

# **DELTA VISION STRATEGIC PLAN**

**Third Staff Draft**

**CONTENT HAS NOT BEEN APPROVED BY DELTA VISION BLUE RIBBON  
TASK FORCE OR DELTA VISION COMMITTEE**

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Comments received before the following dates will be reviewed by staff as the draft strategic plan is revised for discussion at the subsequent Delta Vision Blue Ribbon Task Force meeting:

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## ***Introduction***

The California Delta is the heart of our state. It is an ecosystem, a water supply, and a place that is indispensable to modern California (see Figure 1). But the Delta is at a major turning point in its history. Previous generations shaped a Delta that has generated large benefits for the people of California, but which now cannot be sustained. Challenges that have been accumulating for decades have left the state with no choice but to chart a fundamentally new course for Delta management.

In *Delta Vision: Our Vision for the California Delta* (published in December 2007, and referred to as the Vision), we describe a future in which the Delta can continue thriving over coming generations despite major challenges like climate change, subsidence, and population growth. At the heart of the Vision is a set of 12 integral recommendations (see Figure 2). Of these, the first two are especially central:

1. The Delta ecosystem and a reliable water supply for California are the primary, co-equal goals for sustainable management of the Delta.
2. The California Delta is a unique and valued area, warranting recognition and special legal status from the State of California.

Based on these 12 recommendations, this Strategic Plan sets forth 18 strategies necessary to meet the state's needs for environmental stewardship and water supply, and the needs of the Delta itself. California's water supply and the Delta ecosystem are both irreplaceable assets of paramount importance to the state's future. Neither can be fully secure if the other ails; the ecosystem will remain under stress if water supplies are unreliable, and the water supply will remain vulnerable to interruptions if the ecosystem is unhealthy. Actions taken to manage the Delta must secure the future of both while protecting the Delta's unique characteristics as a place.

### **Current behaviors and policies are unsustainable**

Current laws, regulations, and management structures are insufficient to resolve these challenges, and better information and coordination alone will not tip the scales. Dramatic strengthening of public policies and institutions is required to move beyond the current chaos and build toward a sound future.

Californians' expectations and behaviors regarding water use must also change. No geographic region, economic sector, or group of water users will be unaffected by the inevitable changes coming: increasing population, the need to protect species and ecosystems, and climate change will force change for the whole state. Our Vision identified these forces, as do many other scientific analyses of the future of water and other resources in California, the American West, and the world.

### **Innovative actions are possible**

Consistent with our Vision, this strategic plan identifies actions which will affect all Californians and provides special status to none. California's system of water rights,

including reasonable use and public trust principles, provides a sound framework for implementing these recommendations. However, new legislation will be required, new investments in ecosystem revitalization and water conveyance made, additional floodplains protected, and water use efficiency and conservation improved. In all these areas, claims that change cannot apply to a specific area or water use are already heard and can be expected to increase. Many of these claims are and will continue to be advanced with legal rationale. This is to be expected and must not paralyze effective, timely policy making.

Effectively establishing the foundation of transparency and equal commitment to achieving the two co-equal goals of ecosystem vitality and water supply reliability is critical to the long-term success of the entire state. Granting preferential treatment upon any interest now will only compound and increase the difficulty of future policy making and the cost of eventual adaptation.

### **Meeting difficult challenges**

Adopting and implementing these strategies will be hard politically; we see no possible way to implement these policies without discomfiting most Californians. Equally, however, we see no way to meet the charge given to Delta Vision without confronting these challenges and recommending innovative and effective strategies.

Costly change is hard for Californians to accept and hard for policy makers to engage. Virtually all households and businesses will face increased water prices in the future. Virtually all irrigated agriculture will face increased water prices in the future. Investments in permanent agricultural crops, such as orchards and vineyards, and in urban landscaping will become more risky given challenges in providing reliable water supplies. Policy makers can decide to discourage water use for urban landscaping by regulation or increased water prices may make such uses unattractive to households. Over the next decades, water use for all purposes will become more expensive and likely also more subject to regulation. Achieving reliable water supplies for critical uses at reasonable prices is a realistic goal, but achieving reliable water supplies for all uses at low prices cannot be achieved no matter how often promised.

Our Vision called for reduced reliance on the Delta as a water source, and no other significant source of captured water is likely to be available to California in the foreseeable future. To the contrary, water supplies in California are already over-promised, supplies from the Colorado River will decrease, and climate change is likely to make capture, storage, and conveyance of water more difficult. These factors are all magnified during any short-term drought or long-term dry weather cycle.

The goal of choice and action now—even in the face of feared change, claims of privileged position, and the impacts of increased costs—is a better future for California. Increased effective investments in ecosystem functions, increased water conservation, regional self-sufficiency, and other strategies recommended in this Strategic Plan can result in a future better for Californians than the continuation of inconsistent and unbalanced current behaviors or policies that favor one or another interest or region.

## ***The Delta Vision context***

Executive Order S-17-06 launched Delta Vision in early 2007 to manage the Delta “over the long term to restore and maintain identified functions and values that are determined to be important to the environmental quality of the Delta and the economic and social well-being of the people of the state”. This comprehensive effort addresses increasingly visible crises in ecosystems, levee failure risk, and uncertainty in the ability to provide water to the two-thirds of Californians who receive water from the Delta and its watershed.

In the same timeframe, the Delta Risk Management Strategy (DRMS) has assessed risks to Delta levees, and the Bay Delta Conservation Plan (BDCP) was initiated to achieve regulatory compliance of Delta water exports to endangered species laws. The urgency of these efforts has been magnified by growing recognition that existing institutions and policies are not addressing policy challenges effectively and likely will not be adequate for the future.

### **Intensifying conflicts in the Delta**

As Delta Vision has unfolded, legal uncertainty about the ability to protect species and export water has increased and drought has stressed water supplies. All of the following events in 2007 and 2008 intensified conflict over the Delta:

- In two high-profile legal cases, federal judge Oliver Wanger invalidated biological opinions and policies adopted to protect Delta smelt and several species of salmon and steelhead, Judge Wanger imposed interim remedies in the smelt case, to remain operative until a new biological opinion is issued. He has not yet ruled on the need for interim remedies for salmon and steelhead. Legal challenges to renewals of water contracts based on the rejected Delta smelt biological opinion will be heard in late August 2008.
- A short-term voluntary shutdown of the state water project in summer 2007 to reduce entrainment of Delta smelt revealed the immediate impacts on Delta-reliant water users, mostly near the Delta, that can come with drastic pumping reductions.
- Precipitous declines in the populations of most major open-water (a.k.a. pelagic) fish species, which began early in the decade, continued. Populations of the Delta smelt fell to record-low levels, sparking serious concerns about possible extinction. In 2008, the State of California took the unprecedented step of prohibiting salmon fishing statewide for the entire year to help populations rebound.
- The California Fish and Game Commission identified longfin smelt as a candidate species under the California Endangered Species Act and adopted emergency regulations governing incidental take during the 12 month candidacy period. The

U.S. Fish and Wildlife Service (USFWS) took the first steps toward possible listing of longfin smelt under the federal Endangered Species Act.

- Two consecutive years of low precipitation and snow pack accumulation led Governor Schwarzenegger to declare an official drought in June 2008 and to declare a drought emergency in nine Central Valley counties a month later. Between 250,000 and 275,000 acres of annual agricultural crops were abandoned in the Central Valley that summer, due to reduced water supplies.
- Many water districts across the state urged conservation and some established mandatory water use reductions.
- Inter-regional legal disputes regarding the role of the Delta in water supply increased:
  - Several major water districts reliant on Delta water initiated a challenge, based on the California Environmental Quality Act (CEQA), focused on the discharge of additional nutrients into the Delta against the Sacramento Regional County Sanitation District’s plans for long term expansion.
  - The Central Basin Municipal Water District filed suit against the drought water allocation plan adopted by the Metropolitan Water District of Southern California.
  - The San Joaquin River Group filed a letter with the State Water Resources Control Board (SWRCB) alleging illegal water diversions in the central and south Delta.

These developments collectively signal the need for a major shift in water and ecosystem policy making in California. Most Californians receive water supplies from systems designed and primarily constructed before passage of modern species protection laws. The Wanger cases, in particular, have unambiguously signaled that water delivery systems must now comply with species protection laws. Moreover, the remedies imposed by Judge Wanger also signal that water needed by endangered species will be provided as a first obligation.

In a separate decision on the legality of the Programmatic Environmental Impact Statement/Report of the CALFED Bay-Delta Record of Decision under CEQA, the California Supreme Court also commented on the interplay of water exports and endangered species laws. The Court strongly – and unanimously – stated::

“...Bay-Delta ecosystem restoration to protect endangered species is mandated by both state and federal endangered species laws, and for this reason water exports from the Bay-Delta ultimately must be subordinated to environmental considerations. The CALFED Program is premised on the theory, as yet unproven, that it is possible to restore the Bay-Delta’s ecological health while maintaining and perhaps increasing Bay-Delta water exports through the CVP [Central Valley Project] and SWP [State Water Project]. If practical experience demonstrates that the theory is unsound, Bay-Delta water exports may need to be capped or reduced.” (In re Bay-Delta Programmatic

Environmental Impact Report Coordinated Proceedings [S138974], slip opinion at pg. 26)

### **Constitutional and common law principles**

Similar to the pattern for species protections, the state constitutional and common law principles of reasonable use and public trust have been difficult to incorporate into established water use policies. These principles are critical to ensuring long term sustainable levels of water use and the protection of fish and other values dependent on stream flows.

For decades, state and federal policy makers and water managers successfully focused on providing water to agriculture, households and businesses, while largely treating the reasonable use and public trust doctrines, and endangered species laws, as constraints that were only relevant when imposed by a court. The California Department of Fish and Game, and the State Water Resources Control Board, charged with implementing laws in these areas, were under-resourced and frequently marginalized in water policy-making. However, recent court actions regarding species protection and reasonable use and public trust principles, mean current patterns of water use in California that rely on capture, storage and conveyance facilities and operations are now subject to increasing regulatory restrictions and conditions on operations.

An analysis of reasonable use and public trust cases by the California Office of the Attorney General concludes that “the State, acting through the Legislature, the SWRCB and other state agencies, and the courts, has substantial ability to reallocate water when necessary to prevent unreasonable use, achieve water quality, protect the public trust, avoid nuisance and respond to emergency situations.” . Area of origin claims have a priority and may result in reallocation of water rights but do not provide an absolute claim on water uses, remaining subject to reasonable use and public trust. The reasonable use and public trust cases require “balancing” tests for policy making in which no single interest or principle automatically prevails. Overall, under these doctrines, the State of California is able to make strong affirmative policy regarding use of water resources, and the courts are most likely to accept policy makers’ decisions when based on best available science and robust policy processes.

### **Water crises around the world**

California's Delta is not alone in facing a 21st century water crisis with 20th century infrastructure and institutions. The Colorado River Basin has just experienced an eight-year drought revealing that earlier allocations cannot be sustained, and the amount of water California is able to draw from the river has fallen 18% since 2003. Looking east across the United States, since 1990 the Missouri River system has been the focus of nearly a dozen lawsuits, with the recent drought dividing upper and lower basin interests in multiple states, and placing flood control and navigation in stark opposition with endangered species preservation. The Great Lakes-St. Lawrence River Basin is looking at an estimated \$15 to \$20 billion in restoration and cleanup costs associated with invasive species and raw sewage discharge. The eight states bordering the Great Lakes have worked together and with two Canadian provinces to protect those waters. The states recently signed an interstate compact to for sustainable management of water

resources of the watershed of the lakes, including provisions for conservation, reporting all diversions, managing ground water and limiting diversions outside the watershed. The compact is now pending before Congress which must approve interstate compacts. In late 2007, an extreme drought in the Southeast led to a water crisis in Atlanta and increased conflict over water among Alabama, Georgia, and Florida.

Looking further east across the Atlantic, France, Germany, Britain, and the European Union as a whole have all issued major legislation in the past decade to try and balance needs for flood control, surface and groundwater management, water quality, and endangered species. In the Netherlands, by 2050 the Room for Rivers project plans to return an estimated 220,000 acres to floodplains, natural forests, and marshlands, designate 62,000 acres of pasture as temporary floodwater storage pools, and require 185,000 acres of farmland to adopt land use practices that tolerate soggy conditions in the winter and spring; the estimated spending is between \$19 and 25 billion over the next 50-100 years. And in Australia, the worst drought in 200 years has led the federal government to take over the water rights of the four Murray-Darling Basin States, reduce the over-allocation of water resources, purchase water licenses from willing sellers, assist farmers in relocating, establish surface and groundwater caps, and change the water rights system to better reflect drought and climate change risks.

### **Mounting pressures in the Delta**

The crisis in the Delta accelerated in 2007-8, but it was by no means new. Indeed, the formation of Delta Vision came in response to worries about the long-range sustainability of the Delta, and the recognition that previous efforts to secure its future had failed. Three events in particular shaped the context in which Delta Vision was created.

- In 2005, Hurricane Katrina tragically revealed that even the relatively well engineered levee system protecting New Orleans could be breached, with ruinous consequences. California policymakers subsequently realized that Delta levees, in their current form, are not sufficient to protect against existing earthquake and flood risks, much less future climate change impacts.
- In 2003, the decision of the California Supreme Court in *Paterno v. State of California* established that the state bears liability for the failure of any levee that it has even partially financed or constructed, potentially exposing California taxpayers to very large liability burdens. The state passed a package of floodplain laws in fall of 2007 to improve flood control throughout the Central Valley and reduce liability, but concerns persist that development in floodplains such as the Delta will increase risks and liabilities to the state as a whole.
- In 2005, the state's Little Hoover Commission also recognized that the CALFED process, launched by the Bay-Delta Accords in 1994 and formalized by the CALFED Record of Decision in 2000, had failed to meet its goals of managing the Delta for sustainability. In particular, CALFED was criticized for its voluntary nature, in which "no one level of government is fully in charge, or capable of responding in an orderly and effective way to address and mitigate the range of threats to the Delta" (E.O. S-17-06).

## **Drivers of change**

These threats are growing. The U.S. Geological Survey estimates a roughly 2-in-3 chance that the Bay Area will experience a large-magnitude earthquake before 2032, likely along one of the six faults that lie relatively near the Delta. The Department of Water Resources (DWR) and CALFED have estimated that such an event could cause up to 30 levees to break, flood thousands of homes and farms, and interrupt water exports indefinitely due to saltwater intrusion into the southern Delta. The cost to the California economy could run as high as \$40 billion.

Earthquakes are not the only source of risk. Subsidence of soils and climate change will gradually exert greater and greater pressure on levees, as the gap between land elevations and rising sea levels grows. Levee failure probabilities will increase accordingly. In addition, climate change is expected to produce more rain and less snow in the Delta watershed, increasing the potential for large river floods that could destroy numerous levees.

Population growth in the Delta watershed will also affect the Delta in powerful ways. Demand for new water diversions throughout the watershed will grow inexorably unless major changes are made in how we manage water in the state. An analysis by the SWRCB showed that up to 4.8 million acre-feet of new water rights applications are already pending before the Board. While some of these applications will not be pursued and others are judged unlikely to be successful, demand for water in the Delta watershed will increase. In addition, growing populations may also produce larger flows of contaminants washing into the Delta to damage water quality, unless major efforts at source control are made.

Finally, it is likely that new invasive species will be introduced into the Delta in the coming decades. Existing invasives have had an enormous impact on the ecosystems of the Delta, altering entire food webs to the detriment of natives. These and other predicted changes to the ecosystem, such as increasing water temperatures due to climate change, will continue to threaten the viability of existing fish species. The Natural Resources Defense Council, for example, has already issued a warning about the possible loss of all salmon in the Delta watershed – almost half of California.

## **Organization of the Strategic Plan**

Along with the legal and institutional backdrop of Delta Vision, the drivers of change provide a fundamental context for our Strategic Plan recommendations. In the document that follows, we present, in this order:

- The four major themes that characterize this Strategic Plan
- A description of our overall strategic direction in addressing the Delta's challenges
- A preliminary "Report Card" with which legislators, agency officials, and the public can assess progress toward the realization of the Vision and the implementation of the Strategic Plan

- A summary of the proposed phasing of implementation
- Descriptions of each of the 18 strategies that make up the Plan

## ***Four Key Themes***

The strategic direction undertaken in this Plan may be characterized by four key themes. These themes are a direct outgrowth of the priorities expressed in our Vision, and of the legal, institutional, and historical context of the Delta.

### **Revitalization, not Mitigation**

In order to fulfill the co-equal values of a healthy ecosystem and a reliable water supply, California must move beyond an environmental management strategy dominated by mitigation for water project development. Effective ecosystem revitalization is a much better long-term strategy for achieving environmental goals as it (a) better supports diverse species at any point in time, (b) is less fragile to major disruptions and (c) increases opportunities for adaptation to changing circumstances such as sea level rise or increases in temperature. An effective ecosystem revitalization strategy of sufficient scale should also reduce future listings of species as threatened or endangered.

### **Sustainability, not Extraction**

Water management in the Delta watershed should focus on sustainability of supply, rather than the extraction mentality that has dominated water planning in the past. While quantity of supply will always be an important consideration, policy makers must primarily emphasize the sustainability of those supplies. In the coming decades, the most reliable – and thus the most valuable – water supplies will be those that can be obtained with the least damage to the environment. Sustainable and reliable “supply” will therefore require conservation and efficient use of water.

### **Recognition, not Abandonment**

The Delta region will change regardless of public action; floods, sea level rise, and diversions and uses of water throughout the Delta watershed ensure change will occur. This strategic plan recommends actions which will change the Delta, but the strategic approach is to encourage recognition, not abandonment, of the Delta’s unique character. That unique character includes agriculture, recreation and a distinct social and cultural fabric. Strategic improvements to the levee system, support for sustainable agriculture, investments in the tourism and recreation economies, and decisions about land use should contribute to the recognition and preservation of the Delta’s special values as a place.

### **Consistency, not Chaos**

Finally, though the governance system managing the Delta must be greatly strengthened, this should be done in a manner that emphasizes consistency of action among existing governing agencies, not through top-down control by one “super-agency.” This applies to federal, state and local agencies, all of which will continue to have a vital role in governing the Delta. Consistency of action, guided by a clear and enforceable plan, will enable needed progress in making the other three themes a reality.

## ***Strategic Direction***

Our Strategic Plan directly addresses the challenges produced by the Delta’s legal and physical context through the 18 strategies listed in Table 1. The enhancement of the co-equal values of a healthy ecosystem and reliable water supply remains the prevailing goal. As our themes state, we do this by plotting a course to ensure consistency of governmental action, sustainability of water supply, revitalization of the ecosystem, and recognition of the Delta as a place.

The need for strengthened governance lies at the heart of the Delta’s challenges. The quality and flexibility of governance is a pivotal concern that stretches across all aspects of Delta management. Crises of ecosystem deterioration and water supply interruption have physical solutions, but our ability to decide upon, implement and adjust these solutions as necessary is a governance challenge.

### **Existing governance shortcomings**

When surveying the myriad governance agencies and institutions that currently have a stake in the Delta, one is struck by the realization that no one is in charge. Literally hundreds of governmental entities can affect the Delta, but none is ultimately responsible for the overall well-being of the water system, ecosystem, and Delta region. Some of the major shortcomings of the existing governance of the Delta are:

- No single entity is charged with maintaining the health of the Delta as an integrated aquatic system, or managing risks to the system.
- State interests and liabilities can be strongly impacted by decisions over which the state has limited control, such as local land use decisions.
- Ecosystem management is primarily driven by reactive federal court decisions or mitigation projects, rather than a pro-active plan for revitalization.
- Federal court decisions to protect the ecosystem are species-specific and only arrive once that species is already in significant jeopardy.
- The principles of reasonable use and public trust are not routinely incorporated into the management of the Delta.
- There is insufficient data about many issues critical to the management of the water system, such as the magnitude of diversions throughout the watershed and within the Delta, and the use of groundwater.
- Penalties for illegal diversions (even when they are discovered) are too weak.
- Applications for new water diversions continue to mount without sufficient capacity to judge their collective impact on the co-equal values, and make decisions accordingly.

**Table 1. The 18 Strategies**

- 1 Vastly improve the efficient use of water.
- 2 Optimize regional self-sufficiency by increasing the diversity of local and regional water supply portfolios
- 3 Integrate Central Valley flood management with water supply planning.
- 4 Improve the reliability and predictability of water diverted from the Delta Watershed to support the co-equal values
- 5 Improve water quality for drinking water, agriculture, and the ecosystem.
- 6 Restore extensive interconnected habitats.
- 7 Restore Delta flows and channels to reflect California climate patterns and support a healthy Delta estuary
- 8 Reduce or eliminate ecosystem stressors to below critical thresholds.
- 9 Establish an effective adaptive management framework to support ecosystem revitalization.
- 10 Establish multi-purpose migratory corridors along selected Delta river channels.
- 11 Designate the Delta as a unique and valued place.
- 12 Achieve levels of emergency protection consistent with federal and state policies.
- 13 Adopt an overarching policy for levee design, investment, financing, priorities, and maintenance.
- 14 Ensure appropriate land uses in the Delta region.
- 15 Create a new governance system to manage the co-equal values and other state interests in the Delta.
- 16 Create a California Delta Ecosystem and Water Plan to ensure flexibility and consistency of action among state, federal and local entities.
- 17 Finance the activities called for in the CDEW Plan through user fees and other effective and transparent financing tools.
- 18 Improve the compliance of the diversions and use of water with all applicable laws, regulations and constitutional principles.

- The institutional barriers to adjusting Delta management to meet the demands of evolving conditions are too high, and therefore such adjustments occur too slowly.
- The same agency (DWR) must operate the SWP, in which it is responsible for meeting contractual obligations to the State Water Contractors, and conduct statewide water planning, in which it is responsible for an objective balancing of interests and needs throughout the state.

A new governance structure for the Delta must address these shortcomings, and must clearly assign responsibility for the management of the co-equal values and other state interests. It also must do so in a way that retains needed management flexibility over the long term. Comprehensive and effective governance need not mean centralized governance, however. Striking the right balance between governmental and private structures, between local, regional and state interests, and between regulatory and market-based incentives, are all keys to a successful governance structure.

### **A new governance structure**

At the core of our Strategic Plan is the proposal to create an appointed California Delta Ecosystem and Water Council (CDEW Council) to oversee the implementation of a legally binding California Delta Ecosystem and Water Plan (CDEW Plan). The CDEW Council should be a small body, numbering five to seven individuals appointed by the Governor and confirmed by the Senate. Figure 3 illustrates the proposed governance structure with the Council in a central role. The governance structure is described in greater detail in Strategy 15 and 18.

The CDEW Plan will be the primary mechanism for ensuring consistency of action among federal, state and local government, and will articulate the policies and standards with which Delta management must comply. It must satisfy requirements of the Coastal Zone Management Act (CZMA), which enables state governments to create coastal plans with which federal agencies must coordinate. The CDEW Plan will fulfill a variety of functions, described further in strategy 16, but chief among them are:

1. Establishing binding targets and management objectives for the Delta ecosystem and water supply reliability that incorporate any plan developed under species protection laws;
2. Articulating state land use interests in and around the Delta, especially those that impact the ecosystem, water supply reliability and flood control, and identifying appropriate mechanisms to protect these interests.

Based on the recommendations of this Strategic Plan, the CDEW Plan will identify which actions are to be undertaken by which agencies, and the timelines and performance standards that must be met. The CDEW Plan should be carried out by a mixture of existing entities, such as the DWR, the DFG, the Delta Protection Commission (DPC), and the SWRCB, and the following new entities:

- A Delta Conservancy to acquire appropriate lands and implement ecosystem revitalization projects;
- A California Water Utility to operate and maintain the State Water Project so that the DWR can focus on statewide water planning and flood control;
- A Delta Operations Team (combining individuals with relevant expertise in state and federal agencies) to manage water flows into and out of the estuary on behalf of the co-equal values, on a day-to-day basis;
- A Delta Science and Engineering Program to advise the CDEW Council on technical issues, and to design and support adaptive management of the estuary; and
- A Public Advisory Group to serve as a point of communication between the CDEW Council and the larger public.

This governance structure is intended to learn from the successes and failures of previous Delta governance efforts. Most notably, CALFED broke new ground in achieving inter-agency coordination, soliciting public input, and sponsoring fundamentally important science research. The CALFED governance structure, however, was faulted for its lack of formal implementation authority. The governance structure proposed here retains CALFED’s emphasis on agency coordination, public input, and high-quality science, but also seeks to ensure implementation success by empowering the CDEW Council to require agency adherence to the CDEW Plan, by control of significant financial resources, and by other means.

The governance structure also seeks to improve on the existing situation by creating certain new institutions to rectify specific shortcomings. The Delta Conservancy should be created so that there is a single entity that can implement land-related elements of the CDEW Plan comprehensively, and yet also act with appropriate speed and flexibility when acquisition opportunities arise. The revamped Delta Science and Engineering Program is intended to ensure that evolving scientific knowledge is incorporated into Delta management on a routine and timely basis (see Strategy 9).

The Delta Operations Team, under the direction of the CDEW Council, will work to ensure that the co-equal values are advanced in the day-to-day water operations of the Delta. Finally, the California Water Utility would ensure that management of the State Water Project can proceed without conflicts with statewide water planning functions.

The governance structure seeks to link the co-equal values of a healthy ecosystem and a reliable water supply, not only through the CDEW Council and the Delta Operations Team, but also through financing structures. In the proposed structure, water required to revitalize the ecosystem will not be purchased, but will be provided within the state’s water rights system by exercising the constitutional principles of reasonable use and public trust. The Council and its activities will be financed from several sources, including by a per-acre-foot fee levied on all diversions within the Delta watershed, and a separate per-acre-foot fee on any water conveyed through or around the Delta. In addition, the text of authorizing statutes and all financing instruments should include

language that explicitly links project implementation timetables for ecosystem revitalization and water supply reliability improvements.

### **Managing Delta water flows in statewide context**

Water supply reliability and a revitalized ecosystem must also be linked in the management of water throughout the Delta watershed. California’s hydrology is highly variable. Native aquatic ecosystems, including the Delta, are adapted to that variability, but water users need predictable and consistent access to water (either flowing or stored). For the co-equal values to be advanced, this difference in needs and priorities must somehow be reconciled.

In our Vision, we argued that conveyance and storage facilities in the Delta watershed, the Delta itself, and the export areas would have to be improved, and better linked, in order to meet this goal. As a general strategic principle, we need to ensure that water can be moved and stored when it is least harmful to the environment, and that the stored water is accessible to purveyors and users at times of their choosing. We use the term “wet-period diversion system” as shorthand for this principle, recognizing that the very wettest periods also have special ecological value that should not be sacrificed. Nonetheless, we must take advantage of abundance when it exists, so that conflict between water needs and ecosystems can be reduced during the dry periods.

This principle has a number of important implications that shape our strategies. First and foremost, it suggests that localized supplies are preferable to moving water long distances. The more self-sufficient each region of California can be, the less stress is placed on the Delta ecosystem as a “switching yard” for huge quantities of water moving around the state. Two of our key strategies flow from this idea: increasing water use efficiency and conservation in all uses of water in the Delta watershed (Strategy 1), and maximizing regional water self-sufficiency throughout the state (Strategy 2).

The primary tools to manage the co-equal goals in the Delta – while also meeting the eventual increase in demands from a growing population – are to dramatically improve water use efficiency and to expand locally generated and managed water supplies (i.e. regional self-sufficiency). These include greatly expanding water re-use, water recycling, desalination, and local stormwater capture, along with greatly improved groundwater management and information gathering infrastructure.

We expect local and regional water users and managers to help change our collective expectation of how water is used throughout the state – for it is in our communities, not in Sacramento, that changes in expectations and behavior ultimately must occur. While regional and local planners should formulate and implement efficiency, conservation, and regional self-sufficiency measures, any state funding for water projects should be contingent upon consistency with the CDEW Plan and the achievement of associated state goals.

Within the context of widespread regional self-sufficiency – and the enhanced reliability that comes with it – there will be more flexibility to manage flows through the Delta to ensure that ecosystem health is sustained. Native fish and other desirable aquatic species will not thrive unless they live in water that is within proper ranges of salinity,

temperature, turbidity, and seasonal flow variation – what might collectively be called the “flow habitat.” This is true both in large open-water portions of the Delta, and in the river channels.

Our Strategic Plan makes recommendations about appropriate freshwater flows for the Delta ecosystem (Strategy 7). These call for the CDEW Plan to:

- Increase Delta outflow between February and June
- Ensure positive flow in the south Delta between February and June
- Reconfigure the shape of Delta waterways to increase variability in estuarine circulation patterns and increase aquatic access to floodplains and tidal marshes
- Increase base flows and utilize pulse flows on the San Joaquin River to improve water quality

As the CDEW Plan is developed, however, analysis about the effects of these flow recommendations on water supply reliability should proceed, and they may be refined to ensure that acceptable reliability is achievable under these conditions.

### **Integrating flood control and water supply planning**

Our strategic plan also recommends another key component of the wet-period diversion system: a greater integration of flood control and water supply planning (Strategy 3). One aspect of this is the need to capture and infiltrate (or directly use) as much stormwater runoff, and even floodwater, as possible throughout the Delta watershed *before* it reaches the Delta. This is nature’s “wet-period diversion system.” Under natural conditions, a large proportion of the precipitation falling on any watershed will soak into the soil and either flow slowly underground toward a stream, or remain stored in a groundwater aquifer. In urban areas particularly, much more stormwater could be harvested directly and used for low-grade uses such as landscape irrigation and toilet flushing, as part of a regional self-sufficiency strategy.

In addition, however, the entire Delta watershed could be managed to gain more water yield from existing multi-purpose reservoirs, without compromising flood safety. The key elements of this strategy are to increase flood conveyance capacity along major rivers (i.e. expand floodplains) so that more floodwater may be safely released from dams, and to change the operating rules of the reservoirs so that the space thereby freed up can be used for increased water supply storage. With management changes and appropriate infrastructure, it may also be possible to take some of that stored water from the reservoirs and move it at advantageous times to locations where it can be infiltrated into the groundwater aquifers – thereby freeing up still more storage space in the reservoirs. The effects of climate change will make it even more important to thoroughly examine and optimize these possibilities.

This strategy also has important implications for the Delta as a place. Expanding the flood conveyance capacity of rivers, if it is to enable reservoir re-operation, must begin by loosening up the tightest bottlenecks in the system, which are usually on the downstream end. Increasing the capacity of key river channels in the Delta to pass more floodwaters safely will therefore be important to advancing the co-equal values throughout the entire Delta watershed. These enhanced river corridors should also serve

as migratory corridors for fish, prime locations for boating and other recreation, and places that emphasize to visitors the Delta’s special sense of place (see Strategy 10).

### **Conveyance for the co-equal values**

In addition to all of the above, a wet-period diversion system relies on the construction of appropriate storage and conveyance facilities. Just as with flood control, greater capacity means greater flexibility to manage the co-equal values. The Delta itself has become one of the tightest bottlenecks in the system, because the environmental damage caused by the current conveyance system has led to court-ordered restrictions on pumping. Though thorough and objective analysis of Delta conveyance alternatives must be undertaken, it is our current recommendation that dual conveyance will offer the greatest management flexibility and will be best suited to a wet-period diversion system (see Strategy 4).

Construction of a dual conveyance system dovetails well with the near-term improvements in Delta conveyance that are also necessary. These improvements seek to reduce the conflict between fish habitat and south Delta pumping by experimentally separating Old and Middle Rivers through the use of removable barriers and a siphon. This would allow Middle River to be used as a defined conveyance channel, while Old River would be hydraulically separated from the south Delta pumps. Fish in Old River would be free of entrainment risk and the channel itself could be managed for fish-friendly water quality (which is often at odds with what is suitable for drinking water). If this “Middle River conveyance” works as planned, it could form the through-Delta portion of a dual conveyance system.

### **Storage for the co-equal values**

As our Vision emphasized, however, improved conveyance across the Delta serves little purpose without places south of the Delta to store the water. Though there is currently more storage in southern California than can be filled (because of Delta pumping restrictions), over the long term demand growth and climate change will put storage at a premium. Though we call for the immediate completion of the state’s Surface Storage Investigations and implementation of any options that optimize the capture of wet-period flows, we also emphasize the likelihood that groundwater storage will be a critical part of any south-of-Delta storage system. Management of groundwater storage therefore needs to be a key part of regional self-sufficiency planning, as well as being integrated with flood control planning in the manner described above.

Overall, this Strategic Plan reiterates the statement in our Vision which declared that “new facilities for conveyance and storage, and better linkage between the two, are needed to better manage California’s water resources, for both the estuary and exports.” Since the Vision was published, the State of California has commenced the required environmental impact evaluation process for new conveyance facilities in the Delta.

### **Criteria for decision-making**

We provided a set of decision criteria for the scoping and selection of Delta conveyance alternatives, in a letter to the DWR dated May 29, 2008. We urged that the Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS) process for

BDCP “should directly assess alternative choices by how well they serve these two co-equal goals as the primary framework for analysis,” that the EIR/EIS include a clear description of near-term actions, and that the following recommendations be followed in evaluating alternatives:

- Incorporate assumptions on water conservation to be achieved through the Governor’s announced plan [for 20% improvement in water use efficiency by 2020]
- Integrate sustainable water supply
- Address seismic and flood durability
- Incorporate ecosystem health and resilience
- Incorporate water quality
- Specify projected schedules for construction, the cost of the activities and the source of funding for such activities
- State a specific assumption about projected sea level rise and the implications of that for all the elements of BDCP
- Devise assurances that the actions included in the final BDCP EIR/EIS will be implemented, including, for example, directly incorporating actions into any and all state water contracts, and as conditions for receipt of bond funds, either for facility development or for ecosystem purposes
- Seize any opportunities for positive coordination with other infrastructure or ecosystem improvements.

In addition, implementation of ecosystem revitalization measures should proceed in conjunction with, and on the same schedule as, improvements to conveyance and storage. This means that financing arrangements, permitting milestones, construction schedules, and other major elements of project management should be undertaken and achieved at commensurate times.

### **Restoring physical habitats**

Conveyance improvements are not the only changes to the physical Delta that are required for the management of the co-equal values. The Delta ecosystem requires not only improved flow conditions but also physical habitat restoration (see Strategy 6). The Delta was originally a vast, sea-level tidal marsh fed by strong seasonal pulses of fresh river water and twice-daily infusions of nutrients from the tides, and was home to phenomenal numbers of birds, fish and wildlife. Some, like the Delta smelt, lived their entire lives in the estuary. Others, like the Chinook salmon or the birds of the Pacific Flyway, passed through the Delta on their migrations between far-flung habitats. The blending of the rivers and the tides – and the particular land structures and water flow patterns that resulted – made all of it possible.

The reclamation of the Delta for farming – and the decades of subsequent subsidence – have made a full-scale return of such conditions both impossible and undesirable. As the Vision recognized, it is neither realistic to return the Delta to a pristine, pre-levee construction condition, nor is it adequate to simply return the ecosystem to the conditions that preceded the fish crashes of recent years.

The task for California today is to restore the underlying ecosystem structure, functions, and processes that will make a thriving ecosystem possible in the 21<sup>st</sup> century, and to do so in a manner that is compatible with reliable water diversions upstream, within, and exported from the Delta. Such an ecosystem will possess five key characteristics:

- Viable populations of native resident and migratory species
- Functional corridors for migratory species
- Diverse mosaic of habitats and ecosystem processes
- Stressors below adverse effects levels
- Ability to provide important human services

The task of achieving these characteristics will be difficult and complex, but can be guided by a simple and intuitive “Revitalization Recipe” that organizes our actions in an understandable and easily communicable way (see Figure 4).

Ecosystem revitalization will require a more natural land-water interface throughout the Delta. Tidal marsh habitats, which once dominated the Delta, are now almost non-existent. Tidal marshes are critical sites for primary biological productivity and for the rearing and feeding of many native fish. So too are seasonal floodplains, where occasional high river flows spill out over vegetated landscapes. Like tidal marshes, these can be restored only at certain locations with the correct elevation and connection to the rest of the Delta system.

The primary productivity that occurs in the tidal marshes and floodplains should be carried out into adjacent channels by the river flows and the tides, to provide sustenance to the organisms living there. Even places too small to appear on the map, such as narrow river edges, in-channel islands, and the waterside toes of levees, may be valuable opportunities to re-establish some of this land-water interface.

### **Reducing stressors**

Even restoring both physical habitat and “flow habitat” is not enough. It is also necessary to reduce stressors on the populations of desirable species to levels below critical thresholds (see Strategy 8). These stressors include entrainment in water diversions, contaminants in the water, and invasive species. Stressor management will therefore have a number of components. Prominent among them will be moving the major points of diversion away from dead-end sloughs (such as Barker Slough and the south Delta) to

places along free-flowing channels, where entrainment risks are lower and water quality is higher.

The Delta watershed contributes a number of harmful contaminants to Delta waters, ranging from mercury to pesticides to excessive nutrient loads. These need to be better controlled if we are to revitalize the Delta ecosystem and ensure that recreational uses of Delta waters can continue to thrive.

In addition, there must be vigorous efforts to control invasive species, both new and existing. Existing invasive species have dramatically altered Delta food webs and water conditions, to the detriment of native species. We call for vigorous efforts to control the spread of the invasive species that are already there, especially in restored areas. There is also a high likelihood of new species invasions, but ballast water controls and other relevant regulations should be tightened so as to delay or prevent these invasions as long as possible.

### **The challenge of land use**

Land use challenges in the Delta go beyond what will be required for ecosystem revitalization. As we noted in our Vision, urbanization in and around the Delta poses substantial risks to the long-term sustainability of the Delta. Depending on where it occurs, new development can place new residents at unacceptable flood risks, can increase stress on pre-existing levees nearby, and can foreclose irreplaceable opportunities for habitat restoration and for climate change adaptation.

The governance structure recommended in the plan identifies these state interests in land use in the Delta region. For fifteen years, the Delta Protection Act has succeeded in protecting the primary zone from inappropriate urbanization. The policies adopted by the DPC have supported that protection, and provided the framework for the recent decision to remand a proposal for a controversial project within the primary zone in Clarksburg. But it has also become clear that there are additional areas outside of the primary zone where state interests are at stake, and that not all areas of the existing legal Delta are equally important to state interests.

In order to ensure that state interests related to the Delta are thoroughly protected, the DPC's roles should be modified and enhanced. The DPC's primary purpose should be to ensure:

- The consistency of land use decisions in the primary zone with its Resource Management Plan and the state interests identified in the CDEW Plan;
- The consistency of local government plans and decisions for the secondary zone with the state interests identified in the CDEW Plan.

The primary planning tool by which the DPC can accomplish these objectives is the "Local Plan" (LP), which can be used either to strengthen or relax land use oversight in a given area, depending upon what state interests require. As described in strategy 14, certain areas outside of the primary zone of the Delta (such as the San Joaquin lowlands, the Cosumnes-Mokelumne floodplain, Bethel Island, and Isleton) are critical to the

protection of state interests. In other areas currently contained within the legal Delta, such as urbanized portions of West Sacramento, Delta-related land use oversight is likely not necessary.

### **Recognizing the Delta’s unique character**

New urbanization can also threaten the unique cultural and historical character of the existing Delta. Our Vision recognized that the Delta is one of the state’s most distinct regions, combining a unique physical geography of islands and river channels with a cultural heritage as enduring as any in California. The Delta possesses natural, historical and recreational resources of statewide and even national significance. But despite this fact, it is little known or recognized by most Californians, including many of the millions living in the cities just outside the Delta’s boundaries.

The Delta’s value comes not just from the economic or infrastructure services that it provides to the state, but also from its intrinsic worth as a community with a distinct natural and cultural heritage. The Delta should continue to thrive not only as a key component of the state water system and the estuary, but for its own sake.

Our Vision strongly declared the Delta to be a unique and valued area, warranting recognition, and our Strategic Plan proposes multiple mechanisms by which to do that (see Strategy 11). Designation of the Delta as a National Heritage Area will enhance tourism and recreation efforts by bringing new stature to the Delta in the minds of nearby residents. Creation of a multi-unit State Recreation Area will expand upon the recreational resources already there. In order to support increased tourism and recreation, there should be concentrated investments in “gateway” locations at the edges of the Delta that are best able to accommodate increased traffic and construction of new facilities. Finally, the Delta should be designated for specific agricultural programs that will help Delta farmers take advantage of the unique soils and growing environment of the Delta.

### **Preparing for emergencies**

Levee failure risks and emergency preparedness in the Delta must also be addressed. The current configuration of the Delta landscape will not be sustainable over the long run, but it is difficult to project with any certainty precisely how it will change over time. Levee policy should therefore be focused on achieving congruence between levee designs and the land uses they are protecting. In other words, urbanized areas, lightly inhabited areas, critical infrastructure, agricultural lands, and wetland and habitat lands will all require different levels of protection, and therefore different levee designs (see Strategy 13). The CDEW Plan should identify the appropriate designs for specific levees and prioritize needed improvements. It should also identify beneficiaries of levee improvements and determine the appropriate cost sharing among the beneficiaries.

The residents of the Delta, and the agencies charged with protection of public safety, must also be prepared for failures of the Delta levee system (see Strategy 12). Though the risks to people, property and infrastructure in the Delta are increasingly recognized, there is still inadequate preparedness. The state should immediately embark upon a wide range of emergency management and preparation actions that range from conducting emergency disaster planning in the Delta to establishing boat marshal programs. The

state should also complete a Delta-wide emergency response strategy that includes all federal and state agencies responsible for public safety and emergency management in the region. Finally, the California Department of Transportation and a consortium of infrastructure service providers should each conduct a comparative analysis of the long-term benefits of reinforcement, armoring, co-location or relocation of highway and infrastructure lines, respectively.

### **Financing the future**

All of these strategies share a common set of financing principles, described in Strategy 17. An effective financing system for the Delta will include revenue generation, approved procedures for expenditure, and obligations upon recipients of those benefits. The three major principles, therefore, are:

1. Private beneficiaries should be assigned proportional shares of revenue obligations and of risks and liabilities, while the public is responsible for activities of broader benefit.
2. Revenues should be received by, and allocated by, the same entity that formulates policy – i.e.. the CDEW Council – to ensure consistency.
3. Access to state funding for any purpose related to the implementation of the CDEW Plan must be contingent upon a project contractor or a water right holder demonstrating full compliance with all aspects of California resource laws and policies.

While full cost estimates of the strategies proposed here are not yet available, the best available information suggests that they will certainly exceed \$10 billion in capital costs alone. With investments of this magnitude, equitable and effective financing systems are indispensable to overall success.

## ***Reporting Progress***

Assessing, evaluating, and reporting progress toward achieving the Delta Vision is critical to successful adoption, funding, and implementation of the Strategic Plan. An effective and transparent method of evaluating progress towards meeting clear goals provides accountability, which motivates decision makers to continually assess strategy effectiveness and take appropriate corrective action if needed. Clearly communicating how well the Delta is doing also informs the public about how well the Strategic Plan is working, and promotes trust.

Performance measures increase plan efficiency and effectiveness by providing defined expectations (targets) in key areas where success will be judged. Continued monitoring and assessment of key indicators and performance measures enables strategies to be tested and refined. It also indicates where resources are being used appropriately or if resource reallocation is necessary.

Reporting progress at meeting performance measures provides both transparency and an indication of how effective the strategies are at meeting the Vision. Report cards are effective tools for integrating assessment results and communicating scientific understanding to policy makers and to the general public. These cards rely on performance measures and targets to report progress in a timely and synthesized format which is accessible to a broad audience. They have been used successfully in other complex planning arenas, such as the Chesapeake Bay.

To evaluate and report progress toward achieving the Vision, eight indicators representing key integrated concepts from this Strategic Plan have been identified:

- Delta Risk
- Delta Economic Vitality
- Water Use Productivity
- Water Supply Reliability
- Functional Habitat
- Viable Populations
- Government Responsiveness
- Plan Implementation

Each indicator is comprised of several “reporting level” performance measures, each of which has an associated target (or goal) and timeline. Each performance measure will be monitored and evaluated regularly by an independent assessment team. Progress toward meeting each performance target will be expressed by the team as a percentage of target

attained. To report status towards achieving the Vision, progress towards meeting performance targets will be rolled up into one score or grade for each indicator. Similar to the integration and linkage of all 12 Vision Recommendations, success toward realizing the Vision cannot be claimed unless *all* indicators are performing well.

These indicators and their components will be tracked, along with the status of strategy implementation, and reported to policy makers and the public through a Delta Vision Report Card, which will be issued by an independent and objective board on a regular basis. The Report Card will provide essential feedback to the Council regarding Vision realization and individual strategy success. The Report Card will indicate if implemented strategies are working, or it may signal to policy makers that a course adjustment is necessary.

The following table shows which performance measures are proposed for each of the eight indicators. Each indicator also includes more specific topics and desired results, and is associated with certain strategies, as indicated in the table. These are interim measures, to be refined by the Delta Science and Engineering Board and the CDEW Council before July 2009.

Table 2. Report Card indicators and associated performance measures

Indicator	Topic	Desired Results	Strategies	Performance Measures (and preferred direction of change)
Delta Risk	Levees and Flood Protection	Appropriate levee design and flood protection for land use	Strategies 13 and 14	<p>Number of people living in legal Delta in areas with less than 200-year flood protection (-)</p> <p>Cumulative 200-year flood risk to property in legal Delta (i.e. probability of flood times projected dollar amounts of damage) (-)</p> <p>Number of structures in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-)</p> <p>Number of people living and working in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-)</p> <p>Total volume of air space below sea level (a.k.a. accommodation space) in legal Delta (-)</p>
	Emergency Preparedness	Improved emergency preparedness	Strategy 12	<p>Mileage of designated state highways secured against catastrophic failure by adequate levee improvement, elevation, or other means (+)</p> <p>Number of people who have received Delta Emergency Response Training (+)</p>
Delta Economic Vitality	Land Use	Expanded land providing public benefit	Strategy 11	<p>Acres of land providing public benefits of habitat, flood conveyance, subsidence reversal, or carbon sequestration (+)</p> <p>Expenditures by public agencies for land acquisition, management, and maintenance (+)</p>
	Agriculture	Improved agricultural productivity in Delta	Strategy 11	Gross regional product from sustainable agriculture (+)

Indicator	Topic	Desired Results	Strategies	Performance Measures (and preferred direction of change)
	Recreation and Tourism	Improved income from Delta recreation and tourism	Strategy 11	Gross regional product from recreation and tourism (+)
Water Use Productivity	Per Capita Water Use	Improved per capita water use efficiency	Strategy 1	Water use per capita, relative to 2008 baseline, by hydrologic region (-)
	Industrial Water Use	Improved industrial productivity with water used	Strategy 1	Water use per unit industrial economic output, relative to 2008 baseline, by hydrologic region (-)
	Agricultural Water Use	Improved agricultural productivity with water used	Strategy 1	Water use per unit agricultural economic output, relative to 2008 baseline, by hydrologic region (-)
Water Supply Reliability	Regional self-sufficiency	Increased availability of regional water	Strategies 2, 3, and 4	Length of time, at average rates of use over a three-year period, that a given water district's alternative and stored supplies will last if there is a catastrophic outage of the Delta (+)  Amount of water in accessible surface and ground water storage compared to 2008 baseline (+)
	Water Quality	Improved water quality	Strategy 5	Percentage of time that ambient levels of 3 mg/L TOC and 50 µg/L bromide are achieved at drinking water intakes (or other applicable standards, whichever are more stringent) (+)  Percentage of agricultural water supplies meeting or exceeding current quality standards (+)  Net levels of salinity in major groundwater aquifers (-)  Percentage of time that pathogen concentrations at Delta intakes meet the Bin 1 requirements of the Long Term 2 Enhanced Surface Water Treatment Rule (+)  Number of nuisance growths of algae or aquatic plants in the Delta or water project facilities (-)  Concentrations of contaminants in urban runoff flowing into the Delta (-)
	Flood management and water planning	Integrated flood management and water planning	Strategies 2 and 3	Percentage of precipitation in the Delta watershed that is infiltrated or directly used compared to 2008 baseline (+)  Amount of water exported from the Delta that is recycled or re-infiltrated (excluding water lost to direct consumption by crops and people, or evapotranspiration) compared to 2008 baseline (+)

Indicator	Topic	Desired Results	Strategies	Performance Measures (and preferred direction of change)
Functional Habitat	Restored Habitat	Expanded native Delta habitats	Strategy 6	Acres of restored tidal marsh, Delta (not accounting for sea level rise) (+)
				Acres of restored tidal marsh, Suisun (not accounting for sea level rise) (+)
				Acres of restored shallow open water habitat in the Delta (+)
				Acres of active floodplain (+)
				Acres of seasonal wetlands and grasslands (+)
				Acres of fall open water habitat between 0.5-6 parts per thousand salinity (+)
				Percent of aquatic food web support by diatoms (+)
	Migratory Corridors and Land-Water Interface	Improved habitat connectivity and functional migratory corridors	Strategy 10	Number of functional migratory corridors per river system (Sacramento, San Joaquin, Mokelumne/Cosumnes) (+)
Amount of river miles connected to habitats (+)				
Distribution of large habitat complexes along estuarine gradients and with extensive internal connectivity (+)				
	Delta Flow	Restored Delta Flow	Strategies 7 and 10	Net downstream flow on San Joaquin River at Jersey Point Oct 1 to Jun 30 (+)
				Number of 7-14 day duration fall flow pulses on San Joaquin River at 2,000-3,000 cfs at Vernalis between Sep. and Nov. each year (+)
				Number of months between Aug and Nov with Delta outflow of 12,000-18,000 cfs (+)
				Incidents of migratory passage delays, blockages, or mortalities due to physical barriers, low dissolved oxygen, high temperatures, or toxics (-)
				Dissolved oxygen concentrations in anadromous fish migratory corridors at all times (+)
	Invasive Species, Algae, and Mercury	Elimination of invasive species and control of mercury contamination	Strategy 8	Number of new, uncontrolled harmful invasive species (-)
				Percentage of 1995-2000 average abundance and distribution of invasive clams (Corbula and Corbicula) (-)
				Percentage of 1990-2000 average abundance and distribution of Brazilian waterweed (Egeria) (-)
				Concentration of methylized mercury in Delta water compared to 2008 baseline (-)
Viable Populations	Pelagic Organisms (Delta and longfin smelt, splittail)	Restoration of pelagic organisms in the Delta	Strategies 5, 6, 7, 8, and 9	Percentage of 1967-1983 fall mid-water trawl count of Delta smelt and longfin smelt (+)
				Delta smelt distribution (% of pre 1983 habitat occupied) (+)
				Percentage of 1987-1991 drought count of Sacramento splittail (+)
				Delta smelt and longfin smelt entrained at Delta diversions (-)

Indicator	Topic	Desired Results	Strategies	Performance Measures (and preferred direction of change)
	Anadromous Fish (salmon steelhead, sturgeon)	Restoration of anadromous fish populations which migrate through the Delta	Strategies 5, 6, 7, 8, 9, and 10	Percentage of adult salmon, steelhead, and sturgeon surviving migration through Delta (+) Percentage of juvenile salmon, steelhead, and sturgeon surviving migration through Delta (+) Fish entrained at Delta diversions, outmigrating juvenile salmonids (percent of population) (-)
	Birds	Increased wintering abundance of Delta birds	Strategies 6 and 9	Ducks sustained at peak wintering abundance in Delta and Suisun Marsh combined (+) Shorebirds sustained at peak wintering abundance in Delta and Suisun Marsh combined (+)
	Listed Species	Removal of species from threatened and endangered lists	Strategies 5, 6, 7, 8, 9, and 10	Percent of listed species recovered and removed from federal and state endangered species lists (+) Number of species newly listed on federal and state endangered species lists (-)
Government Responsiveness	Public Involvement and Transparency	Engaged and informed public with CDEW Council	Strategy 15	Percentage of recommendations by Public Advisory Group that are considered by the CDEW Council in a timely manner (+) Percentage of CDEW Council documents and meeting minutes posted online in a timely manner (+)
	Monitoring and Reporting	Monitoring and reporting of all diversions in the Delta	Strategy 18	Percentage of water diversions in the Delta watershed covered by SCADA monitoring or other accurate reporting system (see Strategy 18) (+)
	Permits and Fees Administration	Timely administration of permits and fees	Strategies 15 and 17	Percentage of required state and federal permits for ecosystem and water system management obtained in a timely manner (+) Percentage of required Delta water user fees collected in a timely manner (+)
	Adoption of Policy	Implemented policy of Vision and CDEW Plan	Strategies 9, 15, and 18	Percentage of adaptive management actions recommended by CDEW Science Program that are implemented in a timely manner (+) Number of federal and state court actions involving the co-equal values (-)
Plan Implementation	Consistency	Consistency of all applicable government actions with CDEW Plan	Strategy 16	Number of preemptive or corrective actions on agency decisions taken each year by the CDEW Council to ensure consistency with CDEW Plan (-) Percentage of financial investments in Delta ecosystem enhancement that are not consistent with CDEW Plan (-) Percentage of financial investments in water infrastructure and regional self-sufficiency programs that are not consistent with CDEW Plan (-) Percentage of financial investments in Delta levees and highways that are not consistent with CDEW Plan (-) Number of times that state funding for local investments is withheld due to non-compliance with CDEW Plan (-)
	Performance	Timely demonstrated performance of Plan	Strategies 9 and 16	Length of time before negative trends in the performance of other indices are reversed (-)

## ***Phasing***

The strategies set forth in this Strategic Plan are, like the Vision’s recommendations, both integrated (designed to work together) and linked (dependent upon one another). However, their scope varies from writing a plan to maximizing regional self-sufficiency, and their geographic scale varies from specific river corridors to statewide water conservation. Additionally, some involve institutional redesign while others involve ecological processes. Different strategies will therefore require more or less time to be achieved, and in most cases will require a “staged” or “phased” plan for implementation.

Different approaches to phasing implementation exist. One is to make changes gradually as needed, relying upon existing system capacities until performance measures show them definitively to be inadequate. The dangers with such a cautious approach are three: little change occurs quickly, the original intent of a plan becomes muddled, and the momentum for change dissipates. A contrasting approach initiates wholesale transformation at the start, assuming that existing structures have little capacity for improvement and preferring to completely replace them. The danger with such an approach is that the new structures require a start-up period to be effective, during which time conditions deteriorate and undermine success.

Neither of these approaches is appropriate for the Delta, where declining fish populations and deteriorating levees make quick disaster a very real possibility. Existing governmental entities have needed competencies but are slow to act. The schedule of phasing seeks to build on existing competencies but begins with bold steps designed to decisively shift the institutional architecture of the State and the Delta, yet it balances these with a realistic allocation of available energy and resources.

These “bold steps” consist of six policy initiatives designed to serve as umbrellas under which phased implementation of the 18 strategies can begin to be actualized. The initiatives include:

1. Delta Governance Restructuring<sup>1</sup>
2. Pioneering Water Use Efficiency and Conservation<sup>2</sup>
3. Regional Self-Sufficiency<sup>3</sup>

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<sup>1</sup> This includes restructuring institutions to achieve the co-equal goals, and secure financing.

<sup>2</sup> This includes reducing per capita water consumption 20% by 2020 and 40% by 2050, and leading the nation in the implementation of efficiency standards. The 40% reduction is radical and inconceivable at the present time, yet essential given projections of 60 million residents by 2050. Regional efforts will be essential to achieve the appropriate balance of water sources and some variation in regional per capita use is likely given different hydrology but the state must ensure achieving the targeted efficiency improvements and all regions will have to improve water use efficiency.

<sup>3</sup> This includes requiring the development of integrated water management plans along the lines of the checklist for the State’s 190 watersheds, and will require coordination with existing Integrated Regional Water Management plans/planning efforts. The point is that all areas of the State are covered by at least one integrated plan.

4. Delta Ecosystem Revitalization<sup>4</sup>
5. California Delta Tourism and Land Development
6. Delta Risk Reduction

As detailed in the table below, implementation will involve the following four phases:

Phase 1: 0 to 5 years

Phase 2: 5 to 20 years

Phase 3: 20 to 40 years

Phase 4: 40 to 100 years

It is expected that new phases will need to be identified as the State approaches 2049.

[Table to be developed as Figure 5]

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<sup>4</sup> This will include a plan for wet-period diversions and associated operations.

## *Strategy descriptions*

### **Strategy 1. Vastly improve the efficient use of water**

Paramount to the success of our Strategic Plan will be a major shift over the next half-century in water use expectations and behaviors of our communities and our farming economies. We must reduce the consumptive needs in our communities and reduce the water demand necessary to produce the crops that feed us and often provide regional economic foundations.

On average, California’s communities use over 160 gallons per person per day – with much of the population close to this value, but with some regions tremendously exceeding this rate. Though we enjoy the benefits of a generally temperate Mediterranean climate, these rates often exceed the national average. Over the last decade, we have improved, but we must do better. Governor Schwarzenegger has already established a target of reducing California per capita water use by 20% by 2020, and has directed state agencies to develop a more aggressive plan of conservation to achieve this target. But we do not need to stop there. Further adoption of water saving devices and best management practices can have an immediate effect on today’s demand, but the inclusion of this ethic into future planning for future residents – who’s demand has yet to occur – will be just as important. Among other actions, forward thinking that better links urban land-use and expectations with water supply planning at the local level and recognizes the scarcity of this resource will ensure that the future residents of California use water efficiently.

In agriculture, opportunities to improve the efficient use of water abound, but often they do not currently result in water savings available for other uses. For most farming operations within the Delta Watershed, diversions are made from surface water or groundwater to provide for irrigation demands. Water not physically used by the plants (through evapotranspiration) generally returns to the groundwater or surface water systems – though commonly of degraded quality (temperature and constituents) and in quantities and at times that hamper broader water management opportunities. Again, we must do better. In regions that import Delta water supplies, opportunities to more closely match what is applied with what the plant needs can result in real water savings. However, as a result of increasing delivery costs and less reliable water supplies over the past decade, many easier opportunities to use water more efficiently have already been adopted. But that should not dissuade efforts to do even more, especially as water prices are expected to continue to increase.

Vision recommendations met:

1 4 6

Performance measures:

Water use per capita, relative to 2008 baseline, by hydrologic region (-)

Water use per unit industrial economic output, relative to 2008 baseline, by hydrologic region (-)

Water use per unit agricultural economic output, relative to 2008 baseline, by hydrologic region (-)

Over the long-term of decades, water prices for all uses should be expected to move closer together. Large price differentials will be socially and politically difficult to maintain, water exchanges will tend to equalize prices, and definitions of reasonable use can be expected to require ever more efficient use. With emphasis on use of most productive lands and more effective irrigation equipment and management, California can still be as, if not more, productive with the crops we choose to grow and ensure that the state's agriculture contributes to the food and fiber needs of the nation. Increased energy prices and policies to reduce the carbon footprint of all activities, including food production, can be expected to shift some of California agriculture to production intended for local and regional use. These trends to higher energy prices and policies to reduce carbon footprint, combined with projected higher water costs, suggest that production of agricultural commodity crops for international markets may not be as viable as in the recent past.

Agriculture is more than produced food and fiber. It shapes landscapes and greatly influences ecosystems. Monocultures of irrigated agriculture have landscape and ecosystem effects. Abandoning those agricultural uses would result in other landscapes and ecosystems, including risks of harmful dust storms and weeds. Between these two extremes are a wide range of forms of land management that result in continued agricultural production and desired ecosystem function. Policies to support evolution in these adjustments should be a high priority.

Any change in agricultural practices will affect those employed in that sector and communities in which agriculture is a large factor. Those changes are not necessarily negative and always occur in the context of societal wide economic changes. Indeed, one of the great successes of this nation and many others is the increased productivity of the agriculture sector in the past 100 years, which increased production with a dramatically reduced proportion of total employment, supporting growth in other sectors of the economy.

Change in agriculture's water use comes with costs. In the past, efficiency improvements have been rejected or delayed because they were not deemed cost-effective given the profit potential of current crops and the relatively low-cost of water. Farmers have been unable to justify the expense given these constraints. This constraint on expected efficiency is unacceptable over the long term as it would preclude any change in agriculture's water use. It is also unrealistic given projected increased costs for water.

This strategic plan requires accelerated investments by individuals, communities and farming to reduce both today's water demands and that of generations to come. The critical elements include:

- **By June 2009, enact legislation, such as AB 2175, in a form that would require DWR to establish a statewide target to achieve a 20% reduction in urban per capita water use in California by December 31, 2020.**

- **By June 2009, enact legislation to modify government code sections to require more aggressive tiered pricing and related mechanisms**, and address challenges in Article 13D of the California Constitution (as added by Proposition 218) that potentially constrain water purveyors’ budgeting methods and authorities so as not to hamper efforts to implement conditional-pricing during temporary drought or emergency conditions.
- **By June 2009, enact legislation to improve coordination between land planning and water planning** by further broadening the scope and requirements embodied in California Water Code §10910 et. seq. (commonly referred to as SB 610 Water Supply Assessments) and related provisions under the California Environmental Quality Act (CEQA) to (1) require a significant increase in the number of years of projected sufficient water supply and a decrease in the triggering thresholds, and (2) provide opportunities such as: (a) requiring connection fees to vary based on potential per-dwelling unit water demands to incentivize aggressive implementation of low-water use fixtures as well as adaptation in landscaping expectations and lot sizes, (b) recognition of fully funded localized conservation projects, greywater systems and other extraordinary measures in existing communities as sufficient water supplies for new developments,
- **By June 2009, enact legislation to modify the Urban Water Management Planning Act** to require purveyors to develop an integrated plan for response to (a) drought conditions which reduce by 40 percent for two years the available water exported directly from the Delta or from the Delta Watershed, and (b) one year loss of all surface water imported into the region diverted directly from the Delta. These plans are to be developed pursuant to guidance from the Department of Water Resources (DWR) and to be incorporated into urban water management plans (UWMPs) submitted for 2015. Plans must address all feasible approaches for both conserving water and increasing water supply under these conditions.
- **By June 2010, the legislature shall authorize DWR and provide funding for new incentive-based programs to promote the widespread and mainstream adoption of aggressive water conservation.** These may include concepts such as (1) creating market mechanisms for water quality improvements associated with reducing surface return flows from farming operations, (2) developing “carbon credits” for water utilities for reduced greenhouse gas emission associated with water conservation, and (3) allowing local tax incentives for new communities that meet aggressive conservation criteria.
- **By 2010, the State Water Resources Control Board (SWRCB) will certify equipment and methods which significantly reduce or eliminate any return flows to surface water and groundwater systems** as best management practices available to comply with the Irrigated Lands Regulatory Program. Certification of installation and operation of the equipment and methods shall be completed by third party audits by firms and organizations designated by the SWRCB, at the

expense of those certified. This equipment and these methods may apply at the farm level or water system delivery level. Certification would also require annual reporting on water use to the SWRCB. The SWRCB would adjust certification of equipment and methods over time as understanding of relationships between irrigation methods and degradation of surface and groundwater resources is improved.

- **By 2010, the legislature shall enact legislation that requires (1) agricultural water districts using more than 3,000 acre-feet of groundwater and/or surface water and (2) counties who provide the regulatory oversight for individual agricultural groundwater users outside of recognized water districts, to prepare and submit to DWR every five years an Agricultural Water Management Plans (similar to the Act requiring UWMPs) to address projected agricultural water demands, availability of supplies and implementation of Efficient Water Management Practices (EWMPs).** The first plans would be completed by 2011. DWR's criteria would embody the analysis currently required by members of the Agricultural Water Management Council (AWMC). EWMPs, developed by DWR and the AWMC, should be treated as the floor-level of conservation. Updating of the EWMPs shall occur at least every 5 years. Access to state grants and loans as well as approvals from DWR or the SWRCB for water transfer activities will be restricted to entities that have completed plans per DWR criteria.
- **DWR shall provide continuing financial support for the California Urban Water Conservation Council and the AWMC.** These organizations must continue to provide leadership in water use efficiency in order to serve as surrogates for regulatory action.

## Strategy 2. Optimize regional self-sufficiency by increasing the diversity of local and regional water supply portfolios

Throughout the State, the general concept of regional self-sufficiency is being embraced through Integrated Regional Water Management (IRWM) planning – a framework for actions to address the uncertainties presented to those providing our farms and communities with water. On their own or with the incentive of grant funding, many water management entities are gathering together to look for opportunities to optimize available water supplies, develop new local supplies, and manage demands in a more comprehensive manner – a manner that accommodates expected ranges in the reliability and quantity of specific supplies from various sources. These collaborative planning efforts must be elevated in their importance and function to ensure regions are adequately addressing risks and investing in strategies to manage an unpredictable future.

Resource flexibility – an inherent component of regional self-sufficiency – requires a diversified portfolio of water management strategies including: (1) creating new places to store supplies - either above or below ground during periods of surplus – for use when particular supply sources are constrained; (2) building new facilities to reclaim or desalt otherwise non-potable or poor quality supplies; (3) managing land uses to improve water quality, capture urban storm water, and control water demands; and (4) improving the efficiency of existing and future agricultural and urban uses of water. By implementing more of these strategies throughout all regions of the State, the opportunity for the annual quantity of diverted Delta water supplies to reliably ebb and flow in unison with the need for and availability of water to sustain Delta ecosystem functions will be vastly improved.

Our Strategic Plan requires greater attention to IRWM planning and subsequent investments in diversified regional water supply portfolios. The critical elements of this strategy include:

- **By 2012, all regions of California as defined by the Department of Water Resources (DWR) must collaboratively develop and begin implementing an effective IRWM plan to provide reliable water supplies, water quality protection, public safety, environmental stewardship, and sustained economic prosperity for a**

Vision recommendations met:

1 4 6 8

Performance measures:

Length of time, at average rates of use over a three-year period, that a given water district's alternative and stored supplies will last if there is a catastrophic outage of the Delta (+)

Amount of water in accessible surface and ground water storage compared to 2008 baseline (+)

Amount of water exported from the Delta that is recycled or re-infiltrated (excluding water lost to direct consumption by crops and people, or evapotranspiration) compared to 2008 baseline (+)

growing population in a changing climate. Plans will include an array of elements to be defined in the State’s 2009 Water Plan Update.

- **By 2015, local water agencies must double the current percent of treated urban effluent that is captured and reused** to obtain greater function from water supplies already diverted from natural systems, especially in regions where current discharges are lost to ocean or bays, or create unnecessarily adverse water quality impacts of rivers, streams and groundwater basins. This increase would be aided by requiring dual-plumbing when and where appropriate, addressing complications with seasonal storage, harmonizing State and regional permitting requirements, modifying land use planning practices, funding educational efforts on the value of this water resource, and significantly increasing the State’s committed funding for successful grant and loan programs.
- **By 2015, local water agencies must triple the current plant capacity for generating new water supplies through the desalting of groundwater and seawater resources.** The State must promote research and implementation of coastal desalination projects that also effectively neutralize the emissions impact of additional energy requirements through the use of renewable energy sources and offset programs.
- **By 2010, the State Water Resources Control Board (SWRCB) shall set goals for infiltration or direct use of urban storm water runoff throughout the Delta Watershed and export areas** and promote investment by urban communities in facilities to capture, treat and reuse urban storm water runoff. Integrate achieving the goals with access to state grant and loan programs. Require local governments to include best management practices necessary to achieve goals in their land use planning and decision making.
  - By 2012, DWR should issue a model stormwater management ordinance for urban areas throughout the Delta watershed
  - By 2012, the legislature should pass a law requiring rainwater harvesting in new developments and incentivizing rainwater harvesting retrofits in existing developments
  - By 2012, revise relevant water management legislation, such as the Urban Water Management Planning Act and SB 610, to require coordination between water purveyors and wastewater agencies and to require identification of all local opportunities for use of recycled wastewater and harvested stormwater.
- **The State should continue to provide technical assistance for regional recycled water and stormwater use**, including public education campaigns, promotion of best management practices, promulgation of planning guidelines, and partial funding of demonstration projects as needed.

- **The legislature shall immediately charge the SWRCB with using its authorities in conjunction with DWR, local water districts and counties to ensure accurate and timely information is collected on all surface water diversions in California and reported to the SWRCB.** This action will also repeal all exemptions from reporting to the SWRCB. In addition, charge DWR with providing accurate and timely information on all groundwater diversions and uses in California on a bi-annual basis, as available through expansion of DWR’s groundwater monitoring networks, reporting by local and regional entities associated with Urban Water Management Plans and Groundwater Management Plans. These information systems shall be fully operational by 2012.
- **By 2015, require all local water and land use agencies or their regional partnerships to develop and begin implementing AB 3030 Groundwater Management Plans** as a fundamental component of IRWM plans. Constrain public funding sources for plans that do not adequately address groundwater resources.
- **Facilitate banking, extraction, and delivery of State and local water supplies in groundwater facilities** through immediate revisions of State and federal place-of-use restrictions, adoption of statewide guidelines addressing injection permitting, and continuation of successful DWR and SWRCB grant and loan programs.
- **By 2012, require water resource plans, as well as land use plans (e.g. General Plans, Specific Plans, etc.), to identify mechanisms to (1) protect areas needed for groundwater recharge and (2) change urban landscape aesthetics to more appropriate choices for California’s climate.**
- **DWR and SWRCB shall immediately identify constraints and revise current procedural requirements to allow for efficient evaluation of water transfers** through the creation of an inter-agency team coupled with existing buyers and sellers. These policies must incorporate reasonable use and public trust principles of water rights laws in California and must not reduce or abrogate the constitutional provision that recognizes all waters are the interest of the people of California and for the public welfare. DWR shall promote concepts of rotational fallowing as a mechanism to assure reinvestments of transfer funds into local agricultural economies and evaluate opportunities to pre-approve some transfers to create an available “option” pool for emergency needs.

### Strategy 3. Integrate Central Valley flood management with water supply planning

The entire Central Valley is either upstream of the Delta, reliant on diverted Delta water for its supplies, or both (see Figure 6). In a very real sense, the challenges of flood control and water supply reliability in the Delta are two sides of the same coin. Major multi-purpose reservoirs exist on many of the tributaries to the Delta to store surface water supplies, control floods, generate hydroelectricity and provide recreation. Within a given reservoir, water supply storage and flood control are competing priorities at certain times of year – more of one means less of the other. Therefore, it is very important that flood management operations be tailored as closely as possible to actual flood probabilities, without compromising safety, so that as much reservoir space as possible can be devoted to water supply storage.

Present management practice focuses on maintaining a given capacity in the reservoir and not on the actual threat of flooding. Improved forecasting capabilities now allow reservoir managers to modernize flood control operations diagrams so that more water supply yield can be obtained without compromising flood safety. Expanding the flood conveyance capacity downstream of the reservoirs also increases management flexibility by allowing more flood water to be released safely from the reservoir if necessary, thereby reducing the amount of space within the reservoir that must be reserved for flood storage. Expansion of the conveyance capacity downstream of the reservoirs must be continuous along the entire river, and the capacity of the most downstream area sets the upper limit for the entire system.

Increased infiltration of precipitation that falls on the Delta watershed has the triple benefit of reducing flood peaks, storing water for later use in groundwater aquifers, and potentially reducing the amount of water that has to be exported from the Delta at critical times. It can also improve the quality of water through the natural filtering capabilities of soils. Communities throughout the Central Valley should aggressively pursue stormwater harvesting or infiltration wherever possible. In urban areas, stormwater harvesting can help supply landscape irrigation and other uses, and infiltration zones can provide valuable open space amenities. Much of the upper watershed of the Delta is forests, which should be managed for the water holding capacity of their soils, particularly as climate change produces more rain and less snow in California.

Vision recommendations met:

1 8 9

Performance measures:

Additional annual yield from major reservoirs compared to current flood operation requirements (+)

Additional flood conveyance capacity on major rivers leading into the Delta, compared to 2008 baseline (+)

Percentage of precipitation in the Delta watershed that is infiltrated or directly used compared to 2008 baseline (+)

Amount of water exported from the Delta that is recycled or re-infiltrated (excluding water lost to direct consumption by crops and people, or evapotranspiration) compared to 2008 baseline (+)

The critical elements of this strategy include:

- **By 2012, modernize flood control operation diagrams for all major California reservoirs for which the U.S. Army Corps of Engineers has prescribed flood control regulations.** The modernization should account for existing technology advances, the hydrologic changes that have occurred since the operations diagrams were created, and the hydrologic changes that are likely to occur because of climate change. It should also account for any planned increases in the flood conveyance capacity of the downstream rivers. At a minimum, the operations criteria should be based on forecasts and not be based on existing reservoir storage. The Department of Water Resources (DWR) should cooperate with the USACE on both the update of the operations criteria and manuals and the environmental documentation (EIS) that may be required to accomplish the changes in operation.
- **Beginning immediately, DWR (through the Central Valley Flood Protection Plan) should identify areas of the lower San Joaquin River, including through the Delta, where flood conveyance capacity can be expanded in a continuous reach.** Use existing bond funds to begin acquiring title or easement to floodplain lands immediately, especially in areas where urbanization threats are high. Identification of floodplains should be complete by 2012 and those floodplains protected by easement or purchase by 2014.
- **Beginning immediately, DWR should incentivize additional infiltration and storage of runoff and floodwater upstream of the Delta** using both groundwater and floodplain storage in the Sacramento Valley, San Joaquin Valley, and the Tulare Basin, as well as opportune sites in the upper watersheds.
  - By 2012, DWR should study, and if feasible implement, a plan to convey water from storage reservoirs to groundwater infiltration sites to expand storage resources and to improve flood control capacities of the reservoirs.
  - Over time, work with the U.S. Forest Service to revise the Forest Plans for the National Forests in the Sierra Nevada to encourage greater infiltration

**Strategy 4. Improve the reliability and predictability of water diverted from the Delta Watershed to support the co-equal values**

Whether upstream, within, or exporting from the Delta Watershed, the ability for diverters to rely upon a predictable quantity of surface water is inextricably linked to the ability to plan, fund and implement a more diverse water supply portfolio. As a critical source of water for many, unpredictable constraints on Delta diversions continue to result in tensions between and among the various users of this vital-to-all resource – contributing to the continued deterioration of Delta ecosystem functions and unacceptable economic hardships. We believe these tensions can be reduced or even avoided altogether if diverters were provided greater predictability under differing hydrologic and ecologic conditions. This knowledge increases the ability to define and invest in appropriate diversification of water supplies and management tools – including significant improvements in water use efficiency, water recycling and conjunctive use. Lacking this predictability has resulted in unsustainable short-term actions by water users such as stumping Avocado trees and letting crops wither. Predictability and reliability across a range of defined circumstances would help maximize the benefit of a diversified supply portfolio and move us away from unsustainable short-term actions.

The system must also be more robust to allow flexibility in the timing and quantities of diversions to shift away from periods with highest impacts on ecological functions in and upstream of the Delta, while reliably providing predictable and acceptable volumes of quality water for diverted uses. This flexibility is paramount to achieving the strategies necessary for a resilient ecosystem, as detailed in later strategies.

The degree of flexibility needed to meet the Vision’s co-equal goals is not understood well enough at this point to define numeric objectives – and may never be. Though our strategic plan identifies Delta flow related actions believed necessary to achieve desired ecosystem functions, we do not yet understand the magnitude of impact such actions could have on water supply and reliability – especially for those exporting directly from the Delta watershed. We must immediately invest, however, in expanding our knowledge, then quickly make decisions as to the desired flexibility and proceed with steps to construct necessary infrastructure and entitle management mechanisms. The continued loop of study after study is unacceptable. We also need to change the belief that water will reliably be available up to the “maximum permitted” as has been the paradigm of the past. “Predictable” “reliable” water for diversion will be defined in ranges in tied to hydrological conditions and ecosystem performance measures.

Vision recommendations met:  
1 7 8

Performance measures:  
Likelihood of a catastrophic interruption of Delta conveyance system (-)  
Amount of water in accessible surface and ground water storage compared to 2008 baseline (+)

We recommend the linchpin to managing Delta water supply and ecosystem functions as co-equal objective will be construction of a new canal isolated from the Delta’s natural waterways operate in conjunction with modifications to existing Delta channels – the “through Delta” portion of a necessary conveyance solution. The size, location and operations of both a new canal and modifications to existing channels will require additional analysis, but new conveyance functions must be constructed.

Our Strategic Plan requires construction of new Delta conveyance facilities, significant shifting in export diversion timing to accommodate Delta ecosystem functions, and construction of sizable infrastructure to transfer water from localized abundance of the wet periods to the drier times and places. Because our choices need to be adaptive, yet even new physical infrastructure will create constraining side-boards, we see value in evaluating additional non-physical mechanisms to add to our flexibility.

The critical elements of this strategy include:

- **Building upon the studies underway as part of the Bay Delta Conservation Plan (BDCP) efforts, direct the Department of Water Resources (DWR) in cooperation with the Department of Fish and Game (DFG) to immediately begin a 1-year investigation to improve our knowledge of trade-offs associated with increased flexibility and changes in export diversion quantities that would result from shifting diversion timing to wetter periods (both within and between years) to achieve desired ecosystem flow objectives (see Strategy 7).**
  - By June 2010, using a defined set of attributes listed as primary indicators, make a decision regarding the degree of flexibility desired and direct creation of a long-term action plan to guide design and construction of necessary facilities. This decision may result in changes to objectives currently stated in Strategy 7 as a result of balancing the co-equal goals given the recent knowledge obtained.
  - By October 2009, and if no fatal flaws are identified in preliminary evaluations, obtain permits and ground-test the components of a “two-barrier” Middle River Conveyance option, initially as a reversible experiment. In an open, transparent manner, analyze and refine the Middle River Conveyance option, including evaluation and appropriately staged implementation of fish screens, gates and other “testable” components.
  - By December 2010, and based on the decision made regarding the degree of desired flexibility, while also addressing the potential risks of climate change and levee failures, establish an action plan for the design, funding and construction of an isolated facility, as part of the dual-conveyance approach.

- Require necessary decisions, permits and funding mechanisms for the Delta water conveyance system improvements to be expeditiously obtained after the selection of a recommended alternative.
- **By 2020, complete construction of 50% of the identified new surface and groundwater storage and associated conveyance facilities to accommodate the significant storage requirements associated with shifting diversion timing,** and in anticipation of changes in the precipitation characteristics resulting from climate change. By 2030 complete the remaining 50% of needed facilities.
  - Inform these decisions with completion of CALFED surface storage investigations, which require the legislature and the administration to ensure stable State and federal funding through FY 2010

**Strategy 5. Improve water quality for drinking water, agriculture, and the ecosystem**

While focused on water quality constituents of concern for municipal and agricultural supplies including salinity and organic carbon, these actions also reduce pollutants that are harmful to aquatic life and other beneficial uses. The water quality improvement strategy uses a combination of source control, with benefits for multiple downstream uses, and relocation of intakes where necessary to improve water quality for municipal and agricultural supplies.

Given current trends of population growth and climate change, Delta water quality will be further degraded and the Delta will no longer consistently provide a reliable supply or fully support the ecosystem unless steps are taken to further protect water quality. Water conservation, pollution prevention, stormwater infiltration, water re-use, wastewater treatment, and water recycling all work together to reduce loads of pollutants. The State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards should immediately pursue a program of enhanced source control, focused on the Delta, including incentive based programs, new water quality objectives, current permits, appropriate conditional waivers, and effective enforcement.

Relocating intake facilities or modifying the flow of water within the Delta to effectively draw water from flowing Delta channels improves the quality of drinking water and agricultural export supplies while reducing ecosystem impacts. For example, relocating the current Central Valley Project (CVP) and State Water Project (SWP) south Delta intakes to the Sacramento River near Hood would reduce bromide in exported water to approximately 5% of current levels and would reduce take of Delta smelt. The intake relocation strategy includes immediate steps to relocate smaller in-Delta drinking water diversions by constructing pipelines and new diversion structures on channels with higher water quality and more removed from critical aquatic habitat. The larger multi-purpose diversions in the south Delta will be addressed in stages. All of these new conveyance

Vision recommendations met:

1 3 9

Performance measures:

Percentage of time that ambient levels of 3 mg/L TOC and 50 µg/L bromide or better are achieved at drinking water intakes (or other applicable standards, whichever are more stringent) (+)

Percentage of agricultural water supplies meeting or exceeding current quality standards (+)

Net levels of salinity in major groundwater aquifers (-)

Percentage of time that pathogen concentrations at Delta drinking water intakes meet the Bin 1 requirements of the Long Term 2 Enhanced Surface Water Treatment Rule (+)

Number of nuisance growths of algae or aquatic plants in the Delta or water project facilities (-)

Concentrations of contaminants in urban runoff flowing into the Delta (-)

facilities can be operated together for more effective and flexible water supply and ecosystem management.

Near term projects include the Contra Costa Water District (CCWD) Alternative Intake Project (already under way), relocation of the North Bay Aqueduct intake, and a pilot project to install a flow control barrier in the western Delta near Franks Tract. Projects to be more fully developed in the California Delta Ecosystem and Water Plan (CDEW Plan) may include modifications to through-Delta conveyance (the “Middle River conveyance” system) and relocation of the SWP and CVP intakes to the Sacramento River.

Changes to Delta conveyance and the effects of climate change will have an impact on the reliability and water quality for other water users with intakes located within the Delta. Additional intake locations, conveyance configurations, and connections may be necessary to supply some of the Delta’s agricultural and municipal water needs. Investing in additional alternative intakes for these users can provide further flexibility in helping change the pattern of diversions to when and where least harmful to the environment.

Critical elements of controlling contaminants at the source include:

- **By 2012, the SWRCB and Central Valley Regional Water Quality Control Board (CVRWQCB) should develop water quality objectives for Central Valley rivers, tributaries, and the Delta for priority constituents** (including nutrients, mercury, and selenium) that are fully protective of beneficial uses.
- **By 2013, the CVRWQCB should complete source control elements of the Water Boards Bay-Delta Strategic Workplan, clear the backlog of expired permits, and conduct all necessary oversight.**
- **Annually through 2013 and as needed after that, the SWRCB, Department of Water Resources (DWR), U.S. Environmental Protection Agency (USEPA), and U.S. Department of Agriculture (USDA) should provide financial assistance (loans and grants) for local government and individuals to help achieve Delta water quality objectives.**

Critical elements of relocating Delta diversions to channels where water quality is higher and away from sensitive habitats (high priority restoration areas, low-flow channels and terminal sloughs) include:

- **By 2011, CCWD should complete construction of the CCWD Alternative Intake Project** which will relocate the Old River intake to the southern third of Victoria Canal.
- **By 2011, DWR and the Solano County Water Agency should complete the planning and environmental evaluation phase for relocating the North Bay**

**Aqueduct intake** to a location with higher drinking water quality and with less ecosystem impacts.

- **By 2015, DWR and the Solano County Water Agency should complete construction of the selected alternative intake for the North Bay Aqueduct.**
- **By 2011, DWR and the federal Bureau of Reclamation (Reclamation) should complete the planning and environmental evaluation phase for Delta conveyance modification** including re-location of SWP and CVP intakes.
- **By 2020, DWR and Reclamation should complete construction of the selected delta conveyance alternative and intake.**

Critical elements to identify mechanisms to connect legal in-Delta water users to improved Delta conveyance facilities include:

- **By 2011, DWR and Reclamation should complete a study to identify legal water users that are likely to be significantly impacted by conveyance modifications and climate change, and should identify potential projects for alternative intakes and conveyance configurations to meet their water supply needs.**

Additional critical elements for the Legislature to undertake:

- **Immediately fund studies to investigate the potential for additional intakes, conveyance configurations, and connections to improve Delta water quality and water supply reliability.**
- **Increase SWRCB and RWQCB staff resources for source control program implementation.** An estimated 30-40 additional positions are needed to fully implement these strategies.
- **Require and fund a study of source control resource needs then provide funding for financial assistance programs for the State's share of necessary stormwater management, agricultural drainage management, wastewater treatment, and other source control projects.**
- **Provide State share of funding for intake relocation and Delta conveyance modification projects.**

**Strategy 6: Restore extensive interconnected habitats**

Estuarine ecosystems like the historic Delta are complex, highly variable systems of many interrelated components. Each must be present and fully capable of providing its function to sustain the ecosystem as a whole. Major disruptions of this ecosystem complex – and each of its parts – have led to the systemic failures confronting California today.

Revitalizing the Delta ecosystem is challenging and cannot be implemented piecemeal; all restoration components must be present and function together (see Figure 4). Furthermore, revitalization must be conducted and managed consistently across agencies and jurisdictions and must effectively incorporate science-based adaptive management. Authority and organizational structure must be capable of supporting this goal.

Vision recommendations met:

1 3

Performance measures:

Acres of restored tidal marsh, Delta (not accounting for sea level rise) (+)

Acres of restored tidal marsh, Suisun (not accounting for sea level rise) (+)

Acres of restored shallow open water habitat in the Delta (+)

Acres of active floodplain (+)

Acres of seasonal wetlands and grasslands (+)

Acres of fall open water habitat between 0.5-6 parts per thousand salinity (+)

Percent of aquatic food web support by diatoms (+)

This strategy focuses on creating diverse mosaics of habitats and ecosystem processes that are appropriately connected, and is the cornerstone upon which other restoration strategies are built. This strategy specifically calls for restoration of selected intertidal marshes, seasonal floodplains, and open water embayments. Other restoration actions functionally connected to these habitats are described under subsequent strategies.

Unless otherwise stated, studies and restoration work would be carried out by the California Department of Fish and Game (DFG), the U.S. Fish and Wildlife Service (USFWS), the Department of Water Resources (DWR), the federal Bureau of Reclamation (Reclamation), the Delta Conservancy, the Delta Engineering and Science Board, and various scientific research organizations, within a time frame concurrent with the type of restoration recommended below. (See strategy 15 for more description of the governance structure that would carry out these and other revitalization strategies.)

The critical elements of this strategy include:

- **Increase frequency of floodplain inundation and establish new floodplains.**
  - Increase interannual inundation frequency on the Yolo Bypass by 2015 without compromising flood protection. DFG, DWR, the Delta Conservancy, and other participants shall design and implement the

necessary infrastructure and operational modifications to allow the Yolo Bypass to flood at least 60 days continuously between January and April every other year except during critical dry years. Improvements shall address passage impediments to adult and juvenile salmon, sturgeon, and splittail at the Fremont Weir, Lisbon Weir, Toe Drain, and other barrier points.

- Establish new seasonal floodplains where the Mokelumne River enters the Delta by 2015. DFG, DWR, the Delta Conservancy, and other participants shall acquire the necessary lands and update the Draft North Delta Flood Protection EIR to provide for integrated seasonal floodplain habitat, linkage to adjacent intertidal marsh, and additional flood protection for lands along the lower Mokelumne and Cosumnes River corridors.
- Investigate lower San Joaquin River floodplain establishment along both banks of the San Joaquin River below Vernalis and along Old River to Fabian Tract and implement any feasible projects by 2015. DWR, Reclamation, U.S. Army Corps of Engineers (USACE), DFG, USFWS, National Marine Fisheries Service (NMFS), the Delta Conservancy, and other participants shall identify suitable lands in context of available San Joaquin River flows, channel carrying capacity to convey flood flows, and land surface elevations all necessary to provide seasonal floodplain habitats as part of flood protection efforts.
- Investigate the potential for (and implement by 2015 where feasible) additional floodplain habitats further upstream along all the rivers and streams entering the Delta capable of supporting salmonid rearing and splittail reproduction. DWR, Reclamation, USACE, DFG, USFWS, NMFS, the Delta Conservancy, and other participants shall identify suitable lands in context of available flows, channel carrying capacity, and land surface elevations all necessary to provide seasonal floodplain habitats as part of flood protection efforts.
- **Restore intertidal marsh (see Figure 7).**
  - Restore 15,000 acres of intertidal marsh in the Delta by 2020, with geographic priority on locations with the greatest anticipated benefit to ecosystem processes feasibility for restoration.
  - Restore up to an additional 15,000 acres intertidal marsh in the Delta by 2040. If adaptive management monitoring indicates prior restoration and other activities have not yet accomplished ecosystem goals, restore as much remaining land of suitable elevation as possible by 2060.
  - Restore 12,500 acres of intertidal marsh in Suisun Marsh by 2020.

- Restore another 12,500 acres of intertidal marsh in Suisun Marsh by 2040 and additional acreage as lands become available if adaptive management monitoring indicates prior restoration and other activities have not yet accomplished ecosystem goals.
- **Restore tidal open water areas.**
  - By 2015, under the auspices of the CALFED Science Program and Ecosystem Restoration Program (ERP) agencies, complete additional scientific studies to examine the most effective strategies for restoring tidal open water embayments in the Delta to increase diatom-based primary productivity and minimize adverse effects of harmful invasive plants, fish, and invertebrates on native fish.
  - Restore sufficient acres to achieve 20,000 total acres of tidal open water habitats in the Delta by 2020. Restoration locations should be able to achieve fall open water conditions of temperature below critical thresholds and salinity of 0.5 to 6 parts per thousand to support rearing habitat for resident native fish.
  - Restore an additional 15,000 acres of tidal open water habitats in the Delta by 2040.
- **General principles applicable to all types of restoration:**
  - Establish managed wetlands in advance of restoring tidal action in order to reverse subsidence where feasible and needed. Consider marketing carbon sequestration credits for these subsidence-reversal efforts to assist with offsetting restoration implementation costs.
  - Initiate comprehensive land and easement (with purchase option) acquisition programs that make suitable elevation lands available for restoration. For lands targeted for later restoration, use either lease-back approaches or easements with purchase options that allow existing land uses until restoration can proceed.
  - Include large blocks of land encompassing broad topographic variability that support restoration of diverse ecosystem complexes.
  - Control existing harmful invasive species populations and take measures to avoid expansion into newly restored lands. The NMFS, California Department of Boating and Waterways, the United States Department of Agriculture Invasive Species Division, DFG, and USFWS shall ensure this control by 2012.

**Strategy 7. Restore Delta flows and channels to reflect California climate patterns and support a healthy Delta estuary**

Freshwater flow conditions in the Delta must change to revitalize the ecosystem and provide conditions needed by estuary-dependent species, including many presently at risk. Appropriate flows provide habitat, trigger reproduction and migration, transport nutrients and organisms, maintain and improve water quality, and promote habitat complexity. California’s vast network of reservoirs, canals and pumps, as well as the major reconfiguration of the Delta’s channel geometry and landscape over several decades, have homogenized flow conditions across seasons and reduced the total water supplied to the ecosystem. This has facilitated the spread of non-native organisms and the decline of native species. Variable conditions are widely believed to benefit native species and to be detrimental to many invasive species.

Vision recommendations met:  
  
1 3 7

Performance measures:

- Net downstream flow on San Joaquin River at Jersey Point Oct 1 to Jun 30 (+)
- Number of 7-14 day duration fall flow pulses on San Joaquin River at 2,000-3,000 cfs at Vernalis between Sep. and Nov. each year (+)
- Number of months between Aug and Nov with Delta outflow of 12,000-18,000 cfs (+)
- Incidents of migratory passage delays, blockages, or mortalities due to physical barriers, low dissolved oxygen, high temperatures, or toxics (-)
- Dissolved oxygen concentrations in anadromous fish migratory corridors at all times (+)

Delta outflows in February through June (as measured by the location of the two parts-per-thousand salinity threshold, a.k.a. the “X2 line”) have a strong and statistically significant correlation with the abundance and/or survival of numerous estuary-dependent organisms in the Bay-Delta ecosystem. For most species, higher flows affect survival and abundance in multiple ways, by increasing habitat area, increasing food supply, and facilitating transport within the estuary. Increasing spring inflows and outflows, in particular, will increase the value of floodplain and open water habitats in the Delta, as well as upstream riverine habitats. Higher fall outflows should follow wet springs and lower fall outflows should follow dry springs. In critically dry years (about one year in ten) new flow requirements should result in salinity intrusions to the Delta and improved carryover storage in upstream reservoirs.

Current policies affecting flows are embedded principally in the State Water Resources Control Board’s (SWRCB) Water Quality Control Plan, which requires protection of the low salinity zone (as represented by the X2 line), among other standards. Significant changes to project operations may arise in response to recent court orders and new information.

This strategic plan advances additional flow targets, described below. These are interim targets, based on the best available information developed through the ongoing efforts of the Interagency Ecological Program’s Pelagic Organism Decline (POD) Working Group and the CALFED ERP’s Delta Conceptual Models. These interim targets are to be used in policy making and operations until additional flow requirements are developed through the California Delta Ecosystem and Water Plan (CDEW Plan), the SWRCB’s review of the Bay-Delta Plan, or other formal rule-making processes.

Implementation responsibility for the actions described within this strategy will reside amongst several entities, most notably the CDEW Council, the SWRCB, the Department of Water Resources (DWR), and the federal Bureau of Reclamation (Reclamation), all in consultation with the California Department of Fish and Game (DFG), the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS).

The critical elements of this strategy include:

- **By 2012, the SWRCB should adopt new requirements to increase spring outflow (in all but the wettest years) and reintroduce fall outflow variability.** With input from the CDEW Plan and other sources, the Board should revise the Bay-Delta Water Quality Control Plan to include these spring and fall outflow objectives by 2012, and revise water rights permit terms and conditions to ensure attainment of the objectives by 2015.

In the spring, the requirements should provide a minimum of 10% increase of unimpaired runoff in most years, with highest percentage increases in drier years. Wet years generally will require no increase. This allows greater water supply diversions during wet spring periods, in keeping with the co-equal values.

In the fall following below normal, above normal, and wet years, the requirements should provide two months between August and November with Delta outflows of 12,000 to 18,000 cubic feet per second. (Inflow from the Sacramento River currently is higher than the unimpaired flow in the summer and fall in order to convey water supply south across the Delta to the export pumps, but those flows are not realized as Delta outflow.)

- **The SWRCB should revise its Vernalis flow objectives, and the export criteria for the Central Valley Project (CVP) and the State Water Project (SWP), to provide for net positive (i.e. downstream) San Joaquin River flows by 2012, and revise water rights permits terms and conditions to ensure attainment of the new requirements by 2015.** Flows at Jersey Point in the short term should be at least 20% of the 2006 Water Quality Control Plan flows required at Vernalis, rising to at least 50% in the longer term as strategies related to South Delta exports and improved conveyance are carried out. These flows will allow downstream transport, and minimize potential entrainment, of larval fish and high-quality food items for fish. They will also increase migration

success of outmigrating juvenile salmon, and facilitate movement of resident fish such as Delta smelt.

- **By 2020, DWR should reconfigure Delta waterway geometry to increase variability in estuarine circulation patterns and increase aquatic access to floodplains and tidal marshes**, in conjunction with near-term conveyance modifications described in Strategy 4. These reconfigurations will include installing removable or operable flow barriers, especially in channels of the south Delta, and increasing habitat complexity so that channel lengths are greater than tidal excursion distances (see Figure 8). For floodplains, these reconfigurations will involve allowing more frequent and longer inundation of floodplains, by reducing weir heights, installing gates, and/or removing levees (see Strategy 6).
- **Beginning immediately, the SWRCB should mandate the improvement of Delta water quality, especially on the San Joaquin River, through increased base flows and pulse flows**, while other water quality improvement approaches are developed and implemented. Low dissolved oxygen and high contaminant build-up are known problems for numerous aquatic organisms. Source control of contaminants and oxygen demand loads (see Strategy 5) will eventually reduce the need for using flows to minimize their impacts.

The initial pulse flow standard should be to provide one to two pulses of 2,000 to 3,000 cubic feet per second at Vernalis for a seven- to fourteen-day duration between September and November (i.e. timed to match upmigration timing of fall-run salmon). If desired benefits are not demonstrated, the standard should be revised by the SWRCB in consultation with the CDEW Council.

**Strategy 8. Reduce or eliminate ecosystem stressors to below critical thresholds.**

Numerous stressors to the Delta estuary must be reduced to achieve the revitalization and long-term sustainability of the Delta’s ecosystems. Harmful invasive species, contaminants from sewage and stormwater discharges throughout the watershed, and entrainment from improperly designed diversions, are all important stressors which cause adverse effects to the Delta ecosystems.

Invasive species adversely affect native species through direct predation, competition for food resources, and altered predator-prey dynamics. Contaminants include agricultural pesticides and nutrient loads, municipal wastewater discharges, and other constituents such as methylmercury, all of which can contribute to toxic conditions for fish and the organisms they feed upon. Fish entrainment occurs at the state and federal export facilities, and at other municipal and agricultural diversions within the Delta. Entrainment effects are related to the size of the diversions relative to the channel from which they pump, the time of year when operations are at highest demand, and the geographic location of the diversion point.

Even if appropriate physical habitats and flow conditions are restored, Delta ecosystems may not recover adequately unless these stressors are substantially reduced. Full implementation of ongoing and new regulatory approaches, development of innovative strategies, and effective monitoring will be necessary to execute this strategy properly. Critical elements of this strategy include:

- **By 2015, the Department of Fish and Game (DFG) should implement measures to control harmful invasive species at existing locations, and at restoration areas.** These measures should include:
  - Controlling existing populations by direct measures (i.e., chemical treatment, mechanical removal, etc.) or by altering the habitat in ways that disfavor unwanted species but not desired species.

Vision recommendations met:  
  
1 3 9

Performance measures:

- Number of new, uncontrolled harmful invasive species (-)
- Percentage of 1995-2000 average abundance and distribution of invasive clams (*Corbula* and *Corbicula*) (-)
- Percentage of 1990-2000 average abundance and distribution of Brazilian waterweed (*Egeria*) (-)
- Concentration of methylized mercury in Delta water compared to 2008 baseline (-)
- Percentage of outmigrating juvenile salmonid population entrained at Delta diversions (-)
- Delta smelt and longfin smelt entrained at Delta diversions (-)
- Concentrations of contaminants in urban runoff flowing into the Delta (-)

- Preparing for potential new invasives, including quagga mussel, zebra mussel, and northern pike by prioritize restoration of habitats that they are less likely to disturb (e.g. floodplains), and designing fish screens that will retain their value in the presence of freshwater mussels.
- Reducing the likelihood of new invasives through a combination of education, regulation and enforcement.
- Experimenting to reverse the spread of freshwater invasives, including considering a carefully designed adaptive management experiment to reduce Delta outflow in summer or fall of critically dry years.
- Promoting the restoration of floodplains, elevated side channels, or other habitats that periodically dry out, in order to limit the impact of invasive species on the seasonal use of such habitats by desirable species.
- **By 2012, the Central Valley Water Quality Control Board (CVWQCB) should develop and implement Total Maximum Daily Load (TMDL) programs for areas upstream of the Delta to reduce the loads of organic and inorganic mercury entering the Delta from tributary watersheds.** The mercury TMDL program for the Delta itself should continue.
- **Beginning in 2009, DFG should comprehensively monitor fish and wildlife health at suspected toxic sites.** As part of its governance authority, the Council should build on the recent work of the U.S. Environmental Protection Agency (USEPA), the CALFED Science Program and the State and Regional Water Boards to develop a comprehensive monitoring program for fish and wildlife health at suspected toxic sites. In particular, these programs should make a concerted effort to study the overall health effects of the “soup” of contaminants that cumulatively impact Delta species, as opposed to examining contaminant-species relationships one at a time.
- **Beginning immediately, the SWRCB, the CVRWQCB, and the USEPA should develop comprehensive strategies to reduce contaminant load discharges at all point and non-point sources.** These load reductions should be achieved through multiple methods, including:
  - Improved treatment processes
  - Discharge avoidance through reduced water use, water reuse, and water recycling.
  - Ensuring that all point source discharges throughout the Central Valley watershed are in full compliance with existing regulatory requirements.
  - Use of treatment wetland systems for contaminant removal at agricultural, municipal, and industrial point sources before discharge into Delta waters and all tributary rivers and streams is an effective approach in many circumstances.

- Use of public education messages and non-point source pollution control technologies at drainage collection points such as storm drains.
- **Beginning immediately, the Department of Water Resources (DWR) should reduce entrainment and export effects on fish by implementing near-term conveyance improvements (see Strategy 4), instituting diversion management measures, and ultimately relocating diversions (see Strategies 4 and 5).** As these conveyance and diversion improvements are carried out, the following criteria should be used to reduce entrainment:
  - Properly size and screen diversions to reduce entrainment. This includes in-Delta agricultural diversions.
  - Alter demand relative to capacity (see Strategies 1 and 2) to permit greater flexibility in operations away from times of sensitivity.
  - Carefully manage exports during times of greatest sensitivity with resident and migratory fish distribution.
  - Relocate diversion points to areas less likely to entrain fish and away from the productivity generated by habitat restoration projects.

**Strategy 9: Establish an effective adaptive management framework to support ecosystem revitalization**

Achieving ecosystem goals is dependent upon formulating a comprehensive restoration plan that is fully integrated with water management and science-based adaptive management. Despite tremendous gains in scientific understanding of the Delta ecosystem, many unresolved questions remain, further complicated by the substantial challenges of sea level rise, climate change, seismicity, and population growth. Science-based adaptive management is the mechanism that will allow progress in the face of such complexity and uncertainty.

Vision recommendations met:  
3 10 12

Performance measures:  
Percentage of adaptive management actions recommended by CDEW Science Program that are implemented in a timely manner (+)  
Length of time before negative trends in the performance of other indices are reversed (-)

This strategic plan adopts the definition of adaptive management used in the Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management:

“Adaptive management is a type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices (Federal Register 65, no. 202, October 18, 2000).”

Past efforts to restore ecosystem function to the Delta and Suisun Marsh, while also addressing water demands, have also demonstrated an essential need for more comprehensive planning supported by governance institutions capable of ensuring long-term implementation. Therefore, this approach to adaptive management must also be fully integrated with the governance and planning framework discussed in Strategies 14 and 15. The cycle of strategy development, planning, implementation, and evaluation can then be applied to all areas of organizational activity, so that the California Delta Ecosystem and Water (CDEW) Council and all other engaged parties, can learn and change based on the outputs of the adaptive management process.

The critical element of this strategy is:

- **The CDEW Plan, upon its completion in 2010, must contain an adaptive management plan.** As part of the CDEW Plan development process, relevant science experts (including the CALFED Science Program, the California Department of Fish and Game (DFG), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the Interagency

Ecological Program, and other outside experts) must prepare a science-based adaptive management plan to support ecosystem revitalization. Long-term funding for adaptive management activities should be routinely included in all project budgets and funding. The data collection, organization and science to support adaptive management, plus bringing this information into policy making effectively, including public processes, can reach 10 to 20 percent of total restoration project costs.

**Strategy 10. Establish multi-purpose migratory corridors along selected Delta river channels**

Enhanced multi-purpose river corridors connected with restored upstream habitat will improve the survival rate of endangered migratory species and popular sport fish, increase recreational opportunities, and increase the ability to manage the co-equal values throughout the watershed. “Enhanced” river corridors are managed for aquatic conditions conducive to migratory success, are expanded in size so that they can safely convey larger amounts of flood water, are connected to terrestrial habitats where possible, and have streamside vegetation where possible.

Various factors now impair the migration and survival of salmon, steelhead, and green sturgeon populations in the rivers flowing into or through the Delta. These barriers to migratory success can be minimized by:

- Providing adequate flows at the right time to support adult and juvenile migrations,
- Resolving conflicts between conveyance and migration,
- Establishing multiple (redundant) migratory corridors for each river system,
- Restoring large areas of floodplain and intertidal habitats along and adjacent to these corridors, and
- Restoring riparian and other emergent vegetation habitats along each corridor in areas away from large restoration areas.

Recovery of these fish populations would enhance sport fishing and other recreational opportunities along these corridors. In addition, as described in Strategy 3, expanded flood conveyance capacity on selected Delta river channels would allow re-operation of upstream reservoirs, potentially increasing water supply yield from those facilities.

Implementation will require close coordination and consistency among many parties, including the Delta Conservancy, the California Department of Fish and Game (DFG), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the Department of Water Resources (DWR), the federal Bureau of Reclamation

Vision recommendations met:  
  
3 9

Performance measures:

Number of functional migratory corridors per river system (Sacramento, San Joaquin, Mokelumne/Cosumnes) (+)

Amount of river miles connected to habitats (+)

Distribution of large habitat complexes along estuarine gradients and with extensive internal connectivity (+)

Incidents of migratory passage delays, blockages, or mortalities due to physical barriers, low dissolved oxygen, high temperatures, or toxics (-)

Dissolved oxygen concentrations in anadromous fish migratory corridors at all times (+)

Percentage of adult salmon, steelhead, and sturgeon surviving migration through Delta (+)

Percentage of juvenile salmon, steelhead, and sturgeon surviving migration through Delta (+)

(Reclamation), and other restoration entities. As above, flow targets recommended here are based on the best available information and are for **interim** use until relevant agencies can develop and adopt flow targets.

The critical elements of this strategy are listed below, by river corridor and priority:

- **By 2015, the Delta Conservancy, DFG, and other relevant agencies should implement high-priority improvements to physical habitats along selected corridors.** Subject to further analysis in the California Delta Ecosystem and Water (CDEW) Plan, this should involve:
  - Implementing Yolo Bypass floodplain habitat improvements, without reducing flood safety (see Strategy 6),
  - Expanding floodplains along the Mokelumne River upstream of the Delta
  - Restoring floodplains and tidal marshes at the Delta confluence (including integration with flood protection improvements in McCormack-Williamson and New Hope Tract area)
  - Restoring floodplain habitats along San Joaquin River upstream of the Delta, and between Vernalis and Stockton, wherever possible
  - Restoring intertidal marsh throughout Cache Slough complex
  - Integrating lower San Joaquin River floodplain restoration with South Delta tidal marsh restoration after reducing conveyance conflicts
  - Restoring Prospect Island and Sutter Island
  - Enhancing and restoring channel margin vegetated habitats along:
    - Key Sacramento River locations, including Sutter Slough, Steamboat Slough, Miner Slough, Cache Slough between Miner Slough and the Sacramento River, and the Sacramento River upstream of Steamboat Slough
    - Both forks of the Mokelumne River and along the San Joaquin River downstream of its Mokelumne confluence.
    - San Joaquin River and Old and Middle Rivers with priority applied to migratory paths consistent with conveyance and operations.
- **By 2020, the Delta Conservancy, DFG, and other agencies should implement medium-priority corridor improvements concurrent with conveyance changes.** Subject to further analysis in the CDEW Plan, this should involve:

- Enhancing and restoring channel margin vegetated habitats along the Sacramento River downstream of Steamboat Slough
- Enhancing and restoring channel margin vegetated habitats along Three Mile Slough (unless it is cut off by barriers).
- **By 2012, the CDEW Council, the Delta Operations Team, and DWR should implement high-priority flow improvements.** These include:
  - Periodically inundating the Yolo Bypass (see Strategy 7) and altering Sacramento River flows to meet water quality and passage flow needs.
  - Reducing adverse effects of flow alterations from through-Delta conveyance during migration periods on the Mokelumne River and tributaries, including potential use of temporary or permanent gates and barriers as appropriate.
  - Achieving net downstream flow at Jersey Point from October through May, and pulse flows at Vernalis, as described in Strategy 7. Further evaluate the use of temporary barriers at the head of Old River to direct migrants toward the best water quality and least entrainment risk.
- **By 2012, the CDEW Council, the Delta Operations Team, and DWR should resolve high-priority conveyance-driven flow conflicts by:**
  - Closing the Delta Cross Channel during migration periods, especially November through January.
  - Integrating Mokelumne River corridor improvements with all aspects of conveyance planning, including changes in through-Delta conveyance and location of a dual conveyance facility.
- **Beginning immediately, DWR (through the Central Valley Flood Protection Plan) should identify areas of the lower San Joaquin River, including through the Delta, where flood conveyance capacity can be expanded in a continuous reach** (cross-referenced with Strategy 3). Use existing bond funds to begin acquiring title or easement to floodplain lands immediately, especially in areas where urbanization threats are high.
- **Beginning as soon as possible, the Delta Protection Commission (DPC) and the National Heritage Area planning effort (see Strategy 11) should identify mechanisms to encourage recreational investments along the key river corridors** subject to the improvements described above, and plan their implementation.

### Strategy 11. Designate the Delta as a unique and valued place

Our Vision strongly declared that the Delta “is a unique and valued area, warranting recognition and special legal status from the state of California.” Despite the risks and inevitable changes that will confront the Delta in the coming decades, our strategic plan urges recognition of the Delta’s unique natural, cultural and historic character, rather than abandonment of the region. Indeed, such recognition is warranted at a national, as well as state, level.

Recognition of the Delta should occur through a range of designations and initiatives. These designations should be structured to increase the visibility of the Delta within the state of California and nationally; to strengthen the recreational, tourist, and agricultural economies in the Delta; and to increase visitation. This requires making the Delta more “imageable” and marketable, improving visitation infrastructure (including recreation sites) at appropriate locations, and identifying appropriate ways to enhance the agricultural economy.

The critical elements of our strategy for designating the Delta include:

- **By 2015, achieve the designation of the Delta as a federally recognized National Heritage Area (NHA)**, through the three major steps described below. NHAs are places designated by the U.S. Congress “where natural, cultural and recreational resources combine to form a cohesive, nationally-distinctive landscape arising from patterns of human activity shaped by geography.” Despite being a federal designation, NHAs do not entail any federal ownership or regulation of land. The National Park Service and the Department of the Interior review proposed NHA management plans to see that intended actions tend to advance the mission of the Park Service and the NHA program, but otherwise the federal role is limited to partnering in marketing efforts.
  - Beginning immediately, the Delta Protection Commission (DPC) and interested local entities should work to secure public support within the Delta for the designation, jointly conduct the required feasibility study, and identify the appropriate agency or non-profit to serve as the ongoing management entity.

Vision recommendations met:

2 9

Performance measures:

Acres of land providing public benefits of habitat, flood conveyance, subsidence reversal, or carbon sequestration (+)

Gross regional product from recreation and tourism (+)

Gross regional product from sustainable agriculture (+)

Expenditures by public agencies for land acquisition, management, and maintenance (+)

- Upon completion of the feasibility study, the State of California and the local management entity should apply to the U.S. Congress for the designation.
- Upon receiving the designation, the management entity and its partners must develop a management plan within three years that describes how the NHA will combine preservation, recreation, economic development, heritage tourism, and heritage education to interpret and promote the region’s distinctive landscape.
- **By 2010, the California Department of Food and Agriculture, commodity boards, and local government should create market structures or incentives for Delta agriculture to produce public benefits in addition to food and fiber.** Such public benefits include wildlife habitat, subsidence reversal, carbon sequestration, flood management, and recreational and tourism opportunities. Actions to carry out this strategy should include:
  - Ensuring that carbon farming is officially recognized as an emissions reduction mechanism under AB32 (a.k.a. The Global Warming Solutions Act).
  - The California Department of Food and Agriculture, commodity boards, and local governments should work together to allocate available U.S. Department of Agriculture (USDA) Farm Bill funding to begin a regional labeling program and assist in direct marketing of Delta produce in nearby cities.
  - The California Department of Food and Agriculture should also earmark directed specialty crop funding in support of Delta agriculture, including labeling, direct marketing and the development of new crops and crop varieties.
  - In addition, the State should use its working lands conservation programs in a coherent manner to leverage the conservation funding available through the USDA Farm Bill, such as that available through the Cooperative Conservation Partnership Initiative.
  - Federal, state and local mitigation requirements and agricultural easement programs should also be crafted to support the transition of Delta growers to multifunctional forms of agriculture, particularly wildlife habitat and flood management.
- **By 2010, the Governor’s Office of Planning Research should issue a model ordinance to local governments to create special enterprise zones at the major “gateways” to the Delta.** By 2013, the legislature should pass legislation providing tax breaks and/or low-interest loans within these zones to appropriate

- investments in welcome centers, interpretive centers, recreational support services, and transportation (both land and water) from these locations to points of interest throughout the region. Though recreation and tourism should be enhanced throughout the Delta, the buildings and services required to expand the industry should be concentrated in highly visible locations near highways and population centers, and in areas with relatively low disaster risks (i.e. above sea level or well protected by high-quality levees for other purposes).
- Potential sites for such gateways include Rio Vista on the west; Freeport, West Sacramento, or the Yolo Bypass on the north; Stockton on the east; and Antioch, Discovery Bay or Lathrop on the south.
  - There should be at least one gateway on each of the four sides of the Delta to ensure visibility and access.
- **By 2013, the Legislature should create a multi-unit State Recreation Area in the Delta, potentially combining existing and newly designated areas.** Beginning immediately, the California State Parks Department should complete a feasibility and siting study that considers at least the following:
    - A northern unit that includes Liberty and Prospect Islands and Little Holland Tract;
    - A southern unit located on Sherman Island, in an area that is visible from the Antioch Bridge, is easily accessible from Highway 160, and potentially allows cost-effective levee upgrades to protect the recreation site and major electricity and natural gas infrastructure;
    - The consolidation of Brannan Island State Recreation Area, Franks Tract State Recreation Area, and Delta Meadows River Park into the new multi-unit structure.

**Strategy 12. Achieve levels of emergency protection consistent with federal and state policies**

Our Vision recognized that the Delta faces extraordinary risks in both the near term and the long term. Earthquakes, river floods, “sunny-day” levee failures, and continuing subsidence and sea level rise all pose substantial risks to people, property, and infrastructure in the Delta. Emergency response capabilities must be thoroughly assessed and strengthened immediately.

In addition, the most cost-effective strategies for the protection of critical infrastructure systems, including highways, must also be assessed and implemented immediately. Service providers themselves are in the best position to conduct assessment of the long-term risk exposure facing these systems. Highways should be considered separately, since they are directly managed by the state and are essential to emergency response efforts in the Delta. These analyses must consider the full range of economic and life safety consequences of service outages, the likelihood of such outages, and the proportionate share of the collective costs and benefits achievable under co-location strategies. The analyses must consider these costs and benefits over a time period commensurate with the expected lifespan of the infrastructure system in question, not any shorter planning horizon dictated by financial or regulatory processes.

In concert with our strategy for improving the Delta levee system, we recommend a series of actions to achieve levels of emergency protection and preparedness that are commensurate with the risks the region faces.

- **By 2010, the State should complete a collaboratively prepared Delta-wide emergency response strategy** that includes life safety personnel, evacuation, animal control, and public safety, as well as flood fighting needs in an emergency. The plan must be comprehensive, incorporate existing organizations, and identify problems, such as gaps, overlaps or conflicts among these organizations.
  - This collaboration must include the Delta Protection Commission (DPC), the Department of Water Resources (DWR), the Governor’s Office of Emergency Services, the Delta counties Flood Response Group, the U.S. Army Corps of Engineers (USACE), the Department of Defense, the Department of Transportation (U.S. Coast Guard), the regulated utilities, the railroads, reclamation districts, and water purveyors both public and private.

Vision recommendations met:  
  
9 12

Performance measures:  
  
Mileage of designated state highways secured against catastrophic failure by adequate levee improvement, elevation, or other means (+)  
  
Number of people who have received Delta Emergency Response Training (+)

- The entities involved in a comprehensive emergency response strategy must conduct exercises together to determine what gaps, if any, in emergency planning or response still exist.
- The DPC should be a partner with the emergency response agencies, to provide Delta-specific information and insights concerning the social aspects of emergency response efforts, including identified gaps within existing plans and response processes.
- **Beginning immediately, all agencies responsible for emergency response in the Delta should embark upon a comprehensive series of emergency management and preparation actions.** These agencies include DWR, the Governor’s Office of Emergency Services, the Delta counties Flood Response Group, USACE, the Department of Defense, the Department of Transportation (U.S. Coast Guard). The actions include:
  - Clarify chains of command for responses to emergencies;
  - Conduct an emergency disaster planning exercise in the Delta, involving all appropriate federal, state and local agencies.
  - Establish clear benchmarks for recommending and demanding evacuations;
  - Develop good regional evacuation plans, including evacuation routes and shelter locations;
  - Begin emergency response exercises and drills with citizens as well as emergency response personnel;
  - Stockpile and pre-position supplies, including caches for citizen emergency response;
  - Earmark money and give spending authority for rapid response;
  - Sign contracts for barges along the West Coast to move people and supplies. In a major event, California will likely need help from other states and any existing mutual aid agreements should be assessed and improved as needed;
  - Ensure that adequate human labor resources to repair breaches will be available, and sufficiently mobile in the Delta, after any potential disaster.
  - Set up a Boat Search and Rescue Marshal Program for rapid evacuation of neighborhoods;

- Change building codes to require exits to a building’s roof from the inside;
- Paint lampposts on every block behind levees to show the 100-year flood or sea level, to address human tendencies to underestimate risks and avoid disaster preparation; and
- Begin required school programs about emergency training.
- **By 2012, the California Department of Transportation should conduct a comparative analysis of the costs and benefits of:**
  - Reinforcement of levees protecting highways against seismic and other levee failure threats;
  - Armoring or raising individual highways or segments;
  - Co-location of highways with adjacent infrastructure systems into fortified corridors;
  - Relocation of highways to areas with lower flood risks both now and under expected sea level rise conditions.
- **By 2012, a consortium of public utilities and other infrastructure service providers, convened by the California Public Utilities Commission and the California Energy Commission, should conduct a comparative analysis of the collective long-term costs and benefits of:**
  - Reinforcement of levees protecting infrastructure systems against seismic and other levee failure threats;
  - Co-location of adjacent infrastructure systems into fortified corridors;
  - Relocation of infrastructure systems to areas with lower flood risks both now and under expected sea level rise conditions.
  - Tunneling infrastructure systems below the Delta.

**Strategy 13. Adopt an overarching policy for levee design, investment, financing, priorities, and maintenance.**

The levee system is central to all Delta uses and services, and levee investment will shape the future Delta. Levees also have a significant impact on the ecosystem.

To create a path to a sustainable Delta ecosystem, economy and water reliability, we must pursue a new set of priorities and actions. Land uses and island services and infrastructure that are protected by levees must drive levee designs (see Figures 9 and 10). Furthermore, because the Delta and its services must be fiscally supported by its beneficiaries, the ability of beneficiaries to pay for levee maintenance and improvements will directly affect the long-term nature of Delta islands and tracts. Public funding should be directed primarily to levees that support State interests, especially ecosystem vitality and water conveyance. It is possible, perhaps even likely, that islands or tracts that are in low-value private uses and cannot afford levee maintenance and repairs will eventually revert to wetlands or open water habitat.

Vision recommendations met:  
9 12

Performance measures:  
  
Index measuring congruence between levee designs and land uses (+)

This Strategic Plan embodies following principles:

- The current configuration of islands and waterways is critical to many current uses and services dependent on the existing levee system. But the current levee system is not now providing adequate protection, and the existing landscape will not be sustainable over the long run.
- A range of levee design types and standards should be used to respond to sea level rise, river flooding, subsidence, and seismic risk.
- Environmentally friendly levee designs should be incorporated wherever possible.
- Application of the range of levee design types and standards should be keyed to the land uses and services protected, and to the levels of risk reduction deemed appropriate for each.
- The Delta should achieve full congruence between levels of protection and land uses and services at risk.
- All beneficiaries of levee protection should pay their appropriate share of the costs.

This strategy includes the following critical elements:

- **Within one year, the Department of Water Resources (DWR) should adopt a Levee Policy** that will:
  - Link levee designs with land uses
  - Address seismic risk, climate change, subsidence and sea level rise
  - Identify appropriate levee protection levels and designs for the following land uses and services, at a minimum:
    - Wetlands and floodplains
    - Agricultural lands
    - Critical infrastructure
    - Peripheral urban areas
    - Specific Delta cities, towns, and communities
- **The California Delta Ecosystem and Water (CDEW) Plan (see Strategy 16) should:**
  - Set priorities for levee improvements, maintenance and repairs.
  - Map Delta islands and levees showing priorities and targets for transition to full congruence.
  - Include land use considerations, such as restricting land intensification in flood-prone areas.
  - Identify beneficiaries of levee improvements and determine cost sharing among identified beneficiaries.
- **DWR should adjust the levee subventions program to support State interests and take necessary action to extend legislative authority for it.**

**Strategy 14. Ensure appropriate land uses in the Delta region**

Despite the existence of the Delta Protection Act, and the Delta Protection Commission (DPC), the Delta region as a whole has continued to experience development in locations that potentially threaten state interests, and heighten safety risks, in the region. Large-scale development on certain lands outside of the primary zone can increase flood risks for existing inhabited areas and foreclose critical ecosystem revitalization and climate change adaptation opportunities. Substantial population increases in the region are projected for the coming decades, meaning that urbanization pressures in the secondary zone – and even the primary zone – are likely to continue for the foreseeable future.

Vision recommendations met:

2 10 11 12

Performance measures:

Number of people living in legal Delta in areas with less than 200-year flood protection (-)

Number of structures in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-)

Number of people living and working in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-)

Land use policy in the Delta must also help ensure that ecosystem vitality can be sustained as climate change unfolds. There is a need to protect upland areas adjacent to restored intertidal marshlands so that as sea level rises, the marshlands can naturally migrate landward and continue to provide their important ecosystem functions. The lands subject to this strategy are located around the entire perimeter of the Delta, with priority placed where intertidal marsh restoration is most feasible in the shortest time (see strategy 6).

In September 2007, the CALFED Independent Science Board recommended that planning processes use a sea level rise projection of 55 inches for the year 2100, incorporating more recent scientific information than was available when the California Climate Action Team Report adopted 12 to 36 inches in 2006. Recognizing the great uncertainty in these projections and that sea level rise will continue beyond the year 2100, Delta Vision is assuming 60 inches (5 feet) of projected sea level rise for purposes of policy formulation.

As described in Strategy 15, the DPC should continue to be the primary region-wide land use governance entity, although with an enhanced role. The DPC’s primary new role will be to :

- Exercise direct permit authority over development proposals in the primary zone (as opposed to existing appeal authority);

- Ensure the consistency of local government plans and decisions for the secondary zone with the state interests articulated in the California Delta Ecosystem and Water (CDEW) Plan (see Strategy 16 for description of the Plan).

Our strategic plan for Delta land use policy includes the following critical actions:

- **Beginning immediately, land use oversight for the Cosumnes/Mokelumne floodway, and the San Joaquin/South Delta lowlands**, both of which are outside the primary zone but are critical to enhancing the co-equal values of the Vision, should be strengthened. Local governments shall adopt plans for these areas to ensure compatibility with this Strategic Plan. These local plans shall be submitted to the CDEW Council for certification, or to the DPC if prior to CDEW Council establishment. Pending certification, the DPC shall exert jurisdiction over such areas, as if they were in the primary zone. Upon plan certification, authority shall lie with the local governments.
  - The **San Joaquin River/South Delta Floodplain** is the region extending north from the southern boundary of the legal Delta, including all of Pescadero Tract and Paradise Cut, and Reclamation Districts R-2075, R-2084, R-2085, R-2094, R-2095, the portion of R-1077 generally north of Bethany Road, and the portion of R-2058 north of I-205. Oversight would address:
    - Flood safety
    - A natural floodway for the San Joaquin River sufficient to account for restored river flows, climate change, and sea-level rise
    - Non-structural floodplain management
    - Protection and enhancement of river and slough corridors and riparian vegetation
    - Fish passage and fish habitat restoration
    - Flood tolerant land uses
    - Reconciliation of existing flood-intolerant land uses
    - Water diversion management
    - Water quality
    - Recreation, boating, and waterway access.
  - The **Cosumnes River/ Mokelumne River** confluence is defined as the region generally east of I-5 running from the southern border of New Hope Tract to the northern border of Glanville Tract to the eastern boundary of the legal Delta. Oversight would address:
    - Protection and enhancement of river corridors and riparian vegetation
    - Flood-tolerant land uses
    - Non-structural floodplain management
    - Ecosystem restoration
    - Water quality

- **Beginning immediately, land use oversight for Bethel Island, and the City of Isleton and its vicinity on Brannan-Andrus Island, both of which lie outside of the primary zone but where mounting safety risks from flood and sea level rise have persisted for decades, should be strengthened.** By 2010, legislation should be enacted to require the respective local governments to adopt special plans that focus on risk reduction not only through emergency response, but through land use changes, including the options of flood proofing, levee upgrade, and/or relocation. These plans shall be prepared within three years, and be submitted for certification to the DPC, or to the CDEW Council upon its establishment. Pending certification of these plans, DPC Primary Zone authority shall apply.
  - **Isleton/Brannan-Andrus Island** is defined as all of Brannan-Andrus Island not currently in the primary zone. Oversight would address:
    - Protection of life and property under current conditions, and under sea level rise
    - Emergency services and access, under current conditions and multi-island failure conditions
    - Levee failure response
    - Seismic safety
    - Benefit/cost analysis of levee upgrade options
    - Implications of Brannan-Andrus levee failure for other islands, Delta hydrodynamics, and salinity intrusion
  - **Bethel Island**, defined as the entire island. Oversight would address:
    - Protection of life and property under current conditions, and under sea level rise
    - Emergency services and access under current conditions and multi-island failure
    - Seismic safety
    - Levee failure response
    - Benefit/cost analysis of levee upgrade options
    - Implications of Bethel Island levee failure for other islands, Delta hydrodynamics, and salinity intrusion
- **Beginning immediately, the DPC and local governments should prepare local plans for five at-risk locations within the primary zone:** Walnut Grove (including the portions on Grand Island), Locke, Clarksburg, Courtland, and Terminous. These areas were developed prior to the Delta Protection Act and remain at high risk without clear strategies for risk reduction and sustainability. These plans must:
  - Identify ways to reduce risk to life and property through land use policies, or combination of land use regulations and levee upgrades, including options for full-island upgrades, island partitions, or ring levees.
  - Consider the towns' historic internal needs, the towns' historic growth rates, and the architectural and cultural character of the existing towns.

- Be submitted for review and potential incorporation in the CDEW Plan.
  - Include a rationale for the state’s participation (if any) in levee upgrades.
  - May include common planning issues such as economic development, historic preservation, public services, and infrastructure
- **Beginning immediately, the Department of Water Resources (DWR) should form a consortium with the Ironhouse Sanitary District** to strategize a land use transition to recreation, terrestrial habitat, subsidence reversal, carbon sequestration, dredged material handling, and appropriate agriculture on Sherman, Twitchell, and Jersey Islands.
  - **By 2010, the CDEW Council, the DPC, and the Sacramento Area Council of Governments should develop a model land-use protection ordinance for protecting buffer lands.** The model ordinance will provide cities and counties located around the Delta margins with language for protecting these lands. The specific language should reflect that only land uses incompatible with future ecosystem landward shifts should be precluded; many current land uses, especially agriculture, are generally fully compatible with this protection.
  - **By 2020, the Delta Conservancy and related entities should acquire easements, purchase options, and/or fee title in areas adjacent to the highest priority ecosystem restoration areas.** Land uses compatible with long-term open space buffer protection can continue on these properties.
  - **By 2040, the Delta Conservancy and related entities should acquire easements, purchase options, and/or fee title in areas adjacent to all remaining ecosystem restoration areas.** Land uses compatible with long-term open space buffer protection can continue on these properties.

**Strategy 15. Create a new governance system to manage the co-equal values and other state interests in the Delta**

When surveying the myriad governing agencies and institutions that currently have a stake in the Delta, one is struck by the realization that no one is in charge. Literally hundreds of governmental entities can affect the inter-linked resources in the Delta, but none is ultimately responsible for them. Our Vision therefore called for the creation of a new governance structure for the Delta. This governance structure must clearly assign responsibility for the management of co-equal values and other state interests, but it must do so in a way that retains needed flexibility for managing the Delta over the long term.

To accomplish these objectives, this strategy includes the following elements:

Vision recommendations met:

10 12

Performance measures:

Percentage of adaptive management actions recommended by CDEW Science Program that are implemented in a timely manner (+)

Percentage of recommendations by Public Advisory Group that are considered by the CDEW Council in a timely manner (+)

Percentage of required state and federal permits for ecosystem and water system management obtained in a timely manner (+)

Percentage of CDEW Council documents and meeting minutes posted online in a timely manner (+)

Number of federal and state court actions involving the co-equal values (-)

- **By May 2009, the California Legislature should create a California Delta Ecosystem and Water (CDEW) Council** to govern the co-equal values of healthy estuarine ecosystem function and a reliable water supply, and to approve policies for enhancing the Delta as a place. Council operation should begin in July 2009. The Council should have the following characteristics:
  - The Council should consist of five to seven voting individuals, with one designated as chair.
  - The individuals, and the chair, should be appointed by the Governor and confirmed by the Senate.
  - The individuals should serve for five-year staggered terms and be eligible for re-appointment a maximum of one time.
  - The appointment process should be transparent to the public.
  - The Council shall include ex-officio non-voting state members representing the Delta Protection Commission (DPC), the Delta Conservancy, Department of Fish and Game (DFG), Department of Water

Resources (DWR) and State Water Resources Control Board (SWRCB). Federal ex-officio non-voting members shall include the Department of Interior, U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE), and National Ocean and Atmospheric Administration (NOAA).

The Council should possess the following responsibilities and powers:

- To develop and adopt a CDEW Plan (see Strategy 16). This Delta Vision strategic plan should serve as an interim plan until adoption of the CDEW Plan.
- To ensure consistency of state and federal actions with the CDEW Plan under the Coastal Zone Management Act (CZMA), including approval of all water, road, railroad, utility and levee infrastructure projects in the legal Delta.
- To determine the state’s water delivery and ecosystem interests in Delta levee systems and to establish policies linking levee types defined by specified design standards and allowed land uses.
- To review selected decisions by the DPC for consistency with the adopted CDEW Plan and to remand any decision judged inconsistent to the DPC. These reviews may be initiated upon the request of any member of the Council and are limited to amendment of DPC plans, levee upgrades, state highway routing and upgrade, water or sewer capacity changes or extensions, agricultural land conversion, new land uses inconsistent with the Strategic Plan’s Land-use/Levee Congruence Table.
- To provide oversight for specific areas that lie outside the Delta Primary Zone which are critical to meeting Delta Vision goals (see Strategy 14).
- To appoint members of the Governing Board of the Delta Conservancy.
- To maintain a direct working relationship with the Delta Science Program and the Delta Science and Engineering Board.
- To receive and allocate funds raised under the CDEW Act, by all bonds for improvements in the Delta ecosystem, water conveyance systems and scientific activities, and from other sources (see Strategy 17).
- To issue debt-financing mechanisms, including revenue bonds, tax anticipation notes and certificates of participation.

- To delegate its authority to achieve the purposes of the CDEW Act to any public or non-profit entity, but not to delegate or abrogate its responsibility to achieve the purposes of the Act.
- To ensure that the CDEW Plan and its implementation meet environmental justice criteria.
- To empanel a permanent Public Advisory Group (PAG) to advise and make formal recommendations to the Council. PAG members should be appointed to staggered terms of two or three years. Among the public constituencies that must be represented are water users, environmental groups, local Delta communities, agriculture, business, and environmental justice advocates, among others.
- **By May 2009, the California Legislature should enhance the capacity of the DPC to improve Delta resource planning and management.** The Delta Protection Act has thus far adequately protected the Delta’s primary zone, but there is no guarantee that the current will to do so will be sustained. Land uses outside the primary zone also increasingly impact state interests and the Act does not adequately address this issue. In order to enhance the DPC’s resource planning and management functions in the Delta the following actions should be taken:
  - By 2010, the DPC’s Resource Management Plan should be updated to reflect the impact that the 2007 state floodplain development laws will have on communities in the legal Delta, and should be made compatible with the CDEW Plan. (The Resource Management Plan is already being revised; if it is completed before the CDEW Plan, a retroactive amendment may be necessary.)
  - By 2009, the composition of the DPC should be revised to include all Cities in the legal Delta as well as representation by the Central Valley Flood Prevention Board and the USACE.
  - Beginning immediately, the DPC should carry out the land use planning and oversight described in Strategy 14 for Walnut Grove (including the portions on Grand Island), Locke, Clarksburg, Courtland, and Terminous, as well as the four key areas outside the primary zone: the Cosumnes/Mokelumne floodway, the San Joaquin/South Delta lowlands, Bethel Island, and the City of Isleton on Brannan-Andrus Island.
  - Developing Local Plans, in conjunction with relevant local governments, for protection of identified areas (above) and considering local economic development. These areas require clear strategies for risk reduction and sustainability. The Local Plans for each at-risk community shall not only manage and reduce risks through emergency response, but also through

land use policies, including the options of flood proofing, levee upgrade, and/or relocation. These plans would be submitted for review and potential incorporation in the CDEW Plan. The plans must include a rationale for the state’s participation (if any) in levee upgrades. Local Plans shall be submitted to CDEW Council for certification. Pending certification, DPC shall exert jurisdiction over such areas, as if they were in the Primary Zone. Upon Local Plan certification, implementation authority shall lie with the local governments.

- By 2009, remove DPC’s land acquisition authority and vest that authority in the newly established Delta Conservancy.
- Supporting joint action by Delta local governments and communities in the areas of emergency planning and response and other planning, economic development or cultural activities where joint action is beneficial.
- Permitting all projects in the Delta primary zone currently subject to DPC appeal authority.
- Ensuring the consistency of local government plans and actions in the secondary zone with the CDEW Plan, including appellant authority on proposed projects in the secondary zone.
- Ensuring the consistency of all local government plans and actions (see Strategy 16).
- **By May 2009, the California Legislature should create a California Delta Conservancy** to undertake ecosystem enhancement and urban waterfront area projects, and conduct other activities in support of economic development which are consistent with the CDEW Plan, and to serve as an intermediary among government, and non-governmental organizations, businesses, property owners, and citizens.

Our Vision identified the need for an entity that “helps mobilize public involvement and provides incentives and support for private interests” working in support of the Delta as a place. California has a long and successful history with conservancy structures that perform these functions at a regional level throughout the state, and there is widespread agreement that such an entity is appropriate for the Delta. The California Delta Conservancy would assume responsibility for state ecosystem-related and urban waterfront area projects now underway in the Delta, Suisun Marsh, and Local Plan areas.

The California Delta Conservancy should have the following characteristics and functions:

- It should be devoted solely to the Delta and be comprised of 7-10 members with adequate local representation.
- It should receive adequate funding from the CDEW Council for identified purposes, accept donations and dedication of lands, and pursue grant opportunities.
- It should implement land-related elements of the CDEW Plan and purchase, rent or otherwise acquire decision making control over land as needed to implement the CDEW Plan, including acquiring agricultural and conservation easements to support ecosystem goals, water reliability goals, and sustainable agriculture.
- It should undertake independent assessment of the Delta’s needs consistent with its mission.
- It should receive properties now in state, federal or local ownership.
- It should work closely with the Council to identify and support needed ecosystem restoration activities.
- It should support regional and statewide recreation interests to bolster the local economy, in coordination with the National Heritage Area (NHA) entity (see Strategy 11).
- It should implement state and federal programs to create incentives for mutually beneficial mixtures of agriculture, habitat and recreation, including agri-tourism, wildlife-friendly agriculture practices, birdwatching, and hunting.
- **By December 2010, the California Legislature should create a Delta Operations Team and a California Water Utility** to manage Delta water flows and the State Water Project (SWP) in concert with Central Valley Project (CVP) operating guidelines and measures.

Achieving the co-equal values in the Delta will require careful management of water flows into and out of the estuary. Increased flexibility in operations will be required to achieve wet-period diversions. Though the Council will be responsible for ensuring the consistency of these functions with the CDEW Plan and the co-equal values, the day-to-day management should be performed by the Delta Operations Team, comprised of representatives from state and federal agencies with relevant experience and overseen by the Council.

This continues present practices for the composition of the team, but changes operations and processes to resolve conflicts. Decisions of the Delta Operations Team would be implemented by the California Water Utility and implementation

disputes would be resolved by the Council or its designee. In practice, it is expected that the Council will rely on the relevant state and federal agencies to establish decision rules and designate one of its employees to resolve any implementation disputes requiring quick decision. Any pattern of such disputes would be addressed by the relevant state and federal agencies, resulting in new operating decision rules to be adopted by the council.

Separation of the SWP from DWR will allow DWR to focus primarily on statewide water and flood control planning and management, including its established competencies in water use efficiency and conservation, regional self-sufficiency, integrated water resources management and project implementation, from design through land acquisition to construction.

The California Water Utility would have the following functions and responsibilities:

- The California Water Utility will be a Joint Powers Authority (JPA) or other legal entity formed by state water contractors.
- It should assume operation and maintenance of the SWP under an arrangement which retains state ownership of all real property and structures of the SWP.
- The California Water Utility would execute and manage contracts for water delivery under policies established by DWR covering at least the areas of price for water delivered, other financial obligations (such as capital repayment), and compliance with relevant policies of the State of California regarding resources and water rights.
- The California Water Utility should also pursue increased integration of operations with the CVP, developing a plan for increased integration of operations by 2011 and shall commission an analysis of terms for the possible transfer of the CVP to the State of California, to be completed by 2013. If such a transfer occurs, its terms shall include operation by the California Water Utility under the same policies and obligations as found in the SWP.
- It should operate water conveyance and storage systems to meet the Delta Vision's co-equal goals consistent with the recommendations in the CDEW Plan.

The Delta Operations Team, much like the current structure, would be comprised of representatives from relevant state and federal agencies, and have the following functions and responsibilities:

- It should coordinate and make operational decisions on water flows affecting the Delta estuary on a day-to-day basis in accord with SWRCB’s Water Quality Standards and Endangered Species Act requirements as developed into operations decision rules.
- To achieve the desired flexibility, successful operational decision rules would include (a) guidance for expected contingencies, (b) sufficient description of values to upon which decisions can be made in situations not anticipated, and (c) institutionalized processes for incorporating learning into the operational decision rules.
- **By September 1, 2009, the CDEW Council should create a Delta Science and Engineering Program and a Delta Science and Engineering Board** to support the Council in pursuit of the co-equal goals, and to design and oversee the adaptive management plan (see Strategy 9).

California must maintain a strong and consistent investment in science and engineering relevant to the Delta. Moreover, there needs to be a more direct link between scientific investigation and real-world management and policy needs. To achieve this, the Council must have access to both a permanent Science and Engineering Program staff and to an independent Science and Engineering Board that reviews and advises upon Council actions. In this light, the Science and Engineering Program should include:

- A lead scientist appointed by the CDEW Council with a rotating appointment every 3 years.
- A Science and Engineering Program Director that leads and directs technical inquiry to Science and Engineering Program staff.
- The Council should address requests for scientific advice to the Lead Scientist, who may also identify scientific issues of relevance and bring reports on such issues to the Council at its own initiative.

The Science and Engineering Program Board should consist of between 12 and 20 individuals with relevant natural science, social science, engineering, and policy expertise and have responsibility for:

- Researching critical scientific processes relevant to the Delta Vision’s goals, including both the processes of the physical Delta and processes elsewhere in the state with particular relevance to Delta management.
- Developing scientific and engineering materials to support adaptive management policy making, including the capacity to respond in “real time” to questions arising in the development or implementation of policies and early detection of status and trends. The Science and

Engineering Program will also develop these materials for performance measures.

- Organizing, assessing and synthesizing the best available science and engineering in response to requests from policy makers and the CDEW Council and to make recommendations on actions supported by that assessment when possible and appropriate. The Science and Engineering Program will also participate in scientific and engineering review of all major projects undertaken to advance the goals of Delta Vision.
- Developing independent science and engineering reviews of agency or consultant work products upon the request of the Council, the Conservancy, or other State Agencies.
- Establishing communication channels to effectively communicate science and engineering results to broader and more diverse audiences, coordinating with the Public Advisory Group and developing discussion papers and interactive lectures.
- The Science and Engineering Program must be funded on an ongoing basis so as to continue efficient and timely technical review for effective policy-making.
- **Ensure that environmental justice is adequately addressed** in Delta decision-making processes by requiring review of proposed actions against environmental justice criteria defined in the CDEW Plan.

Many communities living within, and others dependent upon, the Delta may be vulnerable to disproportionate negative impacts from resource management decisions in the state's interest. The CDEW Council should consider the CDEW Plan's impacts on disadvantaged or minority communities and reduce or mitigate these as fully as possible. These effects will not be limited to the Delta, the Central Valley, or any sector of the economy, as policies affecting water availability, quality and price anywhere in the state will affect incomes and employment patterns. Specifically, the Council should adopt the following environmental justice criteria in the formulation of the CDEW Plan, and periodically review their status.

- Public health impacts resulting from mercury or other water contaminants in Delta waters.
- Impacts on drinking water quality for communities reliant on Delta supplies.
- The potential for communities currently lacking potable water supplies to benefit from changes in Delta policies.

- Targeted assessments of risk to low-income and disadvantaged communities from catastrophic events and of the potential of these communities to benefit from emergency response planning.
- Effect on state wide employment opportunities or other community resources, or the potential to improve economic conditions and job creation.
- Changes in the cost of domestic water and the impact on affordability for low-income communities or communities of color.
- Ecosystem changes that may impact access to cultural resources, especially salmon and other river-related resources critical to maintaining particular Native American resources.
- The potential existence of regressive fees and taxes.
- The Public Advisory Group (PAG) should have the primary responsibility for tracking and protecting environmental justice issues in all components of the governance structure.
- **Integrating the two co-equal goals of ecosystem revitalization and reliable water supplies for California requires not only changed policy making, and changed financing (addressed in strategy 17) but also integrated implementation.** The governance and financing strategies provide a foundation for integrated implementation; the following actions support achieving the two co-equal goals.
  - On an on-going basis, the legislature and governor shall include language requiring integrated action in any Delta-related bond or any other financing instrument. They should also include language requiring progress on other Delta Vision recommended strategies for:
    - improved protection of ecosystems and water quality throughout the Delta watershed
    - increased state wide regional self sufficiency and
    - increased efficiency and conservation in use of water. Similar provisions should be included in any related contracts.

The Delta Vision Blue Ribbon Task Force approved an example of such bond language on July 18, 2008:

1. It is the intent of the Legislature, consistent with the recommendations of the Governor's Delta Vision Blue Ribbon Task Force, to implement, at the earliest possible time a comprehensive and linked program for sustainable management of the Bay-Delta, including, among other things, the establishment of a new delta governance entity with long-term policy, funding, and oversight authority.

2. The Legislature finds and declares that it is state policy to achieve sustainable management of the Bay-Delta through the simultaneous achievement of the co-equal goals of a revitalized and resilient ecosystem and a reliable water supply for Californians.

3. Notwithstanding any other provision, to be eligible to be financed pursuant to this division, any project, action or activity that will wholly or partially assist in the fulfillment of one or both of the co-equal goals specified in #2 shall be consistent, as certified by the Secretary for Resources, with the Delta Vision Blue Ribbon Task Force’s November 2007 Vision and its October 2008 strategic plan, including requirements for linked implementation, quantifiable performance measures, monitoring, and adaptive management.

4. Bond covenants and contract language for use of the facilities will specify: (a) use of any facility financed pursuant to this division shall be operated consistent with the co-equal goals and the recommendations of the Governor’s Delta Vision Blue Ribbon Task Force; and (b) contractors shall optimize water use efficiency, including reducing per capita use by 20 percent in their service area with appropriate allowance for early action.

5. Upon establishment of the new delta governance entity contemplated in this chapter:

(a) All unallocated funds previously appropriated under this division for projects, actions or activities that will wholly or partially assist in the fulfillment of one or both of the co-equal goals specified in #2 shall be transferred to the new entity for expenditure, grant or loan consistent with the long-term sustainable management plan adopted by that entity.

(b). All new funds appropriated under this division for projects, actions, or activities and all revenues generated by any fee, charge or tax created by this act that will wholly or partially assist in the fulfillment of one or both of the co-equal goals specified in paragraph 2 shall also be received by the new entity and shall be expended, granted or loaned consistent with the long-term sustainable management plan adopted by that entity.

The intent of such language is to achieve more effective integration of state policies. Once overall plans are formalized, any project or funding stream should be consistent with, and effectively represent, a subset of recommendations developed in those broader plans.

- On an on-going basis, any bond and/or appropriation of state funds should link expenditures and results in ecosystem revitalization and improving water supply reliability to a shared calendar.

California has existing water conveyance facilities in the Delta, owns lands in the Delta and is currently undertaking limited ecosystem improvement projects in the Delta. In the next years, much more activity is expected, largely focused on improving ecosystem performance and increasing water supply reliability, but new initiatives regarding floodplain management and levees will also impact the Delta. The federal government, through the

Bureau of Reclamation (Reclamation) and the U.S. Army Corps of Engineers (USACE), is active in the Delta, and policies of the Federal Emergency Management Agency regarding levees and flood risks will have large impacts. Local governments, including counties, cities and reclamation districts are also making decisions and investments in the Delta. Delta Vision has produced a graphic which identifies many of the activities in the Delta and proposed decision points over time.

This action seeks to ensure that implementation of ecosystem revitalization and water supply reliability projects move forward together on a shared calendar. Success in linking these critical activities will provide anchor points around which other decisions can be made and calendars linked.

The Bay Delta Conservation Plan (BDCP) proposes a calendar for decision making on a Conservation Plan (<http://resources.ca.gov/bdcp/>). Improved conveyance is a large element of that program and an Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS) process is being launched to support a decision regarding conveyance. The final BDCP Conservation Plan is likely to also include ecosystem projects, such as increased inter-tidal areas, as part of a California Natural Communities Conservation Plan and a federal Habitat Conservation Plan.

To ensure that both improvements in water system reliability and ecosystem revitalization of the conservation plan are achieved, a shared time line for projects is required. To that end, authorizing statutes and any bond or other financing instrument should include accountability measures linked to the decision making, capital investment and operations and management phases of projects supporting these two co-equal goals.

**Strategy 16. Create a California Delta Ecosystem and Water Plan to ensure flexibility and consistency of action among state, federal and local entities.**

The California Delta Ecosystem and Water Plan (CDEW Plan) is the central component of our recommended multi-part governance structure. A resource-integrated and adaptable management plan for the Delta has been a significant omission from past Delta revitalization efforts.

Without a cohesive plan, agencies and stakeholders have been working in a vacuum, developing policies and programs that lack context and articulation with other critical resources and actions in the Delta. We also recommend that the CDEW Plan be developed and implemented to become recognized as a California expression of the Coastal Zone Management Act (CZMA).

The critical elements of this strategy are:

- **Develop a legally binding CDEW Plan to establish a detailed management structure to achieve the co-equal goals and direct identified land use issues in the Delta region.**

Long-term governance of the Delta will be centered upon the CDEW Plan, to be created by the CDEW Council. Authoring a legally binding Plan and overseeing its implementation over decades will allow the Council to ensure consistency of action among existing agencies and achieve the level of flexibility appropriate to the Delta’s management challenges. The CDEW Plan will provide guidance and a framework for the functions of the Council, the Delta Protection Commission (DPC), and the Delta Conservancy, as well as other state, federal and local agencies actively engaged in Delta resource management.

In this context, the CDEW Plan must:

Vision recommendations met:

10 12

Performance measures:

Length of time before negative trends in the performance of other indices are reversed (-)

Number of preemptive or corrective actions on agency decisions taken each year by the CDEW Council to ensure consistency with CDEW Plan (-)

Percentage of financial investments in Delta ecosystem enhancement that are not consistent with CDEW Plan (-)

Percentage of financial investments in water infrastructure and regional self-sufficiency programs that are not consistent with CDEW Plan (-)

Percentage of financial investments in Delta levees and highways that are not consistent with CDEW Plan (-)

Number of times that state funding for local investments is withheld due to non-compliance with CDEW Plan (-)

- Establish targets and management objectives for the Delta ecosystem incorporating any plan developed under species protection laws.
  - Establish targets and management objectives for water supply reliability for all users of water diverted upstream, within, and exported from the Delta.
  - Establish state land use interests in and around the Delta, especially those that impact the ecosystem, water supply reliability and flood concerns.
  - Provide guidelines and procedures for adaptive management.
  - Provide other mechanisms for ensuring adaptability and resiliency in governing the Delta.
  - Incorporate and build upon the recommendations of this Strategic Plan.
  - Identify state interests and set performance targets in the legal Delta and beyond with respect to floodplain management and water quality.
  - Articulate a finance plan laying out needed expenditures and identifying sources for needed revenues.
  - Contain a plan for data collection, data management, monitoring, analysis and interpretation to support policy making and management decision making.
  - Serve as the foundational document for a programmatic EIS/EIR as well as any projects undertaken requiring California Environmental Quality Act (CEQA) and/or National Environmental Policy Act (NEPA) permits.
- **In the next two years, carry out the following actions:**
- By May 2009, the California Legislature should adopt the Delta Vision Strategic Plan as the Interim CDEW Plan, as consistent with California’s Coastal Management Plan (CMP) under the CZMA.
  - By August 2009, the CDEW Council, in coordination with the Attorney General, should develop a legal and procedural outline for adopting the CDEW Plan in the context of California’s CMP under the CZMA
  - By August 2009, the CDEW Council in coordination with the Attorney General should prepare a list of all applicable legal requirements in the Delta that must be incorporated into the CDEW Plan. This list will include federal and state Endangered Species Acts management actions and plans, among other legal requirements.

- By September 2009, the CDEW Council should begin process of developing the CDEW Plan in line with the procedural and substantive requirements of the CZMA as well as California law. These requirements include active coordination in plan development with stakeholders as well as state and federal agencies. Effective participation of local, state and federal agencies in development of the CDEW Plan will be critical to achieving the appropriate integration of their responsibilities and capacities.
- The CDEW Plan should be actively coordinated with the CDEW Council's Public Advisory Group (PAG) to not only ensure stakeholder participation but to actively address environmental justice concerns consistent with the CDEW Council's adopted environmental justice policies (see Strategy 15).
- By December 2010, the CDEW Council should adopt CDEW Plan.
- By December 2010, SWRCB should begin modifying the State Water Resources Control Board's (SWRCB) Water Quality Control Plans in light of CDEW Plan recommendations and actions.
- The CDEW Council will amend the CDEW Plan every five years or upon a shorter time period at the direction of the Governor.
- **Achieve consistency among the various layers of governing agencies with the adopted CDEW** by using a combination of the following mechanisms:
  - The enabling legislation creating the governing structure should empower the CDEW Council to link funding distribution to accomplishment of identified tasks.
  - The enabling legislation creating the governing structure should empower the CDEW Council to link specified actions to other specified actions to ensure simultaneous achievement.
  - The enabling legislation should require annual assessments of progress and consistency with the CDEW Plan allowing for modifications of budgets and priorities where lack of progress or inconsistency with the CDEW Plan is apparent.
  - The enabling legislation should require annual reports to the Legislature and the Governor tracking the effectiveness of the CDEW Plan against the performance measures as well as the consistency of agency action with the CDEW Plan.

- The enabling legislation should call for outside audits of progress and consistency and allows for legislative response to inadequacies.
- The enabling legislation should give DPC the authority to review and approve local plans for consistency with the CDEW Plan. In cases where there is disagreement, the CDEW Council would make the final determination. The DPC would also retain its appeal authority within its existing purview as the lead regional land-use planning agency.
- The CZMA requires approval by the Secretary of Commerce (or his or her designee) for the CDEW Plan, and the CDEW Council should have consistency review determination of federal action in the context of the CDEW Plan. The CZMA has an appeal process through mediation to resolve disputes between federal agencies and an “inconsistency” determination.
- Federal legislative language could require consistency with the CDEW Plan in cases where federal appropriations will be made for actions within areas subject to the CDEW Plan.
- Federal legislation could require annual reporting to Congress on actions taken in the Delta by federal agencies and their consistency with the CDEW Plan under the legal requirements of the CZMA.
- **Remedy inconsistent actions by federal, state, or local agencies in the Delta** with the CDEW Plan, through the following possible mechanisms of the CDEW Council:
  - Where federal agencies are involved, use of the mediation components in the CZMA, in which the CDEW Council’s proponent of the perceived inconsistent project has the burden of proving consistency with the CDEW Plan.
  - Where state and local agencies are involved, the CDEW Council has the authority to issue cease-and-desist orders with specific authorization to seek injunctive relief.
  - There are citizen suit provisions in the enabling legislation allowing for citizen suits against agencies acting inconsistently with the CDEW Plan
  - The enabling legislation authorizes the Attorney General to bring an enforcement action on behalf of the People of the State of California against agencies or individuals acting inconsistently with the CDEW Plan.

**Strategy 17. Finance the activities called for in the California Delta Ecosystem and Water (CDEW) Plan through user fees and other effective and transparent financing tools.**

Successful governance of the Delta will depend on a coherent, effective and reliable financing structure. That system will include revenue generation, procedures for expenditure as approved by the CDEW Council, and obligations placed upon recipients of benefits from those expenditures.

Vision recommendations met:

9 10 12

Performance measures:

Percentage of required Delta water user fees collected in a timely manner (+)

**The following principles should guide design of financing systems:**

- A wide range of financing instruments, including appropriations, bonds, user fees, lease revenues, payments incurred under contracts, and others, should be employed.
- Private beneficiaries should be assigned proportional shares of revenue obligations and of risks and liabilities, while the public of California is responsible for activities of broader benefit.
- Revenues should be received by and allocated by the CDEW Council to ensure consistent action to implement its policies. Protections against diversion of these funds to other purposes will be needed, possibly including a provision stating that if any funds devoted to CDEW Plan activities are used for other purposes, no water shall be conveyed through the State Water Project (SWP). This Strategic Plan expects that water required to support and revitalize the Delta will not be obtained by purchase or through market mechanisms.
- Access to state funding for any purpose related to the implementation of the CDEW Plan must be contingent upon a project contractor or a water right holder demonstrating full compliance with all aspects of California resources laws and policies, including:
  - possessing a legal right to divert, store, convey, and use water;
  - satisfying all applicable water quality and ecosystem regulations determined to protect the resources and values of the state; and
  - complying with provisions of the CDEW Plan and the decisions of the Council
- Federal, state, and local agencies that conduct activities that are inconsistent with the CDEW Plan will have funding reduced or terminated.

**Substantial capital investments and continuing support will be required to implement the recommendations of Delta Vision.** No independent estimate of those costs has been undertaken in Delta Vision. However, as many of the recommendations of this Strategic Plan parallel those developed in other processes, some information on probable capital costs over the next 10-15 years is available.

- The range of estimated costs for alternative conveyance provided by DWR (May 2008) is \$4.2 billion for an eastern alignment to \$7.2 billion for a western alignment. DWR estimated through-Delta improvements to cost from \$1.2 to \$9.6 billion depending on the seismic robustness. The earlier Delta Risk Management Study (DRMS) analyses projected much larger costs: \$26 billion for alternative conveyance and \$32 billion for armored through Delta conveyance.
- A late 2007 summary of cost estimates of proposed Delta ecosystem revitalization projects undertaken totaled to \$2.5 billion.
- The other large capital cost is levee improvements, where the upper estimate provided by DRMS is \$20 billion. Four billion is used here as a preliminary estimate.

**These estimates suggest that the range of capital expenditures required for the Delta in the next 10-15 years will range from \$12 to \$24 billion, with a high estimate of \$80 billion.** This large cost estimate range will be refined as policy choices are made regarding conveyance and levees. Bond funds are available for some of these capital investments and water contractors are prepared to pay the capital costs of alternative conveyance. No attempt has yet been made to estimate annual operating costs.

In 2004, a coalition of water and environmental interests proposed principles for CALFED decisions on financing which remain useful starting points for analyzing possible financing systems:

- Adhere to the “beneficiary pays” principle.
- Provide guidelines for apportioning costs of projects with both local and public benefits.
- Public benefits should be financed through federal appropriations, state bond funds, and state general fund dollars, recognizing the current budgetary restraints on the State of California Resources Agency.
- Encourage local interests to develop a finance plan to pay for the local share of a capital project.
- Require a completed finance plan as a precondition for the design and construction phases of a major capital project.

- Initiate a dialogue with stakeholders on establishing the necessary protections to prevent a surcharge from becoming a de facto water “tax.”

Effective and equitable financing systems for activities as extensive and expensive as those proposed in this Strategic Plan rely on multiple revenue streams rather than a single source. “Layering” revenue generation systems better allows matching revenues collected to perceived value and actual beneficiaries.

For example, as part of the management of the co-equal values, there should be a per-acre-foot fee levied on water diversions within the Delta watershed, and a separate fee on any water conveyed through or around the Delta.

**As noted above, an effective and equitable financing system also obligates beneficiaries to support desired public policies and encourages consistency of efforts among public agencies and private interests.** Institutional and policy process improvements which encourage consistency in actions and oblige support of policies adopted by the Council include:

- Require any California department to make an affirmative determination that relevant actions support the adopted CDEW Plan.
- Ensure full transparency in all fiscal arrangements.
- Condition access to and participation in any Delta related program on compliance with all existing policies and programs.
- Use bond control language and contract provisions to ensure policy consistency.
- Use life-cycle costing and benefit-cost calculations to inform decision making.
- Require full allocation of costs and risks, in proportion to benefits received.
- Allow no subsidized use of California resources.
- Water pricing rate structures could be improved by greater use of variable rates, tiered rates and connection fee conservation incentives.
- Use bidding to inform investment decisions and allocate uses.
- Develop and implement processes to achieve timely decisions and accelerate implementation.

**Below is a proposed strategy for moving through the funding process:**

- Develop list of projects requiring funding.

- Identify costs of the projects, including both capital costs and operations and maintenance (O&M) costs.
- Identify willing financiers of the identified projects (or portions of the projects).
- Identify remaining costs of each identified project absent portion for willing financiers.
- Identify entities that seek to benefit from these projects including both private benefit and widespread public benefit.
- Determine as practically as possible the benefits received by identified beneficiaries and the associated costs associated with these benefits.
- If beneficiary pays is not determinative, negotiate with these entities to pay the remaining costs of the projects where applicable.
- Identify mechanisms to pay the costs of these projects based upon the available alternative financing mechanisms.
- Enable identified entities to pay the remaining costs of the projects.
- Identify mechanisms to pay the O&M costs of identified projects.
- Enable appropriate entities to use funding mechanisms allowing them to pay the ongoing O&M costs of identified projects where applicable.

**Strategy 18. Improve the compliance of the diversions and use of water with all applicable laws, regulations and constitutional principles.**

In order to protect and enhance the co-equal values over time, the state must create an integrated policy system among state agencies with jurisdictional authority affecting the beneficial use of water from the Delta watershed. This system involves establishing clear roles and responsibilities for State agencies regarding the approval, monitoring and enforcement of water diversions, and the management of impacts of diversions to resources and values protected by the State. As noted above, this Strategic Plan

expects that water required to support and revitalize the Delta will not be purchased but will be provided within the California’s systems of water rights and the constitutional principles of reasonable use and public trust.

The critical elements of this strategy include:

- **Coordinate the authoritative oversight of the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB) to ensure compliance with the reasonable use doctrine** and applicable water quality requirements by water diverters within, and exporting from, the Delta watershed. Coordinate the authoritative oversight of the Department of Fish and Game (DFG) to ensure compliance with applicable environmental regulations, in balancing diversions with the resources and values protected by the State.

The SWRCB will require secure annual funding for additional positions to investigate water rights compliance, illegal diversions, waste and unreasonable use. The SWRCB’s capacity should be expanded to be able to:

- Require monitoring by all water diverters, including those within the Delta who are currently not required to report diversions
- Authorize monetary penalties for monitoring and reporting violations
- Possess adequate penalties for unauthorized diversions and violations
- Possess provisions for interim relief

Vision recommendations met:

5 10

Performance measures:

Percentage of water diversions in the Delta watershed covered by SCADA monitoring or other accurate reporting system (+)

Number of federal and state court actions involving the co-equal values (-)

- **The SWRCB should develop an integrated Supervisory Control and Data Acquisition (SCADA) network** that covers all significant permitted and licensed surface water diversions and permitted discharges to provide real-time information into a database linked to water rights licenses. The SCADA would enable the state to flag and achieve redress for any excess diversions beyond permit terms.

A striking fact about the current water system is that information about current diversions and use is inadequate to the task of managing the co-equal values. More comprehensive data from throughout the Delta watershed would provide a better foundation for changes in water diversion timing and support efforts to become more regionally self-sufficient. Therefore, California must develop and use comprehensive information on the local, regional and statewide availability, quality, use and management of groundwater and surface water resources to help improve opportunities for regional self-sufficiency.

- **Install stream gauging stations** at critical outflow points associated with the Department of Water Resources (DWR) planning area boundaries to aid in the DWR regional “water budgeting” used to help develop the California Water Plan.
- **Improve local, regional and statewide collection and dissemination of agricultural land-use data** to better represent crop water use and evapotranspiration changes on an annual basis for use in understanding regional trends.
- **Require DWR to continue to regularly and systematically collect groundwater elevation data** in all groundwater basins and sub-basins in the Delta Watershed, and make the resulting information readily and widely available.
- **Require DWR to expand its current network of monitoring wells**, including groundwater elevation and groundwater quality monitoring wells, and continue to coordinate data monitoring and interpretation with local entities.
- **Require local and regional agencies/individuals to submit relevant and timely information on surface and groundwater attributes to state agencies**, such as DWR, to include in broader data repositories.
- **Coordinate state data collection of urban and agricultural water use and deliveries** to facilitate measuring progress in meeting conservation targets.

## Delta Vision Acronyms and Abbreviations

Agricultural Water Management Council	AWMC
Bay Delta Conservation Plan	BDCP
Bureau of Reclamation	Reclamation
California Delta Ecosystem and Water Council	CDEW Council
California Delta Ecosystem and Water Plan	CDEW Plan
California Department of Fish and Game	DFG
California Environmental Quality Act	CEQA
Central Valley Project	CVP
Central Valley Regional Water Quality Control Board	CVRWQCB
Coastal Management Plan	CMP
Coastal Zone Management Act	CZMA
Contra Costa Water District	CCWD
Delta Protection Commission	DPC
Delta Risk Management Strategy	DRMS
<i>Delta Vision: Our Vision for the California Delta</i>	Vision
Department of Fish and Game	DFG
Department of Water Resources	DWR
Ecosystem Restoration Program	ERP
Efficient Water Management Practices	EWMPs
Environmental Impact Report	EIR
Environmental Impact Statement	EIS
Environmental Water Account	EWA
Integrated Regional Water Management	IRWM
National Environmental Policy Act	NEPA
National Heritage Area	NHA
National Marine Fisheries Service	NMFS
National Ocean and Atmospheric Administration	NOAA
operations and maintenance	O&M
Pelagic Organism Decline	POD
Public Advisory Group	PAG
State Water Project	SWP
State Water Resources Control Board	SWRCB

Supervisory Control and Data Acquisition	SCADA
Total Maximum Daily Load	TMDL
U.S. Army Corps of Engineers	USACE
U.S. Department of Agriculture	USDA
U.S. Environmental Protection Agency	USEPA
U.S. Fish and Wildlife Service	USFWS
urban water management plan	UWMP



**Figure 2. The 12 Vision recommendations.**

1. The Delta ecosystem and a reliable water supply for California are the primary, co-equal goals for sustainable management of the Delta.
2. The California Delta is a unique and valued area, warranting recognition and special legal status from the State of California.
3. The Delta ecosystem must function as an integral part of a healthy estuary.
4. California's water supply is limited and must be managed with significantly more efficiency to be adequate for its future population, growing economy and vital environment.
5. The foundation for policy making about California water resources must be the longstanding constitutional principles of "reasonable use" and "public trust;" these principles are particularly important and applicable to the Delta.
6. The goals of conservation, efficiency and sustained use must drive California water policies.
7. A revitalized Delta ecosystem will require reduced diversions – or changes in patterns and timing of those diversions, upstream, within the Delta and exported from the Delta – at critical times.
8. New facilities for conveyance and storage, and better linkage between the two, are needed to better manage California's water resources, both for the estuary and for exports.
9. Major investments in the California Delta and the statewide water management system must integrate and be consistent with specific policies in this vision. In particular, these strategic investments must strengthen selected levees, improve flood plain management and improve water circulation and quality.
10. The current boundaries and governance system of the Delta must be changed. It is essential to have an independent body with authority to achieve the co-equal goals of ecosystem revitalization and adequate water supply for California – while also recognizing the importance of the Delta as a unique and valued area. This body must have secure funding and the ability to approve spending, planning, and water export levels.
11. Discouraging inappropriate urbanization of the Delta is critical both to preserve the Delta's unique character and to ensure adequate public safety.
12. Institutions and policies for the Delta should be designed for resiliency and adaptation.

**Figure 3**

**Third Staff Draft Governance Structure**

The authorities of state and federal agencies described in this figure are limited to Delta Vision-related activities.

This diagram is a draft work product of Delta Vision staff and has not been seen or reviewed or endorsed by the Delta Vision Blue Ribbon Task Force.

**Key:**  
 — authority  
 - - consistency  
 - - - coordination

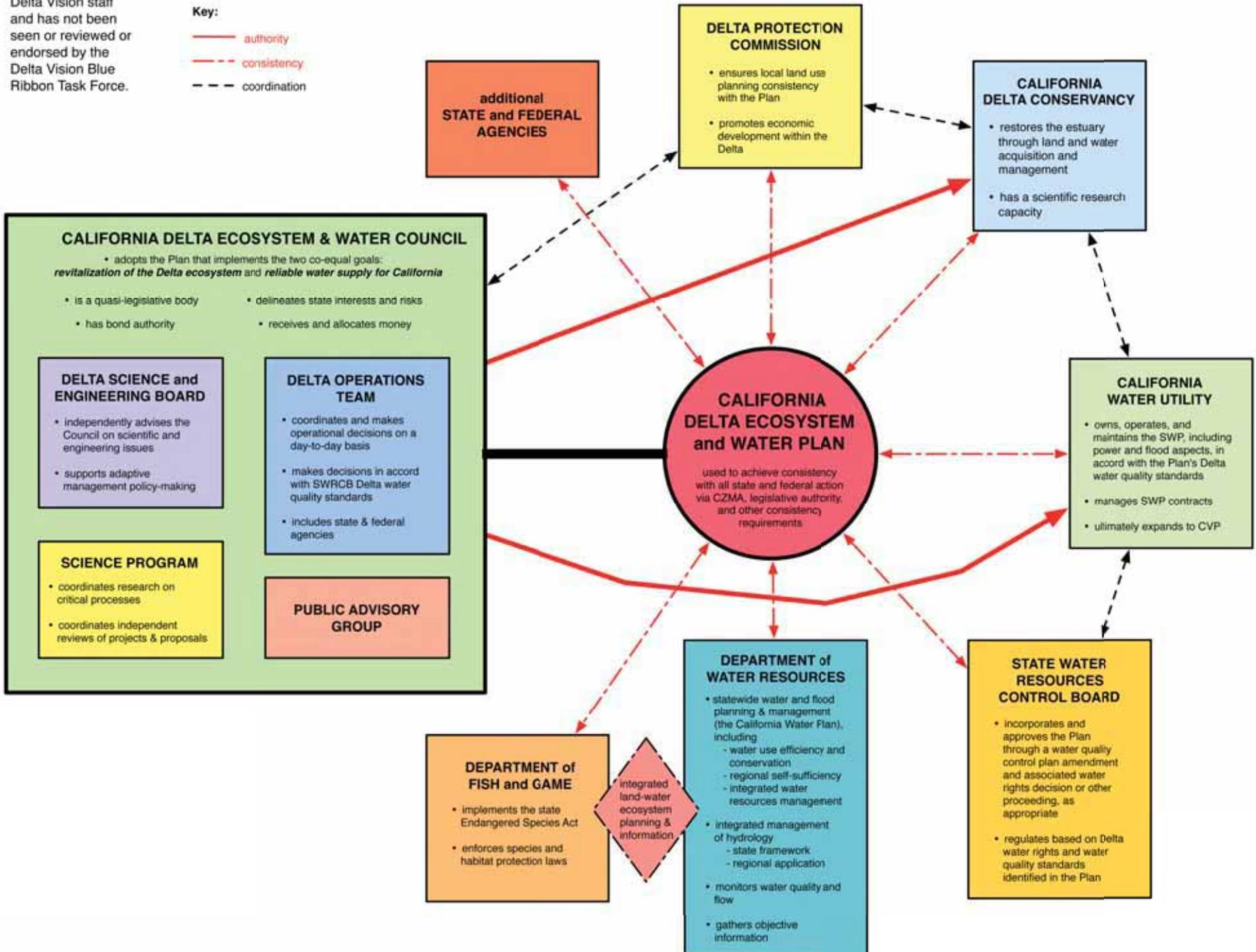
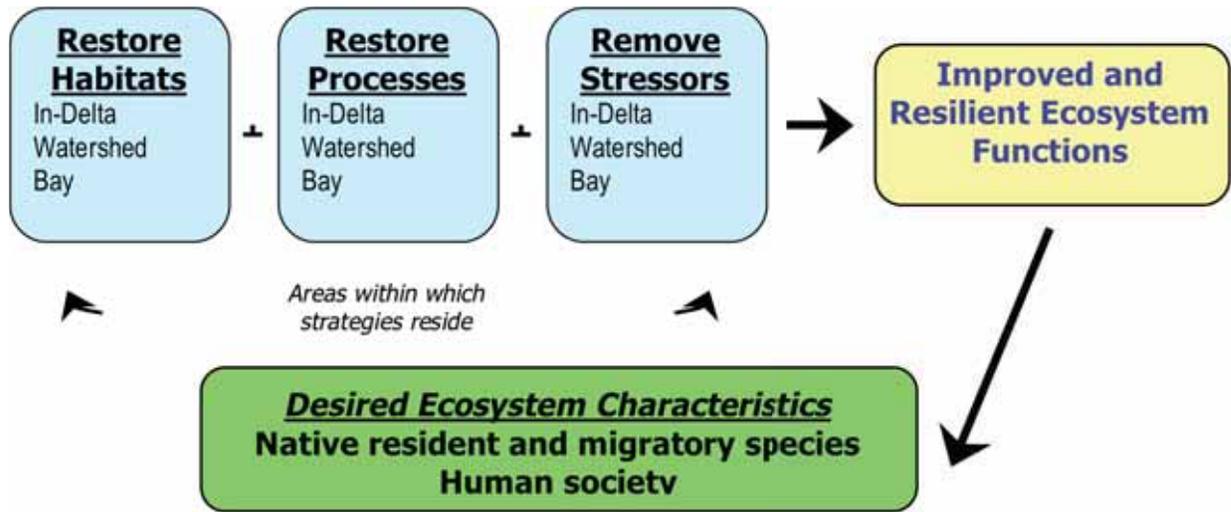


Figure 4. The “Restoration Recipe”





**Figure 7. Sectional view of typical tidal marsh in the Delta/Suisun region**  
*(courtesy of Stuart Siegel, Wetlands and Water Resources, Inc., from Moffat and Nichol)*

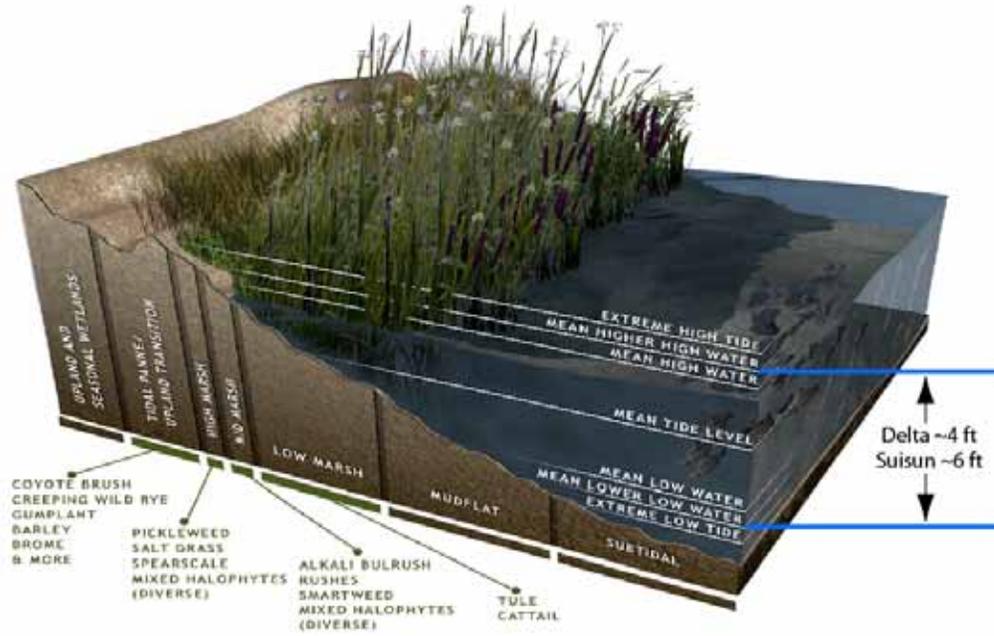
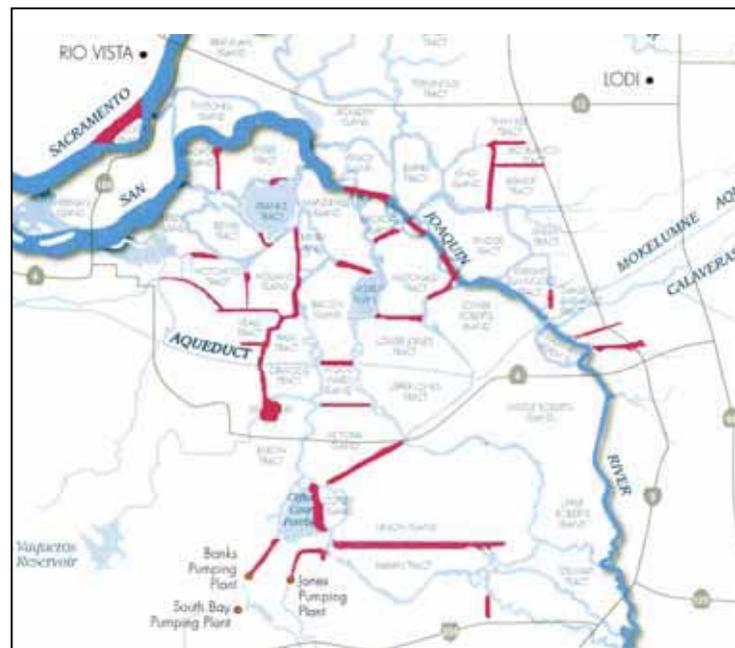


Figure 8. Natural branching versus man-made “cross-cuts” in south Delta channels.

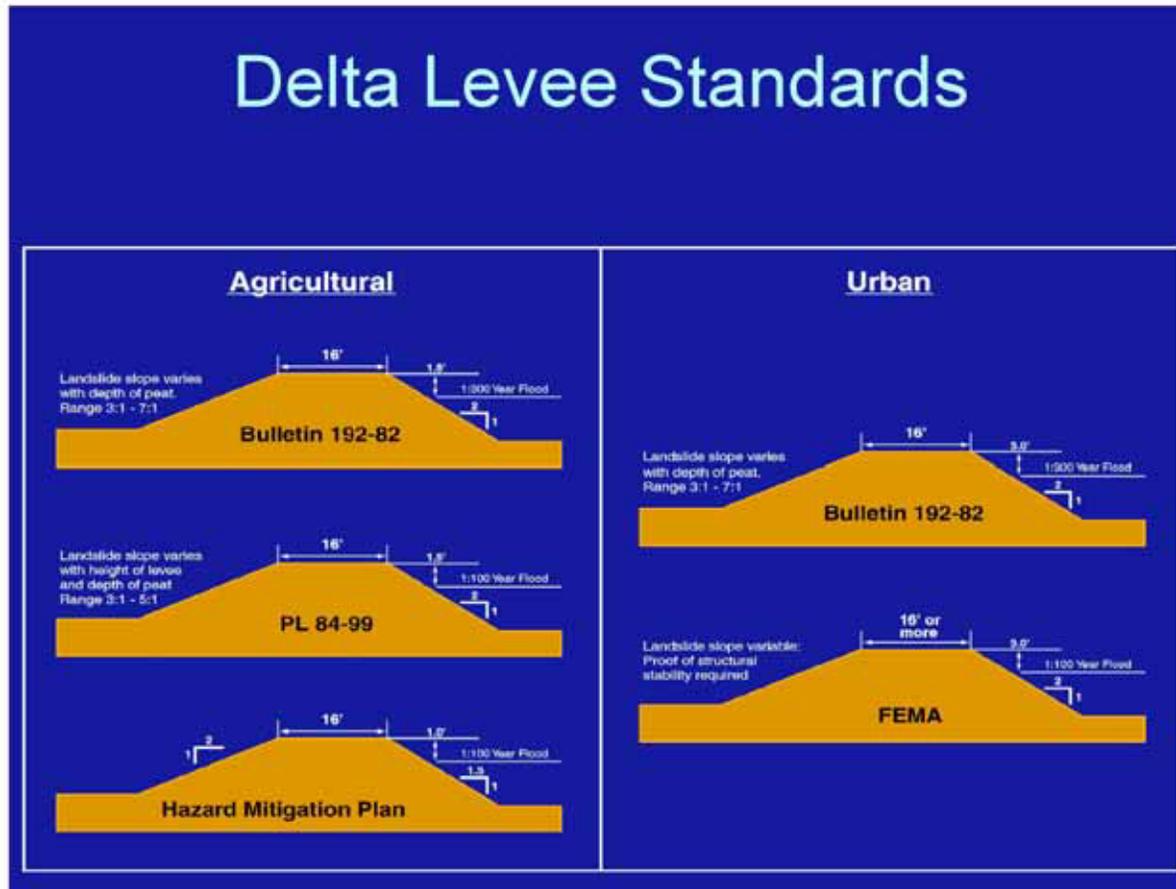


Natural branching channels in the Delta in 1873



Channels in red are the man-made “cross-cuts” in the Delta of today (data from Department of Water Resources Delta Atlas)

**Figure 9. Cross-sections of typical levee designs in common use in the Delta.**  
 Not exhaustive of existing or potential levee designs.



**Figure 10. Delta Levee Classifications**

<b>Land Use / Levee Use</b>	<b>Levee Class</b>	<b>Description / Design Basis</b>	<b>Basic Cost<sup>a,b,c</sup> (\$ Million/mile)</b>
<b>Wetlands</b>	W-1	Habitat and some agricultural (pasture, rice, some annual crops) that can tolerate flooding – e.g., Suisun Marsh, Yolo Bypass Interior, Cache Slough Area, Cosumnes Floodplain	0.3
<b>Agricultural</b>	A-1	HMP – for FEMA Disaster Assistance if a levee fails (unit cost for Delta upgrades in typical cases not yet HMP)	0.5
	A-2	PL 84-99 – Corps Delta-specific standard to qualify for Corps Emergency Levee Assistance and Rehabilitation (for new projects, include upgrades per DWR Bulletin 192-82 agricultural design)	1.0 to 2.0 Up to 3.5 with thick peat
<b>Infra- structure</b>	I-1 = A-1	HMP – for FEMA Disaster Assistance if a levee fails (unit cost for Delta upgrades in typical cases not yet HMP)	0.5
	I-2 = A-2 = U-1	PL 84-99 Corps non-seismic Delta standard (flood control, navigation, highways, railroads, pipelines, electrical and gas facilities), including Bulletin 192-82	1.0 to 2.0 Up to 3.5 with thick peat
	I-3 similar to U-5	Seismic (a) -Fail/Repair – Don’t treat, or minimally treat, soft foundation and existing embankment; add mass to existing embankment so it doesn’t slump to a below-water-line crest elevation and a platform will remain for repairs after an earthquake. (for through- Delta conveyance.)	16 to 25 Up to 28 for thick peat
		Seismic (b) – No Fail/Minimal Slump (State Water Contractors requirement for through Delta water conveyance)	16 to 29 Up to 65 for thick peat & loose sand
		Seismic (c) – Super Levee (use for a raised infrastructure corridor) – For a corridor across deep peat and loose sand, costs are much higher.	6 to 12 with little peat & loose sand
<b>Urban<sup>d</sup></b>	U-1 = A-2/I-2	PL 84-99 – Corps Delta specific agricultural standard (pre-urban).	1.0 to 2.0
	U-2	FEMA Flood Insurance Remapping – for removal from 100-year floodplain and release from flood insurance requirement. Provides protection from 100-year water level, with 3 feet of freeboard. Anticipated to require improved stability and seepage control compared to PL 84-99 or previous FEMA FIP.	4 to 10, depending on the amount of levee raise needed and other local conditions
	U-3	DWR 200-Year – FEMA FIP plus DWR Bulletin 192-82 urban enhancements and 200-year protection per state law.	Less than 1.0 extra over U-2
	U-4	Delta Towns – Class U-3 plus design features such as floodwalls or ring levees and, potentially, seismic protection and higher levels of flood protection. May need to address deep peat or loose sand.	Widely variable based on local conditions
	U-5 (sub- class (a) does not apply)	Seismic (b) – No Fail/Minimal Slump (treat soft foundation, provide new engineered embankment as setback levee)	16 to 20
		Seismic (c) – Super levee (good foundation, engineered embankment, wide crest, houses on levee crest; Bethel Islands “Coves Project” and Stewart Tract “River Islands Project”).	6 to 12 with little peat & loose sand, levee heights of 10 to 20 feet, use of local borrow

<sup>a</sup>The basic cost for each type of levee indicated is based on cost estimates from the DRMS “Levees Optimization Group.” It includes vegetation for ecosystem values, as practical and consistent with levee function. Each can be enhanced to incorporate additional ecosystem features such as benches, tidal zones, flood plain areas, and plantings at additional costs of up to \$3 million per mile.

<sup>b</sup>Each type of levee can be built to moderately higher crest elevation (with no loss of structural stability) to allow for future sea level rise at an additional cost of approximately \$0.2 million per mile for each additional foot of height. These costs would be less for Wetlands and HMP levees and more for Delta Towns and Seismic Super Levees.

<sup>c</sup>Each type of levee can have a variable design (such as a floodwall) at additional cost, if necessary due to special circumstances such as limited space.

<sup>d</sup>It is assumed that urban levees (except for “Delta Towns”) are not applicable in the Primary Zone or with deep peat