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Technical Appendix

Managing California's Water

Insights from Interviews with Water Policy Experts

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Acknowledgments

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Summary

This paper synthesizes the results of interviews with more than 100 water policy experts from a range of sectors and regions within California, conducted in the spring and summer of 2010. Respondents were asked to provide open-ended answers to questions regarding California’s long-term water policy challenges and potential solutions. Top long-term policy problems cited include management of the Sacramento–San Joaquin Delta, unsustainable water supplies, lack of comprehensive groundwater management, threats to water supply and flood risk from climate change, and problems with the administration of the Endangered Species Act. In addition to a range of specific management solutions, respondents emphasized the importance of public education, strengthened leadership and reduced influence of special interests, development of a sustainable funding system, and more holistic resource management as solutions to California’s long-term water challenges.

Introduction

As part of a project assessing the challenges and potential solutions to California’s water problems (Hanak et al. 2011), we conducted qualitative interviews with over 100 leading water policy analysts, researchers, politicians, lawyers, and managers in the first half of 2010. We asked survey participants to share their thoughts on long-term water management challenges and policy solutions by responding to a set of five open-ended questions (Table 1). Our objectives included establishing how much agreement exists among water policy experts about what is going on (and going wrong) with water policy across regions and sectors and gaining insights on current problems, promising solutions, and novel ideas. This paper summarizes the results of these interviews to make them available to the broader water policy and management community.

TABLE 1
Interview questions

1	What do you see as the five most important long-term water policy issues for California?
2	If you could list five state policy actions that would be useful for the long term, what would they be, in rough prioritized order?
3	Similarly, what should be the top five federal policy actions, in rough prioritized order?
4	What are the most significant challenges that will need to be overcome to accomplish the major water policy actions you have identified?
5	How might these challenges or obstacle be overcome?

To encourage an open and honest dialogue, respondents were informed in advance that answers would not be attributed to specific individuals. Because the questions were open-ended, the results indicate which problems and solutions are foremost in people’s minds; they do not indicate the degree of general support for any particular statement or action.¹ Measuring the extent to which opinions and beliefs conflict with the facts is also outside the scope of this analysis.

Respondents representing the state geographically and by water use sector were chosen based on their experience and broad or deep perspectives on water resource policy (see the [list of interview respondents](#)). Time and scheduling considerations limited the number of interviews, so the sample is neither exhaustive nor statistically representative of various groups involved in California water policy. Some interviews were conducted in groups to facilitate discussion of potential solutions.

Given the open-ended nature of the questions and the relatively small sample size, we do not provide a detailed statistical analysis of results. However, we do provide some overall quantitative summaries of responses both for the sample as a whole and for seven sub-categories, to show how experts from different sectors perceive problems and potential solutions (Table 2). “Academics” includes university faculty and researchers and lead scientists at agencies. “Agricultural” and “urban water agency” respondents include employees of water districts and water users associations as well as attorneys and consultants representing these entities, respectively. “Politicians and staff” includes elected officials and their staff specializing in

¹ Acquiring this type of information would have required us to ask respondents to provide feedback on specific issues and options. We opted not to include such closed-form questions to keep the discussions more free-ranging.

water resources. The “operations and flood control” group includes state and federal agency staff and consultants involved in water project operations or flood response. The “regulatory and environmental” category includes environmental organization staff, environmental attorneys and consultants, and staff of regulatory agencies. The “other” category combines groups that were very small, such as media or business interests, and group interviews where respondents included members of different groups.

TABLE 2
Number of respondents by water use sector

Water use sector	Number of respondents (number of group interviews)
Academics	16 (1)
Agricultural water agency	13 (2)
Operations and flood control	14 (0)
Politician and staff	10 (0)
Regulatory and environmental	18 (1)
Urban water agency	16 (2)
Other	7 (2)
Total	94 (8)

NOTE: See text for group definitions. For interviews conducted in groups (consisting of two to five individuals), it was not possible to keep track of individual responses to all questions. We provide a rough estimate of group responses by counting them twice; which understates responses when there was broader agreement among members of a larger group. This method of counting groups results in a lower overall tally of responses than the total number of individuals interviewed (see the list of interview respondents).

The interviews occurred during a period when a multi-year drought, a major economic recession, and a series of court cases regarding endangered species and water supply cutbacks from the pumps at the southern end of the Sacramento–San Joaquin Delta were likely to have influenced the thinking of many respondents.² We start by discussing the problems and policy actions cited most often, drawing on responses to the first three interview questions. We then discuss obstacles to improving water policy and potential solutions, corresponding to the last two questions. Given the considerable overlap in responses to these two groups of questions, we pooled the answers into two summary tables. We conclude with an overview of major findings. To provide a flavor of the discussions, we provide anonymous quotations throughout the paper.

² For background on the problems in the Delta, see Lund et al. (2010).

Long-Term Water Problems and Policy Actions

The first three questions asked respondents to identify the most important long-term water policy issues for the state and to list the most useful state and federal policy actions for long-term water management. These results are summarized in Table 3. Overall, there was general agreement on the most important long-term water policy issues for California, although different respondent categories had somewhat different emphases. Problems of the Delta, water supply sustainability, groundwater management, and climate change were the most commonly cited issues, mentioned by over two-fifths of all respondents. Here, we explore responses according to five broad categories: the Delta, water supply and flood management, environmental protection, California’s water laws, and water governance and institutions.

The Sacramento–San Joaquin Delta

“Absent stronger leadership, things will not get better.”

Unsustainability of current management of the Delta—part of the west coast’s largest estuary and a major conveyance hub within California’s water supply network—was the most commonly discussed water problem, ranking among the top five issues mentioned for all categories of respondents. Some respondents focused exclusively on Delta issues, and politicians as a group were particularly sensitive to this topic (Table 3). Water supply reliability, ecosystem function, the condition of Delta levees, water quality, and governance structure were all commonly cited problems.

Despite the general consensus that the Delta poses a major problem for California water management, there was less agreement about what should be done to fix it, or even what is currently going wrong. Some proposed solutions were vague, such as “the Delta should be fixed.”

Approximately one-fifth of all respondents considered improving water supply conveyance through or around the Delta to be a top policy action for long-term water management. But reasons varied, with some supporting better conveyance primarily to support the Delta’s ecosystem, others to improve water supply reliability, and still others to improve drinking water quality, given the level of salts now found in waters conveyed through the Delta. Opinions on the best system of governance for the Delta were split. Roughly equal shares of respondents favored the continued development of the Bay Delta Conservation Plan (BDCP)—a habitat conservation plan that would support the Delta ecosystem while improving water supply reliability for water users—or considered that an entirely new approach is needed. For this latter group, concerns were raised that the BDCP will have the same (unsuccessful) outcome as an earlier policy process known as CALFED.³ Most respondents thought the state government should be at the helm in addressing the Delta’s woes. More effective leadership from the governor’s office, the California legislature, and state agencies came up repeatedly when respondents were asked about possible solutions.

³ In all, only ten percent of all respondents specifically addressed the issue of Delta governance. CALFED was a state-federal program to address Delta problems that operated from the time of the Bay-Delta Accord (signed in 1994) through 2006, when the California legislature cut funding for its programs.

TABLE 3
Long-term water problems and policy actions (% of respondents)

Problem	Academics (16)	Agricultural agency(13)	Operations / flood (14)	Politicians / staff (10)	Regulatory / environmental (18)	Urban agency (16)	Other (7)	Total (94)
The Delta	50	62	57	90	56	50	43	57
Unsustainable water supply	63	38	50	70	22	63	29	48
Unmanaged groundwater	56	31	36	80	44	19	43	43
Climate change	31	8	71	60	67	25	14	41
Endangered Species Act—related problems	31	54	21	30	61	44	14	39
Insufficient water use efficiency	44	46	36	40	33	38	14	37
Water quality	56	8	29	20	28	50	43	34
Dysfunctional institutions	19	38	64	10	17	44	14	31
Deteriorating aquatic ecosystems	44	15	21	20	50	–	57	29
Lack of regional, state, federal coordination	6	23	64	50	17	31	14	29
Sporadic funding sources (overreliance on bonds)	31	15	50	30	11	19	43	27
Flood risk	25	15	71	20	17	6	43	27
Regulatory problems (redundancy, inconsistency, enforcement...)	13	23	21	30	33	44	–	26
Water transfer problems	19	46	7	10	28	38	14	24
Undervaluation of water (artificially low prices)	44	–	14	20	28	19	14	21
Water rights in need of reform	19	8	14	20	28	19	29	19
Compartmentalized water management	19	15	36	–	6	31	14	18
Aging infrastructure	19	8	29	–	17	25	14	17
State Water Resources Control Board—related problems	–	23	–	10	44	13	29	17
Separate management of Central Valley Project and State Water Project	6	38	7	–	22	31	–	17
Poor data quality and accessibility	19	8	14	10	33	13	14	17
Water rights in need of enforcement	13	23	–	30	22	19	–	16
State Water Project operated by Department of Water Resources	–	15	14	20	11	31	14	15
More infrastructure needed	13	–	7	20	6	19	43	13
More surface storage needed	6	–	7	30	17	13	14	12
Salinity and drainage problems in San Joaquin Valley	19	15	–	20	6	19	–	12
Incoherent / incomplete State Water Plan	13	–	14	30	6	6	29	12
Outdated reservoir operating system	31	8	7	10	–	–	29	11
Unclear criteria for reasonable and beneficial use of water	–	15	–	10	17	6	29	10
Population growth	6	8	21	–	11	6	–	9
Too much federal involvement	–	15	14	10	–	13	–	7
Overallocation of Colorado River	13	–	–	10	6	–	14	5
Water bond needed	–	8	–	10	–	–	–	2

NOTE: For each respondent, the table includes up to 15 answers (up to five answers each for questions 1 through 3—see Table 1). Issues raised under all three questions are expressed in terms of the policy problem they reflect. Responses noted in group interviews were counted twice. Bold values indicate the highest percentage for each sub-category of respondents.

Indeed, many felt that the current lack of strong leadership contributes to the ongoing problems in the Delta. The following sentiments represent this view:

- “I blame [the problems in the Delta on] the lack of strong leadership by our elected officials as well as within our state agencies.”
- “[We need to] merge science on the Delta with political leadership to bring about change that may be unpopular with a significant fraction of the stakeholders.”
- “We’re missing leadership—a governor that leads. We’ve been hypnotized by the public participation process, and the belief that the way to make decisions is by consensus. We need real leadership where leaders figure out the issue, find the supporters and the fatal opponents, make sure all interests are and feel heard, but are willing to make decisions that not everyone will agree with.”

Approximately one-sixth of all respondents expressed the view that the federal government should only play an indirect role in promoting policy solutions in the Delta, for example by providing financial support or applying pressure on state policymakers and stakeholders. Others argued for more direct federal involvement, given the importance of federal actions in the Delta’s current problems, including the federally-operated Central Valley Project (CVP), which conveys water through the Delta. One suggestion was to create a large-scale federal program similar to the Great Lakes or Everglades Restoration Programs.

All the current policy attention on the Delta also generated some resentment, prompting one respondent to remark: “Contrary to popular belief, there are parts of the state that are not tied to the Delta,” and another to say: “Water policy is too Delta-centric right now.”

Water Supply and Flood Management

Above and beyond specific water supply and flooding problems noted in the Delta, respondents highlighted major challenges and a range of potential policy options for addressing unsustainable water supplies and growing flood risk.

Water Supply

“We’re in a man-made, permanent drought.”

Nearly half of all respondents cited unsustainable water supplies as a major issue facing the state—an issue to which politicians, urban water agency staff, academics, and project operations staff were particularly sensitive (Table 3). However, there was an interesting split on how water supply problems were viewed, with some respondents considering the main issue to be one of acknowledging supply limits, and others saying the main issue is the need to augment supplies. One policymaker said: “There is an assumption that we can always get a bit more water, but in fact we are overallocated, and we have to truly understand those limits and incorporate them into planning.” This was contrasted by an opposing view: “We need to make sure that the water is here and available under all climatic conditions to meet the needs of the community at all stages of growth.”

In light of the many problems facing the Delta and a perception that diversion rights on most large river systems are already overallocated, most respondents put little emphasis on expanding large water projects. Instead, they emphasized solutions involving local and regional water supplies, recycling and reuse programs, desalination, stormwater capture, and the joint management of surface and groundwater through

conjunctive use strategies. Nearly two-fifths of the sample noted conservation as a demand-side method to improve water supply reliability (Table 3). However, there was disagreement on the best approach to encourage conservation, with some favoring statewide conservation requirements and others calling for efficiency standards and approaches based on water use type or region.

Although many saw these various local and regional alternatives as promising, they also noted obstacles to their more widespread use, included funding, social acceptance, and government policies inhibiting implementation. Most respondents had a favorite method or two that they considered most appropriate for their region.

Groundwater Management

“Groundwater is a glaring hole in our water resources management.”

Lack of groundwater management was the third most important issue noted by the sample as a whole, although it ranked lower among respondents representing local water agencies than among those in other groups (Table 3). For urban agencies, the low priority placed on groundwater reflects the fact that many respondents in our sample were from Southern California, where groundwater management is less of an issue because most basins are relatively well managed through adjudications or special groundwater management districts. Within the agricultural sector, regional differences also were a factor. Respondents from the San Joaquin Valley and Tulare Basins noted overdraft in unmanaged basins as a growing concern, particularly in light of surface water shortages linked to the drought and cutbacks in pumping through the Delta.

Here again, however, opinions varied as to the solutions. Most respondents believed that the state should play a leadership role in encouraging groundwater management, but a handful of respondents believed the state should desist, with one stating: “Don’t have the state regulate groundwater until they prove they can manage surface water. They’re already like a rabid monkey with a hand grenade with surface water—we’d be mad to give them another one.” Among those favoring state involvement, some argued that basin monitoring (with mandatory reporting) was adequate, while others argued for additional adjudications, following the Southern California model.

Although many expressed the fear that groundwater resources could be irreparably damaged due to overdraft or water quality impairment if problems are not addressed soon, they also acknowledged that groundwater users in unmanaged basins were concerned about regulation. This prompted recommendations to use the fear of regulation as a threat to force groundwater monitoring and reporting. The most commonly noted obstacles to the expansion of groundwater monitoring included distrust among pumpers of how groundwater data would be used and resistance to starting a monitoring precedent. One respondent felt it was in the interest of groundwater users to wait until problems became catastrophic so that costs of management would fall to taxpayers rather than local users.

Respondents generally thought surface and groundwater should be managed in a coordinated fashion (conjunctively), both to facilitate groundwater storage in wet years for subsequent use in dry years and to prevent overdraft in regions such as the Sacramento Valley, where groundwater pumping is sometimes increased to facilitate surface water transfers to other regions. Most also believed that water supply reliability would be more enhanced, and money better spent, by managing groundwater than by building new surface storage reservoirs. The Kern Water Bank was cited as a successful model of conjunctive use.

Water Pricing

“The fact that we have agricultural users getting water at subsidized rates and turning it around and selling it at a profit is indicative of an incredibly broken system.”

As noted above, improving water use efficiency was seen as a major tool for redressing water supply and demand imbalances. Roughly one-fifth of all respondents considered artificially low water prices to be a major factor underlying many of California’s current water problems (Table 3). They stressed the role price signals could play in encouraging more efficient water use.

However, a sectoral divide is apparent on this issue: those concerned with pricing most often questioned whether water was being used wisely in the agricultural sector, while representatives from agricultural water districts did not raise the issue of undervaluation of water as a problem (Table 3). Many respondents thought low-valued crops were using an unjustified portion of the state’s water resources and encouraged full-cost water pricing to promote a shift toward higher value, lower water-using crops.

Opinions differed on the best types of rate structures, with some favoring volumetric pricing applied equally to all water users within a district, and other favoring a tiered pricing system with variable base allocations, such as that used by some urban agencies in Southern California (e.g., the Irvine Ranch Water District). Under such systems, water users are given a larger allocation at the lowest tier if they have larger households and larger lots, so all water users face similar incentives to improve water use efficiency (Hall 2009). Some respondents feared that some urban water agencies would not be able to cover their fixed costs with water conservation programs (since fixed costs still need to be covered, even if water use declines), although some noted that an advantage of allocation-based systems such as IRWD’s lies in its ability to cover fixed costs while promoting conservation.⁴

Not everyone was a fan of conservation. In the words of one respondent from an agency with relatively senior water rights, “Water conservation is the equivalent of the Spanish Inquisition. You’re hauled up before the State Water Resources Control Board (SWRCB) and told that you’re wasting water, and you have no choice but confess.”

Flood Management

“Who gets to decide where you can develop? Those decisions are made at the local level. [So] they should be responsible for the impacts of those decisions. In the current situation, they are not.”

Flood management was cited as a major issue by over a quarter of all respondents, and it tied for first place (along with climate change) among experts dealing with water project and flood operations (mentioned by seven in ten respondents in that group) (Table 3). The low ranking of flood management among urban and agricultural agencies reflects the fact that few of these agencies have flood management responsibilities. Concerns raised included the fragility of flood management infrastructure, the difficulties of raising local assessments to finance flood protection, and the state’s exposure to costly liability for levee failures in the wake of the 2003 *Paterno* decision.⁵ Some respondents also highlighted problems with the rigidity of federal standards for land use within and outside of the “100-year floodplain.” (Federal standards restrict new

⁴ The goal of such systems is to cover fixed costs with revenue from the lower tiers and to use revenue from the upper tier(s) to fund conservation programs and related actions, such as stormwater management.

⁵ In the *Paterno* decision, the California Supreme Court determined that the state was responsible for damage from the failure of federally-authorized levees even if they were constructed and are maintained by local authorities. See California Department of Water Resources (2005).

development in areas where floods are likely to occur with great frequency; the “100-year floodplain” denotes areas susceptible to floods with more than a 1 percent change of occurring in any given year.) Some expressed concern that these standards make it nearly impossible to build in rural communities within the floodplain, posing problems for community viability. However, others were concerned that the 100-year standard (and even the state’s new 200-year standard for some new development in the Central Valley) was too low for urban areas. And, as discussed next, many viewed flood risk as a growing problem due to climate change.

Climate Change

“The technologies of the 1940’s are probably not the answer.”

Climate change was cited as a major issue by two-fifths of all respondents, and particularly emphasized by groups including state and federal officials (politicians and their staff, regulatory and environmental agency representatives, and project operation and flood management personnel) (Table 3). In contrast, respondents from agricultural water districts, as a group, were the least likely to list climate change as a major problem for California’s water management.

Major concerns mentioned included reduced snowpack, extended drought, and increased flood risk. Among those who expressed these concerns, there was general consensus that the infrastructure-based solutions to water resource management from the early 20th century, such as surface reservoirs, would become less useful in a warmer future. Some respondents felt available water supplies would decrease in the future, which, combined with population growth, implies that the state needs to be prepared for major, long-term water shortages. Conservation, water recycling, desalination, conjunctive use, rainwater capture, and water transfers were all noted as useful adaptation actions. Most felt that large, new surface reservoirs were a relatively costly alternative compared with these solutions.

To incorporate climate change impacts on flood control, respondents suggested several actions: (i) revising the rule curves for flood storage space in existing reservoirs to accommodate more rainfall in the winter and early spring (a result of less snowpack),⁶ (ii) improving infiltration (reducing runoff) in upland or mountain regions through better land management, and (iii) stopping new development in floodplains. One respondent offered an innovative suggestion: “Forty or fifty years ago we used to think in terms of big costly dam projects. Now, all the good sites are gone and we don’t have the resources or will to build. We should consider building “micro-storage” —for example 3,000 small projects of little catchment basins, holding ponds, things designed to encourage less runoff and more percolation. This could substitute for snowpack in a sustainable, long-term way.” Others mentioned the potential need for levees around airports and water treatment plants to protect existing investments from future flooding.

Most respondents believed that policy and funding to adapt to climate change should be set at the national level (although the California Department of Water Resources received kudos for assessing climate change impacts on the state’s water resources). A few respondents felt there is so much uncertainty regarding climate change that money should not be spent on the problem until understanding is improved. In addition to addressing adaptation to the effects of climate change, some respondents highlighted the importance of

⁶ Reservoirs that provide storage for both flood waters and water supply have rule curves that determine the schedule by which space needs to be kept available for flood waters. A changing schedule of runoff as a result of climate warming implies the need to change these rule curves, to make more space available for flood storage..

federal leadership in addressing climate change mitigation, or the reduction of CO₂ emissions. One respondent stated emphatically that the federal government should: “pass decent legislation governing greenhouse gas emissions.”

Environmental Protection

Endangered Species Act

“We may have to let one species go to preserve the whole ecosystem, which is the opposite of the ESA.”

Concerns with the Endangered Species Act (ESA), the federal law charged with protecting species from extinction, ranked fifth among all policy issues cited, mentioned by two-fifths of all respondents (Table 3). But although there was a general consensus that the ESA is not working particularly well, perceptions varied about what was wrong with the law or how to improve it.

Some respondents considered the ESA’s focus on species to be insufficiently balanced, resulting in wasteful use of water for environmental flows and unjustifiably high costs to human water uses. They wanted the ESA to be administered taking into account the reasonable and beneficial use requirements under California water law and the impacts of reduced water diversions on people and the economy. Others wanted more short-term flexibility in the administration of the law, to give water diverters time to change their behavior. There were also feelings that ESA rules are not enforced consistently, but instead applied more stringently on the nation’s west coast than east coast, and more often to big, publicly managed water projects than to small, privately managed water diversions.

Conversely, some respondents expressed the view that the ESA needs to be administered more forcefully to protect environmental resources for the future. In this line of thinking, there does not need to be a balancing act between humans and species, nor should water releases to comply with the law be “boiled down to economic costs.” In the words of one respondent, people now “dither in the hopes that species die” — behavior that should not be rewarded. Others brought up the difficulty of attaching a price tag to species and ecological systems, arguing that it is difficult and unfair to compare environmental water uses with human water uses. Many of those who wanted to see the ESA applied more forcefully felt that focus should be on ecosystem health and function instead of single species. They also felt the law should have a broader definition of what constitutes success and failure, such as function, ecosystem services, or self-sustaining aquatic communities, rather than counts of individual species.

Few on either side of this debate were happy with the Biological Opinions⁷ on listed species’ status, saying that they do not use the best, most recent science and rarely present a coherent set of goals for water users.

⁷ Biological Opinions are documents prepared by the federal agencies responsible for ESA administration (U.S. Fish and Wildlife Service and National Marine Fisheries Agency) for projects that are subject to the ESA because they may cause harm to listed species. Two recent Biological Opinions that have received considerable policy attention are for fishes that rely on the Delta ecosystem: delta smelt and a group of anadromous fish (Chinook salmon and steelhead).

Instream Flows

“Accept that we live in a managed ecosystem and that we need to identify which values we want to manage.”

Consistent with the concerns over the ESA, nearly a third of all respondents listed deteriorating aquatic ecosystems as one of the top five water policy problems in California (Table 3). However, few suggestions were given regarding solutions. Approximately one-tenth of all respondents called for the development of instream flow standards for all major rivers in California to protect the public trust. Such standards were typically suggested as a method to incorporate more holistic management of aquatic ecosystems (rather than the species-by-species approach of the ESA). Some expressed the hope that if ecosystem health improves, it will no longer drive water policy in California. Another common sentiment was the desire for environmental and regulatory consistency, where requirements are clear and do not change monthly or yearly, so that after instream flows have been met water users are free to use their water without fear of additional requirements, commitments, or regulations. Some saw designation of instream flows as a task for the SWRCB, while others thought federal support would be needed given the role of federal water projects in contributing to low flows and environmental problems.

Water Quality

“What quality of water is healthy water?”

Protecting water quality in both surface and groundwater was especially important to academics and urban agency representatives (Table 3). Although this topic was usually considered to be an emerging issue, some respondents noted the thousands of miles of impaired waterways as evidence that California is already failing to adequately protect water quality.⁸ Increasing salinity in the San Joaquin Valley was also highlighted as a growing problem affecting agricultural productivity (Table 3).

Respondents generally wanted those entities discharging pollutants to be held responsible for water quality impairment. Some ideas to improve water quality throughout California included raising regulatory standards, completing the ongoing effort to establish total maximum daily loads (TMDLs) to regulate contaminants for all basins, improving management of wastewater discharged to rivers, and tightening regulation and monitoring of groundwater quality.

Although salts, nutrients, and water temperature were the most commonly discussed types of impairment, respondents also worried about pharmaceuticals and untested chemicals in surface and groundwater. Suggestions to address these emerging contaminants included adopting a zero tolerance objective for hormones or other pharmaceuticals, requiring product labeling for contaminants that have not been fully tested, and implementing the state’s new Green Chemistry Initiative, which aims to improve the understanding of chemicals put into production and the disclosure of information on chemicals found in various products.⁹

⁸ Water bodies can be classified as impaired under provisions of the federal Clean Water Act. In 2004, 93 percent of California’s river miles, 93 percent of California’s lake acreage, and 98 percent of its estuarine square miles were listed as impaired (U.S. Environmental Protection Agency undated).

⁹ For more on this initiative, see <http://www.dtsc.ca.gov/pollutionprevention/greenchemistryinitiative/index.cfm>.

Regarding drinking water, some respondents (particularly in urban agencies) believed standards were too stringent, noting that with improving detection technologies, there is a tendency to assume something is harmful just because it is possible to detect it. In this sense, the technology may be outstripping understanding: “We need to figure out what all the data means that we get from testing.” These respondents believed that acceptable contaminant levels should be based on the risk to human and ecological health, which would reduce water treatment costs while assuring reasonable levels of protection.

California’s Water Laws

Water Rights and Water Transfers

“We need the ability to transfer water east to west.”

Water rights and water transfers are two related issues, since transfers allow market-based reallocation of water rights on a temporary or permanent basis. Roughly a quarter of all respondents highlighted obstacles to water transfers as a major problem for California water management, and an even higher share (35%) felt that water rights were a major issue (Table 3).¹⁰ Those concerned with water rights were roughly evenly divided, however, as to whether the solution lay in water rights reform or better enforcement of existing rights. The water rights reform camp characterized the current system as archaic and unfair and called for reform to reallocate supplies. The topic brought out strong feelings, with resentment that historical water rights priorities have resulted in water “winners and losers” (compounded by water subsidies), with little emphasis on efficient use. As one respondent summed up the problem: “You’ve got this theoretical construct with seniority rights ...but the reality is that when conflicts occur, there is usually some sort of deal made that doesn’t follow the water rights system.”

Respondents in the camp emphasizing the importance of better water rights enforcement tended to be more focused on the potential of water transfers to reallocate water—with better clarity and enforcement of rights seen as a key to facilitating water marketing. Those working for urban and agricultural water districts noted a particular need to increase east to west transfers south of the Delta, a growing concern given reduced potential for north to south transfers with new restrictions on Delta pumping. They also noted that numerous factors hamper water transfers, including institutions, infrastructure, politics, regulatory processes, endangered species, and water prices. Although these respondents generally considered it unnecessary to reform the water rights system, some noted that adjustments may be needed to address the overallocation of CVP contracts (relative to delivery potential) as well as potential water supply reductions from climate change. Some respondents also mentioned the need for policies to protect communities in source regions (such as Northern California), so they are not “sucked dry” by water transfers. As one respondent commented: “When scarcity comes, cities will get water from agriculture. This can happen in a disorderly way, with negative effects to third parties, sellers selling the majority of water from a region, or we can set up a system for managing water transfers now.”

¹⁰ The total share of respondents mentioning water rights includes those considering reform to be the major issue (19%) and those considering better enforcement to be the major issue (16%) – see Table 3.

Reasonable and Beneficial Water Uses

“Water law today is more or less as we designed it in 1913, and it continues to fail to meet its stated purpose of assuring reasonable and beneficial use.”

One-tenth of all respondents cited lack of clarity on what constitutes reasonable and beneficial water use under California law as a major problem.¹¹ They considered the concept hazy to begin with, and felt it is inconsistently enforced. As noted earlier, some highlighted perceived contradictions between the reasonable and beneficial use requirements of California law (which apply to environmental as well as agricultural and urban uses), and federal policy, such as the Endangered Species Act, which does not explicitly consider reasonable or beneficial water use in its efforts to protect species.

These respondents suggested that, as a first step, reasonable and beneficial uses should be clearly defined. One suggested defining the concepts situationally, in the context of overall water availability (so that uses considered acceptable in a wet year may no longer be in a dry year, or in the event of decreased water supply). Some also thought that groundwater overdraft should be considered wasteful and unreasonable.

Public Trust

“How do we proceed from theory to doctrine in terms of the public trust?”

The public trust was mentioned in many interviews, although never with much clarity about how to apply it.¹² In general there was broad agreement that the state has public trust responsibilities, but confusion as to how the State Water Resources Control Board should implement them. To emphasize how daunting it is to put the public trust doctrine into practice, one respondent estimated that the SWRCB had: “[only] amended between 200 to 300 permits out of thousands.” Some respondents even mentioned a desire to shift from “a ‘prior appropriation’ to a ‘public trust’ foundation for water management,” although they did not specify how that process might occur.

Water Governance and Institutions

Problems of governance and institutions ranked highly for many participants, with roughly one in three citing dysfunctional institutions, lack of coordination, and regulatory issues as major areas of concern (Table 3). Here, we discuss these issues as they relate to state institutions overall and to some specific state agencies as well as to federal institutions.

¹¹ The reasonable and beneficial use doctrine, which is set forth in Article X, Section 2 of the California Constitution, is a fundamental principle of California water rights law. All water use must be for a beneficial purpose and must be reasonable under the circumstances. The determination of reasonable use takes into account not only each water user’s practices, but also broader considerations including water availability, potential conservation, and competing demands—both consumptive and environmental. A use of water that is reasonable under one set of conditions may become unreasonable as hydrologic, economic, demographic, and environmental conditions change over time. (Hanak et al. 2011).

¹² “Public trust” refers to the legal recognition (under common law) that the state retains continuing supervisory control over all its navigable waters and the lands beneath them and must protect the public’s common interest in them for navigation, commerce, fishing, recreation, preservation, and scientific study, except in the rare situation where the state has abandoned its rights consistent with those purposes. Following court decisions, the public trust has been explicitly held in California to apply to rights in flowing waters. See Box 1.3 in Hanak et al. (2011).

State Governance

“Governance structure and responsibilities are a significant impediment to good stewardship of California’s water.”

Many respondents expressed frustration with a perceived lack of state leadership and dysfunctional state agencies. They wanted elected officials to hold their public service duties in higher regard than their desire for re-election, and to have the courage and tenacity to make difficult decisions even if not everyone agrees with the outcome. Many felt that the state agencies that manage and regulate water in California were ineffective, with inadequate resources to accomplish their missions, lack of independence from the Governor’s office, and poorly defined or overlapping authorities, at times leading to redundancies. Respondents working in project operations and flood protection and those in local urban and agricultural water agencies were among the most likely to note these types of concerns.

Funding and Planning

“We’ve become addicted to voter approved bonds every few years. The voters have been very kind, and the water managers start to see that as a bit of an entitlement. But it’s unsustainable and a poor way to do water planning. It works for short-term projects but not for implementing long-term projects.”

Two overarching shortcomings noted at the state level were a lack of reliable funding and a lack of comprehensive planning for water management. Nearly one-third of all respondents raised the funding issue, highlighting difficulties associated with the sporadic nature of bond funds to support various management functions (Table 3). We discuss solutions suggested for this problem below. Roughly one-tenth of all respondents criticized the current process for developing state water plans, which is overseen by the Department of Water Resources (DWR); they characterized the recent plans as incomplete and uninspired.¹³ They recommended the development of a more integrated, substantive state water plan that amasses accurate data (and identifies data gaps), uses the same data for all state agencies, accounts for all water use, and sets clear policy actions for water agencies (or combines all water agencies into a single entity). Some commented that local and regional water plans typically have greater creativity and vision than the state water plan, and recommended that the state look to them for examples of innovation.

Department of Water Resources and Water Project Operations

“It is not sensible to expect DWR, which is supposed to be a steward of the resource, but is also a purveyor of water (with contracts), to function in an even-handed manner.”

To some, the criticisms of the state’s planning functions reflect organizational shortcomings of the Department of Water Resources, which currently has responsibilities for general water resource planning and management as well as operational responsibility for a major component of the state’s water system, the State Water Project (SWP). Roughly one-sixth of all respondents considered separating the SWP from DWR to be a high priority, with the SWP operated as a public utility or by a new state agency. One rationale for separation is the perception that DWR cannot effectively manage water for the public good while simultaneously acting as a water utility. Some also felt that SWP operational efficiencies would improve if the project could be managed as a separate utility, unencumbered by bureaucratic red-tape and state salary restrictions.

¹³ California Water Plan Updates (Bulletin 160 series) are developed roughly every five years. The latest plan was completed in 2009 (California Department of Water Resources 2009).

The efficiency theme was also raised in conjunction with the separate operation of the SWP and the federally-owned CVP. Nearly one-fifth of all respondents mentioned the idea of merging the two projects as a priority. In this view, operating the projects jointly could facilitate water transfers and facilitate more efficient water operations, since both projects draw water from the pumps in the southern Delta, operate complementary storage and conveyance infrastructure, and serve large regions south and west of the Delta. Although a handful of respondents felt the state could manage both projects, more felt that a new public utility would be appropriate, with models including the Tennessee Valley Authority, the Central Arizona Project, or the California Independent System Operator (which operates the state's wholesale electric transmission grid).

There was some dissent on this issue, however, with one respondent expressing a concern that combining the two projects into a giant utility would be "dangerous and environmentally damaging." Some respondents supported the idea of a merger but did not want California to inherit the existing salinity and drainage problems associated with the CVP in the western San Joaquin Valley. Suggestions for addressing westside drainage included designating salt flats as Superfund sites, compensating farmers to retire land, and threatening lawsuits to motivate the federal government to resolve the consequences of supplying water to this drainage-limited region.

Aging infrastructure was another water management problem routinely discussed in conjunction with the SWP and CVP. In the words of one respondent: "We've been living off of the investments in infrastructure made by our grandparents." However, there was concern that California lacks the funding or the will to address a maintenance backlog on the projects. Similarly, augmenting the surface storage capacity of these projects was viewed as a priority by roughly one-tenth of all respondents, although there was little consensus among this group on whether new storage should be located north of the Delta, south of the Delta, or in both regions. Politicians, as a group, were the most likely to recommend new surface storage and the least likely to discuss aging infrastructure (Table 3).

State Water Resources Control Board

"It seems people have more faith in the [court] process than they do in the water board."

Nearly one-fifth of all respondents singled out the ineffectiveness of the SWRCB, which is responsible for the administration of water rights and state and federal clean water legislation, as a major barrier to effective water management in California (Table 3). Respondents from the regulatory and environmental sector were most likely to raise these concerns. The agency was described as redundant, inconsistent, archaic, or otherwise dysfunctional. The main problems raised were varied (and sometimes conflicting), but included: inaction on the overallocation of water in the state's rivers, negligent management of water resources, hesitancy to use existing authority to address problems, excessive time needed for rulings, difficulty in applying the public trust doctrine, creation of regulatory uncertainty, insufficient protection of water quality and aquatic systems, creation of institutional and regulatory barriers for water transfers, and poor prioritization of water rights hearings. Numerous respondents felt the SWRCB was subject to political whims, so that rulings and legal interpretations were not objective.

Specific ideas for improving the board's function included involving it as a collaborator in negotiations to address water problems, limiting its scope to water quality and transferring the regulation of water rights to another entity, appointing a public trust advocate (modeled after the ratepayer advocate at the California Public Utilities Commission) to make it easier for the board to act as an impartial judge, and establishing an expectation that the board would reach decisions in a timely manner (e.g., within one year).

Department of Fish and Game

"It's like herding cats to get agencies to work together. They don't even agree on baseline data."

Relatively little was said about the Department of Fish and Game (DFG), which has responsibility for the administration of the state's Endangered Species Act and other state ecosystem protection laws under the Fish and Game Code. Concerns focused on the perception that DFG lacked adequate funding, political cover, or clarity of goals to do its job well. Due to general feeling that DFG is too weak to advocate effectively for fish and wildlife, some respondents believed this task was inadvertently falling to the SWRCB. However, DFG's handling of the Marine Life Protection Act Initiative was noted as a positive experience, and some recommended using this as a model for incorporating science into the decisionmaking process and for opening an honest dialogue with stakeholders.¹⁴

Federal Governance

"Money. Just send money."

Consistent with concerns that California does not have adequate state-level water planning, some respondents also expressed the need for a clear national water policy, with consistent direction and support that does not change with administrations. Some suggested that this policy should come from the White House, so that it becomes a national priority for federal agencies. Many felt that there currently is little federal engagement with water problems in California and other western states. The redundancies, inconsistencies, and inflexibility that plague state agencies were also described for federal agencies. The proposal to transfer the CVP to state control reflected a general feeling of some respondents that the federal government should send money to California for water policy, management, and stewardship, but allow the state to manage and regulate its own resources. Although some respondents thought federal agencies did regulatory jobs well, a greater number wanted to see California given more authority to enforce regulations on its own, with the federal government simply providing oversight (as occurs now with the Clean Water Act). In large part, this proposal reflected a desire to streamline administrative burdens associated with having to get numerous state and federal authorizations to implement or alter various projects.

¹⁴ The Marine Life Protection Act, passed in 1999, requires California to reevaluate all existing Marine Protected Areas (MPAs) and potentially establish new MPAs, creating a systematic statewide network of protected areas. In 2004 DFG gained new funding to initiate the Marine Life Protection Act Initiative. The initiative divided the coast into sequential regions and assembled a Blue Ribbon Task Force on Marine Protected Areas, Science Advisory Team, and Regional Stakeholder Group to develop and evaluate the first set of MPAs in the Central Coast region. To date, plans for the Central Coast and the North Coast have been adopted, and work is underway on a plan for Southern California.

Overcoming Obstacles

“Most of the biggest obstacles are longstanding and entrenched. As a result we tend to address problems by tinkering around the edges. I am not convinced that more tinkering will get us very far.”

The last two questions asked respondents to identify the most significant challenges to effective water policy and to provide ideas on how to overcome these obstacles (Table 1). As above, overlap in the themes covered led us to combine responses to these questions (Table 4). Some proposed solutions related directly to specific policy problems noted in earlier questions—e.g., taking steps to strengthen water conservation, manage the Delta, and develop sustainable water supply sources. These types of solutions have been noted in the discussion above. Here, we focus on the more general, cross-cutting themes raised, including public education, leadership, funding, special interests, holistic water management, and the role of science.

Education

“Water is a hugely arcane and complicated subject, in which ignorance is the dominant state.”

Educating the public and policymakers was the most commonly offered recommendation for overcoming challenges facing water policy, mentioned by nearly half of all respondents (Table 4). Respondents felt that most Californians were poorly informed about where their water comes from, where wastewater goes, the value of water, the importance of sustainable funding for water management and regulation, and how declining water quality affects lives. They shared the view that better educating the public about water problems could drive more informed policymaking.¹⁵ Specific ideas for how to implement this idea were varied, ranging from emphasizing critical thinking in grade school, to holding county-level workshops, to developing coherent messages for water education (instead of agendas of particular agencies or organizations). Respondents particularly emphasized this issue as it relates to funding, with many sharing the view that the public undervalues water, and that education could help raise public support for funding the sector. In the words of one respondent: “Public funding requires efforts to educate the public and bring about public and political buy-in about the importance of obtaining new funding sources.”

There was general agreement that acquiring expertise in water policy and management takes time and effort, and that legislative term limits were an impediment to politicians acquiring the needed expertise. One practitioner said: “We need legislators that are around long enough to develop self and staff expertise in their areas of interest, like water and other resources. Now, the knowledge and expertise at the legislative level is mostly fostered by moneyed interests and lobbyists.” Other suggestions included informing politicians on the “real issues” in an effort to stop political rhetoric, which respondents believed causes the public to lose track of the important issues. As one respondent noted, in today’s environment it’s “hard to foster honest debate on the facts.”

¹⁵ Of course, given the diversity of views on the nature of solutions, it is quite possible that respondents from different sectors would perceive such education efforts to be more or less successful depending on the content and the messages conveyed.

TABLE 4
Overcoming obstacles to water problems (% of respondents)

Solution	Academics (16)	Agricultural agency (13)	Operations / flood (14)	Politicians / staff (10)	Regulatory / environmental (18)	Urban agency (16)	Other (7)	Total (94)
Educate public and politicians	44	31	79	60	33	38	43	46
Strengthen leadership and improve decisionmaking	19	54	29	30	67	38	57	41
Develop sustainable funding	25	23	36	40	28	44	43	33
Level the playing field (no special interests)	6	38	36	20	61	25	43	33
Reduce polarization and political dysfunction	19	8	21	50	44	31	-	27
Improve cooperation and trust	19	31	43	20	11	38	29	27
Develop a holistic approach to water management	25	-	43	20	33	31	14	26
Improve relevance and quantity of scientific information	19	31	21	20	6	31	14	20
Reform institutions	19	15	21	10	22	13	14	17
Manage the Delta	13	31	7	10	22	6	14	15
Develop long-term vision for water policy	13	-	36	10	17	19	-	15
Base water policy on science	31	8	14	10	11	13	-	14
Capitalize on crises	-	8	14	20	17	13	29	13
Improve data (monitoring and accessibility)	13	15	14	10	6	13	29	13
Implement cost-based water pricing	25	-	-	-	22	6	14	11
Develop sustainable water supply sources	6	8	7	10	-	25	-	9
Strengthen water use efficiency	13	-	7	-	6	19	14	9
Reform water rights	19	-	-	-	17	-	14	7
Facilitate water transfers	6	-	-	10	22	6	-	7
Repeal legislative term limits	-	-	21	10	6	13	-	7

NOTE: For each respondent, the table includes up to 10 answers (up to five answers each for questions 4 and 5—see Table 1). Answers to both questions are expressed in terms of potential solutions. Responses noted in group interviews were counted twice. Bold values indicate the highest percentage for each sub-category of respondents.

Effective Leadership and Decisionmaking

“We need to acknowledge that the world is uncertain, but that doesn’t get decisionmakers off the hook for making some big decisions.”

Many respondents also highlighted the lack of strong leadership and political constraints on decisionmaking as important handicaps to improving water policy and management in California (Table 4). Many reasons were given, including “political attention deficit,” polarization and political deadlock in the legislature, risk-aversion among politicians who do not want to jeopardize re-election, legislative term limits, and political constraints imposed on agency leaders. Respondents wanted to see leaders work better with each other (for example cooperation between the governor’s office, legislature, and state and federal agencies). Some

suggested that the state needs to foster a culture in which leaders sit down together and work towards sustainable solutions. However, the most common sentiment expressed was that the state needs leaders who make decisions rather than “clinging politically to the status quo.” Respondents believed this would require political will, some degree of risk-taking, and a declaration that issues would be dealt with whether groups participated or not. (There was a good deal of resentment that uncooperative groups or interests were able to derail actions and decisions on issues, essentially a system that rewards bad behavior.)

At the agency level, respondents believed that leaders must be given political independence, clear goals, an adequate budget, and the drive and commitment to solve problems. One respondent summarized many frustrations with agency leadership well: “Agencies change over time depending on who is in charge. Reorganizing agencies doesn’t target the root of the problems. They need a commitment to attacking problems and being aggressive.”

Sustainable Funding

“The bond approach is piecemeal and does not integrate projects.”

One-third of all water experts we interviewed emphasized the need for sustainable funding that does not rely on bonds to support the operation of water systems and the protection of aquatic ecosystems (Table 4). Numerous respondents observed that funding environmental protection and enhancement has become an ongoing need, requiring the development of stable, long-term funding sources. As one noted: “We don’t fund environmental management very well in this state.”

For many, tackling the funding problem was closely linked with improving public education on the value of water, as noted above. Among alternatives to bond funding, some recommended a “beneficiary pays” or user fee approach for water use, in which ratepayers cover the full costs of water projects that benefit them, including the environmental costs. Others supported the introduction of statewide water fees or taxes. Several recommended the introduction of regional stewardship fees for enhancing the environment, drawing on the model of the per acre-foot fee charged by Metropolitan Water District of Southern California on all wholesale water sales.¹⁶ Cost-based water pricing—the user fee approach—was particularly emphasized by academics and respondents from regulatory or environmental groups (and less emphasized by representatives from local agricultural and urban water agencies). Many respondents also raised the issue of federal water subsidies in this context: many expressed resentment that subsidies offset costs for private water supplies.

Special Interests

“Without a level playing field, reform will be unlikely.”

Given California’s culture of conflict regarding water issues, many respondents felt that stakeholders come to the table with deeply entrenched and unyielding perspectives. Special interests, lack of cooperation, and uneven power among interests were commonly cited obstacles to improving water policy and management.

¹⁶ Metropolitan’s per acre-foot stewardship fees are used to support water conservation efforts and the development of local supply sources.

Respondents believed that change would be difficult to achieve as long as special interests remain so powerful and influential. The following statements are illustrative of this view:

- “There is a mismatch between the folks who benefit from the current system and their political power, and the folks who have a more realistic and appropriate vision of where we should be going.”
- “[We need to] level the playing field among the vested/moneyed interests, and the array of environmental quality interests whose products are essentially impossible to properly monetize.”
- “There is a large government and consultant bureaucracy dedicated to the current system.”

Suggested solutions for “leveling the playing field” among stakeholders included reforming water rights, eliminating term limits, and incentivizing cooperation among stakeholders.

Holistic Planning and Policy

“Flood guys have to talk to watershed guys, who have to talk to water supply guys.”

Many deplored the current compartmentalized approach to governance structure and funding, calling for more holistic management approaches (Table 4). Respondents cautioned that California must strengthen coordination among various water management activities: between water supply and flood control, human water uses and ecosystem function, and surface and groundwater. Likewise, many felt that California cannot continue to separate water policy from other resource management policies, like land and energy use, and food and biofuel production. The lack of a holistic approach is resulting in costly, inferior management strategies. As one respondent noted: “Some ‘water policy’ problems are really larger policy problems.”

Integrated Regional Watershed Management Planning was one approach recommended for managing watersheds holistically. The emphasis was not only on planning, but also on action: “[California needs to] transform words about integrated resource management into real actions, and move watershed planning from talk to reality.” Some respondents also noted that changing land use and land cover patterns in mountainous regions are altering runoff and groundwater infiltration; they felt that upstream areas and forest regions should be managed for water resources. As one observed: “A water right starts at the point of diversion, but water is only secured by the proper management of all the landscape upstream, it all has to function properly.” Some urged stronger legislation to link land use planning and growth with water, so that new development must identify firm water supplies before construction and be prohibited from locating in floodplains.¹⁷ In this view, such restrictions may help Californians to focus on “smart growth and land use planning that explicitly takes into account water management needs, water policy, and flood control.” The California Coastal Commission was cited as an example of a state agency that has asserted its authority and independence, effectively integrating water and land use planning in coastal regions.

¹⁷ Legislation passed in 2001 (Senate Bills 221 and 610) require large developments (> 500 units or involving more than a 10% increase in service area water demands) demonstrate 20 years of reliable supplies. Federal law places restrictions on new development in areas designated as part of the “100-year floodplain,” at risk of being inundated by a flood with a 1 percent probability of occurring each year. Flood legislation passed in 2007 places some additional restrictions on future floodplain development in the Central Valley within the 200-year floodplain.

Better Data and Science

“Science tells you what your options are.”

As noted earlier, the need for better baseline data was considered a major long-term problem by one-fifth of the sample (Table 3), and many respondents also identified data gaps as an obstacle to more effective water policy (Table 4). Respondents asked for a more complete understanding of how much water exists by basin (including precipitation, runoff, infiltration, groundwater basin volume...), how much is appropriated in water rights, the paths of water flows (including through canals and other infrastructure), how water is used, and how it is reused. Many expressed incredulity that they were asked to manage water resources with poor baseline data; though others cautioned that data would never be as precise as policymakers and practitioners would like.

One-fifth of all respondents also called for more relevant, higher quality science (Table 4), believing there is sometimes a disconnect between information gaps and studies undertaken by universities. They cautioned academics not to look only for their favorite causal factor, but to truly look for the causes of problems. Another criticism was that scientific results are often too small-scale and hard to apply to real-world management problems. Funding the development of flexible and transparent models and establishing clearinghouses to distribute data and tools for data analysis were suggested as potential solutions to close these gaps. Integrating science into policy was also seen as a current weak point. On the one hand, it was suggested that scientists do not participate enough in the policy process; on the other hand, there is a fear that politics could interfere with the impartial scientific process. Despite these concerns, many respondents expressed the desire to base decisionmaking more on scientific results.

Crisis as Solution

“Necessity is a good driver.”

Many of the solutions offered by respondents would entail an overhaul of California’s current governance structure and approach to policymaking. For example, reducing political polarization or incorporating land use decisions in flood policy require broad reform of existing governance structures. For that reason, waiting for a crisis or catastrophe to force change was a ‘strategy’ that some respondents felt might be necessary (Table 4). Some thought a crisis, whether real or perceived, was the *only* way major water policy change would occur in the state because problems related to governance structure and institutions are simply too entrenched. One respondent recommended to never “waste a good crisis.” Another noted: “Australia had to experience a major drought to get people’s mindsets to change. California is probably headed that same way.”¹⁸ These sentiments underscored a common view that water policy may not be appreciably improved until catastrophe forces major changes from the status quo.

¹⁸ Reforms in Australia include major reductions in urban water use, an overhaul of water rights, and the creation of an active water market.

Conclusions

“All our challenges are political, not technical.”

This paper provides an overview of California’s long-term water policy challenges and potential solutions from the perspective of leading water experts with varying backgrounds, goals, expertise, and regional viewpoints. Although primarily qualitative in nature, this type of exercise is valuable because it synthesizes experiences and expertise, making it possible to share these perspectives with a larger audience. It shows where there is general agreement on water problems and solutions, as well as instances where perceived problems and solutions vary by water use sector.

Overall, we found broad agreement that important aspects of water policy are not working well—such as management of the Sacramento–San Joaquin Delta, administration of the Endangered Species Act, and management of the state’s groundwater resources. Lack of public participation, politicians’ aversion to risk, poor leadership, and stakeholders’ unwillingness to compromise were all named as major factors leaving California to muddle through water problems and maintain the status quo.

Proposed solutions generally relied more on cooperation, local innovation, and removal of regulatory obstacles, and less on the development of large new infrastructure projects. Many suggested solutions to address water supply scarcity—one of the major long-term problems identified—were appropriate for local and regional approaches. Although respondents listed numerous ways in which to augment supplies (recycled water use, groundwater banking, desalination, and for some, expansion of new surface storage), the need for careful management of existing supplies, with increased water use efficiency and water transfers, was also a recurrent theme. Existing levels of water use (and water use efficiency) were most questioned in the agricultural sector, particularly in light of subsidized water prices for recipients of Central Valley Project water. Many respondents stressed the importance of pricing both agricultural and urban water correctly, both to cue water conservation and to reduce reliance on unstable bond funding for needed investments. Some also noted the importance of improving the accountability of environmental water use to ensure that water allocated to the environment is improving instream conditions. The relatively limited emphasis on new surface storage by all groups except politicians is noteworthy, given the often heated debates on this topic in the state legislature over the past decade.

Many respondents favored the idea of regulatory ‘carrots and sticks’ to encourage some behaviors and limit others. For instance, some noted that less paperwork for a quick, streamlined regulatory process would serve as a strong incentive for matters ranging from water transfers to groundwater recharge to recycled water use. Respondents also discussed some novel ideas and regional approaches that could be used as models for California. For instance, the stewardship fees charged by Metropolitan Water District of Southern California were considered a potential model for generating stable revenue for environmental protection. The Irvine Ranch Water District was praised for creative water management, in particular the allocation-based tiered water rate structure used to promote conservation and reduce stormwater pollution from excess landscape irrigation. These water districts were also commended for maximizing the use of local water supplies, thereby reducing pressures on other watersheds. Likewise, the Kern Water Bank was the example nearly everyone used when discussing groundwater banking and conjunctive use of surface and groundwater supplies.

The California Coastal Commission was cited as an agency that has successfully integrated water and land use planning in coastal regions. Similarly, the Department of Fish and Game's Marine Life Protection Act Initiative provides a model for water policy reform because it integrates science into the decisionmaking and policy process. Blue Ribbon Task Force panels, such as the one established for this initiative, were repeatedly brought up as a helpful method to incorporate science into policy and inform decisionmaking without overreliance on particular special interests.

Although expanding large water projects was generally not viewed as the best solution for current water management problems, two main exceptions were noted: better Delta conveyance (to minimize conflicts between ecosystem goals and water supply reliability for export water users south of the Delta), and better cross-valley conveyance south of the Delta (to enhance the potential for east to west water transfers). Many respondents also consider institutional and governance innovations necessary to improve the efficiency of large water project operations, including separating the operations of the State Water Project from the Department of Water Resources and merging the operations of the federally-run Central Valley Project with the SWP. The split of DWR and the SWP would, in this view, allow DWR to focus on its role as a steward of water resources.

We found a broad consensus among these experts that a well-educated public, strong leadership that is invested in resolving problems, sustainable funding for water management, accurately priced water, science-based decisionmaking, and more a more integrated, holistic approach to resource policy and management are difficult, but promising solutions to improve water policy and management. It is easy to ignore such recommendations because they are the most difficult changes to make. But many interviewees also noted that California's ability to solve its water problems will be limited if the state continues to avoid the difficult changes and clings instead to smaller-scale, less controversial approaches to water management.

References

- California Department of Water Resources. 2005. *Flood Warnings: Responding to California's Flood Crisis*. Sacramento: California Department of Water Resources.
- California Department of Water Resources. 2009. *California Water Plan Update, Bulletin 160-09*. Sacramento: California Department of Water Resources.
- Hall, D.C. 2009. "Politically Feasible, Revenue Sufficient, And Economically Efficient Municipal Water Rates." *Contemporary Economic Policy* 27 (4): 539–54.
- Hanak, E., J. Lund, A. Dinar, B. Gray, R. Howitt, J. Mount, P. Moyle, B. Thompson. 2011. *Managing California's Water: From Conflict to Reconciliation*. San Francisco: Public Policy Institute of California.
- Lund, J., E. Hanak, W. Fleenor, W. Bennett, R. Howitt, J. Mount, P. Moyle. 2010. *Comparing Futures for the Sacramento–San Joaquin Delta*. Berkeley: University of California Press and Public Policy Institute of California.
- U.S. Environmental Protection Agency. Undated. *Assessment Data for the State of California Year 2004*. Washington DC.

Interview Respondents

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Alf Brandt
David Breninger
Byron Buck
Celeste Cantú
Michael Carlin
Tito Cervantes
Mike Chrisman
Francis Chung
Senator Dave Cogdill
Richard Roos-Collins
Congressman Jim Costa
Mark Cowin
Dennis Cushman
Cliff Dahm
Darryl Davis
Grant Davis
Martha Davis
Dan Dooley
Thomas Dunne
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Mike Eaton
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David Freyberg
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Bill Kahrl
Randy Kanouse
Lillian Kawasaki
Dan Kelley
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Jerry King
Ken Kirby
Kevin Knuuti
Cliff Lee
John Leshy
Jeff Loux
Mark Lubell
Sam Luoma
Steve Macaulay
Clyde MacDonald
Bob Maddow
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Steve McCarthy
Jerry Meral
Marvin Meyers
Ben Miller
B.J. Miller
John Mills
Dick Norgaard
Doug Obegi
Dennis O'Connor
Tim O'Halloran
Roger Patterson
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Jessica Pearson
Jason Peltier
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Nick Pinhey
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John Rossi
Leah Russin
Andy Sawyer
Monty Schmitt
Rita Schmidt Sudman
Will Stelle
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David Sunding
Peer Swan
Tina Swanson
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