Economic Sustainability Plan for the Sacramento-San Joaquin River Delta

Executive Summary

19 January 2012

DELTA PROTECTION COMMISSION

The Delta is a dynamic environment with rich natural and productive resources.

The Sacramento-San Joaquin River Delta is a unique place of economic, environmental, historic and cultural significance. The land and water resources of the Delta support significant agricultural and recreation economies, and the Delta also has an important role as an infrastructure hub for water, energy, and transportation. The region's rich history boasts of bustling, river-based commerce before the automobile age, and its cultural uniqueness includes the only rural town in America built by early Chinese immigrants. As the largest estuary on the west coast of the Americas, the Delta also is a place of striking natural beauty and ecological significance that is struggling with serious environmental degradation problems. Although surrounded by growing cities, the Delta remains a highly-productive agricultural area with rural charms, landscapes, and waterscapes not found elsewhere in California.

In recent years, there has been great concern over increasing environmental degradation in the Delta and over court decisions that reduced the quantity of water delivered to southern California through the state and federal water project intakes in the south Delta to protect endangered fish. Combined with additional concerns about the stability of the Delta's levee system, these concerns led the California legislature to pass the Delta Reform Act of 2009. The Act created the Delta Stewardship Council and charged it with developing a Delta Plan to achieve the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem."

Recognizing the potential impact of the Delta Plan on the people and economy of the Delta, the Delta Reform Act stated that the coequal goals of water supply reliability and restoring the Delta ecosystem "shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place." Among the measures to address this goal, the Delta Protection Commission was tasked with developing this Economic Sustainability Plan to inform the Delta Stewardship Council's development of the Delta Plan.

The concept of economic sustainability and the objective to "protect and enhance the unique cultural, recreational, natural resources, and agricultural values of the California Delta as an evolving place," can be interpreted in different ways. In economic terms, most stakeholders agreed that a minimum requirement is to maintain the economic value of the entire Delta economy in the future, and many believed in a stronger interpretation of enhancement of every key economic sector. The Fifth Staff Draft of the Delta Stewardship Council's Delta Plan uses performance measures that follow this stronger interpretation of economic sustainability where growth in one sector is not a substitute for deterioration in another sector. The peer review panel for the ESP found this to be too strong, and

recommended that sustainability should allow for substitution between sectors. In contrast, some non-Delta water interests take a narrower view, and claim that "evolving place" means that the Delta is in a state of inevitable decline and only a handful of "unique" values need to be protected.

The Plan interprets sustainability as maintaining and enhancing the economic prosperity of the Delta, and specifically considers the potential of recreation and tourism to offset possible declines to agriculture. Regardless of the interpretation of economic sustainability, it is clear that the Stewardship Council must consider the Delta economy when preparing the Delta Plan. In addition, most stakeholders agree that the Delta Reform Act requires the protection of the cultural and historical heritage and the long-term economic viability of the Delta's historical Legacy Communities.

The Economic Sustainability Plan (ESP) measures the key elements of the Delta economy, develops strategies to enhance the economy, and analyzes the impacts of several important proposals for the Delta Plan on the region's economic sustainability. The analysis in this Economic Sustainability Plan shows that it is possible to protect and enhance the Delta economy and be consistent with the coequal goals. The ESP finds that a large investment in strengthening the Delta's levee and emergency response systems is a cost-effective approach to improving water supply reliability, economic sustainability in the Delta, and reliable energy, transportation, and water infrastructure that serves statewide interests. The ESP also finds that most proposals for ecosystem restoration can be consistent with economic sustainability.

THE ECONOMY AND INFRASTRUCTURE OF THE DELTA: BASELINE, TRENDS, AND STRATEGIES FOR IMPROVEMENT

The boundaries of the Legal Delta are shown in Figure A. The Delta Protection Act of 1992 defined the Delta boundaries including the Primary and Secondary Zone and created the Delta Protection Commission, charging it with developing a Land Use and Resource Management Plan for the Primary Zone. The majority of the Delta's 738,000 acres of land is in the rural and agricultural Primary Zone. The population of the Primary Zone is approximately 12,000 and has remained steady in the nearly 20 years since the passage of the Delta Protection Act.

The Legal Delta, including both the Primary Zone and Secondary Zone, contains significant portions of five counties, Contra Costa, Sacramento, San Joaquin, Solano and Yolo, and a small rural corner of Alameda County. The Delta includes parts of several large cities including Antioch, Pittsburg, Stockton, Sacramento, Tracy, and West Sacramento. The legal Delta has a population of 571,000, according to the 2010 Census, which has increased by about 200,000 people—more than 50 percent—in the 20 years since the 1990 Census. All of the population growth, and virtually all of the Delta's urbanized land, is located within the Delta's Secondary Zone.

The Primary Zone economy is export-oriented and creates jobs and income far in excess of the population and workforce that resides in the Primary Zone. The Secondary Zone and the counties surrounding the Delta supply the Primary Zone economy with a workforce, services, manufacturing, and transportation that add value to the agricultural, energy, and other resource-based output of the Delta.

The ESP calculated measures of industry concentration for the Legal Delta with measures of both employment and output, and identified three clear areas of relative concentration: 1) Agriculture; 2) Transportation, Warehousing, and Utilities; and 3) Construction, Housing, and Real Estate. All of these areas are potentially impacted by the Delta Plan. Since there is great interest in recreation and tourism as an economic driver in the Delta, it is significant to note that the tourism-oriented Arts, Entertainment, and Recreation sector tied with Information and Management for the lowest concentration of the 21 industries analyzed in the Legal Delta. However, water-based recreation in the Delta is a significant economic driver, and as discussed in Chapter 8, most of its economic impact is in the retail and hospitality sector.

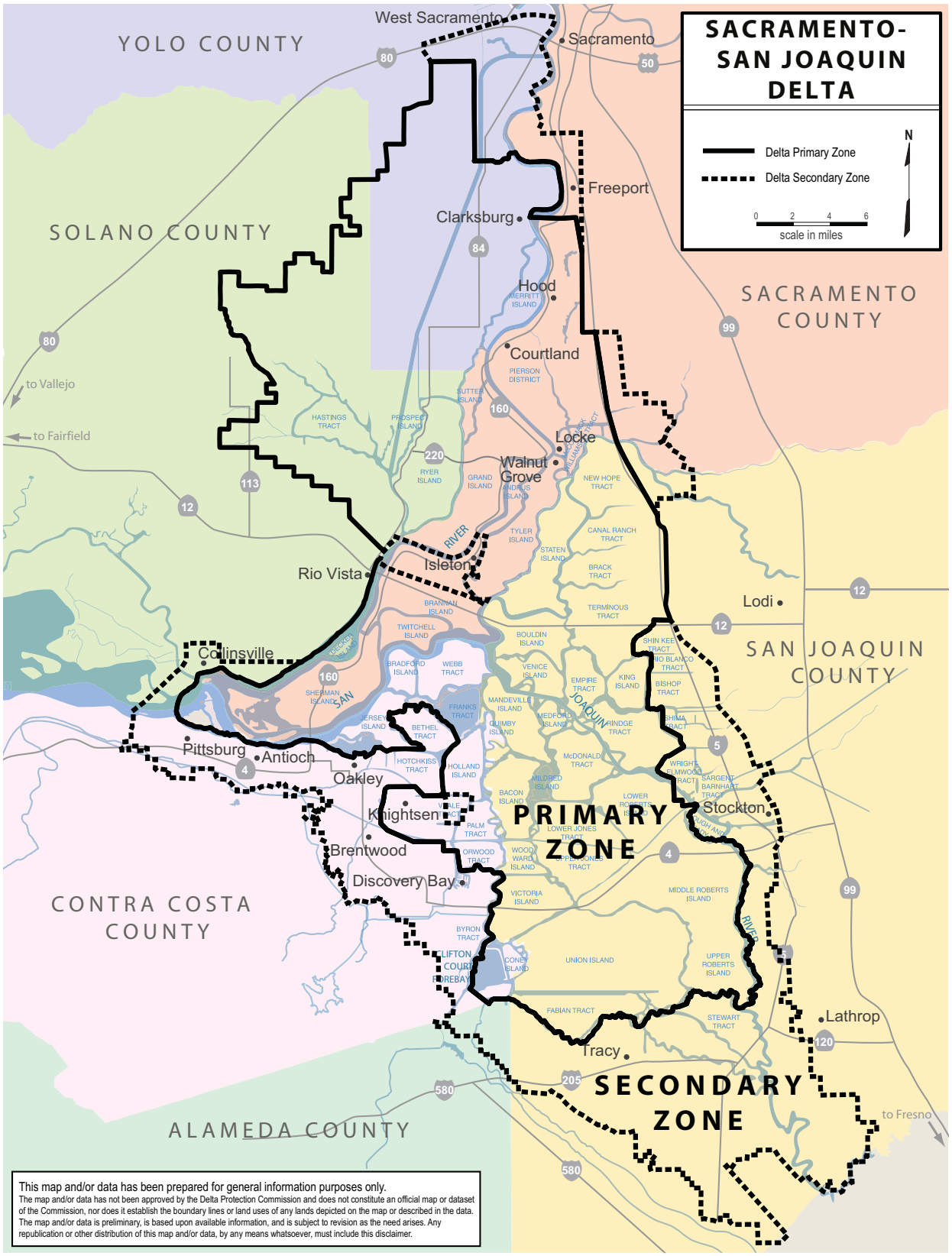
The Delta Reform Act of 2009 and the Delta Protection Act of 1992 are primarily concerned with the natural resources of the Delta and the economic activity sustained by those resources, such as agriculture and outdoor recreation. In addition, the resources of the Delta support significant water, energy, and transportation infrastructure that serves the Delta, regional, and state economies, and an important commercial and recreational salmon fishery throughout the state. Indeed, an important economic cluster in the Delta is Transportation, Warehousing, and Utilities, and their development is directly dependent on maintaining and enhancing the Delta as a regional transportation and energy hub. The ESP conducted a closer analysis of three important areas for the Delta's economic sustainability: agriculture; recreation and tourism; and infrastructure. The remainder of this section looks more closely at the baseline, trends, and strategies for enhancing these areas of the Delta economy.

DELTA AGRICULTURE

Agriculture is the dominant land use in the Delta. Farmland makes up about two-thirds of the area of the Delta, and nearly 80 percent of all Delta farmland is classified as Prime Farmland, the highest quality designation given by the California Farmland Mapping and Monitoring Program. In contrast, less than 20 percent of all farmland in California is Prime Farmland.

Corn and alfalfa occupy the greatest acreage in the Delta, whereas processing tomatoes and wine grapes generate the most crop revenue. These crops have important links to three value-added manufacturing sectors in the region: wineries, canneries, and dairy products. Asparagus and pears are historically high-value crops in the Delta and continue to be significant contributors, although acreage of both has decreased. The majority of

Figure A: Map of Primary and Secondary Zones of the Sacramento-San Joaquin Delta



pumpkins and blueberries grown in California come from the Delta and reflect the variety of products. Total agricultural revenues in the Delta were estimated at $795 million in 2009, including $702 million in crop revenue and $93 million from animals and animal products.

Nearly 80 percent of Delta farmland is used for lower-value field and grain crops, pasture, and grazing lands. These lands are important to supporting animal agriculture in the Delta and the larger region, most notably the California dairy industry where scarcity and costs of forage crops has become a challenge. Animal agriculture is less prevalent in the Delta than in other areas of the San Joaquin Valley, but milk is still the fifth most valuable agricultural commodity produced in the Delta, and animal production generates about 12 percent of Delta farm revenue. In contrast, milk is the most valuable agricultural product in San Joaquin County and other nearby areas in the San Joaquin Valley, and the Delta is an important source of local feed.

High-value vineyards, truck, and deciduous crops generate close to 70 percent of crop revenue in the Delta on about 20 percent of the Delta's farmland, and account for 80 percent of the economic impact of Delta agriculture when value-added manufacturing such as canneries and wineries are included. Like other areas in the Central Valley, Delta agriculture is expected to continue a gradual trend towards higher-value crops over time, increasing the contribution of Delta agriculture to the regional economy.

The economic impact analysis estimates that Delta crop and animal production has an economic impact of roughly 9,700 jobs, $683 million in value added, and $1.4 billion in output in the five Delta counties. Across all of California, the economic impact of Delta agriculture is approximately 13,000 jobs, $819 million in value added, and $1.6 billion in output.[1]

As seen in Table A, when related value-added manufacturing such as wineries, canneries, and dairy products are included with the impact of Delta agriculture, the total economic impact of Delta agriculture is roughly 13,200 jobs, $1.059 billion in value-added, and $2.647 billion in economic output in the five Delta counties. Including value-added manufacturing, the statewide impact of Delta agriculture is about 25,000 jobs, $2.135 billion in value-added, and $5.372 billion in economic output. Additional details and analysis of Delta agriculture can be found in Chapter 7 of the Economic Sustainability Plan.

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[1] The economic impact analysis of agriculture, recreation, and tourism utilizes the IMPLAN model to calculate what are commonly known as the "ripple" effects on other industries such as the purchase of inputs in the local economy and local consumer spending supported by the income. Jobs are reported as annual monthly averages and will vary by season. Value added measures total regional income generated by the activity and is comparable to gross domestic product. Output sums the total revenue of enterprise which is higher than the value added or income created by the enterprise.

Table A: Total Economic Impacts of Delta Agriculture and Recreation and Tourism*

Sector	Employment	Labor Income	Value Added	Output	Source Table
5-COUNTY IMPACTS					
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
CALIFORNIA IMPACTS					
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

*For additional details on economic impacts see the listed source tables and associated discussions.

DELTA RECREATION AND TOURISM

Recreation is an integral part of the Delta economy, generating roughly 12 million visitor days of use annually and approximately $250 million dollars in visitor spending in the Delta each year. Of the roughly 12 million visitor days spent in the Delta each year, approximately 8 million days are for resource-related activities (e.g., boating and fishing), 2 million days are for right-of-way-related and tourism activities (e.g., bicycling and driving for pleasure), and 2 million days are for urban parks-related activities (e.g., picnicking and organized sports).

Boating and fishing have the biggest economic impact, and are estimated to generate nearly 80 percent of the recreation and tourism spending in the Delta, including significant expenditures on lodging, meals, supplies, marina services, and fuel. In addition to visitor spending, non-trip spending such as boat purchases and marina rentals are estimated at roughly $60 million annually for total recreation-related spending of $312 million annually in the Delta. As seen in Table A above, Delta recreation and tourism supports over 3,000 jobs in the five Delta counties. These jobs provide about $100 million in labor income and a total of $175 million in value added to the regional economy. Across all of California, Delta recreation and tourism supports over 5,300 jobs, and contributes about $353 million in value added.

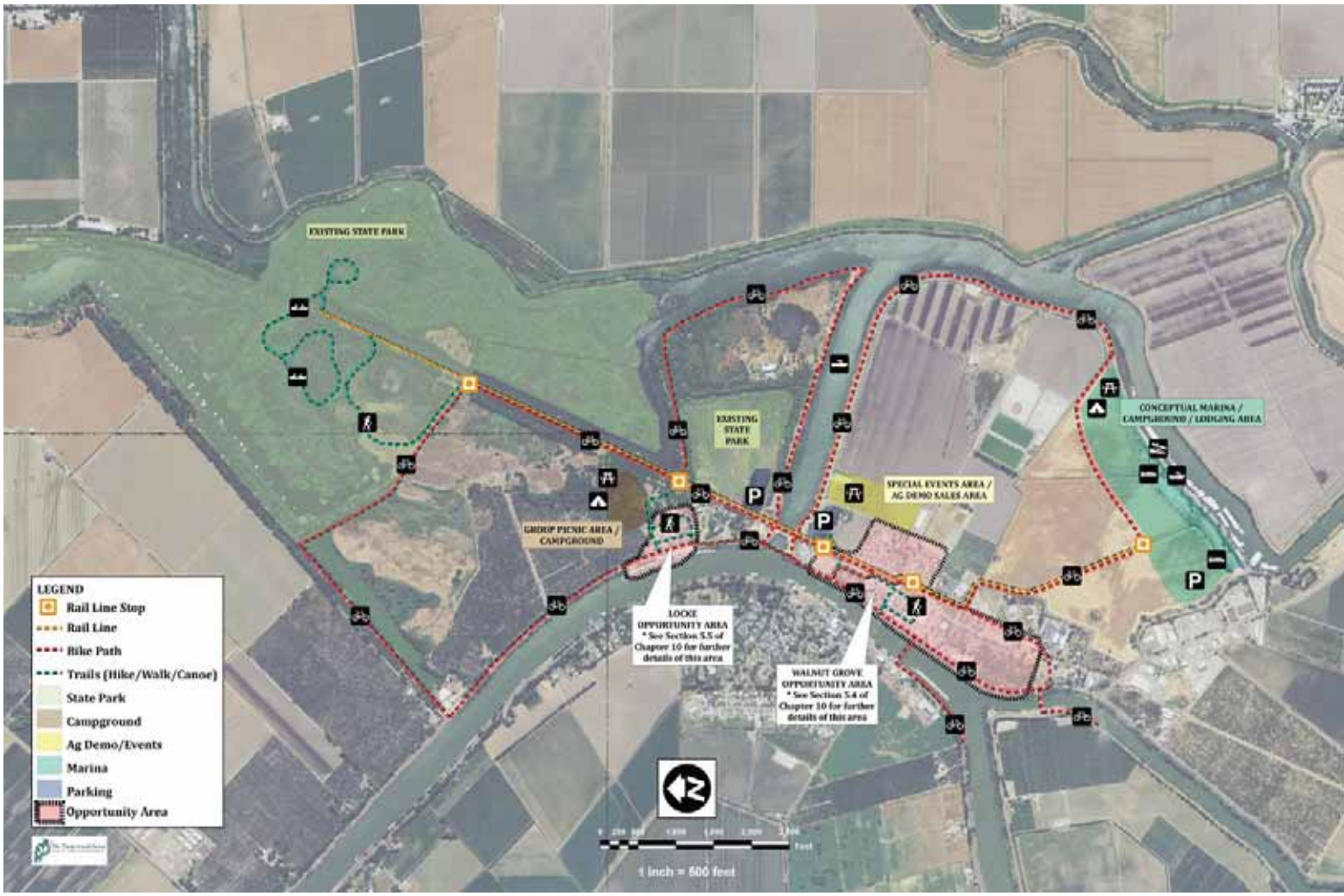
Despite significant population growth in the market area, the available data suggests that boating and fishing activity in the Delta has grown little in the past 20 years. Boat registrations, employment at marinas and boating-related industries, and the number of marinas are virtually unchanged over the past two decades. This trend could reflect concerns about water and fishing quality in the Delta, and could also be influenced by the poor economy, high fuel prices, and broader trends in boating and fishing participation across the nation.

While boating and water recreation will remain the largest piece of the Delta recreation industry, land-based activities such as agritourism, wine tasting, wildlife watching, historic and cultural tourism, bicycling, and driving for pleasure are likely to drive future growth in Delta recreation. The majority of visitors to the Delta are from Northern

California, an area with great population growth potential but also with nearby locations with successful land-based recreation and tourism economies that compete with the Delta for visitors. The residents of a dozen counties around the Delta represent the principal market for future growth in Delta visitation. This market area has a population of approximately 11.9 million people, and projections indicate this figure could grow by about 50 percent or 5.7 million people by 2050.

Because of slow expected growth in boating recreation and the relatively small base of land-based tourism in the Delta, we project Delta recreation and tourism will grow more slowly than the regional population. If resource quality and recreational facilities are maintained and improved so that the Delta retains its current level of competitiveness as

Figure B: Conceptual Proposal for Walnut Grove/Locke/Delta Meadows Focal Point Complex



a recreation destination, visitation could increase by 3.4 million visitor days and in-Delta spending could increase by nearly $80 million, roughly 35 percent, over 40 years.

A plan for the enhancement of recreation in the Delta centers on five location-based strategies: specific waterways, points of interest, focal point complexes, natural habitat areas, and urban edge areas that surround the Delta. Recreation development in the Delta should be coordinated, consistent, branded, and marketed. A National Heritage Area could be an effective means to brand and coordinate strategies to enhance resource-based recreation, agritourism, and historical and cultural tourism.

Figure B is a conceptual illustration of what a viable focal point complex could look like in the historic area of Walnut Grove and Locke. The figure shows coordinated development of a public park at Delta Meadows with a private sector catalyst development in a modern marina and recreation facility that is tied together with a network of non-motorized trails that include revitalized, historic commercial districts of the Legacy Communities. Successful execution of this type of plan would require improved flood control and a facilitator to encourage and coordinate the public and private investments. Additional details on recreation and tourism enhancement strategies are in Chapter 8 of the Economic Sustainability Plan.

DELTA INFRASTRUCTURE SERVICES

The Delta is a critical infrastructure hub for the regional and state economy. While the Delta's importance to the state water system is well-known, its importance to energy, transportation, and in-Delta municipal and industrial water supplies is less appreciated. As discussed in Chapter 5 and mapped in Appendix D, all of these infrastructure services are vulnerable to floods, earthquakes, and sea-level rise, and require the continued maintenance and enhancement of the Delta's levee system.

The Delta is an important energy resource for California. The Delta contains the largest natural gas production field in California, as well as its largest natural gas storage facility below McDonald Island in the central Delta. In addition to heating and cooking, natural gas fuels the majority of California's electricity supply, and natural gas power plants in the five Delta counties, many within the legal Delta, produce 20 percent of California's natural gas-powered electricity. Major electricity transmission lines in the Delta interconnect California with the Pacific Northwest and carry roughly 10 percent of the state's summer electricity load. Gasoline and aviation fuel pipelines crossing the Delta supply large portions of Northern California and Nevada. Besides these energy resources, wind and solar resources are being studied for further development. Taken together, the Delta's contribution to the state's energy network is comparable to its contribution to the state water system.

The Port of West Sacramento on the Sacramento Deep Water Channel, which with the Port of Stockton and the Port of Oakland form the M-580 Marine Highway

The Delta also contains increasingly important parts of the inter-regional transportation network that supports the regional and in-Delta economy. As east-west transportation corridors to the north and south of the Delta become increasingly congested and constrained, the demand for through-Delta transportation is growing rapidly. The ports of Stockton and Sacramento are focal points of regional economic development and rely on through-Delta shipping channels. The ports' marine highway corridor project will increase and diversify the water freight that moves through the Delta and relieve air pollution and traffic in the region. Traffic data shows large increases on highways in the Secondary Zone, as well as through the middle of the Primary Zone on State Route 12, and smaller but significant increases on State Route 4 in the Primary Zone. Through-Delta railways are also an important link in the transportation system.

The Secondary Zone of the Delta and the surrounding counties also draw a significant portion of their municipal and industrial water supplies from the Delta. Changes to Delta water quality—whether an increase in salts or organic carbon—have important effects on urban water supplies in and around the Delta. Significant deterioration of in-Delta water quality could increase water treatment costs by tens of millions of dollars each year and require hundreds of millions of dollars in capital investment in advanced treatment facilities for utilities serving Delta urban areas.

TWO KEY ISSUES FOR ECONOMIC SUSTAINABILITY IN THE DELTA

DELTA LEVEES AND ECONOMIC SUSTAINABILITY

Since the early 20th century, the current-day Delta levee system has provided flood control that allows productive agricultural and urban uses of land, channels water for urban and agricultural uses, protects critical infrastructure, and creates a desirable setting for boating and water-based recreation in an environment unique in California. The levee system is the foundation on which the entire Delta economy is built. Therefore, a sustainable Delta economy requires a sustainable levee system.

It has been the goal of the state and the federal government, working through the Department of Water Resources (DWR), the U.S. Army Corps of Engineers (USACE), and the local reclamation districts, to meet the Delta-specific PL 84-99 standard since 1982 when DWR and USACE produced a joint report on the Delta levees, which recommended the basis for this standard. If effectively used, funds currently in the pipeline should bring the Delta levees close to achieving this goal. When these funds have been expended, more than $698 million will have been invested in improvements to the Delta levees since 1973. These improvements have created significantly improved Delta levees through modern

engineering and construction, making obsolete the historical data that is still sometimes used for planning or predicting rates of levee failure.

Three approaches can help all jurisdictions and planners further reduce the risks resulting from the failure of the Delta levees. These approaches are: (1) build even more robust levees, (2) improve both regular maintenance and monitoring and flood fighting and emergency response following earthquakes, and (3) improve preparedness for dealing with failures after they occur. With regard to the first approach, the big question is not whether they should be improved to the Delta-specific PL 84-99 standard. Indeed, the independent review panel for the ESP agreed that PL 84-99, not HMP, is the minimum responsible levee standard. Instead, the key question is which levees should be improved to a higher standard in order to support and enhance various in-Delta, regional, state and federal interests, and to address hazards posed by not only floods, but also earthquakes and sea-level rise. Our conclusion is that these improvements would be advantageous on 300 to 600 miles of Delta levees, not only for flood control and protection against earthquakes and sea-level rise, but because they also would allow for planting vegetation on the water side of the levees—an essential component of Delta ecosystem repair. These further-improved levees would have wider crowns to provide for two-way traffic and could easily be further widened at selected locations to allow the construction of new tourist and recreational facilities out of the statutory floodplain.

Improvement of most Delta "lowland" levees, the levees that protect lands below sea-level, and selected other levees to this higher standard would cost $1 to $2 billion in base construction costs over the cost of reaching the PL 84-99 standard. Including vegetation and habitat enhancement, total program costs might be in the order of $4 billion, similar to the cost projected by the PPIC (2007) in their "Fortress Delta" alternative. While the billions of dollars required to build levees to this higher standard is a large investment, it is a cost-effective joint solution that simultaneously reduces risk to all Delta infrastructure. While a $12 billion investment in isolated conveyance may allow for somewhat larger water exports, it doesn't protect other critical infrastructure, and billions in additional investments would still be required to protect highways, energy, and other water and transportation infrastructure. Just as a species by species approach may be an inefficient and ineffective way to protect ecosystems, a system by system approach is an inefficient and ineffective way to protect the state's infrastructure. Chapter 5 contains a detailed assessment of the Delta levee system.

SUSTAINABLE LEGACY COMMUNITIES: WHERE THE CHALLENGES AND STRATEGIES COME TOGETHER

Economic opportunities and constraints facing the Delta's Legacy Communities mirror those in the broader Primary Zone. The current economies of the Legacy Communities are agriculturally based, providing support services and limited workforce housing for the Primary Zone's largest industry as well as some housing for retirees and service

and professional workers who commute into nearby urban areas such as Sacramento. Despite the current base in agriculture and rural bedroom and retirement communities, much of the revitalization strategies for Legacy Communities are based on growing their appeal as destinations for recreation and tourism. This includes promoting the emerging agritourism sector—including wine and local foods—as an economic development theme.

However, a strict and multi-layered regulatory framework places limits on economic development opportunities within the Delta's Legacy Communities. The aging and occasionally sub-standard building stock needs improvement, potentially utilizing redevelopment of existing buildings and/or a limited amount of new development in order to accommodate visitor- and local-serving enterprises. New investment is especially important because the existing base of hospitality- and tourism-related enterprises is very limited and insufficient to attract and capture significant tourist activity. The most developed recreation and tourism enterprises in the Delta are campgrounds and marinas that serve water-based recreation; these are mostly located outside the Legacy Communities and often outside the Primary Zone.

An already burdensome regulatory environment has been made significantly worse by the recent remapping of FEMA flood zones. All of the Legacy Communities along the Sacramento River have either been or are in the final process of being remapped into the 100-year floodplain. The requirements of this designation can make major property investments financially infeasible, and many stakeholders are concerned that the flood zone designation could cause the Legacy Communities to slowly wither away. It is clear that the economic sustainability of the Legacy Communities is dependent on levee and flood-control investments as well as other strategies to address the constraints of flood zone designation.

Despite these challenges, the Legacy Communities have significant historical, cultural, and economic values and the potential to become attractive destinations for visitors and support a more prosperous, higher quality of life for residents. Chapter 10 includes more detailed visions and strategies for Legacy Communities, including case studies of Walnut Grove, Locke, and Clarksburg.

Recreational boating is popular throughout the Delta

IMPACT OF WATER SUPPLY AND ECOSYSTEM RESTORATION PROPOSALS ON THE DELTA ECONOMY

Current proposals for new water supply and ecosystem restoration projects have serious implications for economic sustainability in the Delta. The isolated conveyance and many habitat restoration proposals are being developed in the Bay Delta Conservation Plan (BDCP), and the Economic Sustainability Plan relies on the November 2010 draft of the BDCP to describe these proposals. In addition, other proposals regarding Delta levees, land use regulation, and economic development have been made by the Delta Stewardship Council, Department of Water Resources, the Public Policy Institute of California (PPIC), and the Delta Vision Strategic Plan.

Figure C summarizes the estimated impacts of the proposed actions. In Figure C, red shading indicates a negative effect of $20 million or more annually, orange is negative effect of less than $20 million annually, yellow represents little or no effect, and green are economic benefits. Three proposals—isolated conveyance, 65,000 acres of tidal marsh, and six-island open water area—have negative effects in all three critical areas of the economy, with a negative impact exceeding $20 million in at least one area. These proposals are clearly incompatible with economic sustainability at their current levels.

Overall, Delta agriculture would be the most affected sector with total impact of BDCP proposals ranging from $62 to $227 million dollars in revenue per year, an 8% to 29% decline in Delta agriculture. This estimate does not include losses from permanent flooding of islands advocated by some, or the risk that a large capacity conveyance could be used to increase water exports and degrade water quality beyond current standards. The majority of Delta policy proposals considered would also have negative impacts on infrastructure services, and recreation and tourism impacts are a mix of potentially positive and negative effects. The effects of all these proposals are analyzed in detail in Part 2 (Chapters 6 through 9).

THE CO-EQUAL GOALS, COST-BENEFIT ANALYSIS, AND ECONOMIC SUSTAINABILITY

The co-equal goals, economic sustainability for the Delta, and cost-benefit analysis have been put forward as guiding frameworks for the recommendations from this report by the Delta Stewardship Council and the independent review panel of the ESP. It is important to understand that there are conflicts between these frameworks, and therefore it is impossible to construct a set of recommendations that is best from all viewpoints. The primary objective is to provide recommendations that are consistent with the co-equal goals and economic sustainability as envisioned in the Delta Reform Act of 2009 so they can be incorporated into the Delta Plan. However, it also important to note that cost-benefit analysis is the traditional, scientifically accepted approach to analyzing these types of issues, and that such an analysis would be enormously informative to the Delta Plan.

Figure C: Summary of Impacts of Policy Scenarios

Proposals/Impacts	Agriculture	Recreation & Tourism	Infrastructure Services
1. Isolated Conveyance Facility (15,000 cfs tunnel in dual conveyance system)			
	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 are larger	1) Water quality negative impacts on M&I supplies 2) Risk of lost support for levee investment
2. Habitat Proposals			
a) Yolo Bypass Fishery Enhancements	Losses $7m to $10m annually, dependent on flood duration	Potential recreation benefits	Flood control benefits
b) San Joaquin River Floodplain Restoration	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
c) 65,000 acres of tidal marsh restoration	$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
d) "Natural Communities" Protection: 32,000 acres of easements and 8,000 acres rangeland conversion	Agricultural losses range from $5m to $25m annually	Wildlife viewing could generate new recreation visits, although spending is low for this activity	Minimal impact
3. Six Island Open Water Scenario			
	$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
4. DSC Covered Actions Regulation			
	Potentially large impacts on all sectors. Deter investments with increased cost and uncertainty.		
5. Delta Vision Economic Development Strategies			
	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.		

While there is no comprehensive cost-benefit analysis of current proposals for the Delta, it is important to note that the recently released DRMS Phase 2 analysis is a comprehensive cost-benefit analysis of a limited, and somewhat out-of-date group of scenarios. The findings from DRMS phase 2 have tremendous implications for the Delta and the approach to the levee system and conveyance. Below are some key findings from the DRMS Phase 2[2]:

- Improving levees had the highest benefit-cost ratio of any Delta risk reduction strategy, including isolated water conveyance that was assumed to cost only $4.9 billion.
- Water exports account for only 20% of the economic costs from a large earthquake event that would flood between 10 and 30 Delta islands..
- Water exports account for less than 2% of the economic costs of more-common flood events due to high water and storms.
- Water exports account for 0% of the loss of life from any type of flood hazard event.

While the DRMS Phase 2 report evaluated upgrading all Delta levees to the PL 84-99 standard, it did not evaluate further upgrading levees to a seismically resistant standard as recommended in the ESP. However, the August 20, 2007 preliminary draft of DRMS Phase 2 did consider an "Improved Levees" scenario that included seismic upgrades of 100 miles of south Delta levees. The results reported in the preliminary draft found that a scenario with seismic upgrades to levees had lower costs and 40% higher risk reduction benefits than the peripheral canal scenario. Consistent with the conclusions in the ESP, the preliminary draft of DRMS Phase 2 found seismic upgrades to levees improved water supply reliability. Despite seismic upgrades to only 100 miles of levees, the preliminary draft found the improved levee scenario reduced the water supply impact of the largest earthquake by two-thirds while simultaneously protecting other valuable infrastructure and Delta property.[3]

These findings have enormous implications for risk management in the Delta, and highlight some of the potential conflicts between cost-benefit analysis and the co-equal goals. Both the preliminary and final draft of DRMS Phase 2 found improving levees has the highest economic benefit per dollar invested and lowest total cost. Levee upgrades perform well in cost-benefit analysis of Delta options, because they reduce risk in all areas including water conveyance, other infrastructure, and in-Delta property. In contrast,

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[2] These findings are not what is highlighted by the Department of Water Resources in the Executive Summary of DRMS phase 2, but are easily found and calculated from the results tables in the analysis.

[3] A copy of the preliminary draft was requested in a December 15, 2011 to the Department of Water Resources (DWR). DWR responded quickly, and in a January 9, 2012 letter, emphasized that this was a 2007 preliminary draft, and stated regarding seismically improved levees, "It was also not part of the DRMS Phase 2 public draft, because it was not further considered for in-depth analysis in Phase 2." There was no explanation for why the highest ranking strategy in preliminary analysis was not considered for more in-depth analysis.

isolated conveyance only protects water exports which DRMS clearly identifies as a minority of the economic risks.

With respect to the co-equal goals, the ESP recommends a set of actions that would dramatically change the Delta from its current state, and is consistent with the co-equal goals of the Delta Reform Act. The ESP would significantly improve water supply reliability by creating a seismically resistant levee system with enhanced emergency response that effectively addresses the risk of catastrophic, long-term interruption of water deliveries, the most important goal of water supply reliability. The ESP recommends many actions to improve the Delta ecosystem, including actions that support the Delta economy and even some actions that have significant costs for the Delta economy. The ESP presents a positive view of the Delta's economic future with strategies that are informed and realistic about the challenges it faces. Because of its lower implementation cost and compatibility with Delta economic interests, the ESP is also a more feasible and realistic alternative to achieving the coequal goals than plans built around large, isolated water conveyance facilities such as the BDCP.

The Delta Stewardship Council and others are very interested in the potential for gains in the recreation economy to offset potential losses in agriculture. It is important to be realistic about this potential and understand current trends. Over the past twenty years, the trend for recreation in the Delta has been flat despite rapid population growth in the surrounding region. Delta agriculture has grown in value, and shares many of the same strong growth prospects as agriculture in the rest of the state. This is in strong contrast to the 1980s when agriculture was a struggling industry and boating was growing fast. In the 1980s, it might have been reasonable to project these trends would continue and recreation would supplant agriculture as the economic driver in the Delta. As discussed in the ESP, this transition did not occur over the past 20 years when conditions were more favorable than they are today. Given the history of the past 20 years and current economic and demographic trends, a transition to a recreation economy should be viewed as far less likely today than it was 25 years ago. Thus, it would be irresponsible to develop Delta plans that count on a reversal of this pattern and dramatic growth in recreation and tourism.

Despite these cautions, it is important to note that the ESP does show that there is significant potential to grow and enhance the Delta's recreation and tourism sectors. Improving recreation assets can not only provide economic benefits, but also enhance the quality of life in the Delta and people outside the Delta who could take advantage of these opportunities. However, growing recreation and tourism requires strategic investment and reinvestment in facilities, improved flood control, and scaling back some of the water supply and habitat proposals that conflicts with recreation and tourism. A loss of agriculture on the low end of the range of potential BDCP impacts, about 10%, could potentially be offset by growth in other areas and consistent with economic sustainability in the Delta. Proposals that would reduce the capacity of conveyance and

reduce habitat acreage goals by 70-80 percent (i.e. 3,000 cfs conveyance, about 25,000 acres of habitat restoration, one small flooded island) were not evaluated formally, but could be consistent with economic sustainability if combined with substantive actions to improve recreation and tourism, enhance legacy communities, support value-added opportunities in agriculture, and provide adequate flood control to support public safety and encourage the needed investments.

White Egrets are a common sight throughout the Delta.

RECOMMENDATIONS FOR ECONOMIC SUSTAINABILITY IN THE DELTA

The recommendations are organized around eight topics. Considering the recommendations together, the overall strategy is consistent with economic sustainability in the Delta and the coequal goals of increased water supply reliability and ecological restoration. Chapter 12 includes more detailed descriptions and discussion of the proposed recommendations.

LEVEES AND PUBLIC SAFETY RECOMMENDATIONS

- Improve and maintain all non-project levees to at least the Delta-specific PL 84-99 standard.
- Improve most "lowland" levees and selected other levees to a higher Delta-specific standard that more fully addresses the risks due to earthquakes, extreme floods, and sea-level rise, allows for improved flood fighting and emergency response, provides improved protection for legacy communities, and allows for growth of vegetation on the water side of levees to improve habitat.
- The Delta Levee Subventions and Special Projects Program should continue to be supported.
- Transfer to a regional agency with fee assessment authority on levee beneficiaries responsibility for allocating funds for the longer-term improvement of Delta levees and the maintenance of regional emergency preparedness, response, and recovery systems developed jointly with the Delta counties and state and federal governments.
- In addition to providing funding for longer-term levee improvements, provide on-going funding for regular levee maintenance and expanded emergency preparedness, response, and recovery.
- Reduce or eliminate regulatory impediments to action by the creation of a one-stop permitting system for selected activities within the Delta including dredging, levee construction, and ecosystem restoration.
- Fully and expeditiously implement the recommendations contained in the SB27 Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force report.
- Formally identify the legal Delta as the geographic basis for integrated response, mutual aid, decision making, and information sharing processes during major floods.

GENERAL RECOMMENDATIONS FOR ECONOMIC SUSTAINABILITY

- Designate a regional agency to implement and facilitate economic development efforts. The main tasks of this entity are: marketing and branding, permitting and regulatory assistance, planning and coordination, and strategically managing the Delta Investment Fund as described in Section 1 of Chapter 11.
- Economic impacts of habitat creation and development of facilities for export water supply should be fully mitigated.
- Land use planning and regulation must be clear and consistent across agencies.

RECOMMENDATIONS FOR THE ECONOMIC SUSTAINABILITY OF AGRICULTURE

- Maintain and enhance the value of Delta agriculture.
- Limit the loss of productive farmland to urbanization, habitat, and flooding to the greatest practical extent.
- Protect Delta water quality and water supplies for agriculture.
- Support growth in agritourism.
- Support local value-added processing of Delta crops.

RECOMMENDATIONS FOR ECONOMIC SUSTAINABILITY OF RECREATION AND TOURISM

- Protect and enhance private enterprise-based recreation with support from state and local public agencies.
- Focus recreation development in five location-based concepts:
  - Enhance Delta waterways
  - Develop dispersed points of interest and activity areas
  - Create focal point destination complexes with natural areas, parks, Legacy Communities, marinas, historic features, and trails
  - Expand public access to natural habitat areas
  - Create recreation-oriented buffers at Delta urban edges
- Implement Economic Sustainability Plan through specific strategies such as consistency planning and regulation refinement, coordination among state and local agencies, obtaining strategic levee protection for Legacy Communities and key recreation areas, designating a marketing and economic development facilitator, and providing key funding for catalyst projects and agencies.

RECOMMENDATIONS FOR INFRASTRUCTURE

- Planning of levee investments must fully consider the economic value of infrastructure services along with all other benefits.

- All owners and operators of infrastructure that depend on Delta levees must contribute to levee system investment and maintenance.
- Protect and improve Delta water quality and supply for agricultural, municipal and industrial uses.
- Ensure that future development of infrastructure in the Delta is aligned with economic sustainability strategies.
- Support expansion and development of the ports.

RECOMMENDATIONS FOR HABITAT AND ECOSYSTEM IMPROVEMENTS

- Emphasize strategies with little or no conflict with the Delta economy such as increased fresh water flows, growth of vegetation on enlarged levees, restoration of mid-channel berms, and reactivation of upstream floodplains.
- Expanded and enhanced flood bypasses can be consistent with economic sustainability if agencies work with local stakeholders to minimize and mitigate economic impacts.
- Tidal marsh habitat plans should be significantly reduced.
- Increased open-water habitat in the Delta is not recommended.
- Include recreation facility development in habitat enhancement plans when possible.
- Habitat restoration should start on State-owned land and only occur on private lands with willing sellers consistent with local land use plans.

RECOMMENDATIONS FOR WATER SUPPLY RELIABILITY

- Continuing the through-Delta conveyance is important to economic sustainability in the Delta and can be consistent with water supply reliability within and outside the Delta.
- A dual conveyance plan with a large, 15,000 cfs isolated conveyance facility has large conflicts with Delta economic sustainability and has high risk for Delta stakeholders.
- Options to large isolated conveyance must be fully and consistently evaluated.

RECOMMENDATIONS FOR RESEARCH AND MONITORING

- Conduct a comprehensive and credible cost-benefit analysis to analyze Delta alternatives.
- New recreation data is needed and should be updated regularly.
- Maintain an Economic Sustainability Scoreboard to track progress.
- The Delta Science Program should sponsor more engineering and economic studies in addition to ecological research.
- Increase alignment among the various research and planning initiatives.

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