9 Pathways to Reform

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Delay always breeds danger; and to protract a great design is often to ruin it.

Miguel de Cervantes, *The History of Don Quixote of la Mancha*

Our previous chapters have suggested many reforms for California's water policy. Unfortunately, the history of the Golden State is littered with great ideas for water reform that were never adopted because they were poorly planned or badly executed. This chapter discusses how to design and promote effective reforms. The greatest obstacles to a more sustainable water system are political and institutional—not a lack of understanding regarding the need for reform or the nature of beneficial reforms. To be successful, reforms must not only be scientifically sound and rational but also be sensitive to political, economic, social, and institutional considerations (Cordova 1994).

Water reform efforts should keep in mind at least four truths. First, although crises often spur reform, California cannot afford to wait for crises to solve many of its water challenges. Second, federal, state, and local agencies often already enjoy the discretion and authority needed to implement reforms. The challenge generally is not the law but a combination of inadequate resources and lack of political will. Third, although local agencies and governments often have an advantage in designing and implementing reforms, they frequently need a mandate or nudge from the state or federal government to pursue a reform. Finally, the government has a variety of means available to address the problem of transition costs, which are generally the major source of political opposition to reforms. This chapter considers each of these particulars and looks at how proponents of reform can promote reform efforts.

The Jones Tract levee break in the Delta, summer 2004.

Waiting Can Be Costly

Reforms generally are costly and often depend on a precipitating crisis to overcome reluctance to enact them. Political scientists have suggested that successful policy reforms are more likely during political "honeymoons" (when new administrations take office with key reform plans and do not yet face a hostile legislature) and in response to crises (Williamson 1994). New political administrations sometimes enjoy considerable success at enacting bold reforms early in the first year or two of their administrations (Dinar 2000). Crises, however, have motivated most water reforms in California's history (Chapter 1). For example, saltwater intrusion in coastal aquifers of Southern California in the middle of the 20th century helped spur lawsuits among urban water agencies and the creation of groundwater management and replenishment districts (Blomquist, Schlager, and Heikkila 2004; Ostrom 1990). California droughts in the 1970s and 1980s encouraged development of both water markets and significant conservation programs (Archibald and Renwick 1998; Thompson 1993). The "burning" of the Cuyahoga River and similar catastrophic consequences of water pollution helped motivate congressional passage of the Water Pollution Control Act of 1972 (now the Clean Water Act [CWA]) (Salzman and Thompson 2010). Hurricane Katrina spurred a renewed focus on flood management in California. And recent court decisions have focused attention on the problems of the Sacramento–San Joaquin Delta.

However, waiting for a crisis before addressing water problems has substantial costs. First, by the time people realize there is a crisis, the problem may have generated unrecoverable costs or irreversible losses. For example, dewatering a waterway may lead to the extinction of a species. Overdrafting an aquifer can cause irreversible subsidence or saltwater intrusion or strand agricultural or residential developments that relied on the availability of groundwater (Sax et al. 2006). One could argue that in many cases, California is already facing a crisis, but the crisis is moving so slowly that policymakers and the public fail to recognize it.

Second, by the time a crisis is recognized, many of the best management options may be precluded or difficult to implement, and political positions might be too entrenched to overcome. For example, if decisionmakers wait to see if climate change actually leads to large floods that overpower current flood-control infrastructures, flood easements may no longer be viable because key floodplains have already become urbanized. Options for protecting fish species

are generally far more constrained once a species is highly stressed and listed as threatened or endangered under the Endangered Species Act. A major criticism of the Endangered Species Act is that it pursues an emergency-room approach to species protection and acts too late to take the most effective actions (Chapter 5; Salzman and Thompson 2010). Finally, crises typically require quick action, whereas developing effective solutions may require careful and prolonged consultation and deliberation.

Coho salmon provide an example of problems from waiting too long to act. Coho salmon once supported large commercial fisheries yet have been moving toward extinction for at least 40 years, largely from logging, overexploitation, dams, and hatchery effects (Moyle, Israel, and Purdy 2008). The Department of Fish and Game and other agencies failed to deal with the decline until the mid-1990s (Brown, Moyle, and Yoshiyama 1994). The federal government finally listed California coho as threatened in 1996, and the state soon followed suit. Because the decline was so long-standing and deep, the recovery plan (National Marine Fisheries Service 2010) is more of an extinction prevention plan than a recovery plan (Miller 2010). More important, every small change to the few remaining coho salmon streams presents a significant problem with few options. San Geronimo Creek in Marin County, a small tributary to Lagunitas Creek, contains the last sustainable runs of coho in the region. Because it is one of the few streams where steps can still be taken to protect the coho, housing developments in the region are threatened, to the consternation of developers and local residents who cannot understand why efforts to save coho salmon must restrict their use of a tiny creek and its watershed (Miller 2010). Dealing with the decline of coho when they were still widespread would have made far more sense. Likewise, delaying timely action on the Sacramento–San Joaquin Delta provides myriad examples of potential losses of native fish species as well as many economic and recreational values (Lund et al. 2010).

Not every reform to California water policy needs to be immediate. In some cases, waiting may produce valuable information or new technologies or save on administrative expenses (Howitt 1995). For example, waiting for better information on whether the future climate will be wetter or drier before building new surface storage is prudent, because new storage is expensive and will have little added value in a drier climate with less water available to fill reservoirs (Chapter 6). Suggestions to delay water reforms, however, should consider and weigh the costs—financial, ecological, and social.

New Laws Are Often Unnecessary

In most cases, federal, state, and local agencies can reform water policy today without legislative action.[1] Moreover, agencies often have the expertise, experience, and understanding of stakeholder interests needed to identify, analyze, design, and implement effective reforms. However, agencies frequently lack the willingness, and sometimes the resources, to tackle reforms. Where agencies' jurisdictions are unclear or political opposition is significant, legislatures may still need to intervene, but these situations are more the exception than the norm. Courts also can help by reforming common-law rules, by reducing constitutional and other legal barriers to reform, and by providing a forum for reform negotiations among stakeholders.

Agency Authority

The history of California water policy provides many examples of the ability of agencies to pursue crucial reforms without new legislative authority. In the past, for example, the State Water Resources Control Board (SWRCB) has creatively used its authority and discretion under the "reasonable use" provisions of the California constitution and the public trust doctrine to address a variety of perceived water problems. The board, for example, has sought to abolish or limit unexercised riparian rights through stream adjudications (*Long Valley Creek Stream System* 1979), encouraged water conservation by declaring excess water use to be unreasonable (Imperial Irrigation District 1984), regulated the operation of federal dams to protect the state's environment (*California v. United States* 1978), and engaged (albeit fitfully) in efforts to increase water flows in the Delta (Hundley 2001; State Water Resources Control Board 2010b).

Current water challenges require similar creativity and willingness to exercise authority and discretion. The board's broad authority and expertise put it in a prime position to address many reform needs identified in earlier chapters. For example, it can bar illegal diversions and can use its reasonable use authority to promote greater water conservation (Chapter 7). Actions might include:

1. A recent example is the state controller's decision to require that local governments report salary information, in response to concerns over the lack of adequate local oversight. This information, now being made public on the controller's website, was gathered under the controller's existing authority to require financial reports (http://lgcr.sco.ca.gov/). This information may ultimately help spur some consolidation of small water districts, which often have high overheads because they must cover the costs of expensive senior management functions from a small ratepayer base. More generally, making information readily available in a comparable form for decentralized governing bodies may be a powerful tool for reform.

- Requiring use of tiered pricing systems, designed to encourage conservation, as a condition of continued use of an appropriation permit;
- Imposing conservation standards as a condition of continued appropriation;
- Requiring water users to increase the efficiency of their use by, for example, reclaiming and reusing wastewater by urban utilities; and
- Allowing at least limited participation of farmers in water markets within or outside a water district.

Similarly, the board can use its reasonable use power to impose additional terms—or conditions—on water rights permits designed to protect the state's environment (e.g., conditions addressing salinity problems or watershed protection). Finally, knowledgeable experts have argued, with considerable legal support, that the board can exercise its authority over "subterranean waters" to regulate any groundwater pumping that threatens material injury to consumptive or instream surface water uses (Sax 2003).

A state agency with significant authority over an important segment of the state's water supply—but one that is often forgotten—is the California Public Utilities Commission (CPUC). The CPUC regulates privately owned water utilities, which serve roughly one-fifth of California's households. An example of the CPUC's ability to pursue broad reforms is its recent promotion of tiered pricing structures (Box 6.2). The State Water Resources Control Board could follow the CPUC's lead by instituting a regular rate review for publicly owned utilities, to ensure that rates are consistent with reasonable use.

Federal agencies also can pursue many reforms under their current authority without congressional action. Faced with criticism of the federal Endangered Species Act (ESA) from property owners in the 1990s, the Clinton administration adopted several major administrative reforms to the act without seeking or obtaining congressional approval. These reforms include a "no surprises policy" (under which the government agrees not to seek further uncompensated protections from a property owner after issuing an incidental take permit, except in exceptional circumstances) and a safe harbor program (protecting property owners who voluntarily act to protect endangered species from any new obligations under the ESA) (Salzman and Thompson 2010). These reforms are now an accepted and established part of the ESA, even though they are not

explicitly found in the act. Federal agencies also used their discretion under the ESA to participate in the Environmental Water Account, a water transfer mechanism that attempted to introduce a degree of flexibility into the operation of the ESA (Chapter 2; Thompson 2000).

As described above, the U.S. Fish and Wildlife Service today can use its authority under the ESA in a similar fashion to help reconcile environmental water needs with those of agricultural and urban users and focus on protecting ecosystems rather than just individual species (Chapter 5). It can use its latitude under the ESA to move away from a species-specific approach toward a focus on ecosystem protection. In particular, it can work with water users under § 10 of the ESA to develop multispecies habitat conservation plans focused on whole ecosystems. Where a sufficient number of species are listed in a particular ecosystem, federal agencies also can develop recovery plans that focus on broader ecosystem principles underlying the recovery of the species.

Judicial rules for reviewing administrative actions reinforce the latitude of administrative agencies under their governing statutes and other legal provisions. Under both federal and state law, agencies cannot stray from the requirements of clear legislative intent. However, where legislative language is ambiguous or silent on a particular issue, courts uphold agency decisions so long as the agency's interpretation of the statute is a "permissible" interpretation; the agency interpretation does not need to be the best or most reasonable interpretation in the eyes of the court (*Chevron, U.S.A., Inc. v. Natural Resources Defense Council* 1984). Courts, moreover, typically defer to an agency's expertise in the agency's application of the law to specific facts (Salzman and Thompson 2010).

The discretion and authority of local water agencies over local water uses and practices are often far greater than that of federal and state agencies. Local water districts control the largest percentage of California's water supply, including water for over half of the state's irrigated acreage. Like administrative agencies, local agencies have significant discretion to both supplement state water rules and modify them within their borders to better serve local needs (Thompson 1993). Local agencies have used this discretion to adopt numerous reforms—including local regulation of groundwater, development of local water markets, use of reclaimed water to recharge local groundwater basins, and adoption of conservation rate structures (Chapter 6).[2]

2. On groundwater regulation, see also Blomquist (1992); Anderson (1983); Anderson, Burt, and Fractor (1983); and Peck (1980). On local water markets, see Archibald et al. (1992); Thompson (1993); Carey, Sunding, and Zilberman (2001); and Israel and Lund (1995). On groundwater recharge, see Sax et al. (2006). On the adoption of conservation-oriented rate structures, see Hanak (2005b).

Despite their wide latitude, administrative and local agencies often have been reticent to exercise creative authority (Hundley 2001). The SWRCB has generally undertaken major reforms only in response to judicial or legislative pressure. In 1986, the California Court of Appeal criticized the board's failure to more aggressively address water quality issues in the Delta (Chapter 2). According to the court, the board was overlooking its "statutory commitment to establish objectives assuring the reasonable protection of beneficial uses . . . [which] grants the Board broad discretion to establish reasonable standards consistent with overall statewide standards" (*United States v. State Water Resources Control Board* 1986).

Efforts to reform California water policy must understand and address the reasons for the agencies' reticence. In some cases, agencies lack resources, time, and personnel to either evaluate or implement significant reforms. Given the increased complexity of water challenges and the abundance of agencies with some jurisdiction over water, a single agency may also find that its jurisdiction does not extend to all the issues that must be addressed to achieve effective reform. The governmental reforms suggested in Chapters 7 and 8 (particularly creation of adequate and reliable funding and increased collaboration among agencies) would help address these obstacles.

In other cases, however, agencies face significant political pressure not to challenge the status quo and need external mandates or pressure to justify acting (Hundley 2001). The threat of lawsuits if a reform is adopted can also deter agencies from adopting the reform, even if an agency feels confident that the courts will ultimately uphold the action, because lawsuits are costly and distract the organization from other duties.

Legislatures

In several settings, Congress or the state legislature may need to act to enable effective reform. In some cases, Congress or the legislature can further reform by giving agencies clear authority to engage in a needed reform. For example, although legal experts have argued that the SWRCB has authority to regulate all groundwater withdrawals (Roos-Collins 2009), groundwater users are likely to judicially challenge any effort by the board to do so—leading to a significant delay and expense—and the board currently lacks the resources needed to administer groundwater statewide. Only legislative intervention can provide a clear mandate and the needed resources (Chapter 7). The board also does not currently have authority to quantify riparian rights except in lengthy and costly stream adjudications.

Similarly, legislative revisions to the ESA and the California Endangered Species Act (CESA) may ultimately be needed to allow the triage of species as part of integrated ecosystem management that focuses on aggregate species recovery. As explained above, both ESA and CESA appear to incorporate sufficient discretion today to enable fish and wildlife agencies to focus on the protection of broad ecosystems and multiple species; many regional habitat conservation plans, as well as natural community conservation planning, already do exactly that. Neither ESA nor CESA, however, provide a clear mechanism under which the agencies could allow some species in a river or estuary to become extinct to protect more species in the aggregate. Congress designed the existing so-called "God Squad" to address species-versus-economy disputes, not unavoidable species-versus-species tradeoffs, and the CESA contains no system similar to the God Squad (Chapter 5). If such triage becomes necessary to effective species protection in the future, new federal and state legislation providing a mechanism for determining when it is appropriate to engage in triage (like the Endangered Ecosystem Committee described in Chapter 5) will be critical.

Even where an administrative agency appears to have the needed authority and is inclined to pursue a specific reform, the legislature may still find it useful to clarify the agency's statutory authority or signal legislative support for the reform through new legislation or oversight hearings. In the 1980s and 1990s, for example, the state legislature helped promote water markets by clarifying the authority of water districts to engage in such transfers and by expressly emphasizing the state's interest in promoting transfers (Chapter 2). In a similar fashion, the California legislature today could usefully clarify the State Water Resources Control Board's authority to regulate groundwater–surface water interactions, as well as provide guidance on how to engage in conjunctive management (Chapter 7).

Legislative intervention also may be needed to ensure that agencies have the resources needed to design and implement effective reforms. As described above, legislative enactment of a public goods charge or other sustainable revenue source is needed to ensure that the SWRCB, Department of Fish and Game, and other state agencies have sustainable funding (Chapters 7, 8).

In other cases, legislatures may need to set general or specific performance standards for water reforms, either because the legislature does not believe that the agency will otherwise implement reforms or because it concludes that the standard should be set democratically rather than by an expert agency. The state legislature for over a hundred years has established substantive environmental

protections through such laws as the Porter-Cologne Act, the California Wild and Scenic River Act, the state Endangered Species Act, and the Fish and Game Code. The legislature also has adopted quantitative goals for urban conservation and recycling. Similarly, legislative direction on groundwater management, funding, and other issues is desirable.

Courts

Courts have often been the agent of change in California water law and remain critical players in reform efforts. Courts are the major arbiter of common-law doctrines such as the reasonableness rule and the public trust doctrine. In the case of groundwater, riparian rights, and pre-1914 appropriative rights, courts have primary authority. Courts also are the ultimate interpreters and enforcers of statutes, such as the federal and state Endangered Species Acts and water quality laws. Courts, moreover, have advantages as agents of reform. Largely insulated from political pressure, courts may be willing to act in some cases where the legislature would not and are more likely to pay attention to perceived principles than to relative political power in designing reforms (Thompson 1990).

However, courts also have limitations that make it essential that legislatures and administrative agencies also actively pursue reforms and not simply leave reform efforts to the courts. For example, courts have more limited fact-finding ability than legislatures as well as less expertise on complex issues, given legislative staff and committee processes. Courts also lack funding or staff to implement and enforce reforms that require long-run administration. More important, courts are reactive; they cannot proactively identify and solve problems. Courts instead rely on plaintiffs to bring matters before them and present relevant information, and they then implement and enforce judgments. Courts, in short, are important agents of reform, but they are unable to solve California's water challenges by themselves. This is particularly true where legislation limits the opportunity for independent judicial reform.

Even where courts are not direct reform agents, they can serve important supporting roles. First, courts can provide a valuable forum for negotiating and implementing reforms. After World War II, for example, courts in Southern California provided a forum for establishing effective groundwater management and replenishment districts. Although groundwater users could have voluntarily worked together to establish such districts, groundwater adjudications were a formal means to bring all groundwater users together to negotiate, collect and share relevant data and other information, and examine alternative

management options. Courts also could force dissenting groundwater users to accept negotiated agreements and then enforce and oversee the agreements over time. More recently, a federal district court provided the forum in which environmentalists and water users on the San Joaquin River developed a program for restoring environmental flows to the river (Box 9.1). The availability of forums for negotiation, information-sharing, and discussion, as well as for enforcing resulting agreements, is critical to the success of stakeholder processes (Blomquist, Dinar, and Kemper 2010).

9.1

Restoring the San Joaquin River

After completion of Friant Dam on the San Joaquin River in the 1940s to supply water to farmers in the San Joaquin Valley and Tulare Basin, the middle reaches of the river were allowed to go dry, except for a short reach below the dam. As a result, a run of up to 50,000 Chinook salmon went extinct, a clear violation of § 5937 of the Fish and Game Code (Box 1.3). Attorney General Pat Brown declared the Code only advisory and refused to let the Department of Fish and Game sue to keep the river alive. Finally, in 1988, a coalition of environmental groups, led by the Natural Resources Defense Council, filed a lawsuit challenging the right of the Bureau of Reclamation to continue operating the dam without providing water for fish, especially salmon (*Natural Resources Defense Council v. Rodgers*). Eighteen years later, in 2006, the parties finally reached a court-ordered settlement agreement with two major goals: (1) restore and maintain fish populations in "good condition" in 150 miles of the San Joaquin River down to its confluence with the Merced River; and (2) reduce the delivery reduction effects on long-term water contractors that might be affected by the settlement. The settlement established an ambitious schedule to restore Chinook salmon runs and reestablish other fish in the river. The federal and state governments appropriated about $400 million to restore lost channels and provide infrastructure to reduce effects on irrigators. In 2010, the first experimental flows were released from the dam, and major planning efforts were well under way for activities ranging from determining the environmental flow regime to designing new diversions and channels to choosing stocks of fish for reintroduction to appointing a restoration administrator. The post-settlement process has been highly contentious, especially with local farmers, but progress is being made. The first salmon are due to be released into the system by December 31, 2012. The settlement illustrates the potential of lawsuit-disciplined consensus processes to resolve important water management issues, as well as the ability of state laws and policies to "nudge" changes in federal project operations.

The San Joaquin River settlement arose from a lawsuit-disciplined consensus process. Photo by Peter Moyle.

Second, courts can either foster or impede reforms by other branches of government through the constitutional and procedural ground rules that they set. Courts throughout the United States, for example, have helped enable groundwater reform by consistently holding that limitations on pumping do not generally constitute takings of common-law groundwater rights and have assisted efforts to reform federal reclamation practices by holding that the federal government enjoys considerable latitude to change particular policies under federal reclamation contracts (Sax 1990; Thompson 1995; Gray 2002a, 2002b; Sax et al. 2006). Recent decisions holding that restrictions on surface water withdrawals can constitute physical takings for which the government must pay just compensation, by contrast, have created hurdles to increasing environmental flows for endangered or threatened species (Box 7.1). The California Supreme Court's interpretation of the takings protections in the California constitution has similarly made it difficult to abolish or limit riparian rights as most other western states have done (*Long Valley* 1979; Sax et al. 2006). Courts also can affect the ease or difficulty of administrative reforms through decisions dealing with what procedures must be followed under the National Environmental Policy Act or other laws in promulgating reforms and addressing the standing of parties to challenge reforms. The recent decision by a federal district court requiring that agencies comply with the National Environmental Policy Act before complying with a biological opinion issued under the ESA,

for example, makes it more difficult to use the ESA to protect environmental flows (Chapter 1).

Mandating and Nudging Local Action

Local agencies often have special advantages in designing and implementing reforms. Local governments historically have held responsibility for many water issues (Chapter 1; Thompson 1997a) and therefore enjoy significant expertise as well as crucial relationships with water users. Decentralized water management can have a variety of advantages—including a greater understanding of local issues and needs; the ability to customize policies to local conditions, constraints, and needs; enhanced input from local resource users and other local members of the public; and the opportunity for experimentation across jurisdictions (Blomquist, Dinar, and Kemper 2010; Anderson and Hill 1997; Thompson 1997a; Lund 2006). The opportunity for experimentation is particularly important where no policy approach is proven and preferable in all situations. States and localities, for example, have adopted varied options in attempting to reduce groundwater overdrafts and nonpoint pollution, promote water conservation, and increase environmental flows (Smith 1986, Sax et al. 2006). By allowing states and localities the freedom to test and compare different approaches, states and the nation benefit from experimentation, comparison, and borrowing (Thompson 1997a).

Local design and implementation of reforms, however, are sometimes inappropriate. State or federal reforms will be needed to address:

- "Spillover effects" or "externalities" where water management in one region affects a broader area—as with groundwater overdraft and downstream impacts of water pollution and flood management decisions (Salzman and Thompson 2010);
- Ethical issues of interest to the general polity, such as the interest of a state or nation in protecting sustainable resources for future generations, or in transparency or equity (Thompson 1997a);
- Economies of scale in addressing an issue in a larger geographic region;
- Fears that local governments will relax environmental standards to attract or retain businesses, leading to a so-called "race to the bottom" (Salzman and Thompson 2010; Stewart 1977);

- Concerns that some interest groups enjoy disproportionate political power at the local level (Blomquist 1991; Ringquist 1993; Thompson 1997a).

Generally, reform is likely to be most effective where agency boundaries match the boundaries of the resource (Blomquist, Dinar, and Kemper 2010; Ostrom 1990). In water, that is typically the watershed. Effective reforms therefore often call for a coordinated effort among local entities in a watershed or creation of a new watershed-wide entity (Goldfarb 1994; Harrison 1980). The key is to ensure coordinated solutions across the watershed (Thompson 1997a). Our recommendation to create regional stewardship authorities reflects this need to improve coordination among the state's many decentralized water and land use planning entities (Chapter 8).

Even where local agencies would be best at designing and implementing reforms, the state or federal government may need to mandate or "nudge" local agencies to act. Local agencies have often not adopted reforms on their own because of political opposition (Leshy 2009). External pressure has commonly been needed for local agencies to act. Groundwater reform is an example. Local water districts and governments might be best at determining how to restrict groundwater usage in a particular area, but the state, which has a strong interest in ensuring that regions manage their water sustainably, may need to force them to act.

Cooperative Federalism

When the state or federal government directly mandates reform at the local level, the critical question is how much authority to delegate to the local agencies. Table 9.1 shows several models of what has become known as cooperative federalism, in which the state or federal government delegates at least some authority to lower levels of government, along with expectations for performance. In all models, the state (or national) government establishes the basic statutory mandate but then delegates varying levels of control to a lower level of government. *Planning mandates*, in which the state (or national) government requires that lower levels of government analyze and address a particular issue (e.g., urban conservation) but does not set specific standards of performance, provide the greatest discretion to the lower levels. Under *standard-driven federalism*, by contrast, the state (or national) government sets minimum performance standards or goals that the lower level of government must meet but

leaves the choice of how to meet these standards up to the lower level. In most cases, the state (or national) government also reserves the right to step in and implement the standards if the lower level of government fails to implement them effectively. The lower level of government is also generally responsible for enforcement and often free to set more rigorous standards or goals if it wishes. Finally, under *managerial federalism*, the state (or national) government specifies virtually the entire regulatory program and leaves only the mechanical implementation to the lower level of government.

Table 9.1
Types of cooperative federalism

Approach	Description	Examples
Planning mandates	Higher level of government requires lower level to study and address a problem but does not dictate a specific performance standard	National: Coastal Zone Management Act; nonpoint provisions of the Clean Water Act State: Urban Water Management Planning Act; Senate Bill (SB) 610 and SB 221 ("Show Me the Water" laws); Agricultural Water Management Planning Act
Standard-driven federalism	Higher level of government mandates a particular performance standard or goal (e.g., a specific level of water quality) but then permits lower-level governments to determine how best to implement the standard or goal. If lower-level governments do not meet the standard or goal, higher-level government generally reserves the right to step in	National: water quality standards in the Clean Water Act; ambient air quality standards in the Clean Air Act; Subtitle D of the Resource Conservation and Recovery Act State: outdoor irrigation efficiency standards in landscape ordinances; per capita water use targets
Managerial federalism	Higher level of government sets particular regulatory standards but permits lower-levels of government to implement and manage the standards	National: technology standards in the Clean Water Act State: technology standards for low-flow plumbing

NOTE: For years in which various state legislation cited here was adopted, see Table 2.7.

All three forms of cooperative federalism require two elements. First, the lower level of government must have the expertise and jurisdiction needed to undertake the local tasks, or the state (or national) government must help the lower level of government acquire and develop this expertise and jurisdiction. Second, the lower level of government must have enough funding to carry out its tasks, or the state (or national) government must provide such funding.

Where the general public enjoys significant benefits from a cooperative federalism scheme, centralized funding also is generally more equitable (Blomquist, Dinar, and Kemper 2010).

Nudging

Even where the state or federal government does not wish to directly mandate reform by lower levels of government, it can still usefully nudge reluctant governments toward reform. Nudging simply involves informal pressures or incentives to encourage lower levels of government to do something that they would otherwise probably not do.[3] The federal government, primarily through the Department of the Interior, has often encouraged California and other western states to undertake needed water reforms—even short of the type of cooperative federalism efforts discussed above. For example, in authorizing the Central Arizona Project in 1968, Congress prohibited the Secretary of Interior from delivering water to Arizona until the Secretary of the Interior certified that the state was adequately managing groundwater pumping (Leshy 2009). When Secretary of the Interior Cecil Andrus threatened not to allow Central Arizona Project water to flow in the late 1970s, then-Governor Bruce Babbitt was able to use this threat to help motivate and pass the 1980 Groundwater Management Act (Avery et al. 2007). Twenty years later, pressure from the Department of the Interior, in its role as water master of the Colorado River, helped water users in Southern California agree to the Quantification Settlement Agreement, resolving long-standing disputes over water rights in the Colorado River and enabling a package of large long-term water transfers between the Imperial Irrigation District and Southern California urban water districts (Chapter 6). During the Clinton administration, the Department of the Interior, as manager of the Central Valley Project, helped negotiate the Bay-Delta Accord and bring together farmers, urban water agencies, and environmental organizations to address Delta water issues through the CALFED process (Chapter 1; Rieke 1996). The federal government used the threat of sanctions under the Clean Water Act to bring all parties to the table.

The federal government can continue to nudge California toward effective water reforms. The federal government has various opportunities to influence the

3. Thaler and Sunstein (2008) have recently popularized the concept of "nudging." In the academic literature, nudging is used broadly to refer to anything that influences choices. Although much of the emerging literature focuses on the use of social norms, we use the term to refer to the use of power and discretion at one level of government to influence the use of power and discretion at another level.

Federal and state leadership was needed to craft a complex deal to reduce California's use of Colorado River water. Photo by John Locher/ Associated Press.

state's water policies. Through the federal reclamation program, the Department of the Interior runs and manages major irrigation projects in the state. Under *Arizona v. California* (1963), the Department of the Interior also holds significant discretion over delivery of water from the Colorado River. In an era of significant state budget deficiencies, the federal government also could condition federal financial assistance for water management on needed state reforms, or it could provide funding to help states engage in such reforms (Leshy 2009).

The California state government can similarly nudge water districts, counties, cities, and other local governments to engage in necessary reforms. To date, the state has encouraged local reforms by providing financial incentives to local governments—e.g., using the carrot of bond funds to encourage local groundwater management plans, urban water management plans, and integrated water management plans. The state also has significant leverage over local governments through its authority over surface water rights and water quality, and it could use this authority more to promote local reforms and cooperation. The legislature, for example, has encouraged the installation of water meters by threatening to deny new or expanded water supply permits if a utility fails to comply.[4] The state, through the attorney general's office, also could

4. Assembly Bill (AB) 2572 (2004) (§ 529.5 of the Water Code) also requires compliance for eligibility for financial assistance from the state for wastewater treatment projects, water use efficiency projects, and drinking water treatment projects.

be more active in enforcing various laws concerning local agency planning and other actions, which now rely principally on citizen lawsuits for enforcement.[5]

Lower levels of government sometimes can nudge higher levels of government. For example, regional water quality plans have a prominent influence on the relicensing of power plants by the Federal Energy Regulatory Commission (FERC). State water rights administrators can influence the operation and viability of federal water projects and contracts, where they depend on state water rights (*California v. United States* 1978; *United States v. State Water Resources Control Board* 1986). Lawsuits under state Fish and Game Code § 5937 were used to nudge operational changes in the federal Friant Dam under the San Joaquin River restoration settlement agreement (Box 9.1). Similarly, local governments often lobby and become involved in lawsuits aimed at changing state or federal policies. Agitation from local agencies, for example, helped transfer the Kern Water Bank—one of several water banks that became operational in Kern County in the 1990s—from state to local control.

Applying the Approach

Table 9.2 summarizes our assessment of the appropriate actions and roles of different levels of government in some needed areas of California water reform and illustrates the use of cooperative federalism and nudging. Although the state will often need to lead in pursuing reform, other levels of government are important as partners and instigators of reform. Nudging could be effective in several areas. The federal government could use its authority under the beneficial use provisions of the Reclamation Act and under the Clean Water Act, respectively, to pressure the state to institute groundwater management reforms and to implement cap and trade programs for water quality.

In a form of reverse nudging, the state could encourage the federal government to change the administration of the ESA and the CWA to enable more effective ecosystem management in California and more flexible, cost-effective approaches to enforcement of total maximum daily loads (TMDLs) (Chapters 5, 6). State experiments in biodiversity protection (e.g., California's efforts in natural community conservation planning) have often influenced federal reforms (Arha and Thompson 2011). Similarly, the state will need to

5. The attorney general's office has played an active role in encouraging local governments to adopt general plans that take into account the state's greenhouse gas reduction targets by issuing comments on general plans and filing selective lawsuits (Bedsworth and Hanak 2011; http://ag.ca.gov/globalwarming/ceqa.php). It could take similar actions regarding the implementation of water supply and flood planning laws by urban and agricultural agencies and local land use authorities (Hanak 2010).

Table 9.2
Some examples of federal, state, and local roles in reform

Challenge	Federal	State	Regional/Local
Improved groundwater basin and watershed management	Could nudge state to take action	Set performance mandates for local groundwater management and regional integrated watershed approach	Develop and implement basin and watershed plans (including regional stewardship authority governance and activities)
Higher water use efficiency (prices, rate structures)		Set performance mandate for locals	Adopt conservation-oriented rate structures, promote innovations
More flexible water market and grid management	Partner with state in institutional reforms, nudge state reforms	Lead institutional reforms, nudge federal participation	Promote innovations in water marketing
Risk-based flood management	Partner with state in reservoir reoperation	Set new state policy including regulatory standards for locals, lobby federal government to partner in more integrated water supply and flood operations	Implement new risk-based standards
Reconciliation approaches to improve ecosystem function	Align ESA and CWA with reconciliation principles (selective streamsheds, ecosystem function, multiple stressors)	Set new state policy, lobby for federal reforms, experiment with new approaches to help demonstrate value of federal reform, modify state laws to conform to new federal ESA and CWA principles	Partner through regional stewardship authorities for improved ecosystem management
More effective water quality management	Nudge state to implement cap and trade, align CWA for more flexible enforcement of TMDLs	Implement cap and trade for nonpoint sources, lobby for federal reforms on TMDLs	Develop and implement regional water quality plans and cap and trade programs for water quality
Funding for public benefits (planning, ecosystems, system efficiency)		Set new state policy (public goods charge, dam removal fees, etc.)	Establish regional stewardship fees

NOTES: For details on reform actions, see Chapters 5 through 8.

enlist federal cooperation to engage in more integrated water supply and flood management given federal control of flood space in most reservoirs in the state. The federal government also might be nudged into use of more modern risk-based flood policies. The state could also use the reasonable use requirements of the California constitution to pressure the federal government to participate in reforms that improve the efficiency of the water market, including a new water transfer clearinghouse run by a water independent system operator (ISO). Local agencies, similarly, may sometimes need to push the state to institute reforms to

improve the efficiency of the water market (although local districts have often been both obstacles and facilitators for water market reform).

Cooperative federalism can help in many important reform areas, including groundwater management, water quality management, conservation-oriented water pricing, integrated watershed management, and risk-based flood management.

Groundwater management

For groundwater management, including integrated management of groundwater and surface water, the state should set performance standards but allow local implementation. State involvement is necessary because unregulated groundwater pumping affects interests beyond the local basin (Chapters 5, 6, 7). Local water agencies, moreover, may feel pressure to take a shorter-term view of groundwater management and resist regulating local water users, even with clear local authority to restrict pumping. Although these considerations call for state performance standards, local entities may be more effective at designing and implementing programs to achieve such standards given their greater knowledge of local conditions and needs.

The state therefore should establish groundwater management standards that encourage and guide local implementation and enforcement. Following the approach used under the federal Clean Air Act and Clean Water Act, local governments would apply to the state for the authority to implement the standards, and the state would review local performance regularly to ensure that the standards are being implemented effectively. Where local governments either do not seek authority or do not use it effectively, the state would undertake enforcement and implementation. Local governments would also be free to set more stringent local groundwater standards.

An important issue in any such system would be how to determine which local entities are authorized to create groundwater management plans. Under a top-down approach, the state (most likely through the SWRCB or its successor) would define the relevant groundwater basins. The state or regional stewardship authorities could delegate local agencies to develop basin groundwater management plans for each basin or allow local counties a set period of time to agree on joint groundwater management plans. Enabling state legislation could provide local agencies with new authority to enact such plans. Under a bottom-up approach, local governments themselves would determine (with guidance from the state) appropriate basin areas to manage, as well as institutional mechanisms

for managing them. Under either approach, the state would have authority to develop and implement state groundwater management plans for any defined groundwater area in which local governments have not, within a set period of time, developed an effective management plan and demonstrated their ability to implement the plan. Such a program could be phased in over time, with an earlier time limit for basins with critical groundwater problems.

Where groundwater withdrawals affect surface water outside a basin's physical boundaries, local regulation would need to take these effects into account. To ensure effective integration, jurisdictional boundaries might be expanded to include areas outside the physical basin that are affected. Alternatively, interests outside the basin could be given the right to petition for groundwater restrictions and to protest permitted withdrawals that they believe harm them. Disputes between outside interests and the basin authority could be resolved either by the governing state agency or through judicial appeal. California again could draw on experience with interstate disputes under the Clean Water Act. No state can permit the discharge of pollution if it would violate the water quality standards of a downstream state. Moreover, before issuing pollution permits that might affect a downstream state, states must permit the downstream state to object; the Environmental Protection Agency can veto a permit if it concludes that the proposed discharge would interfere with the downstream state's water quality standards (Salzman and Thompson 2010).

If it is politically impossible to provide for direct state groundwater management where local entities fail to develop adequate groundwater management plans, the state might consider other means to encourage local entities to act. To date, the legislature's primary incentive for local action in water reform has been to make state grants contingent on local compliance. This policy could of course be applied for the development and implementation of adequate groundwater management plans that protect not only other groundwater users but surface water users and the environment. However, other tools may be more compelling, particularly if state bond resources are limited. For example, the legislature could make groundwater users responsible for all damages resulting from overdrafts, including reductions in groundwater quality, subsidence, and damage to groundwater-dependent ecosystems or surface water users. Similarly, the legislature could provide for a reduced levy under the public goods charge, recommended in Chapter 7, where local governments are adequately managing aquifers and therefore reducing the costs that the charge would otherwise need to cover.

Agricultural water quality

As discussed in Chapter 6, today's agricultural dischargers must only monitor their water quality. A next step would be to allow groups of farms (perhaps grouped by river reaches) to agree, as a group, to particular water quality or discharge load limits, under the jurisdiction and enforcement of regional water quality authorities. This type of arrangement would facilitate water quality trading within these groups (much as occurred within the Grasslands Water District for selenium discharges; see Chapter 6). Elaborations might allow water quality load trading across groups. Such trading schemes would add flexibility and local integration to water quality regulations.

Water pricing

State-established water pricing standards have the potential to promote more consistent and effective conservation-oriented rate structures. The state would require that utilities implement conservation-oriented tiered pricing and would conduct periodic rate reviews. The process would provide an impartial technical review of rate structures and give cover to local utilities that face local resistance to more progressive water rates. Water utilities failing to demonstrate an appropriate rate structure could be subject to sanctions for failing to encourage reasonable use by their customers.

Integrated watershed management

State planning mandates are appropriate for instituting more effective integrated watershed management. Our proposal to create regional stewardship authorities would impose two levels of planning requirements: plans of various local water and land use authorities would need to be consistent with the regional integrated water plan developed by the regional stewardship authority, and the regional plan would need to be consistent with state plans developed by the proposed Department of Water Management. As explained in Chapter 8, this approach is similar to the successful use of planning and consistency requirements under the federal Coastal Zone Management Act, the transportation planning provisions of the federal Clean Air Act, and the Delta Stewardship Council. To encourage local initiative, the state could set guidelines for the establishment of these regional authorities and delegate authority to consortia of local agencies willing and able to undertake this broad regional coordinating function.

Flood management

Finally, for flood management, the state could use performance mandates to require that local and regional flood control and land use agencies adopt new risk-based guidelines for new development and planning of flood protection investments. This would build on existing performance standards established in the 2007 flood legislation package but with a more protective, forward-looking orientation.

Facilitating Transition Costs

Reforms can often impose transition costs on stakeholders, leading them to oppose the reforms. If the state were to restrict groundwater overdrafts, for example, at least some existing groundwater users would need to either reduce their water use or find other, probably more expensive, water sources. Such transition costs are not unique to water reforms. Almost every major reform in resource management or environmental regulation creates transition costs. Such transition costs, by generating opposition, often lead to "institutional sclerosis" in which rules remain unchangeable even though reform would benefit society as a whole (Hansmann, Gilson, and Pargendler 2010; Heckelman 2007).

Reform proposals must account for such transition costs for several reasons. First, transition costs are a major cause of political opposition, so addressing transition costs is critical to increasing a reform's chance of succeeding. Second, water users often rely on and make investments based on current water policies. Reforms that neglect legitimate reliance concerns can raise equity issues. Third, by demonstrating to the private market that the government recognizes and accounts for investments made on the basis of existing policies, efforts to reduce or eliminate transition costs can encourage future investment and increase societal wealth (Shavell 2008).

Not every reform generates efficiency and equity concerns, and some level of transition costs is usually considered legitimate and appropriate where a reform promotes social welfare. When Congress passed the Clean Water Act in 1972, for example, no one argued that the act should exempt or compensate companies that were then discharging pollution into the nation's waterways. However, the Clean Water Act subjected existing polluters to laxer standards than new point sources of discharge, and Congress provided financial support to wastewater utilities to undertake the substantial investments needed to meet

the new standards (Salzman and Thompson 2010; Misczynski 2009). Whether transition costs need to be addressed in any specific case depends on various factors, including the size of the transition costs, the degree and legitimacy of stakeholders' reliance on existing policies, the importance of the proposed reform to the public welfare, and the political context.[6]

Where the government decides that it must reduce transition costs for political or equitable reasons, a variety of approaches are available. All approaches involve downsides of one form or another, but governments seeking to promote reform have a viable arsenal of mitigation approaches. Here, we summarize some principal approaches to address transition costs for water reforms.[7] The approaches differ in the degree to which stakeholders must bear transition costs and their effect on the reform's effectiveness. The most appropriate approach depends on the circumstances of each reform measure.

Compensation

The most direct method to address transition costs is to fully or partially compensate stakeholders for these costs. The constitutional takings protections are an example of full compensation. Both the federal and state constitutions promise owners of private property that, if a governmental reform constitutes a "taking" of their property as defined and delineated by the courts, they will receive "just compensation." As discussed above, several recent judicial cases have awarded compensation where efforts to protect imperiled fish species have reduced water deliveries (Box 7.1). The constitutions mandate compensation, however, in only a narrow set of situations. Most water reforms, including major shifts in management policies, do not generate legitimate takings claims.

Legislatures, however, may still decide to provide full or partial compensation for the reasons mentioned above, even if the constitution does not require it. The California legislature has chosen to provide at least partial compensation in several settings. For example, to ease the cost of Los Angeles's compliance with the public trust doctrine under the Mono Lake decision, the California legislature in 1989 established a $60 million fund of investment capital to help Los Angeles build water reclamation and conservation facilities to offset its

6. These factors parallel U.S. Supreme Court considerations when reviewing claims that governmental action has "taken" private property for which just compensation is due (e.g., *Penn Central* 1978). The government, however, might decide to reduce transition costs even where private property and thus takings law are not involved.

7. For a general discussion of approaches to address transition costs, see Kaplow (2003) and Hansmann, Gilson, and Pargendler (2010).

Mitigation funds can ease transitions for low-income groups harmed by new water policies. Photo by David McNew/Getty Images.

water losses—although the funding actually supplied to Los Angeles may have been less (d'Estree and Colby 2004).

Compensation typically has the benefit of not undermining the goals of the reform. Funding for reclamation and conservation in Los Angeles, for example, did not undermine the goal of protecting public trust interests in Mono Lake; instead, it promoted the goal by easing implementation of the reforms. The principal disadvantage to monetary compensation is the cost to the public treasury. Compensating stakeholders for the cost of complying with a publicly well-regarded reform also may seem inequitable to the public—simply "buying off" political opposition (Hansmann, Gilson, and Pargendler 2010).

Compensation need not be monetary; it can take other forms less costly to taxpayers. In raising water prices as part of the Reclamation Reform Act of 1982, for example, Congress increased the acreage in a single farm that could receive subsidized Central Valley Project water (Sax et al. 2006). Although farmers faced higher water rates, the increase in acreage provided partial "compensation" for many water users who had been receiving water all along for more acreage and were under legal attack (Kelley 2004).

Compensation may be useful in easing transitions and reducing resistance to new reforms. Congress has established mitigation funds to provide training and assistance for workers affected by trade liberalization as well as forestry workers affected by the Northwest Forest Plan, which protected about 20 million

acres of federal land from logging as part of an ecosystem protection effort for the endangered spotted owl and other species.[8] For example, the state might consider compensating Delta farmers for lands that should be flooded, even if permanent flooding is inevitable and if compensation is not legally required (Lund et al. 2010). Similarly, the state might compensate farmers, in the western San Joaquin Valley or elsewhere, who agree to retire their land for water quality concerns or to free up water for use elsewhere.

Rather than providing compensation itself, the government also can encourage or require the beneficiaries of a reform to compensate opponents. For instance, to allay local government concerns that water transfers lower tax receipts and raise social services costs, the state might encourage participants in the water market to create a fund to compensate these entities for the negative third-party effects of water transfers (Chapters 6, 7).[9] Taxing of "windfalls" to compensate for "wipeouts" can be both efficient and equitable (Hagman and Misczynski 1977).

Grandfathering

Another common method to address transition costs is to "grandfather" existing stakeholders (Hansmann, Gilson, and Pargendler 2010). Under grandfathering, existing stakeholders are either exempted entirely from new rules or subject to less strict rules. When the California legislature adopted a permit system for appropriative water rights in 1913, for example, it applied the rules only to new appropriators; existing appropriators did not require a permit for their existing rights (Chapter 1).

Although grandfathering can eliminate or reduce transition costs for existing stakeholders and imposes no costs on the public treasury, it is generally troublesome because grandfathering undermines the goal of the reform itself. By exempting pre-1914 appropriators from permitting requirements, the legislature undermined the goal of keeping track of appropriative rights; to this day, the exact extent of pre-1914 rights remains uncertain (Chapter 7).[10]

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8. For evaluations of the trade adjustment assistance, which has been in effect in various forms since the 1940s, see Aho and Bayard (1984) and Richardson (1982). For current information on the program, see www.doleta.gov/tradeact/. On the Northwest Forest Plan, which came into effect in 1994, see Tuchman et al. (1998) and Charnley (2006).

9. Concerns of this nature were raised by Yolo County during the Drought Water Bank of 1991 (Carter, Vaux, and Scheuring 1994). Hanak (2003) describes some of the difficulties parties have had reaching agreement on suitable mitigation programs for fallowing in California.

10. Other objections include disparate treatment among similarly situated individuals or entities and adverse incentives to continue to operate old (highly polluting) technologies (Hansmann, Gilson, and Pargendler 2010) as well as anticompetitive behavior (Ackerman et al. 1999).

Feasibility-Based Implementation

Similar to grandfathering, the government can reduce transition costs by excusing those who find it particularly difficult to comply with a reform from all or part of the new requirements. Under the Safe Drinking Water Act, for example, Congress established health-based standards for all water providers but then excused water supplies from purifying their water beyond levels that were technologically and economically feasible (Salzman and Thompson 2010). The water conservation requirements of the California Urban Water Conservation Council have a similar provision, allowing signatories to avoid implementing any of the identified conservation best management practices that do not meet feasibility or economic criteria. Feasibility-based implementation protects stakeholders from the burden of costs that they cannot feasibly absorb but otherwise allows a reform to move forward. Feasibility-based implementation is generally less disruptive to the goals of a reform than grandfathering but still limits the ability of a reform to achieve its goal.

Delayed Implementation

Another common approach is delayed implementation (Kaplow 2003). Because people tend to discount future costs, delaying the onset of a reform can significantly reduce the current value of future transition costs. The delay also allows more time for integrating the reform into other ongoing activities thus reducing the transition cost. Thus, when the California legislature approved AB 2572 in 2004 requiring that all cities install water meters, it delayed the effective date of the requirement until January 1, 2025, to give utilities time to phase in the costs of meter installment. When Congress has adopted new mileage standards for automobiles, it has similarly delayed the effective date of the standards (Salzman and Thompson 2010). Delayed implementation not only reduces the discounted cost of complying with new reforms but also allows the development of new technology and the phasing in of new investments needed to respond to a reform. Delayed implementation also can allow term-limited legislators to make needed structural changes (such as moving from council to executive agency structures) in the future without losing immediate legislative prerogatives and without incurring opposition from sitting board members and their supporters.

Unfortunately, delayed implementation, like grandfathering and feasibility-based implementation, undermines the goals of the reform, unless the reform is adopted far in advance of the onset of a predicted problem. Whether this

drawback is better or worse than grandfathering depends on several factors. For delayed implementation, the benefits of reform are lost only during the period of the delay; once the reform is fully implemented, society enjoys the full benefits, unless irreversible damage has occurred in the meantime. However, all benefits of the reform are generally lost during the period of the delay because the delay typically applies to everyone not just to stakeholders who existed before the reform.

Delayed implementation might be appropriate for a number of the reforms discussed previously, particularly where the reform requires significant advance planning or the development or installation of new technology. For example, the implementation of risk-based flood management should reasonably be delayed to allow time for the development of adequate planning systems (Chapter 6). New conservation standards, which require the adoption of new technologies and behavioral changes, also seem good candidates for delayed implementation.

Phased-In Reforms

A variant on delayed implementation is the gradual phase-in of reforms over time (Kaplow 2003). In the 1972 Clean Water Act, for example, Congress provided for the gradual phase-in of ever-stricter water quality standards, rather than providing for the immediate end of all point sources of pollution (which is a goal of the Clean Water Act) (Salzman and Thompson 2010). Like delayed implementation, phase-ins undermine reform goals in the short run but often to a smaller degree because at least some reform occurs immediately.

A phase-in approach might be particularly appropriate for reducing the transition costs of groundwater reform, particularly where current users have made investments based on groundwater availability and it is not critical to immediately manage groundwater in a particular basin. Other states have phased in their groundwater reforms. When the Arizona legislature adopted its Groundwater Management Act in 1980, for example, it provided for gradual reductions in groundwater pumping in areas of major overdraft, rather than the immediate cessation of all overdrafting (Avery et al. 2007). Texas similarly provided for a stepped reduction in groundwater pumping under the Edwards Aquifer Act of 1993 (Votteler 1998). California might consider both (1) requiring groundwater management first in basins where pumping is causing significant problems for the environment or other ground or surface water users, and (2) allowing local regions to phase in groundwater restrictions rather than requiring immediate cessation of all harmful withdrawals. The danger is that

local groundwater users might face incentives to "race for the pump house," or more quickly exploit groundwater, to improve their position when management becomes imposed. The new agricultural water quality program proposed above also seems a good candidate for a phase-in approach.

Regulatory Choice

Regulatory choice permits stakeholders to choose between operating under a reform regime or the preexisting regime. It is particularly appropriate where a reform promises some stakeholders an improved approach but other stakeholders have reasons, generally because of investments or experience, to prefer the preexisting scheme. Governments have often turned to regulatory choice to reduce political opposition to new economic markets and charter systems (Hansmann, Gilson, and Pargendler 2010). In reforming its equity markets, for example, Brazil chose to create a "new market" within its established stock exchange but to end years of political paralysis let businesses choose between the existing and new markets.

Regulatory choice works effectively only where a reform can attract stakeholder adherents and where maintaining a dual system does not undermine reform goals. Regulatory choice might be particularly appropriate for creating an ISO-type structure for water marketing (Chapter 7). For the voluntary transfer clearinghouse model ("ISO-lite"), Central Valley Project and State Water Project contractors would automatically be included, and local water districts would have the option to join. For the broader ISO model, which would operate a bidding system for all water moving through the grid—not just voluntary transfers—contractors and rights holders could have the option to join the full bidding system. Those who prefer the greater flexibility and marketing opportunities of the ISO-type structure could voluntarily participate, whereas others with strong vested interests in the current system could maintain their current contracts and allocations. The electricity ISO includes some regulatory flexibility—by making participation in the ISO optional for public power providers.

Compliance Flexibility

Governments sometimes reduce transition costs by providing compliance flexibility, allowing stakeholders to meet the goals of a reform by whatever means minimize their costs (or local opposition). Cap-and-trade systems are an example of compliance flexibility. Rather than telling all power plants exactly how much they must reduce their sulfur dioxide emissions, for example, the

Clean Air Act Amendments of 1990 cap total emissions and allow power plants that face higher compliance costs to purchase emission allowances from plants with lower reduction costs that are willing to go beyond their minimum reductions (Salzman and Thompson 2010). Similarly, any reform effort in California to reduce water pollution from nonpoint or other sources could help reduce transition costs through a water quality trading system (Chapter 6).

A cap-and-trade system might be particularly appropriate for reducing transition costs where groundwater reform requires that a region reduce current groundwater use (or in any situation where reform reduces supplies for a group of users). Some groundwater users will find it easier and less expensive than others to reduce their use. By allowing groundwater users to trade withdrawal rights, a cap-and-trade system allows users who find it more difficult or expensive to pay for additional rights—minimizing the overall transition costs of the groundwater reduction (Carlson and Satterwaite 2010). For this reason, the Texas legislature provided for groundwater trading when it restricted pumping from the Edwards Aquifer (Votteler 1998). Many adjudicated basins in California also provide for the marketing of groundwater within the basin (Blomquist 1992; *Water Strategist*, various issues).

Another approach to compliance flexibility is a "default rule," under which the government adopts a reform but allows stakeholders to propose alternative approaches that meet the reform goals. Habitat conservation plans (HCPs) under the Endangered Species Act are an example. Although the ESA generally does not permit adverse modifications of the habitat of endangered species, individual landowners or local governments can get permits to modify land and water flows if they design and demonstrate an ability to implement HCPs that will adequately protect the endangered species from extinction (Thompson 1997b).[11]

Combining Approaches

There is no single optimal approach to addressing transition costs. Grandfathering is generally the least effective because it directly and perpetually undermines the reform goal and can create adverse incentives and reduce economic competition. Direct compensation fully preserves the benefits of the reform but can be expensive. All of the approaches discussed above have advantages and disadvantages and are well suited to some reforms but not

11. New charter provisions in the corporate field also frequently use default rules, under which firms can deviate from particular charter provisions (Hansmann, Gilson, and Pargendler 2010).

others. Approaches can also be combined. For example, reductions in groundwater pumping might be phased in over time and combined with markets that permit compliance flexibility, as Texas did with the Edwards Aquifer.

Promoting Reforms

A final question is how to promote reforms. Here we consider three approaches: (1) increasing public understanding of water issues; (2) involving stakeholders; and (3) building consensus.

Public Education

When the public poorly understands a policy issue, providing greater information can help increase public saliency and discussion and thereby encourage reform—either by generating support for a political solution to the issue or by encouraging the public to change its own behavior.

One way to educate the public is through the information that water suppliers provide their consumers. Water suppliers currently must provide consumers only with yearly water quality reports. Unfortunately, the government requires that water suppliers provide so much data and scientific information regarding water quality that few consumers bother to read the reports, and even fewer understand them. A simpler format that focuses on the information of greatest importance would be far more informative to the public.

Consumer reports also could be expanded, in this age of enhanced information technology, to include information on:

- The efficiency of each consumer's water use (e.g., the consumer's total monthly water use, compared to the monthly use a year before and perhaps to the use of average or similar consumers);
- The source(s) of water supplied to the consumer;
- The reliability of the customers' water supply (e.g., vulnerability to drought, development in the supplier's watershed or overdrafting of the source aquifer, risk of earthquakes in the Delta);
- Environmental or socioeconomic effects of the water supply system (e.g., reduced water flows and increased water temperatures in the habitat of endangered or threatened species); and
- Flood inundation likelihood and depth (e.g., the likelihood of flooding at the first and second story levels of the home).

The first category of information could help consumers be wiser users of water resources and is already common for many utilities. The other categories of information would increase Californians' understanding of their water supplies, the challenges of managing those supplies, and their flood risks. Such information, moreover, would encourage water suppliers to address the threats to and effects of their supply systems and, by increasing public understanding, promote public support of reform. For flood risk, this effort could build on the requirements in AB 156, part of the flood legislation package of 2007, which requires that the Department of Water Resources provide Central Valley landowners in areas protected by levees with annual flood risk information; this effort should be extended to other regions of the state (Chapter 6).[12]

Formatting and presentation of such an expanded "Consumer Water Report" would be important. Reports should focus on key information, presented in an understandable format that highlights the most important information. Full reports might be issued every five years, with summary information and updates provided in other years. Reports could link to a website with more complete information. Such public information would be a grassroots extension of existing urban water management plans.

Stakeholders and Interest Groups

Interest groups need to be involved in shaping the reform of California's water policies. An expansion of the interest groups actively involved in water reform efforts in California is likely to aid adoption of effective and sustainable reforms by ensuring a broader perspective. Although businesses have occasionally supported reform efforts (including enactment of the Central Valley Project Improvement Act of 1992, negotiation of the Bay-Delta Accord in 1994, and development of a Model Water Transfer Act in 1996), they could play more prominent and valuable roles than in the past.

Interest groups can provide legislative and administrative bodies with data and information needed to identify, analyze, and develop effective reforms (Sabatier and Whiteman 1985; Lupia and McCubbins 1994). They also can mobilize public support for reforms. Finally, interest groups can sometimes encourage reforms by threatening to file lawsuits. Threats of lawsuits, for example, encouraged agricultural users to accept the acreage and pricing changes in

12. AB 156 (2007) calls for annual notification of flood risk disclosure in areas protected by levees within the area served by the State Plan of Flood Control (principally the Sacramento and San Joaquin Valleys). See Yune (2010) on the initial notifications, which began in September 2010.

the Reclamation Reform Act of 1982 (Kelley 2004) and supplied one of several motivations for the Arizona legislature's support of that state's Groundwater Management Act of 1980 (Avery et al. 2007).

When the legislature fails to address a reform need, interest groups sometimes also are tempted to try to enact reforms through California's initiative process. As discussed in Chapter 2, initiatives have occasionally been important in prior reforms of California water law; interest groups may need to turn to initiatives in the future to enact needed reforms. However, although the voting public remains devoted to the initiative process (Public Policy Institute of California 2008), initiatives have several disadvantages as a method of reform. Initiatives are often long, complex, and poorly drafted, confusing voters. Funding is critical to both qualifying and passing initiatives, putting wealthy interests at an advantage. Because the legislature plays no formal role in the process, initiatives do not benefit from legislative expertise (Center for Governmental Studies 2008). On the other hand, because initiatives do not implement themselves, reticent political officials have significant say over how an initiative is applied and enforced (Gerber et al. 2001). Overall, initiatives often result from a failure of the legislative process to address public concerns and are a poor substitute for effective legislation (Garrett 2005).

Interest groups also can engage in direct reforms without changes in legislation or administrative rules. Nonprofits, for example, can directly protect the environment through market mechanisms or business pressure. In recent years, "water trusts," such as the Oregon-based Freshwater Trust, have adopted a lesson from land trusts and helped protect environmental flows by acquiring water from willing farmers for environmental purposes (Neuman 2004). The Nature Conservancy also is developing a new program to certify water suppliers who manage their watersheds on a sustainable basis, hoping to encourage water suppliers to change their approach to watershed management (The Nature Conservancy 2010). Both programs can improve freshwater conditions without governmental reform.

The business sector also can directly contribute to reforms without governmental action. As major users of water, corporations directly control industrial and commercial water use efficiency (2030 Water Resources Group 2009). Many corporations are seeking to improve their water efficiency, often with benefit to their financial bottom lines, as part of broader sustainability programs (Barton 2010). Corporations are also the principal developers and marketers of new technologies to improve water efficiency or create new water supplies from reuse or desalination.

Public Consensus

Over the past two decades, support has been building for using consensus-based decisionmaking to resolve water issues and other environmental problems (Chapter 1; Kallis, Kiparsky, and Norgaard 2009; Lemos and Agrawal 2006). Proponents argue that consensus processes can reveal new and innovative solutions to apparently intractable problems that better advance the needs of all parties (Crowfoot and Wondolleck 1990; Ingram and Fraser 2006), better focus stakeholders on scientific rather than political issues (Leach, 2006), help change attitudes and behavior (Bobker 2009; Connick and Innes 2003), and create useful long-term relationships among stakeholders and governmental agencies that can prove beneficial in future problem solving (Connick and Innes 2003).

As interest in consensus processes has increased, so has criticism. Some analysts believe that consensus processes allow entrenched interests to block needed reforms or, because of greater sophistication, unduly influence outcomes (Peterson, Peterson, and Peterson 2005). Some argue that consensus processes often undercut rather than promote democratic decisionmaking by excluding marginal, more extreme, or broader but more diffuse public interests (Schilling, London, and Levanos 2009). Others believe that consensus processes diffuse accountability and can permit governmental entities to evade difficult decisions (Hanemann and Dyckman 2009). Even supporters emphasize that consensus processes can be exceptionally time-consuming, delaying needed reforms, making it difficult for some stakeholders to continue participation, and creating a situation incapable of producing solutions to large-scale, complex issues (Crowfoot and Wondolleck 1990). To some observers, the tendency of consensus processes to emphasize agreement tends to sideline more strategic solutions in favor of safer incremental agreements (Kallis, Kiparsky, and Norgaard 2009; Hanak et al. 2010).

Prior consensus processes in the water field suggest that consensus processes have a greater chance of success where opportunities exist for all stakeholders to improve their current position (i.e., in proverbial "win-win" opportunities) than in win-loss situations or where fundamental interests are at stake (van den Belt 2004; Hanemann and Dyckman 2009). A consensus process, for example, is unlikely to produce agreement for peripheral Delta conveyance because, although a new canal or tunnel might benefit the state's economy and environment, it might accelerate water quality losses for some Delta farmers and decrease incentives to subsidize support of the Delta's aging levees (Lund et al. 2010; Madani and Lund 2011). For this reason, consensus processes might work

best in addressing small regional issues than large, complex problems such as the Delta (Kallis, Kiparsky, and Norgaard 2009). Consensus processes also are generally most effective where stakeholders have exhausted other means of resolving a problem and have relatively balanced power (Kallis, Kiparsky, and Norgaard 2009).

Prior consensus processes also suggest ways to improve their success:

- **External deadlines.** Consensus processes often work best as part of a governmental decisionmaking process subject to a clear deadline. The governmental process can help force closure and provide an alternative decision route if the consensus process is unsuccessful. The San Joaquin River settlement, for example, was reached under threat of a judicially imposed solution (Box 9.1). Similarly, the Yuba Accord—in which parties agreed to a comprehensive management plan for the river for environment, water supply, and flood management that includes substantial water transfers and groundwater banking—was agreed to under the threat of a water rights decision by the SWRCB that would have caused significant reductions in water availability for human uses (Water Education Foundation 2007).
- **Better ways to meet.** New institutional forums are needed in which parties can gather information and discuss their different views (Norgaard, Kallis, and Kiparsky 2009; Taylor and Short 2009). Consensus processes also can benefit from active facilitation and from mediated modeling of the core problem (van den Belt 2004).
- **Linkages with constituents.** Participating stakeholders must actively communicate with their constituents to ensure their support for any final agreement (Kallis, Kiparsky, and Norgaard 2009).
- **Resources.** External financial support can be helpful, particularly by equalizing resource differences among the parties (Kallis, Kiparsky, and Norgaard 2009).

In the future, consensus processes may be valuable in relicensing a dam or providing for a dam's removal. In both situations, license expirations provide a deadline for action, and the FERC process provides ground rules for discussions. All sides, moreover, enjoy relatively equal bargaining power. Efforts to develop new groundwater management rules also might benefit from consensus negotiations. The issue of groundwater management meets many of the

criteria listed above for successful use of consensus processes: It is primarily an economic issue that does not threaten fundamental principles, it can be addressed locally, and failure to manage groundwater can lead to costly adjudications. However, to be successful, groundwater discussions would need a government-imposed deadline and a forum for developing relevant information and discussing options.

Achieving Reforms

Reform is crucial to the sustainability of California's water. And in many cases reform is needed now. The state can ill afford to wait for a crisis to be perceived. Unfortunately, making reform happen is likely to be more difficult than identifying the mix of desirable reforms. It is generally much easier to generate support for incremental reforms than for broadly desirable, but more controversial, strategic reforms. Incremental reforms are generally less threatening to the status quo and so are less likely to face stiff political opposition. However, incremental reforms will often not do the job. Thus, figuring out how to make key reforms happen is essential.

Political opposition is generally the major obstacle to reform. Federal, state, and local agencies typically already enjoy the authority and discretion to pursue needed reforms, without new legislation. California state law includes a variety of broad doctrines, including the reasonable use requirement and the public trust doctrine, that provide means to address many of the state's current water challenges. Many statutes, such as the federal and state Endangered Species Acts, give agencies more leeway for reform than is often assumed. Congress and the state legislature, however, will need to intervene in some cases to encourage or shape reform, establish or clarify agency authority, and provide funding. Congress, for example, may ultimately need to revisit the Endangered Species Act to better align its operation with reconciliation principles, and the state legislature should address the need for better groundwater management. Courts also have a role, not only as the direct source of reform, but as a forum for negotiations (as in the San Joaquin River settlement) and in minimizing legal obstacles to reform.

Achieving strategic reform will require strong leadership from state government as well as federal and stakeholder interests. The concept of cooperative federalism, with authority emanating from either federal or state governments, seems essential to effective long-term water policy for decentralized California

water management. The federal government can usefully nudge the state toward reform on such issues as groundwater management, integrated watershed management, improved water markets, and cap-and-trade systems for water quality. The state has an interest in establishing the goals and standards for groundwater, agricultural runoff, water conservation, integrated watershed management, and flood management, but it should leave implementation and enforcement up to local entities when they are willing to step forward.

A key step to reform will be overcoming the opposition of stakeholders worried about transition costs. Grandfathering current stakeholders is often tempting but should be resisted because it typically undermines the goals of the reform. One major weakness of California water policy today stems from the legislature's decisions in 1913 to grandfather preexisting appropriative water rights and to exclude riparian and groundwater rights from the permitting and licensing system of the modern water code. Compensating stakeholders can sometimes be an effective approach, particularly where the beneficiaries of the reform can help fund the compensation. Depending on the particular situation, a variety of other approaches to reducing transition costs, including delayed implementation, regulatory choice, and compliance flexibility, can help reduce reform opposition.

Public education also will be essential in ensuring support for smart reforms both now and in the future. To help improve public understanding of water issues, the state should consider mandating new information reports for water consumers. These reports could cover not only traditional water quality information but also water consumers' own water efficiency; the sources of consumers' water; the reliability of, costs of, and threats to those sources; and local flood risks.

A wide range of strategic and incremental reforms to California water policy is needed over the coming years and decades, and California already has much of the legal framework needed for such reforms. A strategic goal of reforms is to better integrate local, state, and federal interests in water management in ways that allow a very decentralized system of governance to adapt to a wide range of changing conditions. Reforms must often be done incrementally, taking advantage of opportunities imposed by crises and catastrophes, but some major, strategic reforms will require high-level state and federal leadership and preparation.