California Water: Proposed Science Advisor Actions

Proposal for Bureau of Reclamation science advice on California water issues
Draft: October 19, 2011

Introduction:

California faces formidable water challenges because much of the state is too dry to support municipal, industrial, and agricultural water use. Therefore, an extensive network of reservoirs, canals, levees, and pumps move water from the water-rich north and from the Colorado River to the dry and densely populated south. In the north, most of the natural water flows to the ocean from the Sacramento and San Joaquin rivers, through the Bay-Delta and San Francisco Bay.

Most water diversions to southern California are from the biologically diverse Bay-Delta estuary. These Bay-Delta water demands have increased with increasing population and economic activities, spurring conflicts on scarce water resource allocation. Water diversion restrictions required by two biological opinions to protect threatened and endangered fish (delta smelt and salmonoids), and an extended drought have exasperated the conflict.

Various plans have been developed to find compromises that provide both reliable water supplies and ecosystem protection. For example, the Bay Delta Conservation Plan intends to protect habitat to both mitigate the adverse effects of an isolated conveyance structure that will provide reliable north-south water transport through the Bay-Delta, and to restore threatened and endangered species. Simultaneously restoring the Bay-Delta ecosystem and ensuring a reliable water supply is indeed a grand challenge. Many qualified and distinguished experts have reached differing conclusions, and the introduction of exotic species, increasing pollution, increasing human demands, and climate change make agreement on a solution elusive.

California water management, allocation, and ecosystem protection will be ongoing Bureau of Reclamation challenges, so a proposal for its Science Advisor to provide scientific advice and advocacy to help in that difficult process is presented here. A number of stand-alone, easily separable proposals are presented below in two broad categories: 1) proposed actions to gather critical science information from the community for use in developing advice for the Bureau of Reclamation Commissioner, and 2) proposed actions to provide California water science advocacy and develop collaborative independent science activities towards restoration of a healthy scientific process in support of effective decision making.

1) Information and advising

Several stand-alone, easily separable proposals are presented here for the Bureau of Reclamation Science Advisor to gather critical science information from the community for use in developing advice for the Commissioner on matters involving California science, technology, and innovation policy.

Information Gathering

To establish a baseline of current California water science events and innovation information for use in developing scientific advice for the Bureau of Reclamation Commissioner, it is proposed that the Bureau of Reclamation Science Advisor participate in selected California science telecoms, meetings, panel reviews, conferences, and workshops, and also extensively study the existing literature. These proposed actions should be minimally invasive as these communications are routine or already planned. If an issue

requires more a thorough review or understanding, it is proposed that the Bureau of Reclamation Science Advisor request specific briefings, telecoms, or other communications.

In this way, the Bureau of Reclamation Science Advisor could actively seek in-field science assessments and opinions, solicit information and ideas from the broad range of stakeholders, including but not limited to the research community, the private sector, universities, national laboratories, state and local governments, foundations, and nonprofit organizations. Recommendations for participation by the Bureau of Reclamation Science Advisor in these forums would be solicited from the Bureau of Reclamation Regional Director and relevant scientific staff.

Science Reviews

To establish an understanding of future California scientific plans and directions, it is proposed that the Bureau of Reclamation Science Advisor participate in reviews and edits of selected press-releases, science papers, science review panels, plans and proposals. In this way, the Science Advisor could not only stay current with the California water science planning efforts but also could help improve scientific planning in the region. Recommendations for participation in these reviews, plans, and proposals by the Science Advisor would be solicited from the relevant regional scientific staff and planning bodies such as the Bay-Delta Conservation Program.

Briefing Papers

Based on information gathering and regional participation, it is proposed that the Bureau of Reclamation Science Advisor develop periodic briefing papers for the Bureau of Reclamation Commissioner on current scientific issues, advancements, publications and workshop reports. These briefing papers could provide focused and timely reviews of the current state of the science on particular scientific issues, factsheets providing an updated status on water availability, and threatened and endangered species status.

If these briefing papers provide scientific advice on a pending decision or plan, it is recognized that Science Advisor recommendations are advisory only and not binding on the Bureau of Reclamation or the Commissioner. Rather, the aim of these briefing papers would be to provide the Bureau of Reclamation Commissioner with enough information to make informed decisions, by accurately summarizing complex science issues in a clear and concise manner, explaining the relevance of the scientific information to the issue, and going beyond the science to the impacts on people and ecosystems. These briefing papers could also be used to respond to requests from the Bureau of Reclamation Commissioner for information, analysis, evaluation, or advice, and would be developed in cooperation with, or vetted by, regional scientific experts.

Science Presentations

It is proposed that the Bureau of Reclamation Science Advisor develop periodic science-update oral presentations for the Bureau of Reclamation Commissioner on current California scientific issues, advancements, publications or workshop reports. These Reclamation Science Advisor presentations could be developed exclusively for the Commissioner, but could also be delivered to broader venues to update partners, stakeholders, and the scientific community on Bureau of Reclamation science issues. Oral presentations have the advantage over briefing papers that they allow for 2-way dialogue and faster follow-up on addressing questions and uncertainties.

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Seminar Series

It is proposed that the Bureau of Reclamation Science Advisor develop a Washington-Office brown-bag seminar series focused on California water science issues. Relevant scientific experts from the Bureau of Reclamation, partner agencies, stakeholders, and the academic community would be invited to provide presentations when they are visiting Washington, or via Videocon. Presentations could be videotaped and provided to the Bureau of Reclamation Commissioner for viewing at his leisure if his schedule precludes him from attending in person.

2) Science restoration

A number of stand-alone, easily separable proposals are presented here for the Bureau of Reclamation Science Advisor to provide California water science advocacy and help to facilitate the development of collaborative independent science activities towards the restoration of a healthy scientific process in support of effective decision making. These proposed actions including scientific integrity, peer review, data stewardship, policy, and collaborative science, are described below.

Scientific Integrity

To advocate for scientific integrity in the Bureau of Reclamation's California water science endeavors, it is proposed that the Bureau of Reclamation Science Advisor participate in, and advocate for independent science reviews, scientific integrity inquiries, and education and outreach activities. Californians must have confidence that Reclamation is basing its decisions on the best available science and that the scientific process is free of misconduct or improper influence. Therefore, the Department of the Interior and the Bureau of Reclamation has established Scientific Integrity Policies that mandate that when scientific or technological information is considered in decision making, the information must be as robust, of the highest quality, and the result of rigorous scientific processes as can be achieved within the available decision time-frame.

Therefore, it is proposed that the Bureau of Reclamation Science Advisor actively advocate for implementation of this policy in its California water science endeavors, and engage in reviews or inquiries of scientific integrity issues to help restore the public trust for Bureau of Reclamation science-based decision making. Further, it is proposed that the Bureau of Reclamation Science Advisor actively engage in education and outreach endeavors in the region to help Bureau of Reclamation employees, partners and stakeholders to understand their scientific integrity responsibilities, and to help restore public trust in Bureau of Reclamation decision making being based on sound scientific information.

Peer Review

To advocate for the active role of peer review in the Bureau of Reclamation's California water science activities, it is proposed that the Reclamation Science Advisor actively advocate for independent peer-review of Bureau of Reclamation science and management plans, help to develop a robust science analysis and publication culture within the Bureau of Reclamation using management emphasis, peer-awards, and partnerships (with Universities, federal agencies, and S&T program), and engage in education and outreach on Department of Interior and Bureau of Reclamation peer-review policies and expectations.

It is difficult for decision makers and scientists to spot every mistake or flaw in a complicated research study or management plan. For complex and uncertain topics, an opportunity for improvement may be more obvious to someone with special expertise or who simply looks at it with a fresh eye. Therefore, asking others to review scientific results increases the probability that weaknesses will be identified and

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improved, or that new ideas and approaches may emerge. Bureau of Reclamation policy dictates that all scientific information produced, used, or disseminated must be peer reviewed if it is determined to be "influential scientific information," including "highly influential scientific assessments," or for all other scientific information where peer review would be sufficiently beneficial.

It is proposed that the Bureau of Reclamation Science Advisor help to advance a robust culture of scientific analysis and publication within the Bureau of Reclamation by working with its science professionals to propose a policy that explains the value of such a culture, and provides management and award guidelines to help motivate such a culture. It has been shown that career incentives are the most effective for encouraging peer-reviewed scientific publishing.

Data Stewardship

Realizing the full value of research data requires that the data be accessible to the community of researchers and others who might be able to use them. Issues of useful accessibility, annotation, curation, and preservation are the heart of data stewardship. It is for this reason that Bureau of Reclamation is developing a Data Stewardship Policy.

In the context of California's water science issues, data stewardship is of critical importance due to the large number of agencies, scientists, and stakeholders that collect and use scientific data in support of making critical decisions. The secondary use of data is of growing importance for decision making, so to achieve its mission to develop, manage and protect water and related resources in an environmentally and economically sound manner. The Bureau of Reclamation must ensure that the value and utility of its scientific data, and the data collected by its partners are carefully maintained.

It is proposed that the Bureau of Reclamation Science Advisor actively promote scientific data stewardship in the region through education and outreach describing the importance and benefits of cooperation on data stewardship, by assuring that data stewardship policies and standards are being followed in Reclamation, and to help state and federal agencies cooperate on data sharing and stewardship activities.

The latter proposal may take significant investment to develop data stewardship partners in the region that agree upon common data standards to improve data quality and sharability, task key staff as data stewards who manage the development, use, and storage of key data assets. Data stewardship coordination teams would be formed and charged with developing and recommending data stewardship policies, data standards, technical guidelines and handbooks, best practices, technology, and training.

Science Policy:

California's public trust in its scientists, and the public trust in decision makers to make sound science-based decisions is dwindling. The highly politicized California water sector provides an extremely difficult environment in which to conduct science, and it produces a lot of stress for the scientists and decision makers. There is no question that this environment is not conducive to the science process and scientists need more support from their institutions in dealing with it. When science receives this kind of attention, it means that the science is really important to the public.

Scientists need to do everything possible to make sure that they effectively communicate uncertainty, risk, probability and complexity, and provide a context that includes alternative and competing scientific viewpoints. Rebuilding trust with the public starts with addressing the general practice of science and the personal behaviors of scientists.

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The previous proposals on peer review and scientific integrity largely address scientific codes of conduct and peer-review expectations. However, scientists and their institutions (such as the Bureau of Reclamation) have not yet adapted to the high policy relevance of their work. How scientists can most effectively and appropriately engage with the policy process, being honest brokers, is a topic that has not been adequately addressed.

Scientists involved in the public debate, which they believe follows logically from their scientific findings, may actually play a role in the political polarization of the issues. The interface between science and policy is a muddy issue, but it is very important that scientists have guidance in navigating the potential pitfalls. Improving this situation could help defuse the hostile environment that scientists involved in the public debate have to deal with, and would also help restore the public trust of federal scientists.

It is proposed that the Bureau of Reclamation Science Advisor advocate for the creation of a Federal policy statement for California water that creates a standard of unbiased, trusted results for the public good. As Judge Wanger implies, federal scientists should fully and honestly address a balanced scientific portfolio that addresses the various water stresses and needs beyond those of the listed species, and provide full explanations of the uncertainties related to their science results, so that decision makers have the information they need to make wise choices.

Finally, it is proposed that the Bureau of Reclamation Science Advisor study lessons learned from regions that have successfully implemented science to guide decision making and experienced a public trust renewal (e.g. Colorado Basin).

Collaborative Science

It is proposed that the Bureau of Reclamation Science Advisor advocate for a process for the development of independent scientific input to ensure that decisions are informed with best available science.

The first proposed approach would be to assemble a group of independent scientists who will identify and evaluate scientific information and provide objective insight and expert opinions pertaining to the ecological and economic impacts of various interagency management plans. The role of this proposed science advisory group would be to establish a balanced science-based conservation and water resource management principles that would provide independent advice for policy and decision makers.

A second proposal is to develop collaborative science forums and technical working groups involving the full-range of scientists sponsored by various stakeholders (similar to the Colorado River Hydrology Workgroup). A science challenge could be shared with the stakeholders and then let the solution emerge from the stakeholder discussion, which might result in better ownership of the process. Then independent technical working groups could be established to address the challenge(s) with the results being co-owned by the relevant stakeholders.

Thirdly, it is proposed that the relevant Landscape Conservation Cooperatives and Climate Science Centers could be engaged to serve in the role of collaborative science forums or technical working groups and to aid in the science restoration process.

Finally, it is proposed that we explore the development of truly collaborative scientific research centers that become centers of excellence for trusted, unbiased scientific research. A provisional approach to actually establishing a bricks-and-mortar collaborative research centers, would be to establish collaborative research funds that promote truly excellent, collaborative and interdisciplinary research

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programs. Shared financial and science challenge contributions to these funds from various stakeholders would help to ensure public ownership and trust in the results.

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