Lucile Packard Foundation. The goal of the Packard Foundation's Conservation and Science Program is to find paths for human progress that protect and restore the ecological systems upon which all life depends.

How To Participate

If you would like to participate in the California Nitrogen Assessment, we are seeking stakeholders to read, review, and comment on draft assessment documents in early 2011. We are also seeking hosts for informational forums about the assessment. We plan to conduct a number of these forums in agricultural communities throughout the state where we will seek feedback on draft results.

If you would like to review draft results or host an informational forum, contact Stephanie Ogburn at spogburn@ucdavis.edu or Colin Bishop at cbishop@ucdavis.edu for more information.