

## **8. IDENTIFICATION OF KEY STRATEGIC PLANNING ISSUES**

[TO BE INCLUDED AFTER THE SEPTEMBER SCG MEETING]

## 9. APPENDICES

### APPENDIX A. “FLEXIBLE DELTA” VISION ELEMENTS

The “Flexible Delta” vision incorporates the following elements, categorized by the vision components listed in the Executive Order. For each component, the “Flexible Delta” team identified relevant guiding principles, vision characteristics, key issues and policy questions, and data and information needs.

#### A. Environment

##### i. Guiding principles

1. The Delta and Suisun are living systems that need to be maintained with the intent that productive landforms remain.
2. Maintain, restore, and build terrestrial and aquatic habitat necessary to support desired population levels of native and desirable non-native species, including migratory species.
3. Maintain management flexibility to respond to changing ecological conditions.
4. Incorporate adaptive management, including monitoring, evaluation, staged decision-making and course corrections, to respond to new scientific information and changed conditions.
5. Ensure that fish and wildlife used for food are safe to eat, including fish for food production.
6. Reduce upstream impacts on the Delta and downstream impacts on the Bay estuary.

##### ii. Vision characteristics

1. Restore floodplain along the main stem of the Sacramento River (upstream of the city of Sacramento) for the benefit of splittail and migrating salmonids, and to increase nutrient and organic carbon flows to Delta. Improve salmon spawning gravels in upstream reaches and tributaries of the rivers flowing into the Delta.
2. Enhance habitat along Old River and in west Delta with setback and vegetated levees.
3. Manage Yolo Bypass:
  - for the benefit of splittail and salmonids and other species,
  - to increase nutrient and organic carbon flows to Delta and
  - so flood conveyance capacity of the Yolo Bypass is maintained,
  - in a manner that does not negatively impact the water quality needs of the North Bay aqueduct.
4. Enhance channel configuration and hydraulics of Elk Slough, Sutter Slough, and Steamboat Slough to provide alternative route for migratory fish that avoids Georgiana Slough and the Delta cross-channel.

5. Improve hydraulic residence time and tidal exchange between Cache Slough and the Delta to contribute organic carbon, nutrients, phytoplankton and zooplankton to the Delta, for the benefit of Delta smelt among others. Create a hydrologic and terrestrial connection between Cache Slough and Suisun Marsh.

6. Restore Mokelumne and Cosumnes River corridors. Enter into formal flood flow agreements with private landowners in the Stone Lakes area and other potential flood bypass areas. Explore opportunities to increase flood flow areas.

7. Implement the Suisun Marsh PEIR/EIS, which will call for some conversion of managed wetlands into tidal wetlands as habitat restoration in Suisun Marsh (currently a brackish water habitat). Restore tidal action in a portion of each region of the Marsh as follows, based upon Preferred Alternative:

- 500 to 2,250 acres in Region 1
- 460 to 2,070 acres in Region 2
- 860 to 3,870 acres in Region 3
- 180 to 810 acres in Region 4

The plan will also call for managed wetland enhancement (46,000 acres to 39,000 acres) including the development of a funded exterior levee maintenance program.

8. Restore tidal marsh on Decker Island and Dutch Slough.

9. Maintain existing managed wetlands and create new tidal wetland habitats.

10. Restore various tidal wetlands ecological functions (to benefit clapper rails, delta smelt, and native plants, among others) in Suisun Marsh.

11. Manage Bouldin Island and Holland Tract for habitat.

12. Create setback levees at opportune sites in west Delta and the lower Sacramento River to allow tidal marsh restoration.

13. Convert the west end of Sherman Island to managed tidal marsh.

14. Based on results of pilot projects there may be salinity variation in the Southwest Delta.

15. Purchase terrestrial habitat and wetlands easements from willing landowners.

16. Assist in the achievement of habitat acquisition, creation, and enhancement goals of Central Valley Joint Venture for seasonal wetlands, semi-permanent wetlands, riparian forests, and waterfowl-friendly agriculture.

17. Assist in the acquisition of water needed for seasonal and semi-permanent wetland habitat acquisition, creation, and enhancement under the Central Valley Joint Venture plan.

18. Prevent, control and eradicate undesirable non-native species.

19. Establish and track performance standards for all ecosystem programs and investments.

*Cross-listed from other sections*

1. Restore seasonal floodplain on the lower San Joaquin River, including flood bypass on Paradise Cut.
2. Create new flood bypasses south of Vernalis for San Joaquin River and in Stone Lakes region. Study water system and ecosystem management implications.

iii. Key issues and policy questions

1. Determine how best to direct freshwater to and from southwest Delta.

iv. Data and information needs

1. What are the effects of gates on flow patterns, salinity, and water quality? Are the answers different east of Middle River and west of Old River? How do these answers change if in-Delta storage on Webb Tract and Bacon Island is implemented?
2. What are the salinity impacts of the proposed Delta salinity increases to Suisun Marsh management, infrastructure and habitat quality?
3. What are the ecological consequences of this vision?
4. There is a need for a transparent, easily accessible, ongoing resource information center for Delta to gather information so Delta stakeholders can access existing information and identify missing information/data.

**B. Land Use**

i. Guiding principles

1. The principal base land use in the Delta is agricultural with urban growth restricted to the secondary zones.
2. Encourage economically viable and environmentally friendly agriculture.
3. Maintain quality of life in the Delta.
4. Prevent urbanization of lands in deep flood plains, below future sea levels, or within important habitat areas.
5. Encourage land use and management practices that stabilize Delta land forms.

ii. Vision characteristics

1. Concentrate tourism and recreation investments along Highways 160 and 12, in north Delta waterways, and in legacy towns. Permit legacy towns to grow at historic growth rates driven by internal, locally-driven needs to expand local economies.

2. In the westernmost islands, an assisted transition may be needed from irrigated agriculture to recreation, wildlife habitat, unirrigated agriculture or other land uses if salinity fluctuation impacts irrigated agriculture.
3. Add buffers to protect activities in the primary zone wherever negative impacts are occurring.

*Cross-listed from other sections*

1. Water could be stored for release to the Middle River for in-Delta use and export, or to the Old River to augment flow and manage salinity and carbon levels.
2. Manage Bouldin Island and Holland Tract for habitat.
3. Purchase terrestrial habitat and wetlands easements from willing landowners.

iii. Key policy issues and questions

1. Land use conversion from private to public ownership must be preceded by proper legislation that protects existing tax base. Payment in lieu of taxes is not an acceptable method of protection.

iv. Data and information needs

1. Research into multiplier effects of local farming operations for local economies.
2. What are the potential impacts from Paterno decision on local land-use decision-making?
3. What urban growth patterns are anticipated in local government general plans?
4. What are implications of future flood mapping?

## **C. Transportation, Utilities, and Infrastructure**

i. Guiding principles

1. Ensure security and reliability of all critical infrastructure, including water conveyance facilities, highways, railroads, ship channels, and electricity and natural gas networks.

ii. Vision characteristics

1. Rebuild Highways 12, 160 and 220 on top of seismically resistant, 100-year flood levees.
2. Protect critical infrastructure, including the water conveyance channel, and a South Delta infrastructure corridor (including Highway 4, the Mokelumne Aqueduct, and the BNSF Railroad) with seismically resistant levees.
3. Protect Stockton and Sacramento ship channels and water conveyance channel with seismically resistant levees. Promote the maximum use of beneficial dredge material.

4. Key electricity transmission lines and natural gas fields mostly protected on Sherman and Brannan-Island Islands; repair other reaches on an as-needed basis.

5. Improve and maintain Suisun levees to protect significant infrastructure such as natural gas production, Southern Pacific Railroad tracks, petroleum pipelines, built structures and wildlife habitat.

*Cross-listed from other sections*

1. Protect Ryer Island and Highway 84 Corridor with seismically resistant levees.

iii. Key issues and policy questions

1. What will be the impact of projected increases in activity associated with the Port of Oakland?

iv. Data and information needs

1. How will increased activity impact ship channel levees? What would be the impact of a ship channel levee failure when considering the elevation at the Port of Sacramento?

## **D. Water Supply and Quality**

i. Guiding principles

1. Improve water quality in the south, central and north Delta.
2. Ensure that all who rely on Delta water have a secure, reliable, high-quality water supply.
3. Expand other water supplies in other regions of the state to reduce the demand from the Delta.
4. Ensure conveyance facilities and operations are compatible with ecosystem health and in-Delta water quality.
5. Minimize possibility of water supply interruption due to disaster.
6. Ensure that all water exported from the Delta is of sufficient quality to meet the needs of downstream domestic water treatment facilities.
7. Conduct water export operations from the Delta, which are consistent with protection of in-Delta agriculture and in-Delta water rights.
8. Reduce Delta water quality degradation from urban and agricultural discharges.
9. Delta water needs should be met first before water is exported to other regions of the state.
10. Ensure that fish and wildlife used for food are safe to eat, including fish for food production.

## ii. Vision characteristics

1. Protect the existing island configuration but confine water conveyance to an armored channel along South Fork of Mokelumne and Middle River.
2. Partially segregate the water conveyance system and aquatic habitat with operable gates connecting Old and Middle Rivers, and siphon the Victoria Canal under Old River to deliver water to the Clifton Court Forebay.
3. Re-circulate some export water from California Aqueduct to San Joaquin River.
4. Link Delta export rates to hydrologic and water quality conditions.
5. Water could be stored for release to the Middle River for in-Delta use and export, or to the Old River to augment flow and manage salinity and carbon levels.
6. Ensure that water delivered through Middle River conveyance channel to the pumps is of higher quality than today.
7. Explore reduction of overall export quantities due to reduced conveyance capacity.
8. Extend Contra Costa intakes to Middle River to avoid Old River.

### *Cross-listed from other sections*

1. Explore infiltration of floodwaters upstream to reduce Delta flood risk and replenish Central Valley groundwater aquifers.
2. Manage Yolo Bypass:
  - for the benefit of splittail and salmonids and other species,
  - to increase nutrient and organic carbon flows to Delta and
  - so flood conveyance capacity of the Yolo Bypass is maintained,
  - in a manner that does not negatively impact the water quality needs of the North Bay aqueduct.

## iii. Key issues and policy questions

1. Identify potential for water savings through reasonable alterations of agricultural practices in the Central Valley and in the Delta.
2. Clarify how water savings can be applied to uses beneficial to the Delta given the current structure of water rights.

## iv. Data and information needs

1. What are the options and impacts associated with various forms of storage within the Delta, whether for water supply or carbon production?

2. Review existing research on seepage associated with island flooding (either planned or unplanned) and use interceptor walls where most feasible. (Reference: Delta Wetlands Project, 2006 Update Report.)
3. Consider water quality impacts of closures of Delta Cross Channel and need for fish screens.
4. Water quality (and level) modeling is needed for central and south Delta and export pumps/facilities.
5. Consider placement of operable gates on Grantline Canal and upper Middle River for salinity control.
6. Check if vision would meet existing Water Board standards and consider what future updates may be needed.

## **E. Recreation, Tourism & Economic Dependence**

### **i. Guiding principles**

1. Maintain and enhance opportunities for all recreational activities occurring in the Delta.
2. Ensure that fishable, huntable and birdwatching species are maintained at healthy and harvestable population levels.
3. Enhance tourism potential of “legacy towns” along Sacramento River.

### **ii. Vision characteristics**

1. Enhance fishing, hunting and birdwatching by ecosystem changes described above.
2. Enhance opportunities for boating and other water sports throughout the Delta and past operable gates.

#### *Cross-listed from other sections*

1. Concentrate tourism and recreation investments along Highways 160 and 12, in north Delta waterways, and in legacy towns. Permit legacy towns to grow at historic growth rates driven by internal, locally-driven needs to expand local economies.

### **iii. Key issues and policy questions**

1. Boat locks at gated channels must be operated at all times to ensure boater access.

### **iv. Data and information needs**

1. Recreational boating activity by channel.

## **F. Flood Risk Management**

### **i. Guiding principles**

1. Protect western islands from seismic failure.
2. Ensure continuous protection of Delta agriculture and Suisun Marsh levees to withstand drivers of change.
3. Minimize the possibility of a multiple-island failure.
4. Ensure that Delta communities and their vital resources are protected from floods (especially catastrophic floods) and earthquakes.
5. Prioritize levee improvement, repair and maintenance based on public safety and benefits.

### **ii. Vision characteristics**

1. Protect Sherman, Twitchell, Brannan, Bradford, Webb, Jersey, and Bethel Islands with seismically resistant levees. Explore whether they are best protected by a continuous ring levee or individual levees by conducting cost analysis and reviewing other considerations, such as boat access.
2. Protect Sherman Island against levee failure to avoid destabilizing rest of Delta.
3. Protect legacy towns with seismically resistant, 100-year flood ring levees.
4. Provide seismically resistant flood protection for Sacramento and West Sacramento.
5. Provide seismically resistant flood protection for Stockton/Lathrop area.
6. Improve other levees to future 100-year flood protection as needs appear.
7. Protect Ryer Island and Highway 84 Corridor with seismically resistant levees.
8. Create seasonal floodplain on the lower San Joaquin River, including flood bypass on Paradise Cut.
9. Create new flood bypasses south of Vernalis for San Joaquin River and in Stone Lakes region. Study water system and ecosystem management implications.
10. Continually maintain and improve agricultural levees to meet the drivers of change other than seismic.
11. Develop and implement a levee maintenance program for Suisun Marsh to support water quality, existing wetland values and functions and ecosystem restoration activities.

12. Maintain Sacramento and Stockton ship channel levees to protect channel use.
13. Explore infiltration of floodwaters upstream to reduce Delta flood risk and replenish Central Valley groundwater aquifers.

*Cross-listed from other sections*

1. Rebuild Highways 12, 160 and 220 on top of seismically resistant, 100-year flood levees.
2. Protect critical infrastructure, including the water conveyance channel, and a South Delta infrastructure corridor (including Highway 4, the Mokelumne Aqueduct, and the BNSF Railroad) with seismically resistant levees.
3. Protect Stockton and Sacramento ship channels and water conveyance channel with seismically resistant levees.
4. Key electricity transmission lines and natural gas fields mostly protected on Sherman and Brannan-Island Islands; repair other reaches on an as-needed basis.
5. Improve and maintain Suisun levees to protect significant infrastructure such as natural gas production, Southern Pacific Railroad tracks, petroleum pipelines, built structures and wildlife habitat.
6. Enhance habitat along Old River and in west Delta with setback and vegetated levees.
7. Restore Mokelumne and Cosumnes River corridors. Enter into formal flood flow agreements with private landowners in the Stone Lakes area and other potential flood bypass areas. Explore opportunities to increase flood flow areas.
8. Create setback levees at opportune sites in west Delta and the lower Sacramento River to allow tidal marsh restoration.

iii. Key issues and policy questions

1. There must be standards for levee maintenance and upgrading, in addition to the traditional protection standard (e.g. 100-year flood protection levee).
2. A revised state Flood Control Plan – including a review of the operation of existing facilities – is necessary.
3. What are the potential impacts from Paterno decision on local land-use decision-making?

iv. Data and information needs

1. How can ring levees be employed for seismic protection of the western islands? What options are available? Polders? Levees? Other means? What alternatives are most economically viable? What are the implications for boat access?

2. What should be the requirements and standards for “seismically resistant” versus “flood protection” levees? A description of different levee standards associated with different land uses is required.
3. What is the potential for a San Joaquin flood bypass south of Vernalis, as opposed to one on Paradise Cut, which is prime farmland?

## **G. Emergency Management**

### **i. Guiding principles**

1. Ensure that Delta communities have evacuation routes, emergency response training teams, supplies, and other emergency response necessities.
2. Ensure regional coordination of state and local first responders / emergency responders.

### **ii. Vision characteristics**

1. Identify areas to store materials for emergency response (including temporary channel barriers) as soon as possible.

*Cross-listed from other sections*

1. Protect critical infrastructure, including the water conveyance channel, and a South Delta infrastructure corridor (including Highway 4, the Mokelumne Aqueduct, and the BNSF Railroad) with seismically resistant levees.

### **iii. Key issues and policy questions**

1. Need a comprehensive regional plan for emergency management that clarifies state and local rights and responsibilities in the event of a disaster.

### **iv. Data and information needs**

1. Need specific information on security of evacuation routes (including water routes) in the event of disaster.

## **H. State and Local Economics**

### **i. Guiding principles**

1. Delta must maintain a viable local economy.
2. Ensure that local (including county) governments have sufficient revenue sources to provide services.
3. Protect the channels and levees that support shipping industries.
4. Ensure that Delta solutions contribute to sustainable statewide economic growth.

5. Ensure that fish and wildlife used for food are safe to eat, including fish for food production.

ii. Vision characteristics

*Cross-listed from other sections*

1. Concentrate tourism and recreation investments along Highways 160 and 12, in north Delta waterways, and in legacy towns. Permit legacy towns to grow at historic growth rates driven by internal, locally-driven needs to expand local economies.

2. In the westernmost islands, an assisted transition may be needed from irrigated agriculture to recreation, wildlife habitat, unirrigated agriculture or other land uses if salinity fluctuation impacts irrigated agriculture.

3. Maintain Sacramento and Stockton ship channel levees to protect channel use.

iii. Key issues and policy questions

1. How to ensure that local tax bases can survive if some land is taken out of private ownership and agriculture (e.g. turned into habitat or water storage).

iv. Data and information needs

1. More information is needed on the economics of existing and alternate services and land uses associated with the Delta, and the potential risks to them, including the importance of the Delta to the state economy.

**APPENDIX B. “RESILIENT ADAPTIVE DELTA” VISION ELEMENTS**

[FORTHCOMING AFTER SEPTEMBER MEETING]

## **APPENDIX C. DATA AND INFORMATION NEEDS**

The following data and information needs have been identified in the process of developing long-term visions for the Delta, categorized by the vision components listed in the Executive Order.

The SCG has expressed a desire to have more information, modeling and/or research on:

### **A. Environment**

1. The ecosystem characteristics (e.g. habitat types, ecological functions, etc) that constitute a “healthy” ecosystem
2. The feasibility of implementing, and effects on Delta ecosystems and existing water users of, alternative strategies to attain variable salinity in the west Delta
3. Other variable traits of a healthy ecosystem (water velocity, depth, temperature, residence times, turbidity, etc.) and the ways these traits might be recreated through both the timing and volume of freshwater flows and through non-flow measures (e.g. gates and barriers, variable channel bottoms, other structural restoration).
4. The effects of the sequencing of a given set of management actions, as well as more deliberate, technical consideration of the most logical sequence of staged conveyance options
5. The factors causing the pelagic organism decline
6. Monitoring of invasive species and better understanding of key environmental thresholds and engineered actions that might discourage or eliminate them (e.g. salinity thresholds, temperature thresholds, etc.)
7. How possible differing conveyance options affect decisions regarding proposed ecosystem restoration
8. Data collection on possible trade-offs between impacts of bioaccumulated mercury on human beings and wildlife, on one hand, and the need for restoration of a portion of the Delta’s historic floodplain and wetland habitat types, on the other.
9. The effects of gates on flow patterns, salinity, and water quality, whether the effects are different east of Middle River and west of Old River, how these effects might change if in-Delta storage is implemented?
10. The salinity impacts of the proposed Suisun Marsh management measures
11. The potential for a transparent, easily accessible, ongoing resource information center so Delta stakeholders can access existing information and identify missing information.

## **B. Land Use**

1. Carbon sequestration and subsidence reversal potential of various crops, including tules and rice
2. Multiplier effects of local farming operations for local economies
3. The potential impacts from Paterno decision on local land-use decision-making
4. The urban growth patterns are anticipated in local government general plans
5. The implications of future flood mapping on land use decisions

## **C. Transportation, Utilities, and Infrastructure**

1. Costs and benefits of moving critical infrastructure lines versus elevating or reinforcing them
2. How increased activity impact ship channel levees, and the impact of a ship channel levee failure when considering the elevation at the Port of Sacramento?

## **D. Water Supply and Quality**

1. The potential effects of a peripheral conveyance on the water quality and ecosystem of the Delta, especially the north Delta
2. The potential effects of deliberate inundation of selected Delta islands, whether for water supply or carbon production.
3. The quality of water stored on such islands, its impact on overall export water quality, and its potential uses (ranging from irrigation to carbon production).
4. Seepage associated with island flooding (either planned or unplanned) and the use of interceptor walls to prevent this.
5. The effects of the sequencing of a given set of management actions, as well as more deliberate, technical consideration of the most logical sequencing of staged conveyance options.
6. The effects of regional climate change, especially snowpack reduction
7. Contingency planning for various climate change and snowpack reduction scenarios
8. Modeling, cost-benefit analysis, and planning for storage of flow peaks for use in dry season, including examination of both surface and groundwater storage options
9. The operational and cost implications of delivering peak flow water to selected storage locations.

10. How the development of new storage (surface and/or groundwater, upstream and/or south-of-Delta) would impact the costs and benefits of an isolated facility.
11. The water quality impacts of closures of Delta Cross Channel and need for fish screens.
12. The water quality (and level) needed for central and south Delta and export pumps/facilities.
13. Impact of operable gates on Grantline Canal and upper Middle River for salinity control.
14. Conformance with existing Water Board standards and consideration of what future updates may be needed.

## **E. Recreation and Tourism**

1. Design and cost information on potential for including habitat and recreational elements into levee cross-sections
2. Recreational boating activity by channel.

## **F. Flood Risk Management**

1. How upstream conditions, including precipitation patterns, snow pack conditions, reservoir operations and upstream urbanization, affect flood risks in the Delta and the Central Valley generally.
2. The impact of potential climate change scenarios on river hydrology and flood risks
3. Application of potential innovative subsidence reversal, subsidence reduction, carbon sequestration, and renewable fuels technologies
4. The conflicts and synergies between levee vegetation and structural levee integrity, reinforcement, and maintenance.
5. How ring levees, including Dutch-style “polders” can be employed for seismic protection of the western islands, their economic viability, and their implications for boat access
6. The requirements and standards for “seismically resistant” versus “flood protection” levees, and the levee standards associated with different land uses.
7. The potential for a San Joaquin flood bypass south of Vernalis, as opposed to one on Paradise Cut, which is prime farmland

## **G. Emergency Management**

1. The security of evacuation routes in the event of disaster

## **H. State and Local Economics**

1. The economics of existing and alternate services and land uses associated with the Delta, and the potential risks to them, including the importance of the Delta to the state economy.

## **APPENDIX D. COMMON ELEMENTS TO BE ADDED TO VISIONS**

The following common elements language was crafted by the SCG in plenary session. Additional common visions elements may be developed at future meetings.

### Suisun Marsh Plan

Integrate the outcomes of the Suisun Marsh PEIR/EIS Plan, which is currently under development. The Plan will call for numerous elements, including the conversion of some existing managed wetland to tidal wetland habitats and the enhancement of managed wetlands, as well as the development of a funded exterior levee maintenance program.

Based on the Preferred Alternative selected in the PEIR/EIS, the conversion of managed wetlands in each of the four identified regions in the Plan, will total between 3,000 to 10,000 acres. Actions completed under this Plan will benefit a variety of species, ecosystem functions, and water quality. Levee improvements will protect managed wetland habitat, Delta water quality, and significant infrastructure such as natural gas production, the Southern Pacific Railroad tracks, petroleum pipelines, and other built structures.

### Fisheries and Wildlife Recovery and Restoration

To address the concerns about the long-term recovery and sustainability of aquatic, terrestrial and water fowl species, attention should be given to the following as starting points, building on the following guiding principle:

Maintain, restore, and build terrestrial and aquatic habitat necessary to support desired population levels of native and desirable non-native species, including migratory species.

- All levels of government, and their administering agencies, should ensure they perform their obligations to protect and manage fish and wildlife resources (in the context of other beneficial uses)
- Entrainment reduction strategies for aquatic species should be considered
- Commitments made and anticipated through programs such as the Joint Venture for terrestrial species and waterfowl should be reinforced.

### Environmental Justice

Public outreach and participation involving Delta governance should include “capacity building opportunities” for impacted communities, especially low-income communities and communities of color. The ultimate decision-making on Delta issues should be transparent, and reflect balanced perspectives, including environmental justice.

## APPENDIX E. NEAR-TERM ACTIONS SURVEY ITEMS

A list of potential near-term actions was posed to the Delta Vision Stakeholder Coordination Group and they were asked to answer whether they “Support”, “Potentially Support”, or “Do Not Support” by using the web-base SurveyMonkey.com software. This survey was taken by the group on-line between July 27 and August 7, 2007.

Below is a list of the items provided to respondents during the survey. The descriptions of the proposed actions differ greatly in detail because they come from different sources within the SCG.

1. Restore Floodplain Habitat and Fish Migration through the Yolo Bypass. Authorize construction of fish passage and flow control facilities at the Fremont Weir. Inundation of the Yolo Bypass provides excellent rearing habitat for juvenile salmon and splittail and critical spawning habitat for the splittail. Presently the bypass is only inundated once every three years on average and sometimes goes for four to five years without inundation. Increasing the frequency of inundation on even a small portion of the bypass could substantially improve conditions for splittail and salmon. Providing these flows would require notching or gating the Fremont Weir to allow a controlled inflow of water into the bypass in years when the stage of the Sacramento River is below the crest of the weir. The goal would be to create inundated floodplain habitat on a publicly owned portion of the bypass -- not privately owned land. Modification of the Fremont Weir could also allow improved fish migration through the bypass, permitting juvenile salmon to bypass the Delta cross channel and other hazards associated with migrating through the Delta. This project has been extensively studied by DWR and is called for by PPIC report (p. 79) and the CALFED Ecosystem Restoration Program Plan.  
[http://www.delta.dfg.ca.gov/erp/docs/reports\\_docs/Attachment\\_2.pdf](http://www.delta.dfg.ca.gov/erp/docs/reports_docs/Attachment_2.pdf)
2. Restore Tidal Marsh in Suisun Marsh. Suisun Marsh has largely been managed as non-tidal seasonal wetlands for waterfowl and other birds. Levees and gates prevent tidal inundation of large areas of managed wetlands. Restoration of brackish tidal marsh would improve habitat for native fish in an area where they are less vulnerable to the Delta pumps. Brackish marsh restoration would reduce habitat for waterfowl, but these losses could be more then offset by creating and promoting managed freshwater marshes and wildlife friendly agriculture on central and western Delta Islands and in the Yolo Bypass. Unlike much of the Western Delta, elevations in Suisun Marsh allow immediate restoration of tidal marsh habitat. Restoration could start immediately at the Meins Landing site purchased by DWR for that purpose. Agencies should proceed with restoration planning for Van Sickle Island, as discussed in the PPIC report. (PPIC pg. 79, 182).
3. Expedite Implementation of the Dutch Slough Tidal Marsh Restoration Project. The 1,200 acre Dutch Slough site was acquired by DWR in 2003. DWR and its partners have completed a restoration plan that is especially designed both to restore habitat and generate information about how best to restore Delta habitat in the future. Information gained could be invaluable for long-term Delta management. The project is ready for implementation. DWR has completed a draft EIR and is expected to release it in the near future (PPIC, p. 82).
4. Restore and Enhance the Cache Slough Region. Cache Slough is an ecologically important but heretofore neglected portion of the Delta. The PPIC report recommends this region for restoration investment. (PPIC, p. 78, 182). Restoration of dendritic tidal marsh in the Calhoun Cut ecological

reserve owned by the Department of Fish and Game would significantly increase habitat for endangered fish in the Cache Slough Region. Similarly, restoration of regular seasonal flows and floodplain inundation will increase connectivity between Cache Slough and the upper Sacramento River.

5. Implement the McCormack Williamson Tract Flood Control and Ecosystem Restoration Project. The 1631 acre McCormack Williamson Tract was acquired in 1999 by The Nature Conservancy using Proposition 204 CALFED funds. The purpose of the Project is to implement flood control improvements on the Tract in a manner that benefits aquatic and terrestrial habitats and ecological processes. The Project presents unique opportunities for synergy in achieving flood control and ecosystem restoration goals in a high priority area prime for additional floodplain habitat (PPIC, p. 76, 80). DWR is currently completing a draft EIR for the larger North Delta Project of which the McCormack Williamson Tract improvements are listed as Group 1 actions. The EIR is expected to be complete by spring of 2007.
6. Acquire and Restore Decker Island. Decker Island, in the Western Delta, is composed of old dredged spoils and, unlike other Delta islands, is several feet above sea level. Material from Decker Island should be excavated and used to reinforce and partition nearby Delta islands such as Sherman and Jersey. Excavation of Decker Island could result in approximately 400 acres of restored tidal marsh along the main migration corridor for juvenile salmon and Sacramento splittail – two native species thought to benefit most from tidal marsh restoration. Thus, this project could contribute material to address Delta stability issues and create new habitat.
7. Partition Sherman and Jersey Islands. Partitioning these islands could create habitat, reverse subsidence, increase recreational opportunities, protect State Highway 160, and reduce the water quality consequences of levee failure (PPIC, p. 84). Sherman and Jersey Islands are strategically located in the western Delta where they are most vulnerable to seismic failure and most likely to entrain saltwater into the Delta in the aftermath of a levee failure. Sherman Island is owned by DWR. Jersey Island is owned by the Ironhouse Sanitary District, which is interested in partitioning the island and implementing a large-scale subsidence reversal project. Partitioning islands with cross levees reduces the area that would be flooded by any one levee breach -- reducing the amount of salt water entrained, enabling vehicle access after a breach, and reducing the cost of rehabilitation. The Natural Heritage Institute has developed a plan for partitioning and restoring Sherman Island. Save San Francisco Bay Association proposed partitioning Sherman Island in 1999.
8. Increase Investment in Exotic Species Control (e.g. *Egeria densa*): Exotic species are one of the primary drivers of change in the Delta and could constrain the success of future restoration and water supply investments. Significantly more funds should be allocated to university level research to evaluate potential control strategies and to Coast Guard and port authorities to assure that existing laws designed to prevent introductions are strictly enforced.
9. South Delta Floodway: Construct a South Delta Floodway to attenuate flood flows and redirect floodwaters away from the developed communities of Stockton and Lathrop. DWR should undertake modeling and initial design work evaluating a potential floodway, including, among other sites, Stewart Tract. DWR should also be authorized to purchase land. Variations of this project are included in most of the PPIC options (PPIC, p. 145-152). This project could provide multiple benefits, including flood management for Delta communities and for deeply subsidized

Central Delta islands, improved water supply reliability, habitat restoration, and agricultural preservation.

10. Delta Conservancy and Agricultural Conservation Easements: Create a new Delta Conservancy, with the ability to respond rapidly to opportunities. There is an existing North Delta Conservancy, with limited jurisdiction and funding. Jurisdiction of a Delta Conservancy should include the entire legal Delta and lands adjacent thereto. The Conservancy should be authorized to purchase title and easements, and to undertake projects in areas including the environment, agricultural land preservation, historical preservation, tourism and recreation. In 2003, SB 86 (Machado), which would have created a Delta Conservancy, was passed by both houses, but was vetoed. Initial funding might be focused on agricultural conservation easements, with a primary focus on preventing urbanization in the secondary zone.
11. Dredged Material Reuse: Establish a DWR and local agency pilot project evaluating the potential for and the challenges facing large scale reuse in the Delta of clean material dredged from San Francisco Bay. One of the challenges managers face in the Delta is a shortage of affordable material suitable for levee maintenance. Every year, millions of cubic yards of sediment are dredged from the Bay. Much of the material dredged from the Bay is clean and structurally suitable for use in levee maintenance. Indeed, dredged material is commonly used for levee construction and maintenance, both in the Bay and Delta. In addition, Delta reuse of Bay dredged material could assist in raising bottom elevations on subsided Delta islands. Impermeable Bay mud could be used to cap, prior to restoration, Delta islands which may contain sediment contaminated with Mercury. Thus, Bay material could provide levee stability, habitat and water quality benefits. The CV RWQCB has raised concerns regarding the potential for salty Bay dredged material to result in salinity impacts in the Delta. In 1999, Save San Francisco Bay Association prepared a scoping-level analysis of Delta reuse of Bay dredged material that identified several potential strategies to reduce salinity impacts. Given these strategies, as well as the need for material to assist in habitat restoration and the prevention of large-scale failures in the Delta (followed by large scale salt intrusion), a pilot project could produce valuable information. Sherman or Jersey Islands could be appropriate sites for such a pilot project. (See related recommendation above.)
12. Cumulative Impact Analysis: Provide funding to the Delta Protection Commission and DWR's Division of Flood Management to analyze potential cumulative impacts, over the next 50 years, of urbanization in the primary and secondary zones of the Delta and on adjacent lands. Potential impacts analyzed should include, but not be limited to, flood risks to existing and potential future Delta residents, risks to water supplies and infrastructure, habitat loss, endangered species impacts, fisheries impacts, lost opportunity for habitat restoration, impacts to agriculture, and risks associated with climate change (e.g. sea level rise, increasing percentage of precipitation falling as rain and increased intensity of storms.) The PPIC report identified urbanization as an important, but overlooked, driver of change within the Delta (PPIC, p. 55).
13. Emergency Response: Implement a basic emergency response program in the Delta (e.g. pre-positioning material and equipment). Strategically stockpile borrow material, sand bags, and other materials in various locations around the Delta. Assure that there is adequate barge and trained personnel capacity to respond to unexpected events such as seismic levee failure. A large-scale public works program to substantially rebuild western Delta islands could significantly increase emergency preparedness by assuring a trained, well equipped, and pre-contracted levee repair capacity. [Additional information was presented related to human safety and related aspects of

emergency planning and preparedness, but this was not included in either of the initial lists being merged. How would you like to handle this?]

14. Prepare emergency plans to deal with threats to lives and property in the Delta as well as critical local, regional and statewide infrastructure.
15. Fortify the levees in the Western Delta that we already know are the most vulnerable to the greatest risk - seismic failure.
16. Allow dredging to provide lower cost material for critical levee protection. Preserve navigation channels to allow for more environmentally friendly goods movement to central valleys.
17. Employ South Delta movable barriers.
18. Create additional bypass capacity in the North Delta and along the San Joaquin River.
19. Considering 95% of the Central Valley's wetlands have been destroyed, restore wetlands/riparian areas would lend added environmental stability to the Delta and the watershed and restore some measure of ecosystem health. There would be immediate fish and wildlife, plus recreational, benefits with no regrets.
20. Cease agricultural practices that continue land subsidence, begin land use practices that would gradually increase island elevations.
21. Implement demonstration projects at Franks Tract for salinity and fish protection and demonstration project screens at Clifton Court forebay.
22. Work towards (1) market based water distribution (after health and safety needs are met for all communities), (2) encouraging communities (using carrots and/or sticks) to make cost effective investments in groundwater storage, and (3) incorporating the flexible project operations available through the EWA and B2 supplies in operating rules.
23. Use the land that is already owned by federal and state agencies and by nonprofits to run experiments on subsidence reversal, agricultural practices, habitat restoration, carbon sequestration.
24. Operate under the Moyle-Swanson recommendations. Ensure actions necessary for anadromous fish health are also implemented.
25. Retire (through purchase or otherwise) Westland Water District's water contract in order to leave more water in the Delta for ecosystem improvement and to reduce impacts on other exporters.
26. Aggressively increase water conservation, water recycling and groundwater cleanup/groundwater desalination to increase water supply reliability.
27. Implement the fish screen pilot project for the pumps in the South Delta.

28. Reduce contamination entering the Delta by eliminating the agricultural waiver, eliminating drainage from drainage impaired lands in the San Joaquin Valley, and reducing runoff from urban areas (through stormwater capture and other methods).
29. Begin screening in-Delta diversions.
30. Create a new Delta Conservancy to fund restoration and oversee land use in the Delta.
31. Identify and purchase lands needed for flood protection, (e.g. flood corridors, room for levee setbacks, etc.) and environmental restoration (e.g. shallow water tidal habitat).
32. Continue to provide regular levels of funding for Delta levee maintenance.
33. Develop a plan for the phased conversion of selected islands over time in response to sea level rise.
34. Provide funding to bring flood management for already urbanized areas up to a 200 year standard.
35. Provide increased protection for one or two infrastructure corridors (e.g. rail, road, aqueduct).
36. Determine the water needs of the Delta, including what flow regime is needed under different conditions for a healthy Delta.

# "Flexible Delta"

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