RESEARCH BRIEF

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Dealing with the Delta: Envisioning Futures, Finding Solutions

California's Sacramento–San Joaquin Delta is a vast, low-lying inland region located east of the San Francisco Bay Area, at the confluence of the Sacramento and San Joaquin Rivers. Geographically, this region forms the eastern portion of the San Francisco estuary, which includes the San Francisco, San Pablo, and Suisun Bays. A web of water channels and man-made islands, the Delta stretches nearly 50 miles from Sacramento south to Tracy and spans almost 25 miles from Antioch east to Stockton (Figure 1).

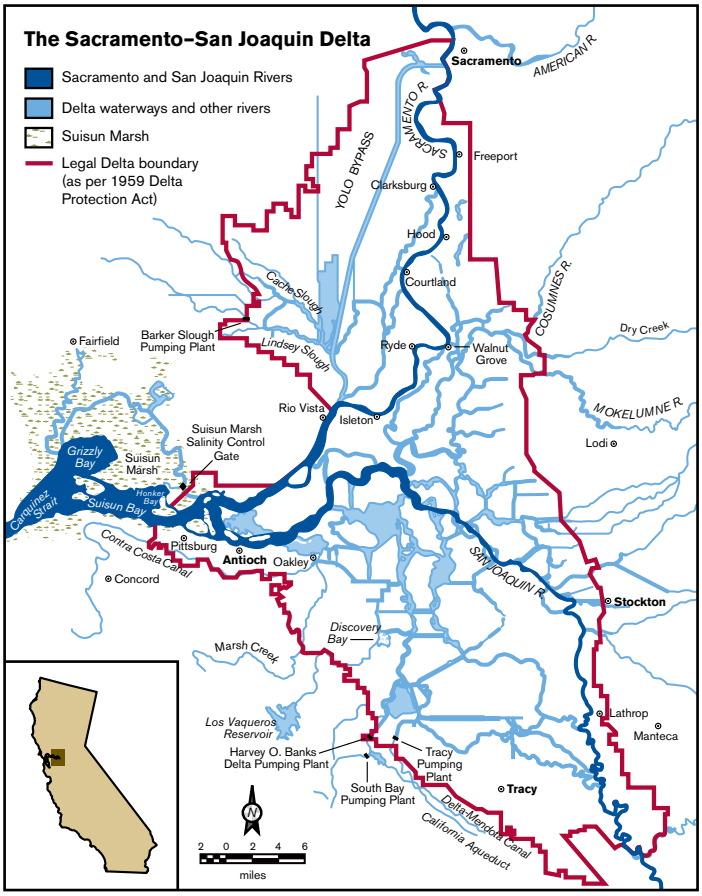


Figure 1–Map of the Delta

Before European settlement, the Delta was primarily a tidal wetland, interlaced with water channels running between natural low earthen levees and teeming with diverse plant and animal life. Much of this marshy landscape has now been drained, diked, and converted into islands, most of them lying below sea level and protected by artificial levees. Today, those who drive through the Delta see mainly huge tracts of flat farmland, intersected by narrow waterways dotted with recreational boaters.

The Delta has long been an important resource for California, providing agricultural and recreational uses, wildlife habitat, infrastructure pathways, and water supply services throughout the state. But by many measures, the Delta appears to be in poor health today. Its levee system is fragile, many of its native species are declining, and it lacks strong governing institutions. In response, PPIC research fellow Ellen Hanak and an interdisciplinary team of experts from the University of California, Davis (Jay Lund, William Fleenor, Richard Howitt, Jeffrey Mount, and Peter Moyle) have conducted a wide-ranging analysis of Delta issues in a new report, *Envisioning Futures for the Sacramento–San Joaquin Delta*.

> *The Delta's levee system is fragile, many of its native species are declining, and it lacks strong governing institutions.*

This report explores and compares long-term Delta solutions. The authors consider a variety of options, constructing nine alternatives for Delta management and evaluating their performance in three key areas: water supply, environmental effects, and economic costs. In addition, the report includes detailed historical, ecological, and economic analysis, drawing lessons from the Delta's past and looking to its future. Today, the Delta is changing–because of a variety of natural and human pressures. It is now up to Californians to figure out how to manage those changes, for the health of the Delta and the state as a whole.

Why the Delta Matters

Almost all Californians rely on the Delta for something, whether they know it or not. Foremost among Delta services is water supply. Most residents drink water that passes through the Delta, and much of California's farmland depends on water from rivers tributary to it. Delta aqueducts, canals, and pumping plants convey water to many far-flung regions of the state. In addition, several critical components of the state's civil infrastructure are found in the Delta, including gas and electricity lines, highways, rail lines, shipping channels, and underground natural gas storage.

But the Delta is more than a water resource or an infrastructure crossroads. Delta land has recently come into greater demand for urban, environmental, and recreational uses. Agriculture has long been a central activity in this region but urbanization is on the rise, with many new homes being built or planned. At the same time, the Delta also provides crucial habitat for both land and water species, some of which live *only* in this region. The Delta is also valued for its aesthetic appeal and for its support of recreational activities. Its proximity to population centers in the Bay Area, Sacramento, and the northern San Joaquin Valley make it an attractive and growing destination for boating, fishing, hunting, and ecotourism.

The Delta in Crisis

By several key criteria, the Delta is now widely perceived to be in crisis. One dimension of the crisis is the health of the levees. The devastating effects of Hurricane Katrina on New Orleans' levees galvanized public attention on the fragility of the Delta's 1,100-mile levee system, where close calls occur with some frequency; for example, a Jones Tract levee broke in June 2004–and repair costs reached approximately $90 million. With seismic risk on the rise, the levees are increasingly vulnerable to failure caused by earthquakes, floods, or other forces.

One recent study analyzed the economic consequences of multiple levee failures caused by a large earthquake. It predicted that water exports would be cut off for several months, that shipping to the Port of Stockton would be shut down, and that there would be disruptions of power and road transportation lines. The total cost to the economy, over five years, was estimated at $30 billion to $40 billion.

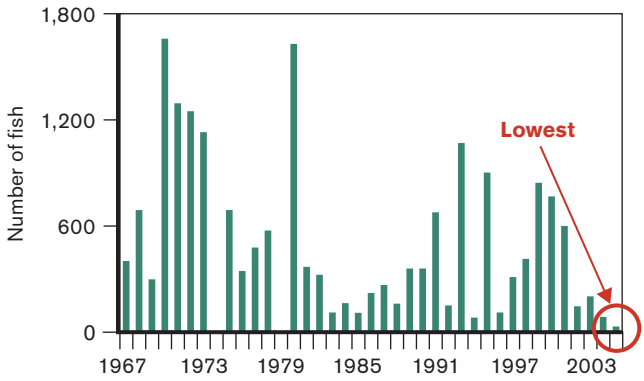
But instant, catastrophic failure is not the only danger facing the levees. Land subsidence (that is, sinking land elevations), sea level rise, and regional climate change all put significant additional pressure on the levee system. These are ongoing concerns that management of the Delta must address.

A second aspect of the Delta crisis is the health of its fish species (Figure 2). In fall 2004, routine fish surveys registered sharp declines in several pelagic (open-water) species, including the delta smelt, a species listed as threatened under the federal and state Endangered Species Acts. Subsequent surveys have confirmed the trend, raising concerns that the smelt–sometimes seen as an indicator of ecosystem health in the Delta–risks extinction if a solution is not found quickly. This is a legal and political necessity as much as an ecological one. Many aspects of Delta management are significantly affected by a number of federal and state environmental laws. These laws will have considerable bearing on any future management strategy of the Delta.

Source: California Department of Water Resources

Jones Tract Levee Break, June 2004

The third dimension of the crisis is institutional. CALFED, the joint federal and state program responsible for coordinating Delta solutions since the mid-1990s, has faced serious problems since late 2004. Both CALFED's failure to elicit anticipated funding and disagreements among stakeholders on some key elements of its program have contributed to a loss of confidence in this institutional framework. Since the summer of 2006, the California Bay Delta Authority–the body responsible for coordinating CALFED activities–has been operating without independent authority or budget. Thus, the strong leadership and financial resources needed to address the Delta's problems are currently lacking.



SOURCE: California Department of Fish and Game.

NOTE: The graph reports the indices for the fall midwater trawl. The circle indicates the 2005 level, a low point in the long-term decline of the delta smelt population.

Figure 2–Number of Delta Smelt Was Lowest Ever in 2005

Responding to the Crisis

As an immediate response to concerns over the health of the levee system, the state significantly increased the budget for levee repairs in 2006, and two bond measures passed in November 2006 allocate additional funds for flood control in the Delta. But there is as yet no broader plan for responding to the crisis in the Delta, including how the bond funds should be spent. Some planning efforts are now under way, including the Delta Vision process, launched by the governor in fall 2006. As these efforts go forward, some new ways of thinking about the Delta should be taken into account.

Source: California Department of Water Resources

California Conservation Corps repairing the Jones Tract Levee

First, a comprehensive solution for the Delta needs to consider the new understanding of the Delta's ecosystem that has emerged over the last several years. For the past 70 years, the state's policy has been to maintain the Delta as a freshwater system. However, to address the problems of the Delta's native species, a fundamental change in policy is needed. A Delta that is heterogeneous and variable in terms of its salinity levels and water flows is more likely to support native species than is a homogeneously fresh or brackish Delta. It is also more likely to reduce the effects of invasive alien species, which tend to thrive in more homogeneous environments. Accepting the vision of a variable Delta, as opposed to the commonly held vision of a static Delta, will allow for more sustainable and innovative management.

Second, new management solutions must also include goals for the human use of Delta resources—including land use and water supply and quality. But again, a change in thinking is necessary, particularly in terms of the ability to satisfy all goals simultaneously. The approach adopted by CALFED in the mid-1990s was that "everyone would get better together," and it was assumed that this could be achieved by managing the Delta as a single unit, simultaneously achieving improvements in habitat, levees, water quality, and water supply reliability. Going forward, Californians will need to recognize that the Delta cannot be all things to all people. Tradeoffs are inevitable. The challenge will be to pursue an approach that yields the best outcomes overall, accompanied by strategies to reasonably compensate those who lose Delta services.

Some Alternatives

The report constructs nine alternative approaches to a comprehensive solution for the Delta's problems. This list is not exhaustive; a near-infinite number of alternatives exist for managing the Delta. However, these nine alternatives allow the exploration of a variety of very different approaches in light of recent understanding of the dilemmas, vulnerabilities, and possibilities for Delta water and land management. Some of these alternatives have been under consideration at various times in the past; others are relatively new. Most seek a "soft landing" from the Delta's current severe disequilibrium and vulnerability.

Going forward, Californians will need to recognize that the Delta cannot be all things to all people. Tradeoffs are inevitable.

Three of these alternatives would maintain the Delta as a freshwater body, either by relying on current strategies or by building stronger systems. A second group of alternatives would manage the Delta as a more complex and fluctuating mosaic of uses, supporting water supply exports with peripheral or through-Delta aqueducts. A final group would reduce overall dependence on the Delta or potentially abandon the Delta altogether.

Freshwater Delta Alternatives

All three freshwater Delta alternatives would aim to maintain the Delta as a homogeneous freshwater body, continuing policies begun in the 1930s.

1. *Levees as Usual*. The current levee-intensive system would be maintained at recent levels of effort or modestly upgraded to meet federal standards for agricultural levees. Water exports would continue to be pumped through the Delta. Levee failures would occur with increasing frequency.
2. *Fortress Delta*. "Whatever it takes" investments would be made to support or fix levees deemed strategically important for urban areas, infrastructure, and water supply exports. To contain costs, the total length of the levees in the system would be shortened, reconfiguring some islands. Lower-reliability levees (mainly in the interior of the Delta) would be allowed to fail.
3. *Seaward Saltwater Barrier*. A permanent or movable barrier would be erected at the western edge of the Delta. This is one of the oldest and most extreme proposals

for keeping salt water at bay, but Dutch engineers have recently revived it, suggesting the construction of a large movable barrier, similar to the Maeslant storm surge barrier that protects Rotterdam in The Netherlands.

Fluctuating Delta Alternatives

In all three of these alternatives, environmental conditions, especially salinity, would be allowed to fluctuate in the western Delta to improve habitat conditions for native fish species.

4. *Peripheral Canal Plus*. An aqueduct would be constructed from the vicinity of Hood, on the Sacramento River, south along the Delta's eastern edge, sending water exports to Clifton Court Forebay. This would allow water exports to circumvent the Delta and yet continue to meet the Central Valley Project and State Water Project intakes that send water to other regions of the state. This proposal augments the traditional peripheral canal proposals with special operations, investments, and activities for environmental and other in-Delta land and water uses (hence the "plus").
5. *South Delta Restoration Aqueduct*. This aqueduct would be similar to the peripheral canal mentioned above, but its major outlet would enter the lower San Joaquin River. These supplemental freshwater flows would resolve various water quality and flow problems of the lower San Joaquin River and the southern Delta while improving the quality of water exports and reducing the capture of native fishes at the pumps. Some flows could be channeled into a wetland and flood bypass channel through the southern Delta, contributing to improved habitat and agricultural water quality. In-Delta investments would be made for environmental and other in-Delta uses.
6. *Armored-Island Aqueduct*. By armoring select islands and cutting off or tide-gating various channels within the central-eastern Delta, a major, semi-isolated freshwater conveyance corridor for water exports would be created. Various versions of this approach have been considered since the 1950s.

Reduced-Exports Alternatives

These alternatives do not rely on new Delta export facilities or on levees. However, they imply an ability to greatly modify the pattern and quantity of Delta water exports.

7. *Opportunistic Delta*. Only opportunistic seasonal exports would be allowed, during times of high discharge of freshwater from the Delta (generally winter and spring). Export pumping capacities would be expanded to accommodate these high pumping periods, and some surface storage within and near the Delta may be built. Salinity levels would fluctuate in the western Delta, and many islands would eventually become flooded. Urbanization would be possible along the Delta's periphery, behind strong levees.
8. *Eco-Delta*. The Delta would be managed as a single, unified entity to favor key Delta aquatic and terrestrial species. Water extraction, transportation corridors, and other functions would be maintained as long as they do not interfere with rehabilitation goals. Some water exports would occur but fewer than in the Opportunistic Delta alternative.
9. *Abandoned Delta*. A planned, multidecade retreat from the Delta would occur, with the phasing out of much of the Delta's farm economy. Water exporting agencies would transition to alternative water sources and would increase water use efficiency.

Delta Farmland Along the Sacramento River

The analysis of these alternatives suggests some promising solutions. How much would these solutions cost? Table 1 provides some broad estimates, showing both investment costs and annual costs for each alternative. What about effectiveness? A summary evaluation of each alternative appears in Table 2. The intent of this evaluation is to eliminate unpromising long-term directions for the Delta and point to some promising approaches, focusing the limited available attention, talent, and resources on those more likely to be successful over time.

The first three alternatives, which strive to preserve the Delta as a homogeneous freshwater body, feature poor environmental performance at great financial expense, even though some of them would secure substantial quantities of fresh water for export and use within the Delta. In particular, the current approach to managing the Delta–with moderate reinforcement of existing levees and net Delta outflows to keep the Delta fresh–prolongs its risks and vulnerabilities, which are likely to increase over time. Temporary or permanent in-Delta improvements for agricultural and urban land users do not overcome these drawbacks.

The second set of alternatives, which allows for local specialization and variability in the Delta, seems worthy of more detailed development and consideration. These alternatives are built around very different approaches for supporting water exports. In-Delta agricultural and urban users could both see benefits from levee strategies within these alternatives. Although elements of these alternatives will be familiar to many who know something about Delta water policy and politics, each has some fundamental differences from earlier proposals.

The final set of alternatives modifies current water export policies to gain the flexibility to achieve other objectives. At the extreme is the abandonment of the Delta for most purposes. We find that the environmental outcome of abandoning the Delta would be poor, because the Delta would likely have many undesirable ecosystem properties. Moreover, the economic costs to agricultural and other water users would be extreme. However, the Opportunistic Delta and the Eco-Delta alternatives, which would reduce water exports without eliminating them entirely, show some promise. Both would

Table 1. Economic and Financial Costs of Delta Alternatives

Alternatives	Investment Costs	Annual Costs from Water or Land Reductions	
		Statewide Water Users	Delta Agriculture
Freshwater Delta			
1. Levees as Usual	~ $2 billion, plus increasing costs of failure and replacement	Increasing costs as levees fail	Increasing costs from island flooding
2. Fortress Delta	> $4 billion	No additional water scarcity costs	Some land out of production from island flooding
3. Seaward Saltwater Barrier	$2 billion–$3 billion	No additional water scarcity costs	Increasing costs from island flooding
Fluctuating Delta			
4. Peripheral Canal Plus	$2 billion–$3 billion	Some water scarcity costs	< $70 million/year
5. South Delta Restoration Aqueduct	$2 billion–$3 billion	Some water scarcity costs	< $41 million/year
6. Armored-Island Aqueduct	$1 billion–$2 billion+	Some water scarcity costs	< $30 million/year
Reduced-Exports Delta			
7. Opportunistic Delta	$0.7 billion–$2.2 billion in Delta and near-Delta facilities	$120 million/year	< $50 million/year
8. Eco-Delta	Several billion dollars for eco-restoration + water user investments	< $500 million/year	$100 million/year
9. Abandoned Delta	~ $500 million	~ $1 billion/year	$200 million/year

NOTES: Capital costs do not include possible investment needs for nonwater infrastructure (e.g., roads, rail). All alternatives except #9 (and possibly #2) would require additional investments for urban levees to provide flood protection exceeding 200-year average recurrence. All alternatives except #8 and #9 would require additional investments for ecosystem restoration. Adding finer fish screening or bank filtration to intakes to reduce fish and larvae entrainment would increase costs and potentially reduce pumping capacities for Alternatives #1–8. Water scarcity costs occur when water deliveries are less than desired. Scarcity is often managed by price, rationing urban water use, fallowing some farmland, or curtailing recreational activities.

Table 2. Summary Evaluation of Alternatives

Alternatives	Summary Evaluation	Rationale
Freshwater Delta		
1. Levees as Usual (current or increased effort)	Eliminate	Current and foreseeable investments at best continue a risky situation; other "soft landing" approaches are more promising; not sustainable in any sense.
2. Fortress Delta (Dutch standards)	Eliminate	Great expense; unable to resolve important ecosystem issues
3. Seaward Saltwater Barrier	Eliminate	Great expense; profoundly undesirable ecosystem performance; water quality risks
Fluctuating Delta		
4. Peripheral Canal Plus	Consider	Environmental performance uncertain but promising; good water export reliability; large capital investment
5. South Delta Restoration Aqueduct	Consider	Environmental performance uncertain but more adaptable than Peripheral Canal Plus; water delivery promising for exports and in-Delta uses; large capital investment
6. Armored-Island Aqueduct	Consider	Environmental performance likely poor unless carefully designed; water delivery promising; large capital investment
Reduced-Exports Delta		
7. Opportunistic Delta	Consider	Expenses and risks shift to water-importing areas; relatively low capital investment; environmental effectiveness unclear
8. Eco-Delta	Consider	Initial financial costs likely to be very high; long-term benefits potentially high if Delta becomes park/open space/endangered species refuge
9. Abandoned Delta	Eliminate	Poor overall economic and environmental performance; southern Delta water quality problems; like Alternative #1, without benefits

allow greater fluctuation in salinity and would likely lead to improved environmental performance. These alternatives, along with the Fluctuating Delta options described above, merit further consideration.

The report does not endorse any single "best" solution among these alternatives. Detailed knowledge and further analysis will be needed before such a solution can be identified. Furthermore, the report suggests that the creation of a hybrid solution, relying on some combination of key elements, may provide the most promising path forward. (See the text box, "New Ideas for Managing the Delta," for a list of innovative approaches.)

Financing Change

No alternative will be ideal from all perspectives, and some would preclude certain current uses of the Delta entirely. Changes in the Delta will have significant costs and cause some dislocations. Because these various costs will be borne by different groups and regions, questions of fairness will be an inevitable part of the policy discussion, in addition to investment costs and operating expenses.

A Houseboat on the Sacramento River

How to pay for change in the Delta? User finance—that is, payment by the actual users of the investments—has many advantages. It frees public funds for truly public purposes, such as environmental restoration and mitigation, and it helps ensure that investments are cost-effective. However, to be effective in funding large-scale projects, this strategy must carefully balance the size of a project against different users' willingness to pay and must be backed by formal up-front financial commitments.

What about those who lose out economically or are displaced by future changes? Most users of Delta services have considerable ability to adapt; however, mitigation should be used to ease adjustment costs.

Policies could include a range of different forms of assistance, such as investment cost sharing to help western Delta water users develop new storage or conveyance systems, financial compensation for those who lose income or assets as a result of new water management strategies, community mitigation funds to assist the transition to new economic activities, and performance bonds to cover the risks of cost overruns or delays in large construction projects. In relation to California's $1.5 trillion per year economy, compensation costs—if properly managed—should be modest in statewide terms.

Central Themes

This report makes five major points about the current and future state of the Delta:

1. The current management of the Delta is unsustainable for almost all stakeholders. The combined effects of continued land subsidence, sea level rise, increasing seismic risk, and worsening winter floods make continued reliance on weak Delta levees imprudent and unworkable over the long term.

In relation to California's $1.5 trillion per year economy, compensation costs— if properly managed— should be modest in statewide terms.

2. Recent improvement in the understanding of the Delta environment allows more sustainable and innovative management. Seeing the Delta as a functioning ecosystem with fluctuating flows and salinity, as it once was, allows us to think of new solutions to the Delta's problems.
3. Most users of Delta services have considerable ability to adapt economically to risk and change. Water and land users have a wide variety of adaptive responses, which, although sometimes costly, do allow them to adjust. Moreover, users of the Delta also have a history of responding to change; many are already adapting in anticipation of worsening problems in the Delta.
4. Several promising alternatives exist to current Delta management. The situation is far from hopeless. A sustainable Delta economy and society can be built while providing water and other services statewide.
5. Significant political decisions will be needed to make major changes in the Delta. Incremental, consensus-based solutions are unlikely to prevent a major ecological and economic catastrophe of statewide significance.

Recommendations

The report recommends a number of actions and activities.

Technical and Scientific Approaches

1. *Create a technical track for developing Delta solutions.* Most recent attempts to solve the Delta's problems have been politically driven. The political track of any Delta solution is necessary, but it can be better informed by a technical track, which can develop new solutions and adapt older solutions to current and future conditions.
2. *Establish an institutional framework to support the development of solutions and to bring scientifically and economically promising alternatives to the attention of political authorities*. This activity needs to take a long-term view and avoid crisis-driven responses to short-term political thinking. It should have some political independence, an appropriately sized budget, the technical capability to creatively and competently explore and eliminate alternatives, and the management capability to direct multidisciplinary research and development.
3. *Launch a problem-solving research and development program*. Much past research on the Delta and its problems has been associated with agency data collection or basic academic and disciplinary research. A directed problem-solving research and development program aimed primarily at developing and informing the analysis of promising solutions is needed. This program would include some basic research, but most effort would be aimed at developing and evaluating solutions.
4. *Consider the Delta's water delivery problems in a broad context.* The foremost physical problem in the Delta is delivery of fresh water through or around the Delta. And some promising solutions exist. However, physical solutions for water delivery must be accomplished in the broader context of developing a more sustainable Delta environment.
5. *Eliminate some solutions to the Delta's water delivery problems from further consideration.* To reduce investments of scarce time, expertise, and resources in evaluating Delta alternatives, some unpromising options should no longer be considered. These include Levees as Usual, Fortress Delta, the Seaward Saltwater Barrier, and the Abandoned Delta–all unreasonable solutions that perform so poorly in economic and environmental terms as to be nonviable.
6. *Approach the Delta as a diverse and variable system rather than as a monolith.* A diversified and variable Delta by design is likely to perform better than the freshwater Delta that has been artificially maintained over the last 60 years. Better solutions are likely to emerge if the Delta is not treated homogeneously. Historically, the Delta naturally contained diverse habitats. Reintroducing and extending

New Ideas for Managing the Delta

Although the report draws on the long history of thinking about management options for the Delta, it includes several relatively new ideas.

- *Creating localized Delta specialization.* Traditionally, policymakers have sought to treat the entire Delta homogeneously. Letting different parts of the Delta specialize in particular functions or services may allow greater overall sustained performance for all, or almost all, purposes. Spatial and temporal variability in flows, water quality, and habitat was common in the pre-European Delta.
- *Establishing a western Delta fluctuating-salinity ecosystem.* Western Delta salinity appears to have naturally fluctuated more in the past than it does now; reintroducing this fluctuation in parts of the western Delta might benefit native and desirable alien species.
- *Using peripheral areas, such as Suisun Marsh and Cache Slough, to bring back desirable natural conditions that existed in the Delta historically.* These are especially promising examples of locations that could serve valuable environmental functions.
- *Allowing urbanization of some Delta lands.* Local land use pressures, access to major transportation and employment centers, and financial opportunities make urbanization of some Delta lands seemingly inevitable, despite the high risks of flooding. Urbanization has significant potential to contribute financially and politically to solving problems in the Delta. Careful regulation should be able to provide sufficient flood protection and prevent urbanization from unreasonably interfering with environmental functions.
- *Building a Sacramento–San Joaquin Canal (Alternative #5).* Such a canal would supplement lower San Joaquin River flows with Sacramento River water to provide water near export pumps. It would simultaneously improve freshwater quality and availability in the lower San Joaquin River and the southern Delta. This canal would provide larger supplemental flows to the San Joaquin River than earlier peripheral canal proposals.
- *Creating a San Joaquin River marsh and flood bypass.* As part of the Sacramento–San Joaquin Canal alternative, such a system would provide additional habitat for fish and wildlife, water quality improvements for farmers in the southern Delta, and flood bypass capacity for the lower San Joaquin River.
- *Managing expectations and providing mitigation alternatives.* It is unlikely that any Delta solution can satisfy all Delta interests in terms of water and land use. This approach differs from the underlying assumption of CALFED that all Delta interests could "get better together." Stakeholders whose land and water interests cannot be directly satisfied may be compensated by financial or other means. Even with such mitigations and compensations, one cannot reasonably expect universal satisfaction.

this diversity by specializing parts of the Delta for wildlife habitat, agriculture, urban, recreation, water supply, and other human purposes seem promising.

Governing and Financing Change

1. *Give direct beneficiaries primary responsibility for paying for Delta solutions.* Public funds, such as those raised through general obligation bonds, should be reserved for the truly public components of a Delta investment program, such as ecosystem restoration and mitigation for those who lose out. Failure to develop an effective funding mechanism, including up-front financial commitments from beneficiaries of large investments, will result in financial catastrophes for state and local interests in the future, especially in the wake of a natural disaster.
2. *Establish mitigation and compensation mechanisms to support the implementation of any alternative.* Not everyone will get what they want or what they have been used to getting from the Delta. In some cases, providing money or alternative land might compensate for changing or eliminating uses of water or land that would hinder broad progress.
3. *Create stronger regional and statewide representation in Delta land use decisions.* The current institutional fragmentation of land use authorities in the Delta fosters piecemeal decisionmaking that will compound flood risks, irreversibly destroy valuable wildlife habitat, and cause water quality to deteriorate. The Delta needs a strong regional permitting authority, along the lines of the San Francisco Bay Conservation and Development Commission or the Coastal Commission.

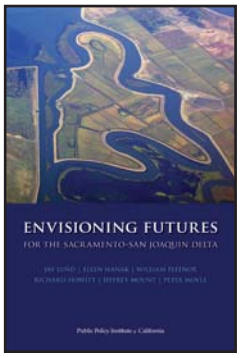
Urgent Items for Policy Action and Debate

1. *Make essential emergency preparedness investments.* All agencies relying on Delta waters should develop extended export outage plans through regional interties, water sharing arrangements, and other measures. Other infrastructure providers also need contingency plans. Programs for the rapid repair of critical levees, such as the one launched in 2006, and emergency flood response plans are key.
2. *Implement a "no regrets" strategy for the Delta.* Given the urbanization pressures on the Delta, policy decisions are needed to establish an improved regional governance structure, institute a program to set aside or purchase key habitat, and create adequate, coherent flood control guidelines for urbanizing lands.
3. *Make tough decisions about responses to levee failure.* To avoid costly expenditures for islands that are of low strategic value, it makes sense to develop a "do not resuscitate" list in the event of levee failure.
4. *Begin restoration projects.* To improve habitat conditions for the delta smelt and other pelagic fish species in the short term, restoration actions should be initiated in the Suisun Marsh and Cache Slough regions.

Facing the Tradeoffs and Moving Forward

The task at hand is urgent, and the stakes in the Delta are high. If California fails to develop a viable solution and act on it soon, we risk the loss of native species and important ecosystem services–and face significant economic disruptions. Yet there is also a risk of prematurely closing off the consideration of options that could help California make the most of the Delta while protecting its unique ecosystem and species.

The CALFED process, which has been responsible for developing solutions in the Delta since the mid-1990s, is now widely perceived as having failed to meet its objectives. CALFED's failure lay in the course chosen for crafting solutions: favoring political consensus over making tough choices and assuming that taxpayer largesse would foot any bill. The question going forward is whether the current crisis in the Delta can spur stakeholders and the state to action, using new strategies that accept the inevitability of both winners and losers in any long-term plan. The future of this unique ecosystem and regional resource, as well as the state's water supply system, all depend on the answer. All Californians are likely to see benefits (and costs) from a comprehensive long-term solution. Otherwise, we will all see only costs.



This research brief summarizes a report by Jay Lund, Ellen Hanak, William Fleenor, Richard Howitt, Jeffrey Mount, and Peter Moyle, Envisioning Futures for the Sacramento–San Joaquin Delta. *(2007, 324 pp. $25.00, ISBN 978-158213-126-9). The report may be ordered online at www.ppic.org or by phone at (800) 232-5343 or (415) 291-4400 (outside mainland U.S.). A copy of the full text is also available at www.ppic.org. The Public Policy Institute of California is a private, nonprofit organization dedicated to independent, objective, nonpartisan research on economic, social, and political issues affecting California.*

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