Summary

Return of the Pacific Flyway: Maintaining and Enhancing Recent Gains

February 3, 2017

A partnership formed by rice producers, regulators and environmental groups has resulted in a unique success story that provides habitat for 230 wildlife species including millions of migrating waterfowl along the Sacramento River, while at the same time supporting the cultivation of rice and the livelihood of several thousand farmers and supporting workers.

How can this remarkable symbiotic balance between humans and nature be maintained and improved and what lessons could be drawn from the cooperation among key actors that could be applied to other human-nature challenges? Those were the topics during a workshop hosted by the Stanford Woods Institute for the Environment. Approximately 30 experts and stakeholders participated in the dialogue representing the growers, farm advisers, academia, government, a boundary organization (California Rice Commission) and environmental writers. The workshop was facilitated by Harold (“Hal”) Mooney, Senior Fellow, Emeritus with the Stanford Woods Institute and Paul S. Achilles Professor of Environmental Biology at Stanford University. The workshop began with an overview of the various dimensions of the rice production system and then explored broader regulatory issues and the roles of all levels of government—federal, state and local—and for managing wildlife.

Session I: Dimensions of the Rice Production System: System Processes

The discussion began with a historical context of rice production. During the 1990s, rice growers burned the rice straw left in fields after harvesting. Then came regulations curtailing burning because of its detrimental effect on air quality. The rice industry researched other potential uses for rice straw but none of the viable alternative uses resulted in significant off-field uses of the material. Therefore, the industry has dominantly used a method of “soil incorporation” (tilling the straw back into the soil) as the primary management practice for over 75% of the straw. However, this technique can contribute to higher levels of disease in the system and is costly compared to burning the straw. Instead, they proposed flooding some of the fields after harvesting and allowing burning to continue in small portions of fields, but only when air regulators allow it, because it was the only way to destroy certain fungal diseases that impact rice yields and quality.

With reductions in burning and increased flooding of fields, air quality complaints went away. The hard, clay-packed soil in the fields prevent much of the water from being lost through percolation, and lots of it is recaptured and reused within the very efficient hydrology of the Sacramento Valley.

At the same time, the flooded fields attracted more winter birds, both in numbers and different kinds of species. Rice fields in the Sacramento Valley now support more than 230 species of wildlife, including 50 species of waterbirds. They provide habitat and food for approximately 4-6 million ducks and geese.
migrating along the Pacific Flyway each year – one of the highest concentrations in the U.S. Recent studies have shown that California ricelands provide more than half the nutritional requirements of wintering waterfowl in the Sacramento Valley.

Yet the balance allowing growers to profit while flooding their fields is delicate. If water becomes scarce or flooding of fields isn’t permitted because of a state’s water and greenhouse gas emission goals, or if overseas rice producers drive down the price of rice, California rice growers may not find rice production profitable. Rice producers are also being criticized by some members of the public who perceive flooded agriculture as wasted water. The hard-pan, poorly-drained soils are not suitable to other crops in most of the rice growing region of California.

The California rice industry’s “checkoff system,” is something most U.S. commodities do not have, is like a self-imposed mill tax on rice production paid by the industry that helps fund research for the industry. Most California rice growers don’t have the luxury of switching to another crop largely because of the nature of the soils in the Sacramento Valley.

**Session II: The Regulatory System-State**

This session focused on finding ways in which regulation can advance progress. While regulation can often generate conflict and create distrust, it can also create an opportunity for people to work together to find better ways to influence regulation.

It should be noted that the good air quality in the Sacramento Valley is not an accident. Efforts within the rice industry to reduce air pollution have been successful and that success has helped the industry become better positioned as a responsive industry on environmental issues with the state legislature when potential new regulations have been contemplated. While the industry has so far managed to find middle-ground and solutions that sometimes have limited new regulations and achieved the desired end results, there is concern about California’s targets for reducing greenhouse gases and being able to reasonably meet those goals.

Pesticide use is another major regulatory consideration for the industry. Pesticides have potentially strong implications for water quality. The rice industry began managing its discharges from irrigation in over 25 years ago and will start its first groundwater regulation this year. Because the industry did a groundwater assessment report a year before it was due, it’s ahead of the curve. The assessment showed that rice production was not polluting the groundwater underneath the fields (due largely to tight clay soils) and that the nitrogen applied to the field was being taken up by the plant.

Other issues and challenges discussed during this session included the Sustainable Groundwater Management Act (SGMA), which was identified as a major concern because of the uncertainties surrounding its implementation and whether incentives would exist for rice growers to continue flooding their fields if the economic benefit begins to decline. It was suggested that growers should perhaps receive some sort of a “cost-share payment” to flood their fields given the significant environmental benefits that are realized.
Three main takeaways emerged from this session: 1) building trust among stakeholders ahead of the regulatory curve is crucial; 2) new regulatory requirements are a challenge particularly those that focus on one thing at a time (such as one species) rather than the whole system — this is a risky approach as it could result in undoing something else of great importance; and 3) if you are doing something of value to society as a whole, how does that fit into the economic system and what are the incentive structures?

### Session III: State and Federal Government Wildlife

This session provided an overview of agencies involved in the rice-wildlife system - what they do, their concerns and engagement with the rice industry in California, what is being done to help wildlife needs, what the risks are and what more could be done. The session further explored how much of the rice ecosystem is unique because of the species dependent upon it and how important the government is in both the state and federal realm in retaining the network that supports it.

As partners in the Central Valley Joint Venture, all of the key agencies listed below, including others, are concerned with, and engaged in - habitat conservation, restoration and enhancement for waterfowl, shorebirds, other birds and wetland-dependent wildlife.

**California Natural Resources Agency**
- Department of Fish & Wildlife
  - Species Management
  - Habitat Conservation
    - California Waterfowl Habitat Program (CWHP; Presley Program)
    - Permanent Wetland Easement Program
    - Landowner Incentive Program (LIP)
- Wildlife Conservation Board
  - Inland Wetlands Conservation Program (IWCP)
  - Ecosystem Restoration on Agricultural Lands (ERAL)

**USDA: Natural Resources Conservation Service**
- Environmental Quality Incentives Program (EQIP)
- Conservation Stewardship Program
- Conservation Innovation Grants
- Regional Conservation Partnership Program (RCPP)
  - Rice Stewardship Partnership - Sustaining the Future of Rice
  - Waterbird Habitat Enhancement on Central Valley Agricultural Lands

**Department of Interior**
- U.S. Fish & Wildlife Service
  - National Wildlife Refuge System (NWR)
  - Division of Migratory Bird Management
  - Endangered Species program
  - Landscape Conservation Cooperatives
• U.S. Geological Survey
  o Study the landscape of US, natural resources, and the natural hazards that threaten it

Agencies are addressing wildlife needs through a variety of efforts that include:

• Easements (payments to limit what can be grown; ensures land stays in ‘friendly’ agriculture; short-term or perpetual)
• Incentives (payments to implement a wildlife/conservation friendly practice)
• Conservation partnering & planning
• Monitoring, assessment & research (CDFW; USFWS; USGS)

The conversation also focused on risks to rice production. Among the issues identified were the conversion to other crops, the SGMA (Sustainable Groundwater Management Act), changes in post-harvest practices such as reduced winter flooding, a reliance on easements which creates a “pay to play” culture, broader California water war issues (for fish, fowl, farmers & faucets), and a loss of summer water.

Participants also identified what more could be done to support the rice system. These included a need for easement programs that target agriculture to keep land in rice. Tax incentives or the use of alternative funds could be used to ensure continued winter flooded rice or potentially creating incentives through the SGMA to mitigate groundwater withdrawals.

In the discussion that followed, participants pointed out how the abundance of waterfowl is directly related to the flooded rice fields. Modeling shows that if water for winter-flooded rice is lost, birds would begin to starve by late December and mortality rates would escalate. And while incentives are currently having desired outcomes, the system will eventually need to move away from them.

Session IV: NGO and Academic Partners in the Rice, Wildlife Nexus

Participants were encouraged to think about the big commodity markets in which companies are feeling pressure to take actions that address sustainability. They were also urged to consider how interactions revolve as interests change.

Nongovernmental organizations (NGOs) used to see preservation and conservation as their primary tool for achieving environmental goals, but that has changed based on a better understanding of the value of private lands and the need to work with private landowners to achieve conservation objectives. Trust has been built over time through NGOs and growers coming together to share ideas. NGOs are also seen as filling gaps in research capacity, but the partnership with academic institutions is highly valued particularly in joint pilot projects that play a role in helping to get state and federal agencies to think outside of the box.

NGOs played and continue to play several valuable roles in this system including:
  1) Partnerships - bringing together diverse partners to build trust between what many would consider non-traditional allies,
2) Flexibility – NGOs can often move faster and with more flexibility than governmental agencies, which allows the pilot testing of new ideas or concepts.

3) Model Creation – NGOs and academics use applied science to design, test and demonstrate new practices or techniques that can then be adopted or promoted at a broader scale by agencies, industry and landowners.

4) Communications/Messenger– The NGOs and academic institutions help tell the story of this successful partnership and why it matters to the public and to the academic field more broadly.

5) Funding – The NGO and academic community brought private or other grant funding to help test and design new practices on the rice ground that benefits both wildlife and agricultural production.

With a new U.S. presidential administration, it is likely that we will see a growing recognition from a number of NGOs that the single-species focus is not working. We need to continue thinking more broadly and that’s going to involve some NGOs taking some risks.

In summary, a profound evolution has occurred in the roles of and relations between NGOs and academics. NGOs have moved from preservation to conservation, partnerships, and a focus on science and research. On the academic side, there has been movement toward greater engagement and seeing connections change, so now we see agriculture and community together.

One further piece of the rice-wildlife conservation partnership deserves attention. The mosaic of ricelands in the Sacramento Valley that support the diversity and abundance of waterfowl and other wetland-dependent wildlife is complemented significantly by managed wetlands – primarily private duck clubs, but also state and federal wildlife areas and refuges. The role of the private sector cannot be overemphasized. Many private duck clubs also have rice fields as part of their overall management, and some rice fields are leased specifically for duck hunting during fall and winter, generating revenue for rice farmers after harvest. The implications are twofold: 1) management for waterfowl and waterfowl recreation on private lands are an integral component of the rice-wildlife partnership; and 2) there is a risk – with declining interest in hunting and an aging demography of duck clubs owners – that we might lose the support of this important sector. Funds generated by the sale of duck stamps contribute substantially to the ability to maintain wetland habitats in the Sacramento Valley, and there have been suggestions that perhaps some of that revenue could be used to ensure continued winter flooding of rice and wildlife friendly agricultural practices.
Key Observations and Future Actions

1. Publicize what the rice community has done in an international venue/literature as a model for others to follow.

2. Write a strong paper/document on the water-rice relationship and how rice is not a threat; publicize it to general public.

3. Tell the story in a visual way with a graphic, perhaps one showing where a water molecule in the Sacramento Valley goes.

4. Use the 25th anniversary of *Cadillac Desert*, Mark Reisner’s book about the rice crop in California, as the inspiration for the story of how partners came together to support water, rice and wildlife.

5. Point Blue, Audubon, The Nature Conservancy and others will tell this story at an international rice conference in Australia.

6. Tell multiple stories: a water management story about how we get hydraulic systems to work together, a human story about how people work together, a business story, the wildlife story, the conservation story.

7. Publish a series of articles on websites/blogs/print via NGOs, journals, media, academia and others via a structured framework/outreach plan.

8. Gather the data and write a science paper or a series of journal articles. Suggest *Nature* or *Science*.

9. Take a reporter out into the field for a magazine article or book or story on NPR. Could likely interest KQED in doing a story now about the Pacific Flyway and how future water policy could threaten the delicate balance that sustains it.

10. Talk about how to get fish involved.

11. Tell the story about how we’ve transformed the way we think about conservation and why we are looking at these partnerships differently. Talk about the tools involved. You could tell it from the bird’s viewpoint: from conservation refuge system to more private lands conservation to working landscapes.

12. Write something about the grower’s perspective.

13. Focus on threats going forward rather than things that have happened in the past.

14. Pursue specific research projects that might advance or enhance this work, including examining the role of social networks in this system.
WORKSHOP AGENDA

Return of the Pacific Flyway: Maintaining and Enhancing Recent Gains

January 13, 2017
9 a.m. to 5:30 p.m.
The Faculty Club, Stanford University, Gold Room

The sessions will be guided by the following set of questions:

- What is working now and what events from the past helped inform the present situation?
- What more should be done?
- What are the present obstacles to further progress and of these which are recalcitrant?
- What are the threats, near, and in the possible future? How can these be addressed and by whom?
- How to make the system more stable and resilient?
- What are the new opportunities?
- What are the lessons learned from the successful partnership between the rice industry and wildlife conservation and are they applicable to other managed-natural systems in California?

8:30-9:00  Continental Breakfast

9:00-9:30  Introduction by Hal Mooney, Stanford University
           Welcome by Chris Field, Director of the Stanford Woods Institute for the Environment
           Round-table introductions – Attendees (~2 minutes each)

9:30-10:45  Session I: Dimensions of the Rice Production System: System Processes
           Framing the Issue: Bruce Linquist, UC Davis
           Moderator: Gretchen Daily, Natural Capital Project, Stanford University

Key Issues:
- Economic chain from production to export, including subsidies
- Biogeochemical balances
- Water balance
- Production threats
- Human health threats
10:45-11:00  **Break**

11:00-12:30  **Session II: The Regulatory System—State**
Framing the Issue: Paul Buttner and Roberta Firoved, CA Rice Commission
**Moderator:** Leon Szeptycki, Water in the West, Stanford University

**Key Issues:**
- Pesticides and water quality
- Mosquito abatement
- Air quality
- Environmental Regulations, ESA
- Ground water regulation

12:30-1:30  **Lunch**

1:30-2:30  **Session III: State and Federal Government Wildlife**
Framing the Issue: John Eadie, UC Davis
**Moderator:** Liz Hadly, Stanford Woods Institute for the Environment

**Key Stewards include:**
- California Department of Natural Resources
- U.S Fish and Wildlife
- USDA

2:30-3:30  **Session IV: NGO and academic partners in the rice, wildlife nexus**
Framing the Issue: Meghan Hertel, Audubon
**Moderator:** Jim Leape, Stanford Woods Institute for the Environment

**Key Organizations include:**
- Academia, wildlife
- Academia, environment
- Academia, agriculture
- Audubon
- Point Blue
- Ducks Unlimited
- EDF
- TNC
- Northern California Water Association
- California Rice Commission

3:30-3:45  **Break**

3:45-5:15  Craft Outline of White Paper

5:15-5:30  **Summary Discussion – Key Observations and Future Actions**
**Moderator:** Hal Mooney
**Proposed Meeting Products:**

1) A white paper summarizing the unusual history of the rice-wildlife system and the mutual benefits it brings to society and the environment, and the challenges, threats and opportunities existing now and in the near future to this complex system.

2) A popular article for an appropriate magazine as well as press releases focusing on the meeting outcomes.

3) Other products to be determined by the attendees.

*Organizing Committee: Mark Biddlecomb, Ducks Unlimited; Paul Buttner, California Rice Commission; John M. Eadie, UC Davis; Meghan Hertel, Audubon; Bruce Linquist, UC, Davis; Harold Mooney, Stanford University; Don Bransford, Rice Farmer;*
Return of the Pacific Flyway:
Maintaining and Enhancing Recent Gains
January 13, 2017
Stanford University

Participant List

Thad Bettner, Glenn-Colusa Irrigation District
Don Bransford
Paul Buttner, California Rice Commission
Gretchen Daily, Stanford Woods Institute for the Environment
Noah Diffenbaugh, Stanford Woods Institute for the Environment
John Eadie, UC Davis
Luis Espino, UC Cooperative Extension
Scott Fendorf, Stanford Woods Institute for the Environment
Chris Field, Stanford Woods Institute for the Environment
Aaron Goodman, Stanford Woods Institute for the Environment
Liz Hadly, Stanford Woods Institute for the Environment
Mary Ellen Hannibal
Anne Hayden, Environmental Defense Fund
Meghan Hertel, Audubon
William Horwath, UC Davis
Tim Johnson, California Rice Commission
Roberta Firoved, California Rice Commission
Jacob Katz, California Trout
Sharon Lawler, UC Davis
Jim Leape, Stanford Woods Institute for the Environment
Bruce Linquist, UC Davis
Hal Mooney, Stanford Woods Institute for the Environment
Mark Petrie, Ducks Unlimited
Mark Reynolds, The Nature Conservancy
Carlos Suarez, USDA/NRCS
Leon Szeptycki, Stanford Woods Institute for the Environment
Victoria Schlesinger, Bay Nature Magazine