

# ECONOMIC SUSTAINABILITY PLAN FOR THE SACRAMENTO-SAN JOAQUIN DELTA

Delta Protection Commission

Approved October 25, 2011

Revisions accepted January 26, 2012

Presentation to the Delta Stewardship  
Council

February 9-10, 2012

# Organization of ESP Presentation

1. Key Sectors of the Delta Economy
2. Levees
3. Habitat and Water Conveyance Proposals
4. Strategies, Opportunities, and Constraints for Enhancing Recreation and Legacy Communities

# Location Quotient For Gross Regional Product

(based on IMPLAN zipcode data approximation of legal Delta)

Industry (rank of 21 industry categories)	Location Quotient	Gross Regional Product (\$millions)	% of Total GRP
<b>Top 5</b>			
1. Utilities	2.76	\$1,073	5.3%
2. Transportation and Warehousing	2.35	\$1,199	6.0%
3. Imputed Rental Activity for Owner-Occupied Dwellings	1.66	\$1,949	9.7%
4. Construction	1.57	\$1,234	6.2%
5. Agriculture* (*IMPLAN \$701m output vs. \$795m in ESP)	1.35	\$319	1.6%
<b>Bottom 3</b>			
19. Arts, Entertainment, Recreation	0.31	\$97	0.5%

# Key Economic Sectors Connected to Resources Affected by Delta Plans

- Agriculture
- Recreation and Tourism
- Infrastructure Services
  - ▣ Transportation
  - ▣ Energy
  - ▣ Water
- Construction and Real Estate (not analyzed in depth for secondary zone – inside cities sphere of influence)

# Gross Regional Product Per Job in Key Delta Industries

- Agriculture Related
  - ▣ Agriculture (\$59,500)
  - ▣ Food and Beverage Manufacturing (\$161,900)
- Recreation and Tourism Related
  - ▣ Arts, Entertainment, and Recreation (\$33,000)
  - ▣ Hospitality: Restaurants and Lodging (\$33,200)
- Infrastructure Related
  - ▣ Transportation and Warehousing (\$77,000)
  - ▣ Utilities (\$601,200)

# Delta Agriculture Revenue

- Crops: \$702 million
- Animal and Animal Products: \$93 million
- Total: \$795 million [DWR estimates \$818 million]
  
- San Joaquin 61%, Sacramento 17%, Others <10%
  
- High-Value Crop Trends
  - Massive declines in asparagus nearly over.
  - Strong growth in wine grapes.
  - Tomatoes and other truck crops steady or

# Agriculture Baseline Forecast (2050)

- Modest shift towards higher-value crops.
  - ▣ 30,000 acres (7% of farmland) could shift to higher value crops.
  - ▣ Adds \$111 million (16%) to crop revenue at current values.
- With Urbanization Effect
  - ▣ Project 26,600 acres urbanized.
  - ▣ Reduces forecasted crop revenue by \$43 million.

# Agriculture Baseline Forecast

- Net change of crop shifts and urbanization
  - ▣ Revenues increase \$68 million (about 10%) at current prices.
  - ▣ Net loss of 48,800 acres in low-value crops.
  - ▣ Net gain of 22,100 acres in high-value crops.
  - ▣ Agricultural habitat programs could reduce the shift.
- The value of Delta Agriculture can be maintained and enhanced, while allowing for substantial environmental restoration.



# Recent Trends in Recreation and Tourism

- New Primary Data is Needed
- Short-term trends in secondary recreation/tourism data are not encouraging.
  - Employment, Establishment Counts, Boat Registrations Have Been Relatively Flat for 2 Decades.
  - Focus Groups and interviews with recreation and tourism oriented business owners confirm flat trends.
  - State Park Closures

# Total Economic Impacts of Delta Agriculture and Recreation and Tourism

Sector	Employment	Labor Income	Value Added	Output	Source Table
<b>5-COUNTY IMPACTS</b>					
Agriculture	13,179	\$593,975,736	\$1,059,453,520	\$2,647,124,544	Table 13 p.125
Recreation & Tourism	3,064	\$104,320,642	\$175,862,370	\$329,229,232	Table 36 p.174
<b>CALIFORNIA IMPACTS</b>					
Agriculture	25,125	\$1,252,216,824	\$2,135,095,400	\$5,372,014,752	Table 14 p.126
Recreation & Tourism	5,317	\$208,104,490	\$353,312,020	\$654,415,364	Table 37 p.174

Employment and Wages: Agriculture Impact is 4.5 times larger.

Value Added: Agriculture Impact is 6 times larger.

# Impact of a dollar of revenue

- \$1 in local Recreation and Tourism Spending
  - ▣ 50 to 60 cents of income in 5-counties.
- \$1 of Delta Agriculture Revenue
  - ▣ 86 cents to \$1.33 of income in 5-counties

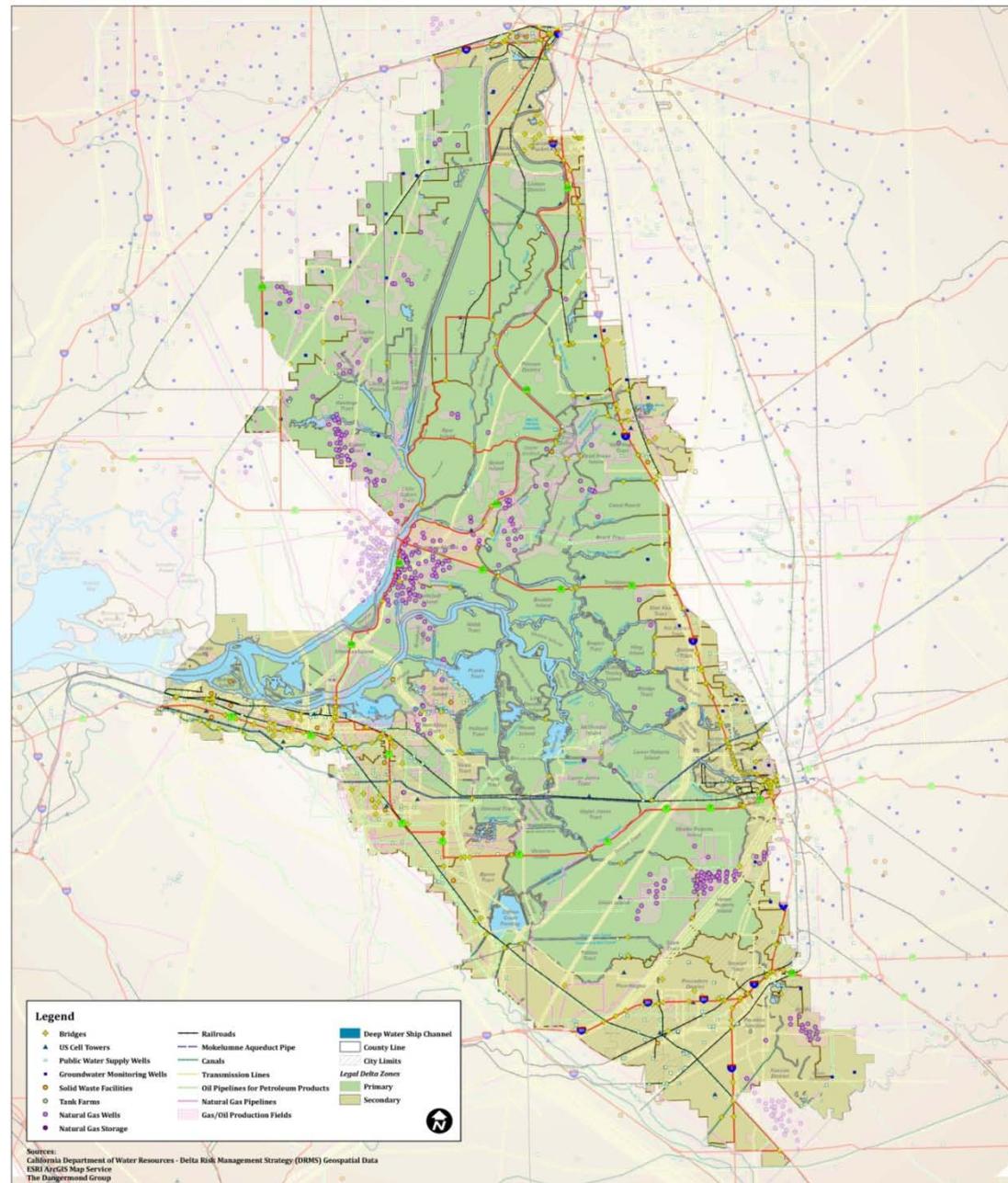
“Economic impact” understates the full value of recreation to quality of life and community identity.

# Can Recreation/Tourism replace the economic impact of agriculture?

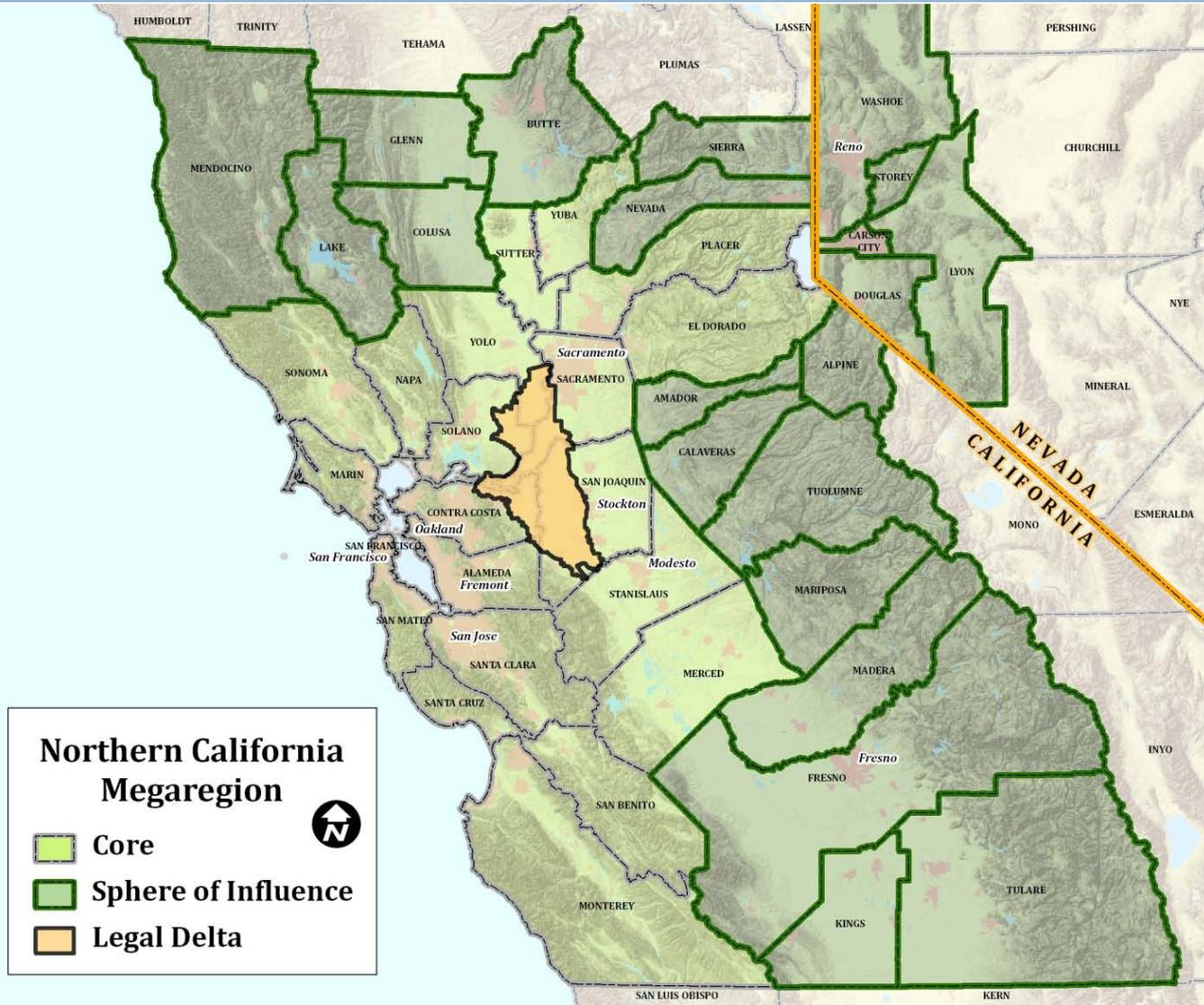
- Potential is limited.
- A 35% increase in recreation spending would generate about \$50 million in local income; 5% to 8% of agriculture's current impact.
- Increasing economic impact requires more overnight stays and tourist services to capture and generate more spending per trip on higher value added services.

# Delta Infrastructure Services

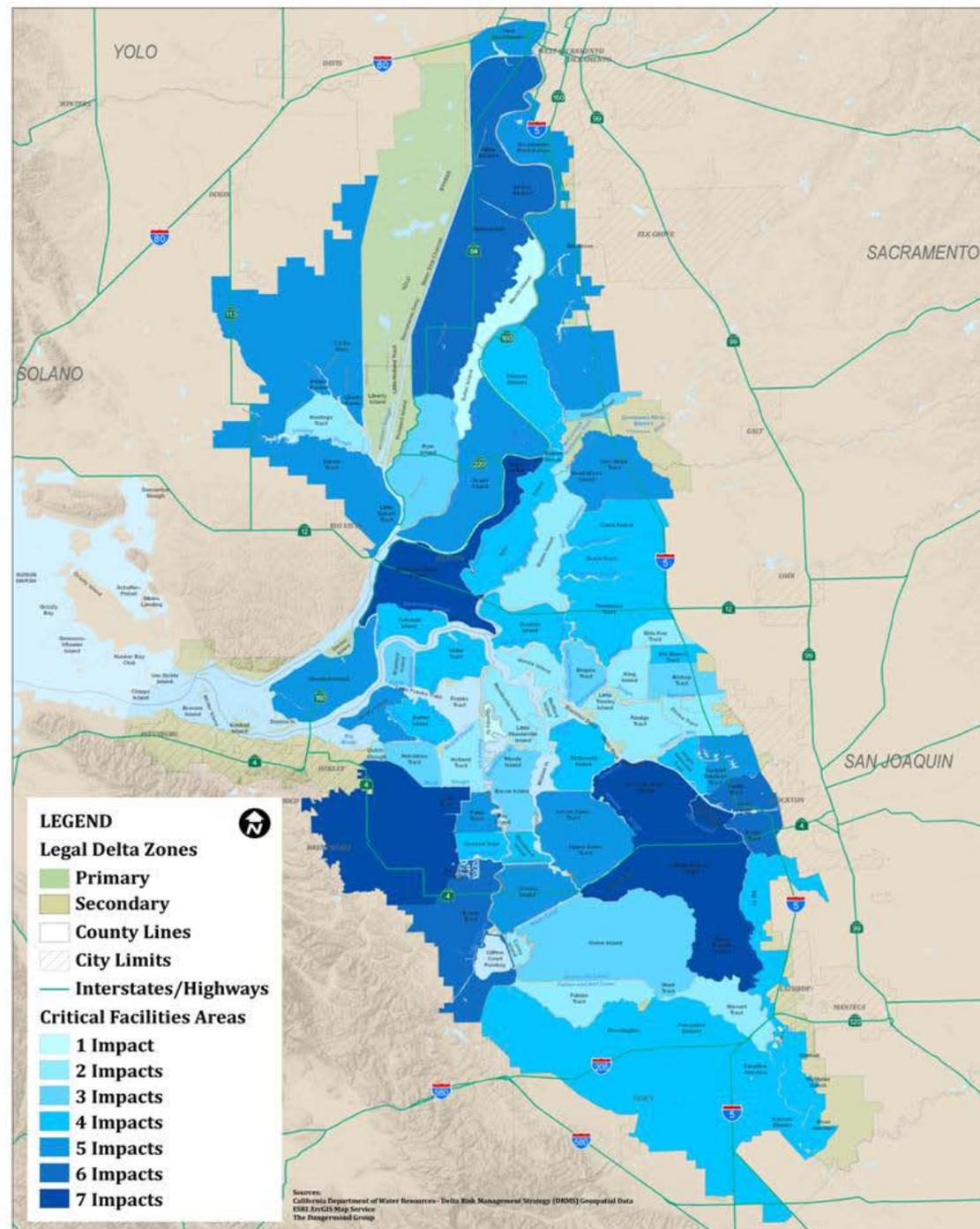
- Energy
  - ▣ Natural Gas Production and Storage
  - ▣ Electricity Generation and Transmission
- In-Delta Municipal and Industrial Water Supplies
- Transportation: Roads, Rails and



# Infrastructure Hub for Northern California Megaregion



# Delta Islands Containing Critical Infrastructure Facilities



# Delta Levees

- Preconceptions
- What we found
- Recommendations
- Cost Estimates

For high-resolution graphics and further details:  
[forecast.pacific.edu/desp.html](http://forecast.pacific.edu/desp.html)









# Delta Levee Economics: The Narrow, but Common View

“The cost of maintaining, improving, or repairing these levees may be more than the assessed value of the use of the land they protect in some cases (Sumner et. al. 2011). This creates an uncertain future for Delta agriculture and for the associated Delta economy and those residents who depend upon it today.”

Delta Stewardship Council Delta Plan (5<sup>th</sup> draft, August 2, 2011), Chapter 1, page 23.

# Problems with Island by Island benefit-cost approach.

- Levees work as a system. Many engineers say island by island cost-benefit analysis is not valid.
  - ▣ Department of Water Resources' background/technical memorandum for investment framework.
  - ▣ Department of Water Resources' 2008 report to the legislature on DRMS.
  - ▣ Economic Sustainability Plan (Pyke and Conrad)
  - ▣ Independent Review Panel of Economic Sustainability Plan (Gilbert and Marcuson)
- Can Minimize Public Safety, and Protection from Loss of Life (Suddeth et. al. 2010)

# What are the costs of levee upgrades and failures?

- Use up-to-date data on levee system.
  - ▣ Suddeth et. al. estimate 557 miles require upgrades to achieve PL 84-99 (based on DRMS)
  - ▣ ESP estimates 350 miles are not at PL 84-99.
  - ▣ New DWR maps show 326 miles are not PL 84-99.
  
- Not every levee failure is a 2004 Jones Tract event.
  - ▣ Many failures are less expensive.
  - ▣ Enhanced emergency response can reduce failures and cost.

# A Step Towards a Broader View of Levee Benefits

Suddeth et. al. (2010) is better, but is still an overly narrow view of levee benefits.

- Farmland Property Values (capitalized after tax farm profits)
- Cost of Elevating State Highways and Rail
- Value of Residential and Commercial Structures
- Some protection of adjacent levees.

# What is the economic value of farmland?

- Agricultural property value reflect capitalized expected net farm profits (Suddeth. et. al. used \$2,250 per acre for low value Delta cropland)
- The Economic Value is value added (profits, wages, taxes, supplier income, etc.), plus non-market values.
  - Total value added averages \$5,000 per acre in the Delta, about \$1,000 per acre for low-value crops.
  - Present value of annual value added averages \$100,000 per acre, \$20,000 per acre for low-value crops (5% discount rate).

# Other Economic Values of Levees That Are Often Overlooked

- Recreational Values (boating channels and hunting areas)
- Water Quality for municipal and industrial users in and outside the Delta
- Water Conveyance
- Energy Infrastructure (electricity transmission, natural gas production, fuel pipelines)
- Impacts on Deepwater Shipping Channels
- Wildlife Habitat
- Disruption of Business and Homes (beyond structure value)

# With Broader View, 4 Islands May Not Justify PL 84-99

## Upgrade

Island Name	Total Levee Miles	Levee Miles Already at PL 84- 99
Quimby	7.01	6.06
Fay	1.52	0.38
Deadhorse	1.70	0
Coney	5.49	2.84
<b>Total</b>	<b>15.72</b>	<b>9.28</b>

Potential Savings By Not Upgrading to PL 84-99: 6.5 miles, about \$10 million.

Levee investment prioritization is needed to identify locations where investment should go beyond PL 84-99 to protect against seismic risk, support environmental restoration, and protect legacy communities.

# New DRMS Phase 2 Results are Consistent with the ESP

- Draft analysis completed in 2007, final report completed in 2009.
- Final report posted June 2011. No draft results were ever released.
- DRMS Phase 2 correctly used the DRMS Phase 1 findings to evaluate system-wide risk reduction strategies.
- Risk-reduction scenarios need revision and updating, but the consequences analysis is comprehensive and well-done.

# DRMS Phase 2 Findings

1. “Improved Levees” has a benefit-cost ratio of 6.6, better than the isolated conveyance scenarios (did not include seismic upgrades and conveyance is assumed to cost under \$5 bil, no tunnel)
2. Water export interruptions are only 20% of the economic cost from a large earthquake.
3. Water export interruptions are less than 2% of the cost of other floods, and earthquakes flooding less than 10 islands.
4. Water export interruptions are 0% of the loss

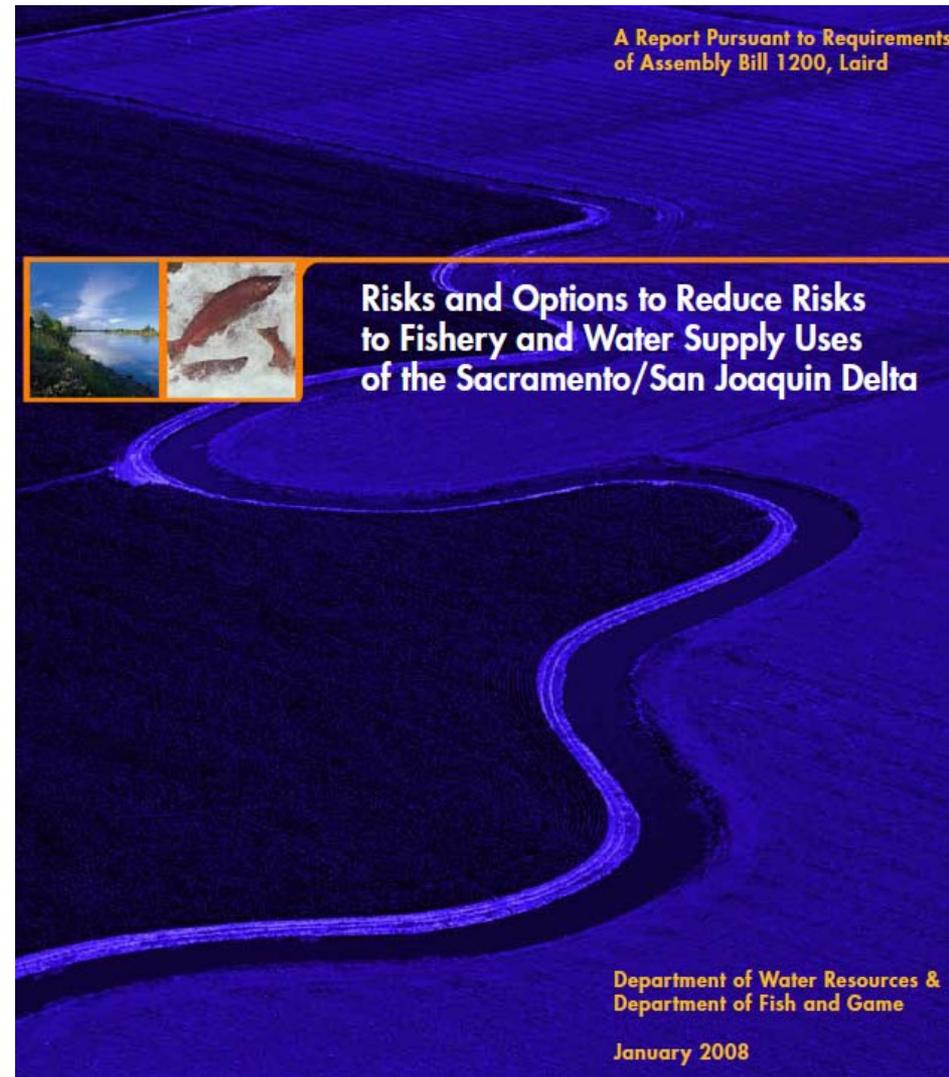
# AB 1200 Report to the Legislature (January 2008)

“DRMS is the primary process to provide technical information requested by AB 1200.”

[http://www.water.ca.gov/floodmgmt/dsmo/sab/drmssp/docs/AB1200\\_Report\\_to\\_Legislature.pdf](http://www.water.ca.gov/floodmgmt/dsmo/sab/drmssp/docs/AB1200_Report_to_Legislature.pdf)

“The (DRMS Phase 2) results suggest that three building blocks have the highest risk reduction potential, but also very high implementation costs. These building blocks are:

- **Armored Pathway Through Delta Conveyance.**
- **Seismically Improved Levees.** (included 100 miles of levees designed to withstand 300 year earthquake)



# AB 1200 Report to the Legislature (January 2008)

Page 24, Ranking of preliminary scenarios (emphasis added).

“The ranking of preliminary DRMS scenarios is shown in the following table. These rankings were developed by DWR and DFG staff based on DRMS analyses, **with adjustments based on the BDCP analyses**. Scenario 1 (Improved Levees) ranks **moderate** for reducing risk and is the least expensive of the three. Scenario 2 (Armored Pathway) and Scenario 3 (Isolated Conveyance Facility) rank **high** and **very high** respectively for reducing risk. Scenario 1.”

TABLE 5. PRELIMINARY PERFORMANCE RANKING<sup>1</sup> FOR DRMS SCENARIOS

Goal <sup>2</sup>	Existing: (Through Delta)	Scenario 1 (Improved Levees)	Scenario 2 (Armored Pathway)	Scenario 3 (Isolated Conveyance)
Prevent water supply disruption	●	●●	●●●	●●●●
Improve export water quality for drinking and agriculture (reduce salinity)	●	●	●●●	●●●●
Maintain Delta water quality <sup>3</sup>	●●●	●●●	●●●	●●●
Preserve lands and protect levees	●	●●●●	●●●	●●
Improve ecosystem	●	●●	●●	●●●●
Overall risk reduction	●	●●	●●●	●●●●
Total long-term costs (including losses)	●●	●●●	●●	●●●

Notes: 1. Performance ranks are were prepared by DWR and DFG staff based on preliminary information from DRMS and BDCP:

# DRMS Phase 2, August 2007 draft

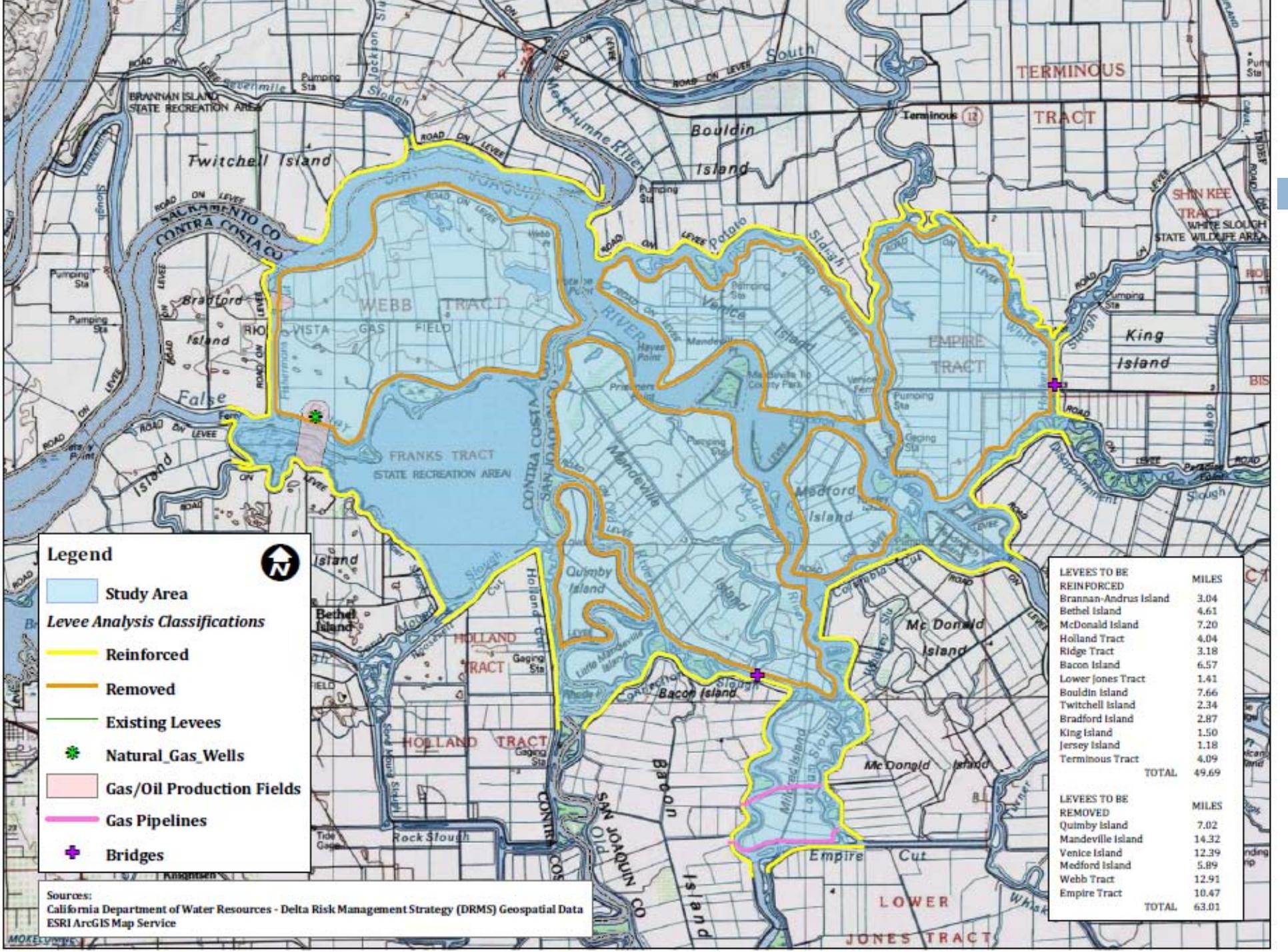
- Requested quantitative results behind the rankings in the AB 1200 report.
- Seismic Improved Levees Scenario had both the lowest costs and the highest risk reduction benefits (\$7.9 billion vs. \$5.7 billion).
- Seismic levee upgrades to 100 miles reduced worst case water supply disruption by 2/3.
- AB 1200 report reversed the risk reduction ranking in the DRMS Phase 2 draft to match the isolated conveyance strategy in the BDCP.

# ESP Levee Strategy is Feasible and Cost Effective

- ❑ Existing Bond Funding And Local Funding
- ❑ Cost Estimates Are Consistent with Current Projects, DRMS, and PPIC (2007)
- ❑ Levee Upgrades Create Immediate Benefits
- ❑ DRMS finds levee improvement has highest benefit-cost ratio.
- ❑ Regional Agency with Levee Assessment Authority is Feasible Long-term Funding Strategy
  - ▣ Beneficiary Pay Linkages are Clear and Quantifiable
  - ▣ Solves Free Rider Problem

# Impact of Water Supply and Ecosystem Restoration Proposals on the Delta Economy

1. Isolated Conveyance: 15,000 cfs tunnel
2. Habitat Proposals
  - a. Yolo Bypass Fishery Enhancement
  - b. San Joaquin River Floodplain
  - c. Tidal Marsh Restoration (65,000 acres)
  - d. Natural Communities Protection: Agricultural conservation easements
3. Open Water Area (6 Central Delta islands)
4. Increased Regulation by Stewardship Council
5. Delta Vision Economic Development Strategies



**Legend**

- Study Area
- Levee Analysis Classifications**
- Reinforced
- Removed
- Existing Levees
- Natural Gas Wells
- Gas/Oil Production Fields
- Gas Pipelines
- Bridges



Sources:  
 California Department of Water Resources - Delta Risk Management Strategy (DRMS) Geospatial Data  
 ESRI ArcGIS Map Service

LEVEES TO BE	MILES
REINFORCED	
Brannan-Andrus Island	3.04
Bethel Island	4.61
McDonald Island	7.20
Holland Tract	4.04
Ridge Tract	3.18
Bacon Island	6.57
Lower Jones Tract	1.41
Bouldin Island	7.66
Twitchell Island	2.34
Bradford Island	2.87
King Island	1.50
Jersey Island	1.18
Terminous Tract	4.09
<b>TOTAL</b>	<b>49.69</b>
LEVEES TO BE	
REMOVED	
Quimby Island	7.02
Mandeville Island	14.32
Venice Island	12.39
Medford Island	5.89
Webb Tract	12.91
Empire Tract	10.47
<b>TOTAL</b>	<b>63.01</b>

# 15,000 cfs Isolated Conveyance and Agricultural Production

- Footprint: \$10 million to \$15 million annually
- Estimated Salinity Impact: \$20 million to \$80 million annually
  - High estimate includes proposed change in south Delta D-1641 standard.
  - Based on crop shifts. Does not include potential yield impacts or cumulative effects.
  - Risk of worse outcome with large facility. Smaller facility would reduce risk.
  - Econometric modeling approach was commended by the independent review panel.

# BDCP Habitat Proposals and Agricultural Production Losses

- Yolo Bypass Fishery Enhancements
  - ▣ \$7m to \$10m annually
- San Joaquin River Floodplain Restoration
  - ▣ BDCP proposal: \$20 million annually
  - ▣ Paradise Cut proposal: under \$5 million
- 65,000 acres of tidal marsh restoration
  - ▣ \$18m to \$77m annually, depends on location
- Agricultural Easements (32,000 ac crops, 8,000 ac range)
  - ▣ \$5m to \$25m annually
- BDCP Total: \$62m to \$227m (8% to 29%)

# Six Island Open Water and Agricultural Production

Island	Agricultural Acreage	Annual Agricultural Revenue
Mandeville	2,345	\$2.2 million
Medford	365	\$0.3 million
Quimby	629	\$0.5 million
Venice	2,587	\$2.0 million
Webb	4,469	\$3.5 million
Empire	2,521	\$2.5 million
<b>Total</b>	<b>12,916</b>	<b>\$11 million</b>

Using broader measure of agricultural value, consideration of permanent flooding should be limited to Medford and Quimby.

# Infrastructure Impacts of Proposals

- Yolo and San Joaquin Bypasses, Agriculture easements: Small or positive impacts.
- 15,000 cfs conveyance
  - ▣ Potential negative water quality impacts
  - ▣ Risk of reduced investment in levees
- Tidal Marsh
  - ▣ Significant water quality impacts
  - ▣ Adjacent levee concerns
- Six Island Open Water
  - ▣ Significant Impacts for all islands except Quimby (Stockton water supply, shipping channel, water quality, gas field)

<b>Proposals/Impacts</b>	<b>Agriculture</b>	<b>Recreation &amp; Tourism</b>	<b>Infrastructure Services</b>
<b>1. Isolated Conveyance Facility (15,000 cfs tunnel in dual conveyance system)</b>	1) Water quality losses \$20m-\$80m annually, increased risk 2) Footprint displaces \$10m to \$15m in annual crops	Potential fishing benefits, but negative effects from North Delta intakes and water quality larger.	1) Water quality negative impacts on M&I supplies 2) Risk of lost support for levee investment
<b>2. Habitat Proposals:</b>			
<i>a) Yolo Bypass Fishery Enhancements</i>	Losses \$7m to \$10m annually, dependent on flood duration	Potential recreation benefits	Possible Flood control benefits
<i>b) San Joaquin River Floodplain Restoration</i>	1) BDCP proposal - 10,000 acres, up to \$20m annual crop loss 2) Paradise cut alternative: 2,000 acres – collaborative plan	Potential recreation benefits	Flood control benefits
<i>c) 65,000 acres of tidal marsh restoration</i>	\$18m to \$77m annual crop losses, low losses in Suisun Marsh /highest losses in South Delta	South Delta tidal marsh likely negative recreational impacts	1) South Delta & Cache Slough tidal marsh could increase organic carbon in municipal water supplies 2) Suisun Marsh and west Delta restoration could have positive impacts on Delta water quality
<i>d) "Natural Communities" Protection: 32,000 acres of easements &amp; 8,000 acres rangeland conversion</i>	Agricultural losses range from \$5m to \$25m annually	Wildlife viewing could generate new recreation visits, although spending is low for this activity	Minimal impact
<b>3) Six Island Open Water Scenario</b>	\$12m in annual crop losses	Recreation impact very large as located in most popular boating area. Eliminates wind-protected channels and 40% of Delta marinas in immediate area exposed to negative impact	Empire Tract has new Stockton Water intake. Organic carbon impact to Stockton water supply, and silting of shipping channel.
<b>4) DSC Covered Actions Regulation</b>	Potentially large impacts on all sectors. Deter investments with increased cost and uncertainty.		
<b>5) Delta Vision Economic Development Strategies</b>	National Heritage Area designation could be useful (DPC feasibility study in progress). Delta Investment Fund is useful, but prospects for funding are very uncertain. Other ideas have limited potential and feasibility.		

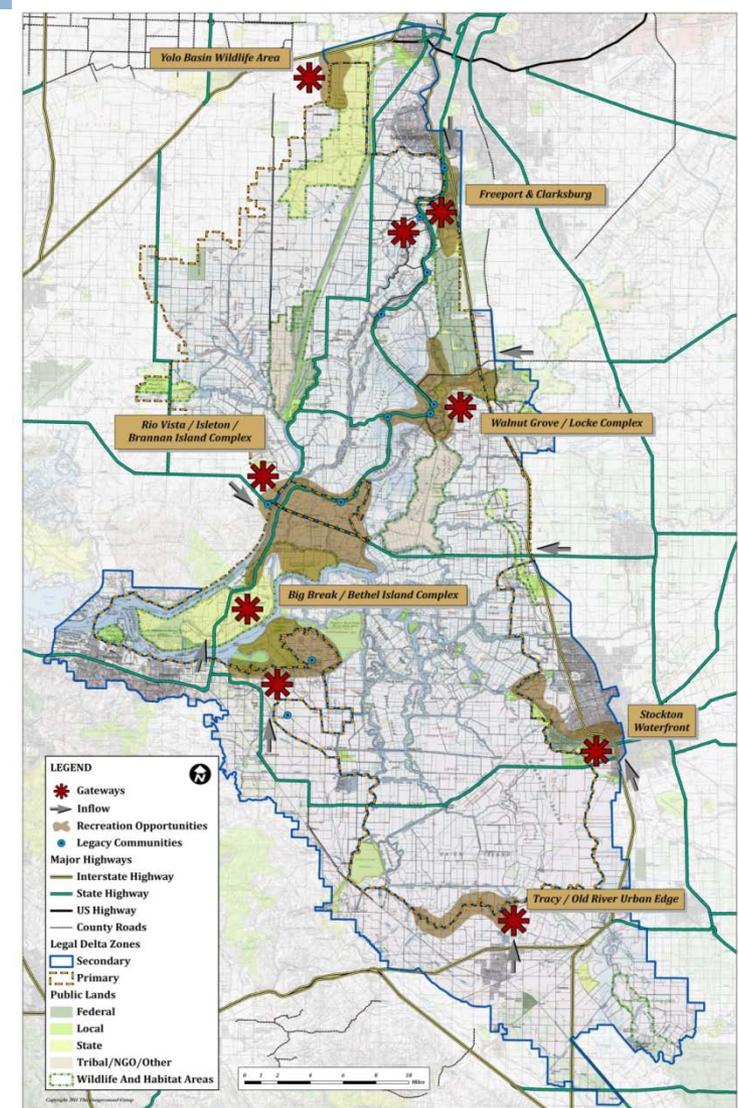
# Recreation Impacts of Habitat and Conveyance Proposals

- Positive Impacts
  - ▣ Fishing Enhancements
  - ▣ Wildlife Viewing and Nature Study
- Negative Impacts
  - ▣ Six-Island Flooding
  - ▣ Water Quality in Central and South Delta
  - ▣ Intake and Pumping Stations – Clarksburg to Courtland

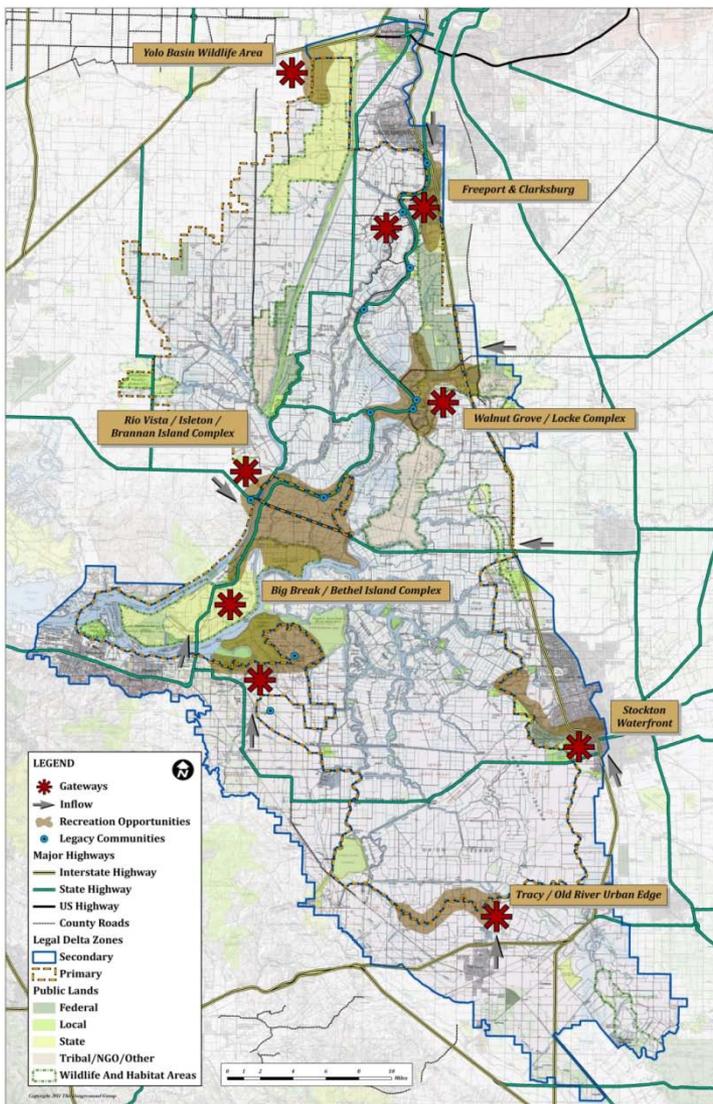
# Recreation and Tourism Enhancement Strategy

## Delta-wide Location Principles

1. Protect and respect agriculture
2. Avoid conflicts with, and adapt to, habitat zones
3. Locate in areas most likely to have long term flood protection
4. Respect and protect hunting areas
5. Enhanced clusters to create focal point areas

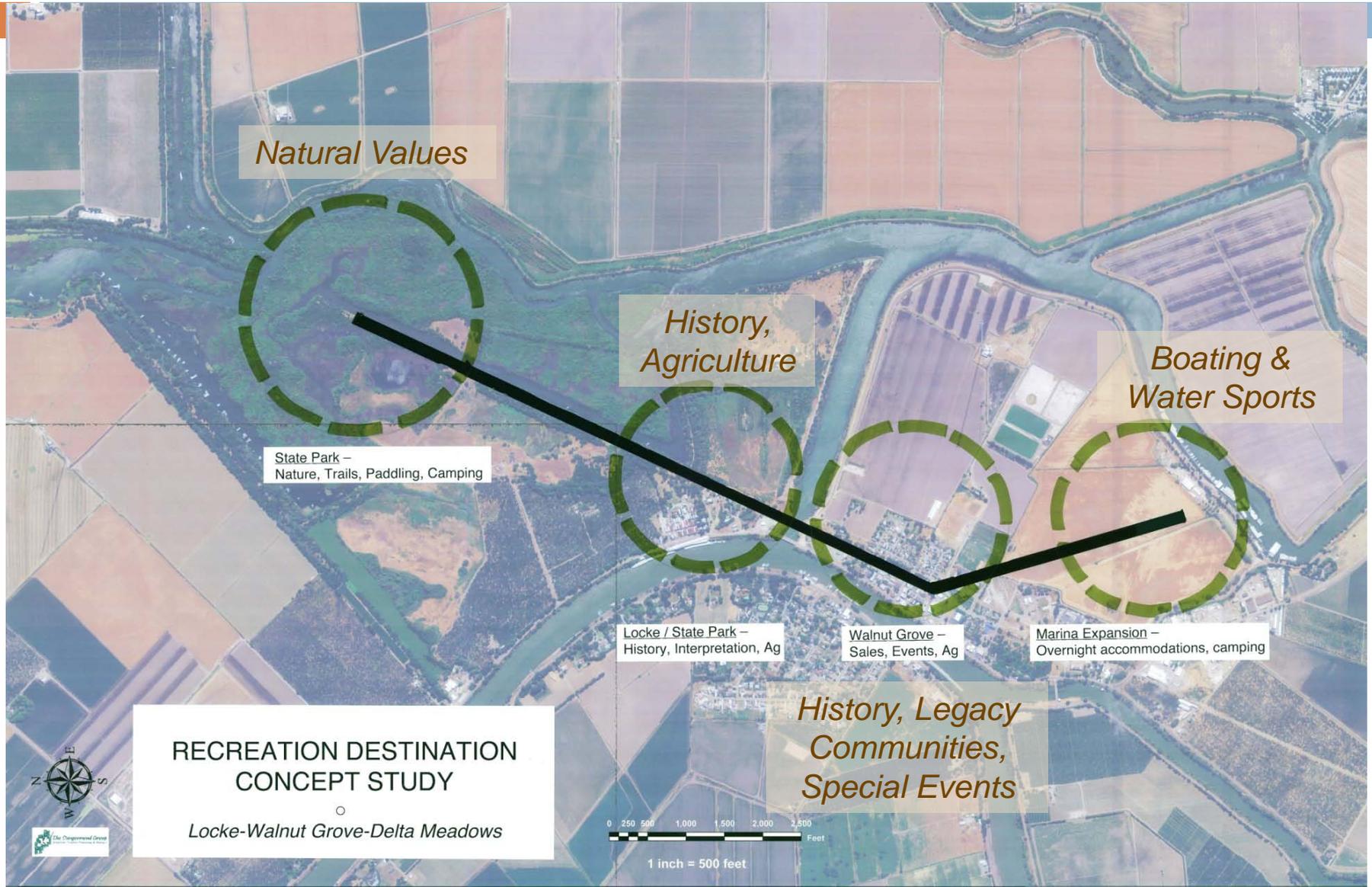


# Five Location Based Concepts

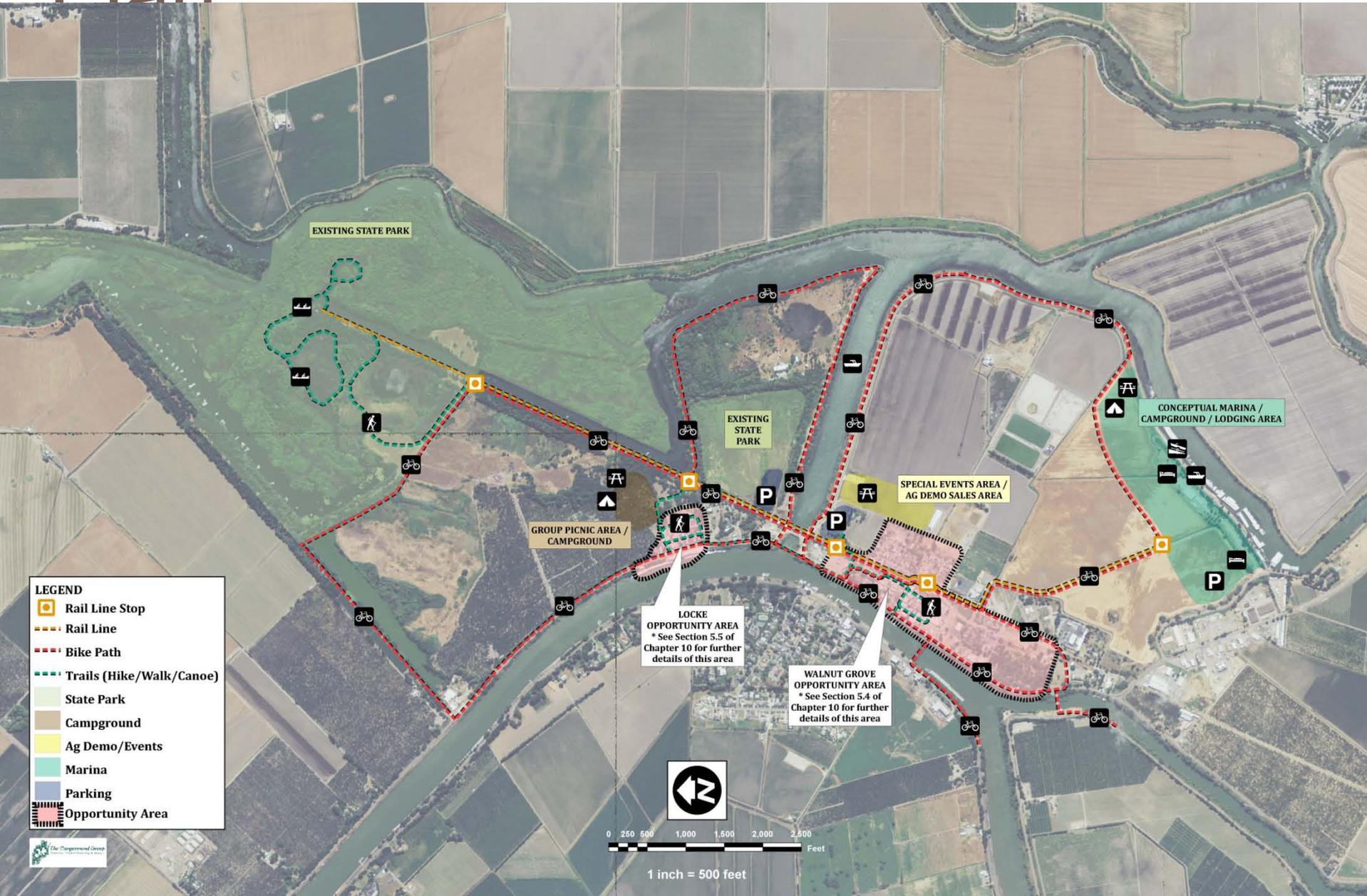


1. Enhance Delta waterways
2. Develop dispersed points of interest and activity areas
3. Create focal point destination complexes
4. Expand public access to natural habitat areas
5. Create recreation oriented buffers at urban edges

# Recreation Destination Concept



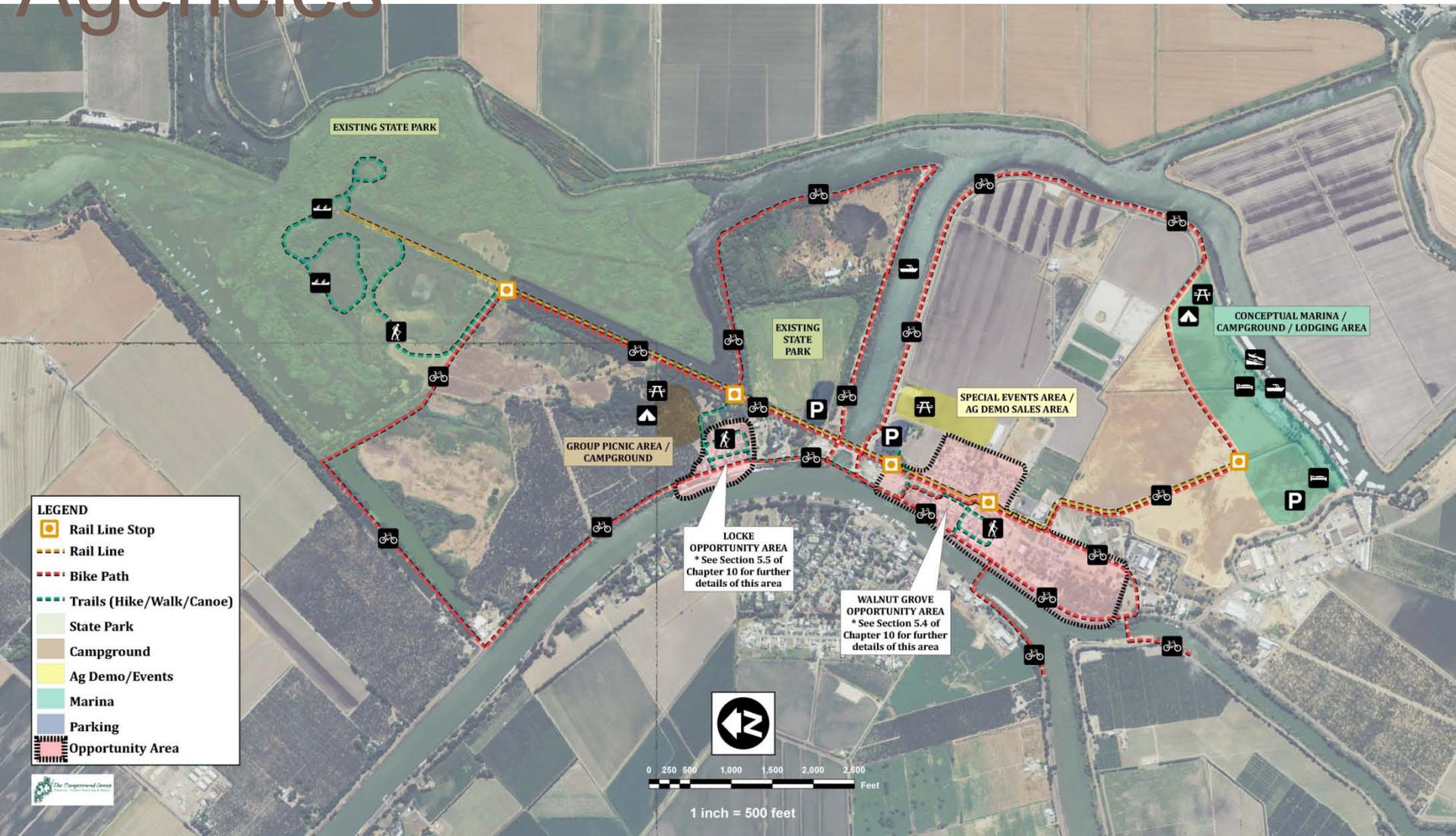
# Recreation Destination Concept Plan



# Partner with Private Enterprise

- Identify appropriate sites
- Public agencies can provide:
  - ▣ Catalyst settings
  - ▣ Recreation facilities
  - ▣ Infrastructure (access and flood protection)
  - ▣ Technical assistance
  - ▣ Regional branding
  - ▣ Streamline permitting for appropriate projects

# Protect and Enhance Private Recreation with support from Public Agencies



# Implement Economic Sustainability Strategies

Critical Areas for Facilitator Organization in a Successful Recreation and Legacy Community Enhancement Vision:

- Coordinate among state and local agencies for consistency in planning, regulation, and implementation
- Permit Processing and Assistance
- Obtain Strategic Levee Protection
- Facilitate Marketing and Economic Development
- Operations and Management Responsibilities
- Encourage Public-Private Partnerships
- Provide Key Funding for Catalyst Projects

# Reducing Private Investment Risk

- Flood Zone Risks and Regulations
- Additional Regulatory Costs in the Delta
  - ▣ DSC Covered Actions
  - ▣ DPC Land Use Resource Management Plan
  - ▣ Other Agencies
- The Delta is already a risky market for investment without these additional concerns.



For further details: [forecast.pacific.edu/desp.html](http://forecast.pacific.edu/desp.html)