FRANKS TRACT FUTURES 2020

reimagined

Options for enhancing navigation, recreation, ecology, and water quality in the central Delta

California Department of Fish and Wildlife

September 30, 2020

Acknowledgements

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Credits

PROJECT MANAGEMENT

Carl Wilcox, California Department of Fish and Wildlife

Michelle Orr, P.E., Environmental Science Associates (ESA)

Kathleen Berridge, ESA

Technical Teams

CONCEPTUAL DESIGN AND INTEGRATION

ESA Associates

Michelle Orr, PE

Kathleen Berridge

UC Davis

Brett Milligan, Professor of Landscape Architecture and Environmental Design, UC Davis

Alejo Kraus-Polk, Ph.D. candidate in Geography, UC Davis

Yiwei Huang, Ph. D. candidate in Department of Human Ecology, UC Davis

Compass

Dan Ohlson, Compass Resource Management

STAKEHOLDER AND PUBLIC OUTREACH AND ENGAGEMENT

Milligan, Kraus-Polk, Huang, UC Davis (see above)

STRUCTURED DECISION MAKING

Ohlson, Compass (see above)

HYDRODYNAMICS

Eli Ateljevich PE, Ph.D. Bay-Delta Office, Delta Modeling Section California Department of Water Resources (DWR)

Kijin Nam PE, Ph.D. Bay-Delta Office, Delta Modeling Section, DWR

ECOLOGY

Berridge, ESA (see above)

Chris Fitzer, ESA

Rachel Brownsey, ESA

John Bourgeois, ESA

Bruce Herbold, Ph. D. Fish Biologist

Lars Anderson, Ph. D. Botanist

RECREATION AND NAVIGATION

Karin Winters, The Dangermond Group (TDG)

Pete Dangermond, TDG

Milligan, Kraus-Polk, Huang, UC Davis (see above)

LOCAL ECONOMY

Ben Sigman, Economic & Planning Services (EPS)

Ashley Boots, EPS

CONSTRUCTABILITY AND COSTS

Mads Jorgenson, PE. Moffatt & Nichol

DESIGN GRAPHICS AND REPRESENTATION

Milligan, Kraus-Polk, Huang, UC Davis (see above)

REPORT PRODUCTION

Editor: Ariel Rubissow Okamoto

Design: Darren Campeau

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Franks Tract Futures Project Website:

https://franks-tract-futures-ucdavis.hub.arcgis.com

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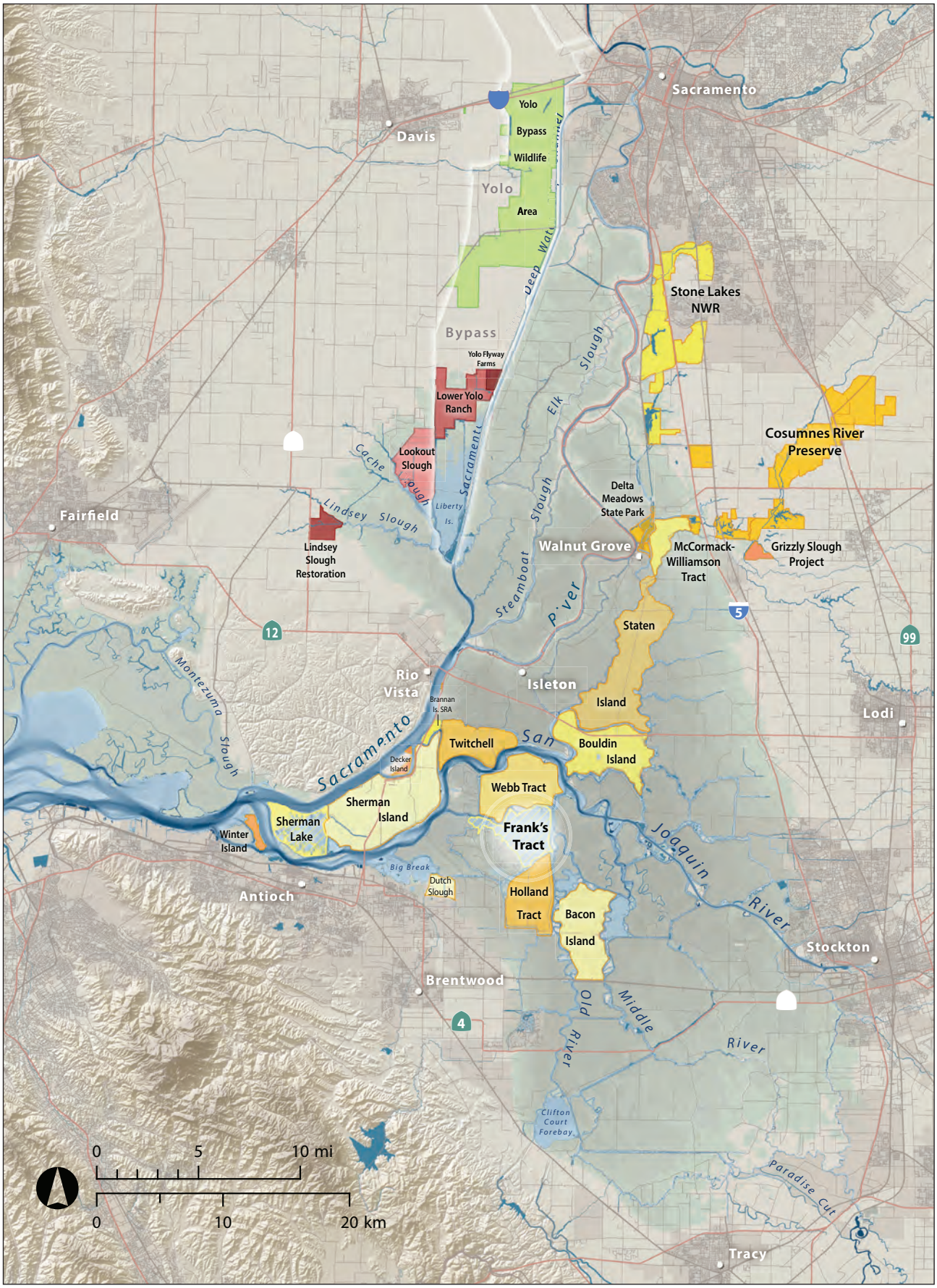
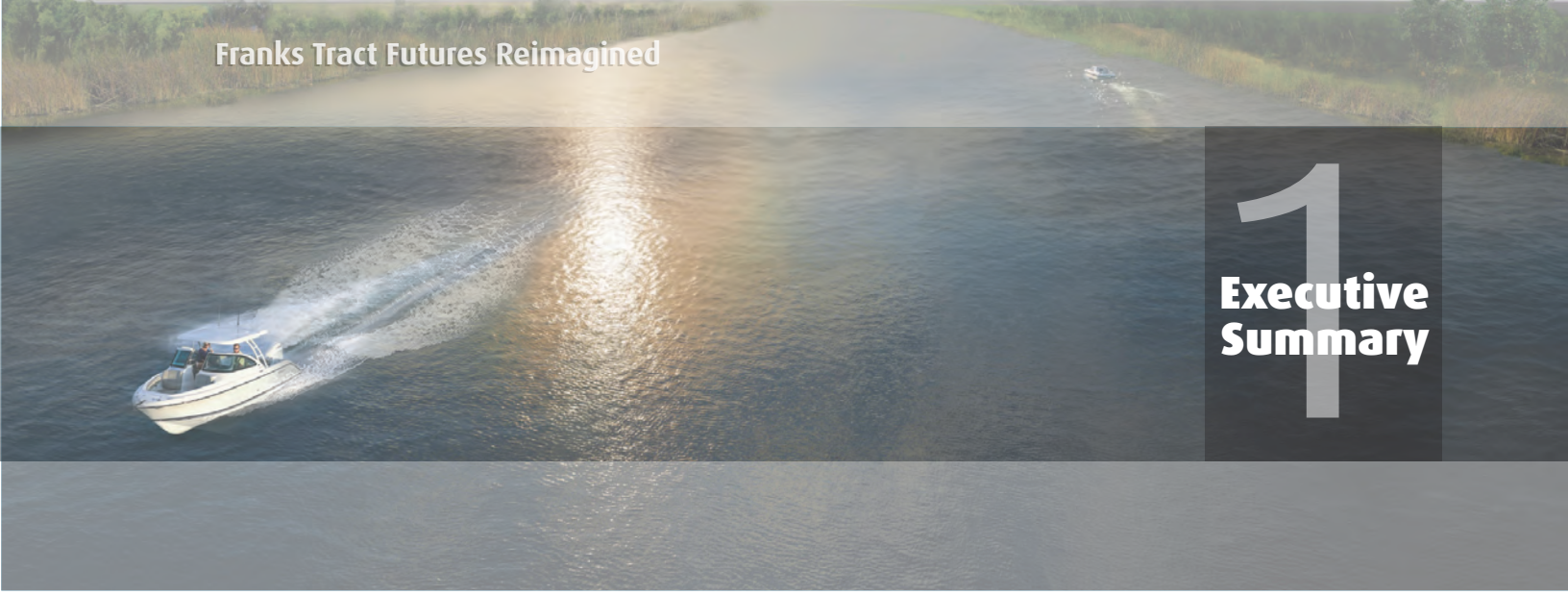
Delta Restoration Frontiers



Planned restoration and fish habitat: Cache Slough (red); Yolo Bypass Wildlife Area (green); Bypass (white boundary) and public lands corridor (various shades of yellow). Map: Amber Manfree



1 Executive Summary

A Bold Landscape Redesign in the Heart of the Delta

This summary of the 2020 Franks Tract Futures Reimagined report describes a proposal to redesign and enhance the 3,000-acre flooded island, and the smaller adjacent Little Franks Tract. The Tract is located about 40 miles south of Sacramento, California in the Sacramento-San Joaquin River Delta. The report covers a 2019-2020 planning process and community input into a proposal for improving conditions within the Tract first explored in 2017-2018.

Franks Tract, a shallow lake-like area, is a popular recreational and fishing destination in the Delta, with associated important benefits to the local economy on Bethel Island. However, it is also a hot spot for invasive plants, predatory fishes and saltwater intrusion from the ocean into waterways used to convey freshwater supplies to cities and agriculture throughout California.

As one of the least subsided and largest flooded islands in the central Delta, Franks Tract is a strong candidate for regional scale improvements to navigational channels, shoreline recreational amenities, and ecosystem function. Since 2017, the California Department of Fish and Wildlife, working with other state agencies and a multi-disciplinary consultant team, has undertaken a two-stage planning process to develop and evaluate a multi-benefit project for enhancing Franks Tract. After the second 2019-2020 phase, which involved four public-facing rounds of design and comment, a single design was selected as the preferred concept. The process and proposed changes embody emerging conservation guidance for the region described in the 2018 *A Delta Renewed, 2019 Delta Conservation Framework*, and the ongoing Public Lands Strategy.

Project Benefits

The preferred concept for Franks Tract would redesign the landscape, adding new land masses, tidal marshes, navigation channels, beaches and other amenities. The design addresses deteriorating environmental, safety, and water quality conditions in the area (see p.2). Among diverse benefits, it would: improve recreational boating and navigation (through dredging and reduction in aquatic weeds); create beaches, mooring sites, sheltered coves, day-use areas, and other amenities within the state recreation area; improve remnant levees that provide wave sheltering adjacent to Bethel Island and Little Franks Tract while maintaining open water views and marina access; create large areas of tidal marsh, riparian channel edge, and ecologically valuable features that provide habitat for a variety of species, including species of concern, sport fish and waterfowl; improve water quality for human use by reducing salinity in the central and south Delta; and help Franks Tract and local communities adapt to sea level rise (see map p.4).

Photo: Rick Lewis

Co-Design with the Public and Stakeholders

Meaningful public engagement in planning and design has been a guiding principal of the Franks Tract landscape redesign and enhancement project. Designing with, rather than designing for, those who have a stake in the outcome was and is a top priority. Incorporating local knowledge and stakeholder priorities also requires a strong grounding in place – the unique place that is Franks Tract in the central Delta.

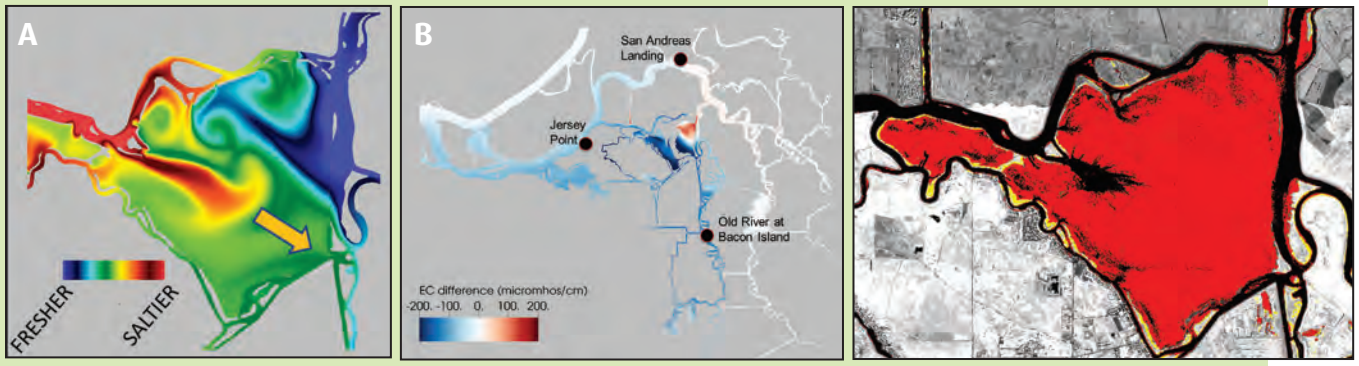
The goals of the Franks Tract project are to benefit native and desirable species by re-establishing natural ecological processes and habitats, provide enhanced recreational opportunities and other community benefits, and improve water quality. More detailed project objectives reflect input from prior Franks Tract restoration efforts, State Parks' General Plan for the Tract, and stakeholder input. Overall, the project seeks to find a balance of benefits across all objectives that will be sustainable over time.

The project team engaged with state and federal agencies, local districts, community members and other stakeholders throughout the planning process, and made the results transparent at every level. The project formed a Steering Committee, comprised of relevant state and local agency representatives, and an Advisory Committee, comprised of representatives of many diverse stakeholder interests. These committees served as the central bodies for deep engagement in the Franks Tract planning process. Public input was solicited early in the process, as well as during and after concept refinements via meetings held in the vicinity of Bethel Island, online Franks Tract user surveys, and other outreach (see timeline p.3). Public comments received on a draft version of this report resulted in revisions incorporated into the final report.

Deteriorating Conditions

While boaters, hunters, and anglers clearly value the open waters of Franks Tract, the ecological and water quality problems of this island are now impinging on the greater Delta and California water uses and compromising what the local economy values most: access to first- rate recreational and fishing waters. If no steps are taken to improve conditions on Franks Tract, current conditions could easily worsen. Dense mats of aquatic weeds will continue to degrade fish and wildlife habitat, spur algal blooms, and impede boat passage. Management with herbicides must be ongoing and remains burdensome. At the same time, healthy tidal marshes critical to native species will remain scarce in the Delta unless more are restored in the least subsided areas like Franks Tract.

Another contributor to deteriorating conditions is the direct connection provided between the lower San Joaquin River and Old River through Franks Tract. This allows saltier water and fish to be drawn into the south Delta into the zone of influence of the state and federal water projects. The presence of even small quantities of salt compromises the quality of fresh water needed for irrigation, drinking, and other uses throughout the state. As droughts recur more frequently or lengthen with climate change, and as the sea level rises, countering salt water intrusion from the ocean will require expensive and disruptive management measures such as the emergency drought barrier built on False River in 2015. The barrier consisted of 150 tons of rock, 750 feet across the top and 120 feet wide at the base. Installation and removal cost taxpayers approximately $37 million.



Current tidal conditions pump salt water into the Tract but don't let it out again (A). Modeling suggests a reduction in these conditions in a reconfigured landscape (B). Conditions under a project would be less favorable to submerged aquatic vegetation (fall 2019 extent shown in red) Sources: DWR & Khanna, CSTARS, UCD .

Co-Design Timeline 2019-2020

Over 14 months, the planning team worked through a public process on four rounds of concepts for redesigning Franks Tract. The first round consisted of 7 potential project designs plus the No Action (no project) alternative. Input from committees and the public narrowed the field down to 3 designs, and more recently to a preferred concept (see next page).

2019

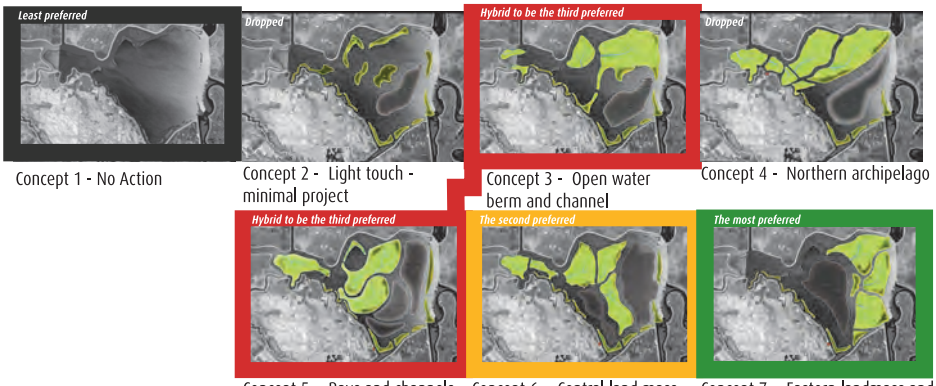
07/11 Kick off Meeting (public)

Project background and planning process overview.
Introduction to ESA-led team and overall project approach.

08/29 The First AC/SC Workshop

Reviewed and received input on the project goals and objectives
Reviewed and received input on the No Action alternative scenario
Shared the initial results of the (online) Stakeholder Survey
Conducted a design charrette to receive input on the first round of design concepts

ROUND 1

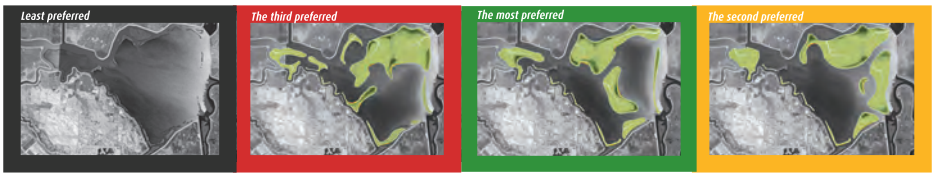


Concept 1 - No Action
Concept 2 - Light touch - minimal project
Concept 3 - Open water berm and channel
Concept 4 - Northern archipelago
Concept 5 - Bays and channels
Concept 6 - Central land mass
Concept 7 - Eastern landmass and central island

11/06 The Second AC/SC Workshop

Reviewed and received input on the revised design concepts
Reviewed and received input on the draft evaluation methods and criteria
Shared the initial results of hydraulic modeling, received input on the initial recreational features design ideas and marsh aesthetic surveys
Conducted a design charrette to receive input on the next round of design concepts

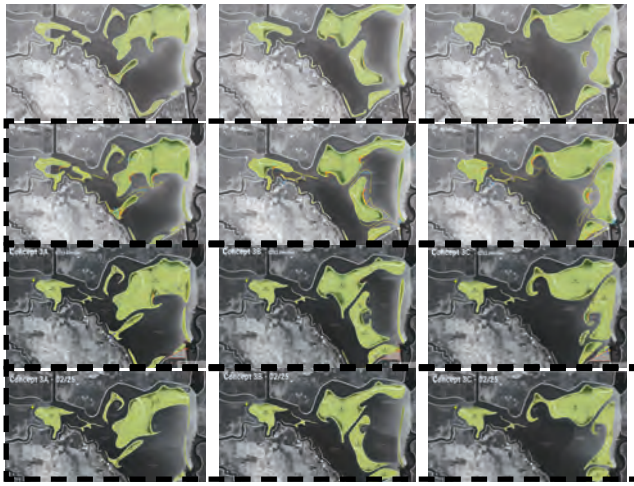
ROUND 2



Concept 2A - Open water berm and channel
Concept 2B - Central land mass
Concept 2C - Eastern landmass and central island

ROUND 3

In between 11/06 and 03/04 meeting: detailed design refinement and modeling



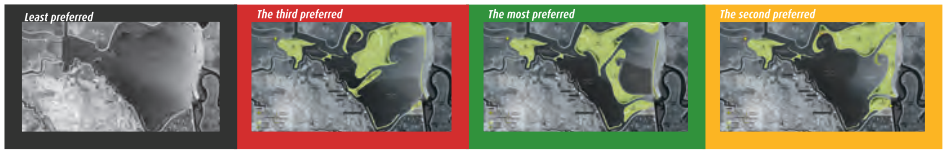
Revision based on 11/06 meeting feedback (AC and SC members)
Revision based technical input (construction, dredge material calculations, State Park management logistics)
Draft plan for Round 3

2020

03/04 The Third AC/SC Workshop

Reviewed and received input on the revised, 3rd round of design concepts
Reviewed the performance of the three concepts in meeting the project objectives
Conducted a design charrette to receive input on the next round of design concepts

ROUND 4



Concept 1 - No Action
Concept 3A - Open water berm and channel
Concept 3B - Central land mass
Concept 3C - Eastern landmass and central island

process is ongoing

Preferred Landscape Redesign Concept

The project design for Franks Tract and Little Franks Tract establishes a large area of intertidal marsh with channels, deepens open water areas to discourage nuisance submerged aquatic vegetation, and creates water and land based recreational opportunities. Re-establishing tidal marsh and associated channels would require raising selected areas 8-11 feet as Franks Tract is currently subsided below sea level. The design addresses all local, state and regional priorities (see pp.10-13 FTF2020) and meets all project goals and objectives (see Sections 4-5 FTF2020).

Navigation: Fast water navigation routes between key locations were identified as critical by boaters and recreational users. The project includes extensive deeper dredged areas in open water and navigable channels that would reduce growth of shallow water weeds identified as a nuisance to boating. The project includes other measures to improve boating safety, such as removing existing underwater snags and hazards, and sheltering the more wave-exposed eastern entrances to the Tract. Finding a way to allow for fast and safe boat navigation through Franks Tract while also meeting the water quality objectives was a key planning consideration. Channel widths were modeled to quantify the effects of channel size on

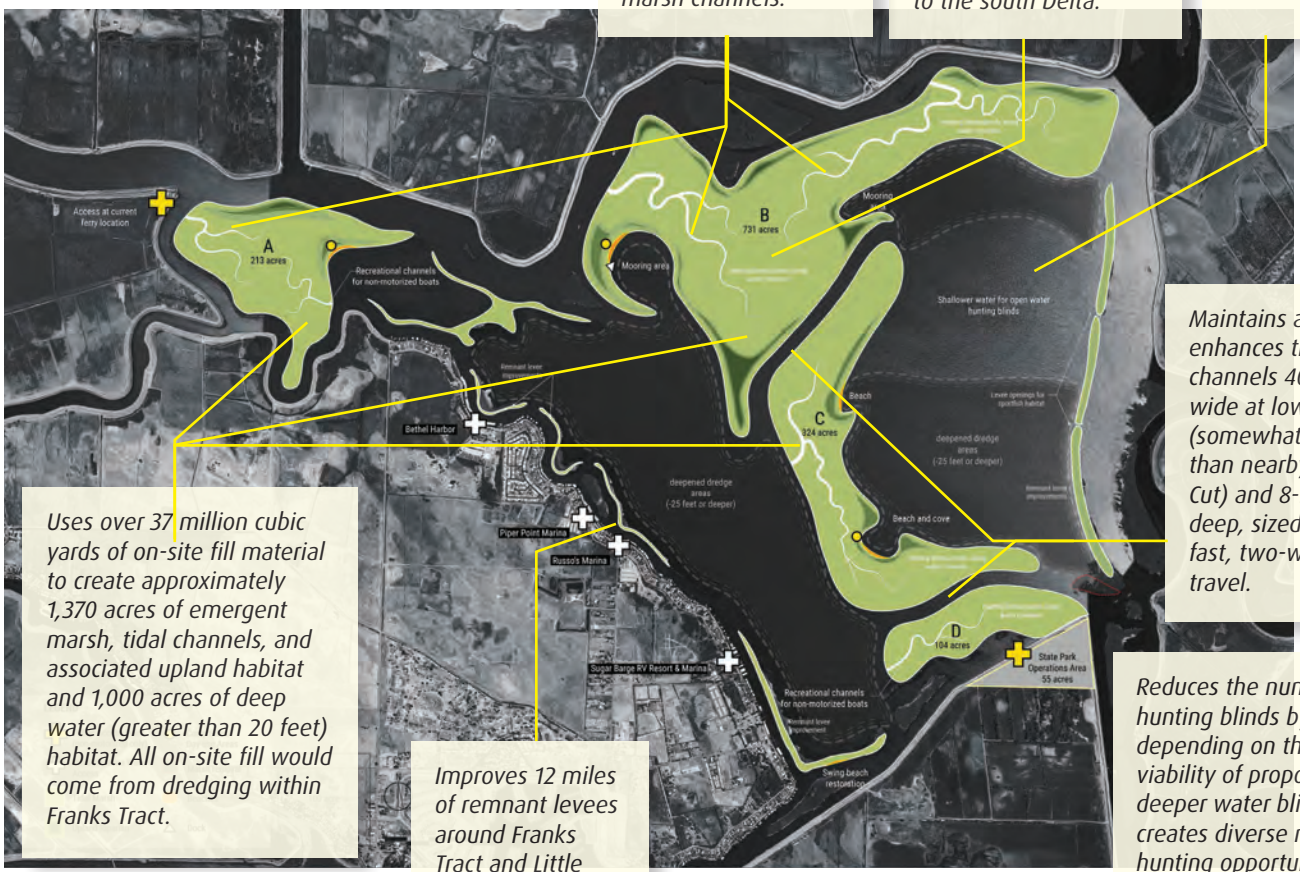
New Marsh, New Beaches, New Amenities, Less Weeds, Less Salt

The project proposed for Franks Tract develops three focal points for boat-to access to recreational activities that would attract three different user groups. The design pairs the eastern open water area with the active water sports enthusiasts; the Little Franks Tract with non-motorized boaters and paddlers; and the north end of the western open water area with a mooring for those with larger boats.

Creates approximately 21 miles of tidal marsh channels.

Builds a central tidal marsh landmass which maintains open water in front of Bethel Island, creates accessible, boat-in, land-based recreation, and impedes salt water movement from the western Delta to the south Delta.

Maintains about 1,900 acres of shallow water (less than 6-8 feet deep) on the Tract.



Uses over 37 million cubic yards of on-site fill material to create approximately 1,370 acres of emergent marsh, tidal channels, and associated upland habitat and 1,000 acres of deep water (greater than 20 feet) habitat. All on-site fill would come from dredging within Franks Tract.

Maintains and enhances through-channels 400 feet wide at low water (somewhat wider than nearby Holland Cut) and 8-9 feet deep, sized to allow fast, two-way boat travel.

LEGEND

- Public Access Point (non-motorized only)
- Private Marina Water Access
- Tidal Marsh
- Upland Riparian
- Camp Sites/ Day-use Areas
- Beaches
- Dock

Improves 12 miles of remnant levees around Franks Tract and Little Franks Tract to shelter flood protection levees and adjacent waterways from waves.

Does not significantly alter flood conveyance or high water levels in Franks Tract.

Reduces the number of hunting blinds by 29-36, depending on the viability of proposed deeper water blinds, but creates diverse new hunting opportunities in tidal marshes.

Creates 5 sheltered beach locations.

water quality impacts. The resulting channels are sized to allow fast, two-way boat travel.

Recreation: Recreational features focus on maintaining open water areas for boating and creating new types of recreational opportunities. Slow-water channels, especially in Little Franks Tract, would allow for non-motorized boating. Well-designed beaches would offer day use, sunbathing, swimming, as well as proximity to the water for water skiing and wakeboarding. Mooring coves would provide sheltered destinations for boaters. Opportunities to maintain or enhance sport fishing were integrated into the design of habitat enhancements (See Ecology).

Local Economy: The economic wellbeing of Bethel Island is reliant on the popularity of outdoor recreation in the central Delta. Jobs data show that approximately half the employment on Bethel Island is directly tied to recreation. A key planning consideration for the project was how best to balance the range of recreation interests while maintaining or benefiting the local economy. The current and ongoing degradation of environmental conditions in Franks Tract is a business risk. If the boating and fishing conditions are first-rate, and navigation and access are sustained or improved, the prospects for ongoing local business success are strongest. Overall, the key objectives of the Franks Tract project are in line with local business goals and economic development. The project seeks to reduce weeds, restore native ecology, and enhance recreation, all which could help grow local economic opportunity.

Ecology: Extensive new areas of tidal wetland would provide enhanced habitat and food production for fish and wildlife. Tidal marsh with narrow channels along the north of Franks Tract would provide refuge and a corridor for out-migrating juvenile Chinook salmon. The creation of tidal marsh in Little Franks Tract and the western part of Franks Tract would provide rearing and foraging habitat and food web support in the areas Delta smelt are most likely to occur. Modeling indicates that fisheries benefit from the project due to reduced risk of entrainment into Old River and the water supply pumps. The redesign project would maintain areas of sportfish habitat, as bass fishing is a key economic driver. The additional edge habitat along tidal marshes and remaining open water provided would be desirable for largemouth bass and striped bass respectively.

Water Quality: Based on hydrodynamic modeling conducted for the project, the overall configuration of tidal wetlands in all three final landscape redesign concepts would reduce salinity transport through Franks Tract, with meaningful improvements to water quality for drinking and irrigation supply, among many beneficial uses. More in-depth modeling indicates that the preferred concept improves water quality in the central Delta under a variety of flow conditions and reduces potential fish entrainment, which currently limits in-Delta diversions and the reliability of water operations. The project provides significant drought protection, reducing the frequency with which an emergency salinity control structure would be needed. Moreover, the relative efficacy of the project goes up as sea level rises.

Flood Protection: Remnant levees around Franks Tract shelter critical flood protection levees from overtopping and erosion from waves. The Bethel Island Municipal Improvement District and others are interested in project features that enhance the remnant levees in order to reduce required flood protection levee maintenance activities and associated costs. The preferred concept for the project would raise and widen levees with dredge or other material while retaining key gaps used by boaters. Flood modeling was conducted on the preferred concept using 2017 flood season data to simulate flood water levels throughout the Delta. Results indicate the preferred concept does not significantly alter flood conveyance or high water levels on the Tract.

Construction & Cost

Rearranging a vast shallow open water area into a new landscape is an ambitious construction task. The Franks Tract 2020 project conducted an assessment of construction options, reviewing feasibility and engineering constraints, types of onsite fill material, duration of construction, and unit rates for movement of material. The assessment concludes that the preferred design concept is feasible to construct (see chart). Local material dredged from Franks Tract is the least cost alternative and is available in sufficient quantities to construct the preferred concept. The project pricetag is estimated at $560 million, though costs could be lowered by reducing the area of constructed land mass in Franks Tract and Little Franks Tract. The duration of the construction period is estimated at four to nine years minimum.

Restoration Quantity	Preferred Concept
Marsh Area (acres)	1,370
Recreational Use (acres)	12
Fill to Grade (CY)	25,834,000
Consolidation (CY)	11,401,000
Total Fill/ Dredging (CY)	**37,235,000**

CY= cubic yards

Project Relation to Water Project Operations

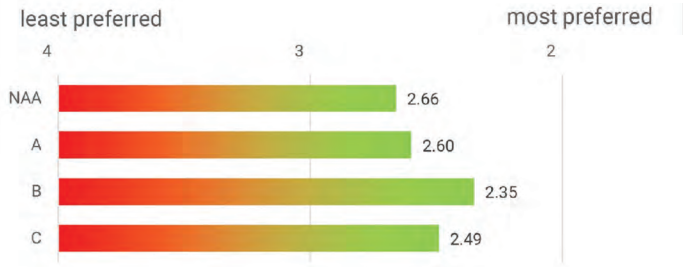
The Franks Tract project does not influence decisions about water project operations, water quality standards, direct improvement of existing flood protection levees, and local infrastructure planning. However, the Advisory Committee did ask the planning team to qualitatively consider how ongoing water project operations and any delta conveyance project may relate to the proposed Franks Tract reconfiguration. The planning team considered various seasonal and flow scenarios and concluded that changes in water project operations in response to the project are unlikely to significantly offset the project's water quality benefits in the central Delta for most seasons across a range of wet and dry hydrologies. Tunnels would not alter the Delta outflow required to meet regulatory requirements nor do they free the agencies from their obligations to do so. The scenario in which Franks Tract and any Delta conveyance project would most likely have to be considered together is the fall during dry or critically dry years (see p.55 FTF2020 & Appendix D for details).

Future Outlook

The landscape redesign and enhancement actions developed and selected through the 2019-2020 co-design process suggest a bold, sustainable change in the heart of the Delta. Stakeholders recognize that any feasible project must achieve multiple benefits to generate sufficient public and financial support for what would be a major construction effort. In addition, any project must ultimately be supported by the local community to move forward. As stakeholders and the public consider the future of Franks Tract, the following key findings offer a foundation for next steps.

- At the highest level for consideration, a redeveloped Franks Tract offers an opportunity for improvements in ecology, recreation, water quality, and other community benefits.
- Public surveys agree with the Advisory and Steering Committees that Concept B currently offers the best redesign vision for Franks Tract.
- There would be unavoidable trade-offs with any project, especially with respect to costs and construction impacts, but the cost of taking no action is high.
- Project benefits are expected to be resilient to future sea-level rise.

Overall Comparative Ranking of Design Concepts



Summer 2020 public survey rankings of 3 design concepts for Franks Tract and No Action alternative. Source: UCD

- For the local community, enhancing recreational opportunities is a must. A project without a robust recreational component and reliable sources of funding to maintain this component will lose community support.
- For State Parks, the proposed recreational components would require: development of new State Park operation and maintenance facilities in the vicinity of Franks Tract, a General Plan amendment or new management plan for the State Recreation Area, funding to support the operation and maintenance of the new recreation facilities and recreation use, and the establishment of new staff positions to support the new facilities and activities.
- Broad local, regional, state, and federal support is needed to move the project forward, including identifying sources of funding. Before any project would move forward, construction funding would need to be secured, along with a commitment to long-term operations and maintenance funding for recreational, habitat and water quality changes.
- Since cost remains a high-level feasibility issue, the next phase would explore project refinements to reduce overall costs.
- Other outstanding issues remain further work on how best to make boating through the dangerous corner at Holland Tip safer; further consultation with duck hunters and others in the design and management plans for the proposed marshlands and hunting blinds; further discussions with stakeholders on marsh aesthetics and the experience of boating through a channel between landmasses; further efforts to creatively separate conflicting activities (such as motorized and non-motorized boating) by distancing them in time and space; developing a clearer design for a State Parks facility in the vicinity of Franks Tract; and considering key remaining design issues for Little Franks Tract so that it can provide scarce habitat and food for native fish.

Acknowledgements in Brief
Advisory & Steering Committees

Primary Consultants: Environmental Science Associates; University of California Davis; Dangermond Group; Compass Resource Management; Moffat & Nichol; Economic and Planning Systems.

California Agencies: Fish & Wildlife, Water Resources, Parks & Rec

Report Production:
Ariel Okamoto & Darren Campeau

Project Contact:
Carl.Wilcox@wildlife.ca.gov

Franks Tract Futures Information:
https://franks-tract-futures-ucdavis.hub.arcgis.com
https://wildlife.ca.gov/Conservation/Watersheds/Franks-Tract

2 Introduction

This report describes a proposal to improve Franks Tract, a 3,000-acre flooded island, and the smaller adjacent Little Franks Tract, about 40 miles south of Sacramento, California. The report covers a 2019-2020 planning process and community input into a proposal for enhancement and renewal of the Tract first explored in 2017-2018.

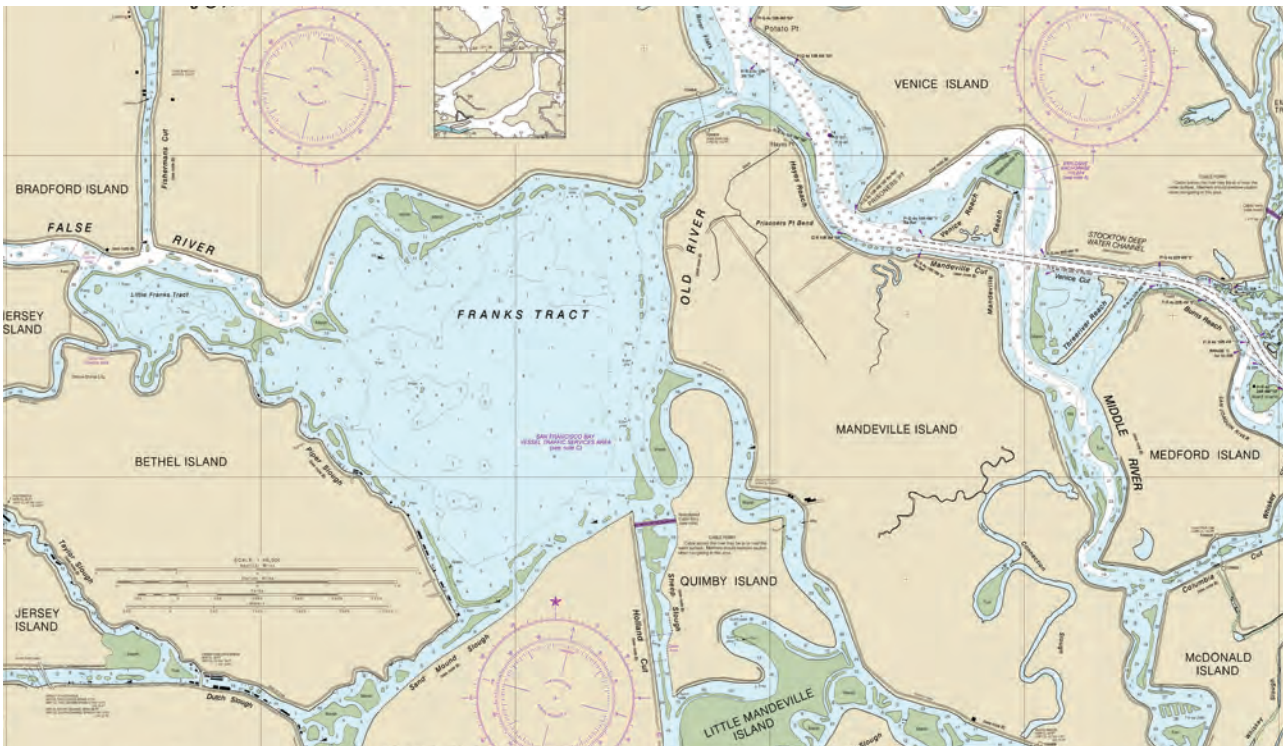
Franks Tract, a shallow lake-like area, is a popular recreational and fishing destination in the heart of the Delta region, with associated important benefits to the local economy. However, it is also a hot spot for invasive plants, predatory fishes and saltwater intrusion from the ocean into waterways used to convey freshwater supplies to cities and agriculture throughout California.

As one of the least subsided and largest, flooded islands in the central Delta, Franks Tract is a strong candidate for regional scale improvements to navigational channels, shoreline recreational amenities, and ecosystem function. Since 2017, the California Department of Fish and Wildlife (CDFW), working with other state agencies and experts, has undertaken a two-stage planning process to develop and evaluate a multi-benefit project for enhancing Franks Tract. To conduct the planning process, CDFW hired a multidisciplinary consultant team led by Environmental Science Associates and supported by University of California Davis researchers, the Dangermond Group, Compass Resource Management, Moffat & Nichol, Economic and Planning Systems, and others. During the most recent 2019-2020 planning phase, the team worked with a steering committee and an advisory committee made up of local stakeholders and the public to co-design four iterations of conceptual designs, including evaluations of their respective benefits to navigation, recreation, local economies, ecological processes, tidal marsh habitat, flood protection, water quality, and water supply reliability, as well as construction costs, and construction impacts. Ultimately, a single design was selected as the preferred concept. This report outlines the processes used to engage stakeholders and the public, presents conceptual designs, and explores the benefits and tradeoffs of the preferred concept in achieving multiple benefits for the community and Delta region.

Site History

Franks Tract is located in the Sacramento –San Joaquin Delta (Delta) in California's Central Valley. The Delta is where fresh water from major rivers (the Sacramento River in the north and the San Joaquin River in the south) mixes with salt water from ocean tides (San Francisco Bay and the Pacific Ocean to the west). Historically, the Delta, including Franks Tract and Little Franks Tract, was an extensive network of tidal marsh and inter-tidal channels. Beginning in the late 1800s, levees were constructed to create islands for agricultural use. Over time, these levees degraded and breached. Levees around Franks Tract and Little Franks Tract repeatedly failed. After a breach in 1938, the Franks Tract levees were not repaired, leaving the island submerged. Decades later, in 1982, Little Franks Tract also flooded, leaving the large flooded island landscape seen today.

In terms of the historic Delta landscape, reclamation fundamentally altered the region's character by creating islands and eliminating, straightening and connecting dead-end channels. The increase in interconnectedness, along with subsequent flooding of subsided islands like Franks and Little Franks Tract, has doubled the area of open water habitat in the Delta, changed tidal circulation patterns, reduced water residence times, and increased flow velocities. These changes have also reduced food web production, shelter, and habitat complexity for aquatic species throughout the Delta (*Delta Transformed*, SFEI, 2014).



Navigation Map Franks Tract

Franks Tract today consists of two main water bodies — a large 3,000 acre submerged area and a 330-acre portion known as Little Franks Tract. The Tract is surrounded by a network of waterways and adjacent islands. On the north side lies False River and Webb Tract, on the east Old River and Mandeville Island, on the south Sand Slough and Holland Tract, and on the west Piper Slough and Bethel Island.

Current Conditions

Franks and Little Franks Tract are vast, flooded islands dominated by shallow open water with little tidal marsh. The majority of the open-water area is less than 10 feet deep (6 to 8 feet below mean lower low water) and filled with dense submerged aquatic vegetation. The substrate is relatively uniform, composed of silt, sand, and peat. Tules and submerged aquatic vegetation grow in the open water areas and along the shorelines of the Tract. Extensive reaches of Brazilian waterweed (*Egeria densa*), a non-native submerged plant species, can be found in Franks Tract and throughout the Delta. The infestation of Egeria and other submerged aquatic plants presents challenges for navigation, recreation, agriculture, and ecosystem processes. Nonetheless, the Tract supports a variety of native and non-native wildlife including fish, birds, mammals, and plants. Most of the fish currently in Franks Tract are non-native fish species, particularly largemouth bass, striped bass, and sunfishes. The prevalence of invasive plants and the associated predatory fish community (Grossman 2016) make the area poor habitat for native species such as Delta smelt.

Franks Tract encompasses the Franks Tract State Recreation Area, owned and managed by the California Department of Parks and Recreation (State Parks). Classification as a State Recreation Area indicates the area was selected and developed, and is now operated, to provide outdoor recreation opportunities (Public Resources Code Section 5019.56). Franks Tracts is a popular destination for boating and water sports, fishing, and waterfowl hunting but the area offers few land-based recreational opportunities for non-boaters. Fishing tournaments and other recreational events are often based in marinas along the Bethel Island waterfront. These facilities contribute to the local community and economy.

While boaters, hunters, and anglers clearly value the open waters of Franks Tract, the ecological and water quality problems of this island are now impinging on the greater Delta and California water uses. The biggest problem is the direct connection provided by Franks Tract between the lower San Joaquin River and Old River through False River. This allows salt water and fish to be drawn into the south Delta into the zone of influence of the state and federal water projects.

See Background Primer (p.14) for more detailed background on key environmental problems in the Tract.

Future Outlook

If no steps are taken to improve recreational and habitat conditions on Franks Tract, current conditions could easily worsen. While sportfishing and other current recreational activities may continue, navigational hazards and poor ecosystem quality will persist as aquatic vegetation grows and spreads. Dense mats of aquatic weeds will continue to degrade fish and wildlife habitat, spur algal blooms, and impede boat passage. Management with herbicides must be ongoing and remains costly.

Healthy tidal marshes critical to native species will remain scarce in the Delta unless more are restored in the least subsided areas like Franks Tract. As droughts recur or lengthen with climate change, and as the sea level rises, salt water from the ocean will intrude increasingly into Franks Tract and the Delta. Countering such water quality challenges will require additional expensive and disruptive management measures such as emergency drought barriers like the one built on False River in 2015 (see pp. 14 and 59).

Previous Franks Tract Initiatives

The project and process described in this report build on a prior feasibility study prepared by CDFW in 2017 and 2018. The study, entitled Franks Tract Futures?, explored options for achieving multiple ecosystem and water quality benefits at the central Delta site. The 52-page 2018 study described preliminary proposals for changes to the local landscape and waterways, early stakeholder feedback from State Parks and neighboring communities, and results from initial hydrodynamic modeling and engineering studies.

One primary outcome of the 2018 planning effort was a stronger understanding of local views and concerns. From a stakeholder and public perspective, the initial design concept presented in this early study was clearly not feasible in terms economic, recreational and aesthetic values. Planners found local communities were wary of significant change to the tract, as well as of any top-down decision making that did not take their interests and place values into account. Local communities expressed significant interest in being involved in any future design and planning processes for potential changes to Franks Tract. The 2018 effort concluded with recommendations for more intentional and open communication between state agencies and the general public (see Section 3).

The current 2019-2020 design process responds to the public concerns outlined above. The team used a transparent and participatory process to see if options proposed were feasible, not just from an engineering and ecological perspective, but also in terms of community support. Throughout this document, the prior effort will be referred to as Franks Tract Futures 2018 and the current effort as Franks Tract Futures Reimagined 2020.

Photo: Brett Milligan

Context for CDFW Involvement

As California's trustee agency for the fish and wildlife, CDFW has long advocated for ecosystem restoration in the Delta. As part of the California Natural Resources Agency 2016 Delta Smelt Resiliency Strategy (see p. 10), CDFW took the lead in assessing the feasibility of restoring some of Franks Tract's historical ecological and hydrodynamic functions based on the guidance of A Delta Renewed *(2016). In the past, state and federal agencies had investigated a variety of alternatives for improving conditions at the Tract. Most prior proposals focused on water quality and supply. The current proposal focuses on achieving multiple benefits and ecological reconciliation.*

At the same time the initial Franks Tract Futures project feasibility study was being developed, CDFW was also working collaboratively within Delta communities to develop the 2018-2050 Delta Conservation Framework. *The Framework emphasizes early and active engagement with communities affected by conservation projects in order to co-create strategies to conserve natural resources. The Framework also emphasizes the importance of recognizing the Delta as place as required by the Delta Reform Act.*

At CDFW's direction, the current Franks Tract proposal addresses these other priorities, and reflects multi-objective, multi-interest decision-making by a variety of environmental, water quality, recreation, and local stakeholders. Beyond ecosystem restoration, the current planning process recognizes that any feasible project must generate sufficient public and financial support for what would be a major construction effort. The process also recognizes that any project must ultimately be supported by the local community to move forward. CDFW funded the most recent 2019-2020 Franks Tract planning process with Proposition 84 bond funds for Delta restoration.


Photo: CDFW

PLANNING PRIORITIES

The restoration and renewal of Franks Tract will not be feasible without careful consideration of the interests of its owners, neighbors, and local communities, as well as state interests in providing recreational opportunities, preserving navigational routes, recovering native species, and protecting water quality and supply for all Californians. All participants in the planning process were invited to co-create and co-design the project products, and to weave their local expertise and priorities into the knowledge base of the project.

Local Priorities

Any proposed changes to Franks Tract and Little Franks Tract will affect those who live, work and play in the area. In an effort to learn more about how the area is currently used, CDFW reached out to many of these people, using a landscape research team from UC Davis. Outreach from prior and current efforts yielded the following common areas of concern and interest:

- Navigability and access to fast water navigable channels.
- Real estate values based on access to fast water, recreation opportunities, and open water views.
- Protection of the existing local economy including marinas and service industry (restaurants, gas stations, repair shops, storage, etc.). Any proposed project should contribute to, rather than compete with, the local economy.
- Creation of, and improvements to, recreation features (beaches, mooring and day use areas, wildlife viewing, etc.).
- Secured and sustained funding for ongoing maintenance and operation of recreational facilities.
- Reduction in nuisance species like aquatic weeds.

State and Federal Priorities

The priorities and interests of both state and federal agencies are also relevant to any proposals to improve or change Franks Tract. The Tract includes a state recreation area. And early on, California recognized the potential at Franks Tract to contribute to state goals for ecosystem health and native species recovery, as well as to facilitate improved recreation and water quality in the region.

Delta Smelt Resilience

The habitat improvements proposed for Franks Tract and presented in this report would further the goals, objectives and actions recommended in the State of California's 2016 Delta Smelt Resiliency Strategy. Delta smelt is an endangered native fish species uniquely adapted to life in the estuarine mixing zone, which occurs near Franks Tract (see 2018 report). The Strategy is a science-based document prepared by the state to address both immediate and near-term needs of Delta smelt, and to promote their resiliency to drought conditions as well as future habitat variations. The Strategy relies on conceptual models developed through intensive, interagency, science modeling and research conducted in 2015 and compiled in the Interagency Ecological Program Delta Smelt Management, Analysis, and Synthesis Team (MAST) Synthesis Report. This research helped articulate a suite of actions to be implemented by state agencies in the near future to benefit Delta smelt. A team of state and federal agencies, water contractors and NGOs also developed a framework that will be used to assess the outcomes of these actions individually and synergistically over time.

The Strategy's primary objective is positive population growth (>1) for Delta smelt. Goals related to achieving this objective include population growth, improvements to habitat conditions such as increasing small dendritic channels in restored marsh and shallow turbid areas, food resources, and turbidity, as well as reducing levels of invasive species (e.g. aquatic weeds and predators) and harmful algal blooms.

Parks & Recreation

Franks Tract encompasses a State Recreational Area (SRA). These areas are selected, developed, and operated by State Parks to provide outdoor recreational opportunities. The declaration of purpose developed for the Franks Tract SRA and approved by the State Park and Recreation Commission in 1966 is to permanently provide water-related recreational activities so that the recreational, scenic, historic, and scientific values of the area may be enjoyed by the public. The most current management plan for the area dates back to 1988. Given the potential magnitude of the changes to the Franks Tract SRA, as a result of the enhancement and renewal actions proposed in the Franks Tract 2020 study, it is likely that either an amendment to the existing General Plan, or a new management plan, is needed.

The 1988 General Plan for the Franks Tract SRA describes resource management policies; proposed uses, facilities and interpretive programs; and physical, biological, ecological, cultural, esthetic and recreational resources. In terms of its recreational value, the plan recognizes Frank Tract is an open waterway with no land-based facilities. The plan identifies fishing, waterfowl hunting, and navigation through the Delta as key existing recreational uses.

Overall State Parks supports the concept of restoring portions of Franks Tract SRA in order to benefit native fish species and to minimize habitat for non-native fish and plant species. State Parks does, however, have related concerns about ongoing maintenance and management costs resulting from the proposed creation of additional recreational features.

Water Quality and Supply

The Delta is a primary source of the state's freshwater supply for human consumption and agricultural uses. The two main water diversion programs, in addition to in-Delta uses, are the State Water Project and the Central Valley Project. The State Water Project, administered by the California Department of Water Resources (DWR), captures, stores, and conveys water from the Sacramento and San Joaquin Rivers to several water agencies throughout the state. Similarly, the Central Valley Project is a federal facility administered by the United States Bureau of Reclamation that stores and transports water for irrigation and municipal purposes used in the Central Valley and elsewhere.

Water derived in the Delta is used for a variety of purposes, including irrigation, domestic consumption, industrial use (i.e., power plant cooling), and environmental protection (i.e., habitat maintenance and water quality improvement). Water use and the volume of water available for use are in part controlled by water quality standards established in the Bay-Delta Water Quality Control Plan and enforced by State Water Resource Control Board to protect beneficial uses.

The planning team proposing a landscape redesign and enhancement of Franks Tract evaluated benefits and impacts under existing water operations and potential future operations of interest or concern to stakeholders. While DWR is coordinating with the project and provided hydrodynamic modeling of enhancement scenarios, the project is being developed independently from ongoing water operations, Delta exports, or proposals for alternate conveyance (see p. 23 Scope and p. 58).

Hunters enjoy blinds in Franks Tract. Photo: Alejo Kraus-Polk

Emerging Conservation Guidance

The landscape redesign and enhancement actions described in the following pages suggest a bold, sustainable change in the heart of the Delta that is in keeping with current and emerging state priorities. The proposed design offers a model of the kind of larger scale approach based on natural physical processes recommended in three important conservation visions for the region and the upper part of the San Francisco Estuary: the 2016 *A Delta Renewed*, the 2018 *Delta Conservation Framework*, and *the Delta Public Lands Strategy*.

A Delta Renewed is the last of a series of three sequential reports developed by the San Francisco Estuary Institute with support from CDFW. The reports provide the technical and scientific basis for a suggested approach to restoring the Delta. Based on input from twelve academic and government science advisors, the reports outline the Delta's past and present conditions, and suggest restoration approaches focused on harnessing the remaining natural physical processes in this much-altered and re-engineered system for the future. The Franks Tract restoration approach applies the recommendations in *A Delta Renewed* for flooded islands and former marsh (see Franks Tract Futures 2018 pp. 22-23).

The *Delta Conservation Framework* was developed between 2016 and 2018 by CDFW in partnership with Delta stakeholders. These stakeholders included federal, state, and local government representatives, conservation practitioners, non-profit organizations, landowners, residents, and business owners. Three primary sets of resources guided development of the Framework: feedback from a series of public workshops held in 2016; prior plans focused on the people and ecosystems of the Delta; and best available science on ecosystem processes in the Delta. From this foundation emerged seven conservation goals, 26 strategies to reach those goals, 200 pages of details, seven appendices, and a 30-year vision for a healthier Delta for both humans and wildlife: the *Delta Conservation Framework*.

The Franks Tract Futures Reimagined 2020 vision and planning process reflects at least three Delta Conservation Framework goals prioritizing stakeholder communication, socioeconomic considerations, multi-benefit solutions, and improvement of ecological processes to benefit society, natural communities, and species recovery.

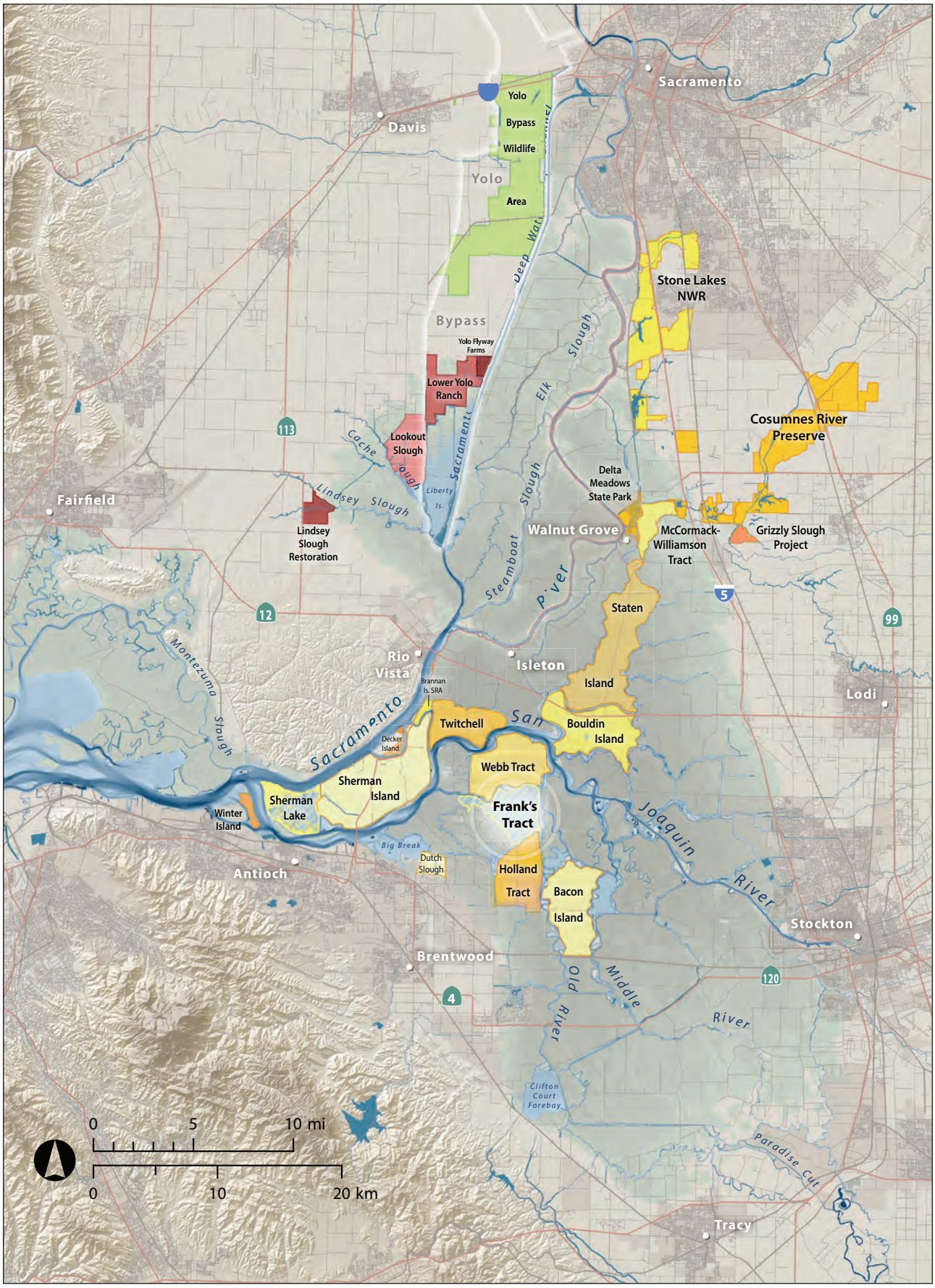
The changes proposed for Franks Tract also complement the larger conservation vision of the Delta

Healthy tidal marsh at Lindsey Slough near Cache Slough, one target area in the Delta for habitat restoration. Photo: Amber Manfree

Public Lands Strategy (formerly the Central Delta Corridor Partnership). The Strategy recognizes the need to succeed in habitat restoration on public lands first, before approaching private landowners. It focuses on engaging the owners of public, and publicly-financed lands, interconnected throughout the central Delta from north to south, in forming a conservation lands corridor. With water and landscapes connected in this corridor, more benefits for fish and wildlife can be achieved. In the north and northeast areas, the corridor is characterized by lakes, floodplains, and tidal wetlands within the Stone Lakes National Wildlife Refuge, Cosumnes River Preserve, and the Cosumnes-Mokelumne river confluence. Southward, the corridor encompasses deeply subsided islands (Staten, McCormack-Williamson Tract, Bouldin, Webb, Holland, Bacon, Twitchell, Sherman, and Decker) and the flooded Franks Tract State Recreation Area (see map p.13).

Through the public lands strategy, public landowners hope to control invasive species, improve habitat for endangered Delta smelt and salmon populations, and support recreational boating, fishing, wildlife viewing, and waterfowl hunting, among other priorities — all elements of the current vision for improving Franks Tract.

Restoration Frontiers in Delta



Planned restoration and fish habitat: Cache Slough (red); Yolo Bypass Wildlife Area (green); Bypass (white boundary) and public lands corridor (various shades of yellow). Map: Amber Manfree

Water primrose.

Background Primer on Marshes, Weeds, Barriers

Re-establishing Tidal Marsh

Over the last several decades, numerous tidal wetland restoration actions have been planned and implemented throughout San Francisco Bay and the Delta. Most of the restoration sites are highly altered from their historic natural states and have ground elevations below sea level, like Franks Tract. The basic restoration approach, and the one proposed for Franks Tract, is to place fill to raise ground elevations to intertidal elevations at which emergent marsh vegetation can establish and persist. Beyond this, there are many additional considerations for re-establishing a diversity of aquatic habitats and natural processes to the site. For example, achieving habitat heterogeneity and complexity will require the re-establishment of blind channels that help drain the tidal marsh and provide food web nutrients that can flush into larger channels to support native fish species such as Delta smelt (see also A Delta Renewed, SFEI 2016).

It is critical to achieve vegetated tidal marsh and channel forms before new marsh sediment accretion is no longer able to keep pace with rising sea levels naturally (Baylands Goals Climate Change Update 2015). Marshes maintain themselves in relation to sea level by trapping inorganic matter in the form of sediment and accumulating organic matter in the form of plant roots and other plant material. Vertical accumulation via the buildup of organic matter (such as eventually forms peat) is particularly important for marsh sustainability in the central Delta. The Franks Tract landscape redesign project would use dredge material to provide intertidal elevations necessary for marsh plant growth. This is designed to allow vegetation establishment and provide for long term resilience to rising sea levels.

Discouraging Invasive Aquatic Weeds

Invasive aquatic plants have far-reaching impacts on the Delta ecosystem and are now widespread. The total invaded area in the Delta (submerged and floating aquatic vegetation, or SAV and FAV) increased from 5,000 acres in 2008 to 16,000 acres in 2014 and almost 17,400 acres in 2015 (Khanna et al. 2016). Invasive aquatic plants have changed shoreline habitat in the Delta by slowing water velocities and increasing water clarity, conditions which further their spread (Hestir et al. 2016). This dense mat of vegetation can also offer largemouth bass places to hide and hunt. Meanwhile, native species like Delta smelt, who like to stay in open water, are more vulnerable to attack in clearer waters. Such effects can propagate up and down the food chain, affecting the entire ecosystem. Invasive aquatic plants also impede boat travel and often require mechanical removal or chemical spraying to control. Prolonged drought has likely increased shallow habitat with slow moving water ideal for aquatic weeds.

*Submerged aquatic weeds in the central Delta increased each year from 2014-2017 (Ustin et al. 2017, Khanna: personal communication). More specifically, Franks and Little Franks Tracts are heavily vegetated by aquatic weeds including Richardson's pondweed (*Potamogeton richardsonii*), Brazilian waterweed (*Egeria densa*), and water primrose (*Ludwigia spp.*). Recent drought conditions may have promoted this growth. When the emergency barrier was installed and removed in 2015, changes in the movement of water within the Tract also changed the orientation and location of weed patches, worsening them in some areas and clearing them up in others. The state has been spraying Franks Tract with the aquatic herbicide Fluridone since 2006, targeting Egeria. Over the last five years, measures of native plant species diversity indicate some promising results of continued herbicide management. At present, however, aquatic weeds remain a key reason that Franks Tract supports more non-native than native fish species. The Franks Tract project would change the island's topography, deepening some areas and raising others so that conditions are not so conducive to submerged and floating aquatic vegetation.*

Protecting Water Quality During Drought

During drought and dry summer months, salt water from ocean tides intrudes into the western Delta — closer to irrigation and drinking water intakes— because there isn't as much freshwater flowing downstream from rivers, runoff and reservoir releases to push it back out. There are few options for keeping the tides out when major reservoir levels are drawn down, snowpack is low, and so many Delta channels are connected to others except to build multiple temporary barriers across key channels. The state first built such barriers in the Delta during the mid-1970s — two in 1976 and six in 1977. In 2015, following up on modeling suggesting that a single obstruction might be less disruptive to fish habitat while still protecting water supplies, the state built the most recent barrier across the False River.

The barrier was huge - 750 feet across the top and 120 feet wide at the base, and consisted of 150 tons of rock. Installation and removal cost taxpayers approximately $37 million (see photo p.59).

While engineers estimate the 2015 barrier served its purpose of protecting water supply, it was hugely disruptive to the local community in the vicinity of Franks Tract. The barrier significantly rerouted boat traffic, created unsafe high velocities in certain channels, threatened ferry operations to Bradford Island, and created slow water in Franks Tract that has been blamed for the spread of nuisance aquatic weeds. Temporary rock barriers also impede natural physical and biological processes still at work in the Delta ecosystem and fail to provide long term, permanent solutions to salinity intrusion problems. The Franks Tract project would change the way water moves and mixes through Franks Tract, offering a more sustainable approach to water quality management.

3 Engaging Stakeholders & the Public in Design

Meaningful public engagement in planning and design has been a guiding principal of the Franks Tract landscape redesign and enhancement project. Designing with, rather than designing for, those who have a stake in the outcome was and is a top priority.

Incorporating local knowledge and stakeholder priorities requires a strong grounding in place – the unique place that is Franks Tract in the central Delta. Regional interests charged with Delta planning and stewardship have made consideration of the Delta as a special place a policy priority. Core components of that regional vision include protecting the Delta's lands and communities, economy and way of life (Delta Protection Commission 2019).

The Delta is characterized by high rates of change, wherein even without the landscape transformations considered by the project – the "No Action alternative" – the Delta will continue to change. In this evolving place there will be more aquatic weeds, increasing rates of sea level rise, and further problems with salinity intrusion, changing conditions even if residents, scientists, water exporters and state agencies don't want them to (Milligan & Polk 2017).

So the real question is how to go about design and planning for these socio-ecological changes in an equitable and inclusive manner. Without engaging local place values no planning process can be successful or representative (Milligan & Polk 2017).

The Franks Tract project's engagement goals aimed to create and facilitate opportunities for stakeholders and members of the public to be integrally involved in the project planning and design process, from beginning to end. All participants co-created and co-designed the knowledge and products that emerged over the year-long project timeline. Co-design generally refers to inclusive and creative design processes that attempt to include all who might be positively, negatively, or neutrally affected by a design intervention or change in place. In this 2019-2020 project, co-design meant that diverse groups and experts, including designers, engineers, scientists, public agency representatives, boaters, fishers, hunters and local residents and business owners (all experts of the landscape in their own distinct way) worked together to contribute ideas and values driving the design concepts. It also entailed the iterative refinement of design concepts through inclusive rounds of review by these same participants (see Section 5).

Lessons Learned

Engagement efforts for the 2019-2020 project were based on the outcomes and recommendations of the prior 2018 Franks Tract Futures feasibility study. The latter clearly identified that although the first conceptual designs met state goals for water quality and ecological restoration, they fell far short of being accepted by the local and regional communities who would be the most impacted by the project. Based on those findings, the study stated that: "more detailed restoration planning will take into account the social, economic, and recreational interests of the affected local communities and user groups, in keeping with the collaborative principles outlined in the multi-agency Delta Conservation Framework". Based on outreach efforts, the study found that stakeholders and the public wanted to be involved in any further planning efforts, from the very beginning, and that that process should be fully transparent.

As next steps, the 2018 study proposed:

"...developing a variety of scenarios considering both the CDFW restoration design, as well as community and user group alternatives" as well as, "convening of a facilitated advisory group of local community interests (boating, fishing, economic, landowners, and hunting), local government, and other interested stakeholders..."

Accordingly, the follow-up 2019-2020 planning effort primarily focused on determining if the project could be redesigned to benefit both local and regional communities (such as through the creation of desirable recreational features), as well as to minimize detrimental impacts of the project to these same communities, while still meeting ecological and water quality goals.

Project Engagement and Co-Design Methods

Franks Tract 2020 used multiple modes of engagement to facilitate feedback and co-design activities with diverse stakeholders and the general public. In addition to in-person participation through committees and public meetings, modes of engagement included project website hosting, social media communications, creation of public online map-based surveys, fieldwork, canvassing and interviews. Each of these methods is briefly described below, with many of the products and results of each method are fully documented in Appendix A.

Project Startup, July 2019

Prior to the first project meeting and public workshop, UC Davis team members conducted outreach to support the project through background research, one-on-one meetings and on-the-ground fieldwork in the project region. This work served to solidify new committees (see below), to ensure that stakeholders and residents were aware of the upcoming planning process, and to confer with them on how the process should best unfold to ensure participation (timing of meetings, tour, etc.). This work built off contacts and relationships fostered in the earlier Franks Tract Futures 2018 feasibility study. Additional activities included regional canvassing and social media communication, creation of the project website, and collection of tidal marsh imagery to use in aesthetic preference surveys.

Formation of Project Advisory and Steering Committees, Spring-Summer 2019

The 2019-2020 planning process included formation of two important committees. The Advisory Committee (AC) was made up of representatives from all known key interests in the Franks Tract area, including local residents and landowners, marina and small business owners, local government representatives and reclamation districts, local hunters, fishers, boaters and recreational advocates. The AC served as the central forum for deep engagement and evaluation of Franks Tract Futures design concepts. Members had the opportunity to directly participate in, and influence the outcomes of, the design process. Throughout the yearlong process, members not only attended AC meetings, but also reviewed and commented on design materials and served as liaison to the larger stakeholder community (see Sections 4-5).

The Steering Committee (SC) was comprised of senior representatives from state, regional and local agencies responsible for decisionmaking, funding and implementation of the planning project, including California Departments of Fish and Wildlife, Water Resources, and Parks and Recreation, as well as the Delta Protection Commission and Delta Stewardship Council. Their primary responsibilities were to provide overall guidance for the project, attend project AC meetings for technical support, and to secure and share information within their respective agencies regarding the project.

Steering Committee

Name	Affilliation
Bill Harrell	California Department of Water Resources (DWR)
Erik Loboschefsky	DWR
Ted Sommer	DWR
Eli Ateljevich	DWR
Jacob McQuirk	DWR
Edward Hard	Division of Boating and Waterways (DBW)
Gina Benigno	California Department of Parks and Recreation (State Parks)
Steve Musillami	State Parks
Jim Micheaels	State Parks
Jennifer Cabrera	State Parks
David Moffat	State Parks
Erik Vink	Delta Protection Commission (DPC)
Karen Kayfetz	Delta Stewardship Council (DSC)
Jeff Henderson	DSC
Louise Conrad	DSC
Mike Roberts	California Natural Resources Agency (CNRA)
Jim Starr	California Department of Fish and Wildlife (CDFW)
Maureen Martin	Contra Costa Water District (CCWD)
Deanna Sereno	CCWD
Brian Holt	East Bay Regional Park District (EBRPD)
Mike Moran	EBRPD

Advisory Committee

Name	Affilliation
Regina Espinosa	Bethel Island Municipal Improvement District (BIMID)
Ryan Hernandez	Contra Costa County Water Agency
Russ Ryan	Metropolitan Water District (MWD)
Brian Sak	San Francisco Public Utilities Commission (SFPUC)
Karen Mann	Save the California Delta Alliance (STCDA)
Jan McCleery	STCDA
David Gloski	Bethel Island resident
Jamie Bolt	Bethel Harbor
Lenora Clark	STCDA, former commissioner DBW
Chuck Russo	Russo's marina
David Riggs	Sugarbarge RV resort and marina
Kathleen Stein	Bethel Island realtor
Blake Johnson	Engineer RD 2059
Robert Davies	President RD 2059
Bill Jennings	California Sportfishing Protection Alliance
John Francisco	Franks Tract hunter
Andy Rowland	San Joaquin Yacht Club
Mark Whitlock	BIMID, BI Chamber of Commerce, Delta Chamber of Commerce
Joshua Ireland	Bethel Island Resident and Pro Fishermen
Karen + Smith Cunningham	Five Palms Cattle
Paul Seger	Sierra Club, Diablo Water Agency
Katherine Jones Smith	San Joaquin Yacht Club
Jim Cox	California Striped Bass Association Western Delta Chapter
Tyson Zimmerman	Assistant GM. Ironhouse Sanitary District, RD 830 Trustee

Public and Advisory Committee Meetings, 2019-2020

The backbone of the engagement process consisted of both public and AC meetings. Outreach for the July 2019 kickoff meeting included canvassing on Bethel Island and the Franks Tract region, as well as online and media outreach efforts using social media, list serves, and print and online media outlets (the team later repeated these efforts to promote surveys). All public meetings were held in the immediate vicinity of Franks Tract and Bethel Island, with the farthest being at the Big Break Visitors Center in Oakley, although Covid-19 forced later meetings online.

July 2019 public meeting

The planning team held the two larger public meetings (up to 160 people) at key points within the project timeline to provide project information to the public and to receive their feedback (see also Sections 4-5). The team held an additional three AC meetings (all with SC members in attendance) throughout the project. These smaller, more focused meetings enabled the team to engage with advisors and stakeholders on project status and review detailed design, modeling, and evaluation criteria. Within these meetings, the primary objective of was to conduct "hands-on" design workshops to review, refine and advance the design concepts and their evaluation methods. The team provided all SC and AC members with meeting materials and surveys prior to in-person meetings, including those who could not attend the meetings. The team also compiled and shared meeting notes with all members by email and with the general public via the project website.

Fieldwork & Canvassing, 2019-2020

As part of its project fieldwork, the planning team visited precedent landscapes in the Delta, such as existing recreational areas like Sherman Island and Brannan Island, and took guided tours with the public agencies who manage these areas. The team also performed fieldwork to validate and assess conditions on-the-ground within the project boundaries, such as the condition of levees, boating routes, and boating hazards, among other factors. The team also conducted many interviews with stakeholders and residents in the field.

Website and Social Media 2018-2020

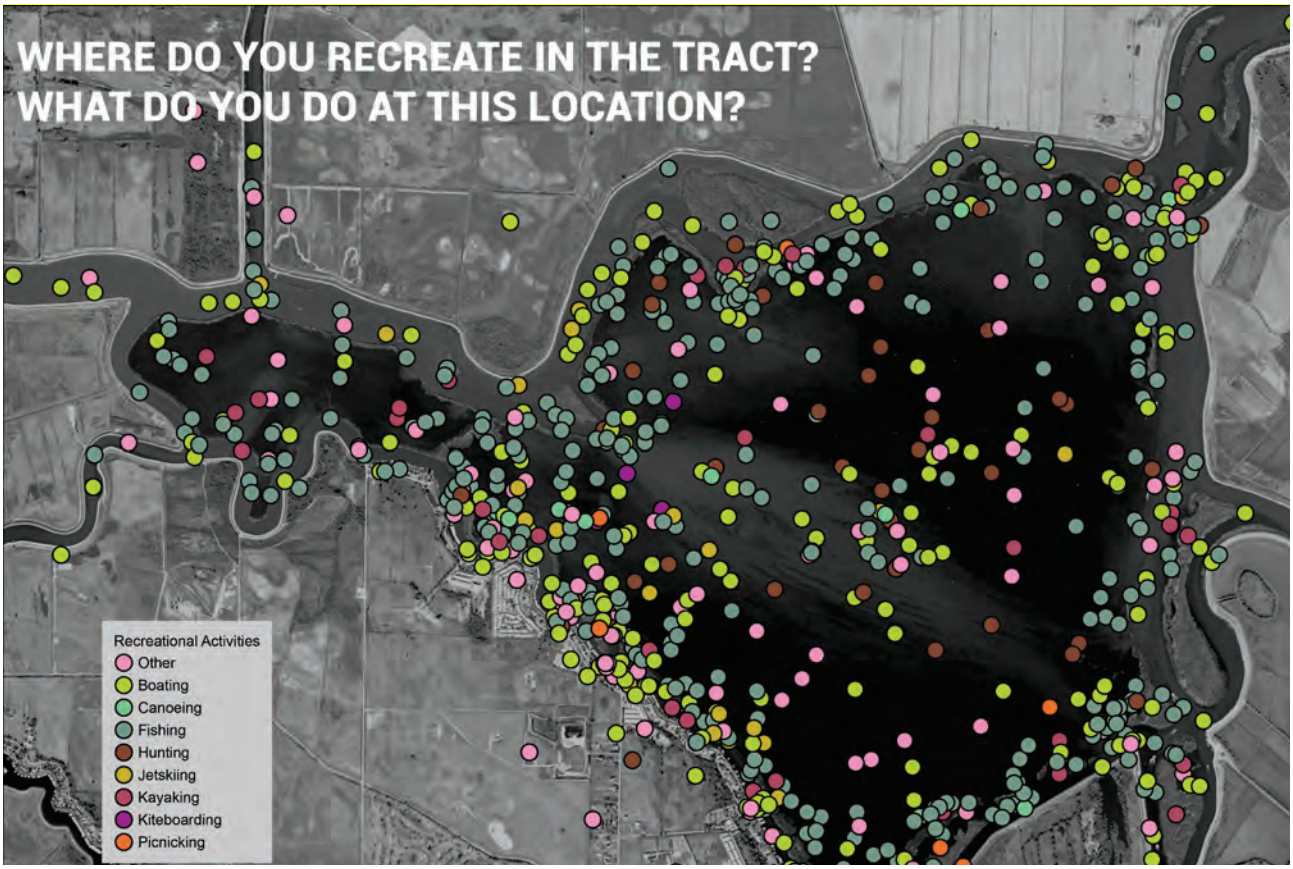
The planning team created the Franks Tract Futures website in 2018 (https://franks-tract-futures-ucdavis.hub.arcgis.com/) as a central hub for broad public involvement and planning information. Since then, the team has maintained and updated the site as new information has become available (posting meeting notes, sharing presentations, and making announcements, etc.). The team also created social media accounts (Twitter, Facebook, Instagram) to expand engagement, disseminate information, and provide additional forums for project-related discussion and communication with the community and stakeholders.

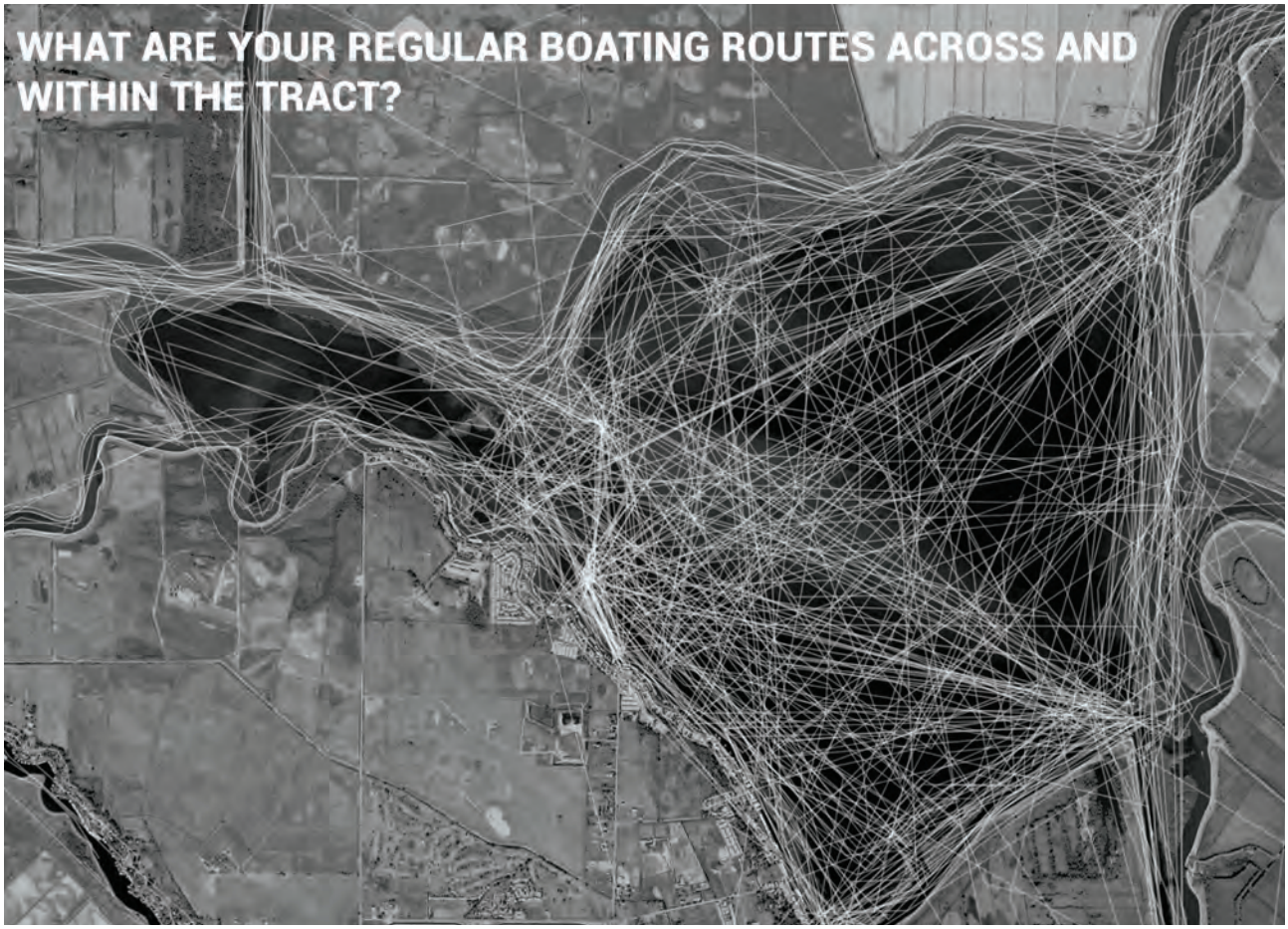
Geospatial Public Surveys, 2019-2020

To inform design concepts during the planning process, the team created and deployed two online public surveys. Both of these used Maptionnaire, a web-based, relatively easy-to-use, mobile compatible survey platform. This software allows survey participants to provide map-based, georeferenced and geo-specific information that can be uploaded to Geographic Information System (GIS) platforms for analysis (participatory GIS methods, or PPGIS).

The first survey, conducted in 2019 at the beginning of the second planning effort, was intended to assess current Franks Tract user preferences. The survey included map-based questions related to recreational activities, boating routes, launching and berthing, areas of potential improvement, and tidal marsh placement. Questions were informed by a previous survey conducted as part of the 2018 Franks Tract Futures feasibility study, which generated useful insights into the demographics and preferences of a substantial group of people who live, work, and play in and around Franks and Little Franks Tracts.

2019 Survey Results





The maps created from the first survey were thus crowdsourced and user drawn, rather than primarily authored, composed, or decided by the planning team. Participants were also asked to rank concerns and state their perspective regarding climate change in relation to the Tract. Findings from this survey are discussed Section 5 and provided in Appendix A.

The second survey, conducted in the summer of 2020, solicited comments and feedback on the concepts developed through the design development process. This survey relied on the same map-based platform and contained fly-through three-dimensional renderings of the design concepts as well as images of key proposed recreational and navigation features. The survey enabled participants to provide spatially explicit input on three design concepts and a No Action alternative. At the end, participants were asked to rank the four concepts. Findings from this survey are summarized in Section 5 and detailed in Appendix A.

Agency Presentations 2019-2020

The planning team made presentations of project goals, concepts, and processes to multiple state and regional agencies, including the Delta Protection Commission, the Delta Stewardship Council and the Collaborative Science and Adaptive Management Program to keep them informed of project activity and to solicit feedback. Presentations were also provided to interdisciplinary technical groups, such as the Interagency Ecological Program's estuarine ecology work team.

Looking Ahead

The project's engagement goals created and facilitated opportunities for stakeholders and members of the public to be integrally involved in the project planning and design process, from beginning to end. Indeed, public comments on the draft version of this report were used to revise and improve the final report. As stated before, designing with, rather than designing for, those who have a stake in the outcome was and is a top priority.

User interface of second survey showing one of the design concepts.

4 Design with Goals & Objectives in Mind

Photo: Rick Lewis

Common goals and objectives are critical to any successful planning, design, or decisionmaking endeavor. Over the course of the project, the planning team has worked with the Advisory Committee, Steering Committee, the public and the California Department of Fish and Wildlife (CDFW) to develop goals and objectives for enhancing Franks Tract and Little Franks Tract, and to design various concepts for landscape change that meet these objectives.

The design approach is based on input from these participants, as well as on past investigations, expert consultation, local user input, ecosystem restoration actions called for in various plans, and State Parks' General Plan. Additional input will be considered if and when a design concept is approved for further development.

The project team applied a Structured Decision Making (SDM) approach to guide and integrate technical design and engagement results during planning. This decision making approach seeks to guide groups of people working together on complex environmental and social planning problems in a way that is rigorous, inclusive, defensible, and transparent (Gregory et al. 2012).

Project Goals and Objectives

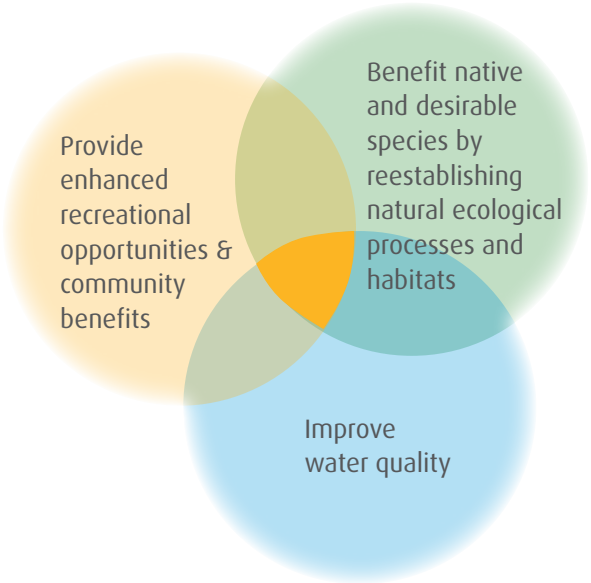
The goals of the Franks Tract Futures project are to enhance recreational opportunities and provide other community benefits, to support native and desirable species by re-establishing natural ecological processes and habitats, and to improve water quality. Project objectives elaborate on each of the goals (see table). Overall, the project seeks to find a balance of benefits across all objectives that will be sustainable over time. Together, these goals and objectives serve as the roadmap for redesigning the Franks Tract landscape.

Transparency in Project Scope

This project explores opportunities to achieve multiple benefits at many levels, from the community to the Delta region to the state, on Franks Tract. As an exploratory effort, no project "owner" or final decision-maker was identified up front. Any future project would require both local community and agency support to attract planning and implementation funding. The study funder, CDFW, was only one voice among many in a collaborative planning process.

Early on in planning, members of both the public and the Advisory Committee requested clarity on how the project related to water operations. Advisors wanted the project to be transparent in evaluating benefits and impacts under both existing water operations and potential future operations of interest to stakeholders, such as various conveyance alternatives including tunnels (to the extent they have been defined). While the California Department of Water

Project Goals



Resources is a project partner, with a primary focus on hydrodynamic modeling of enhancement scenarios, the Franks Tract Futures project has no influence over water operations, Delta exports, or proposals for alternate conveyance.

Structured Decision Making

The structured decision making approach guides groups of people working together on complex environmental and social planning problems such as Franks Tract stakeholders and communities. Careful attention is paid to separating judgments and deliberations about facts (such as outcomes that can be counted, measured or modeled) from judgments and deliberations about values (such as whether the benefits of an option outweigh its costs). As such, structured decision making facilitates the incorporation of important scientific and technical information into a formal deliberative options analysis process, with the aim of seeking consensus agreements on proposals and solutions.

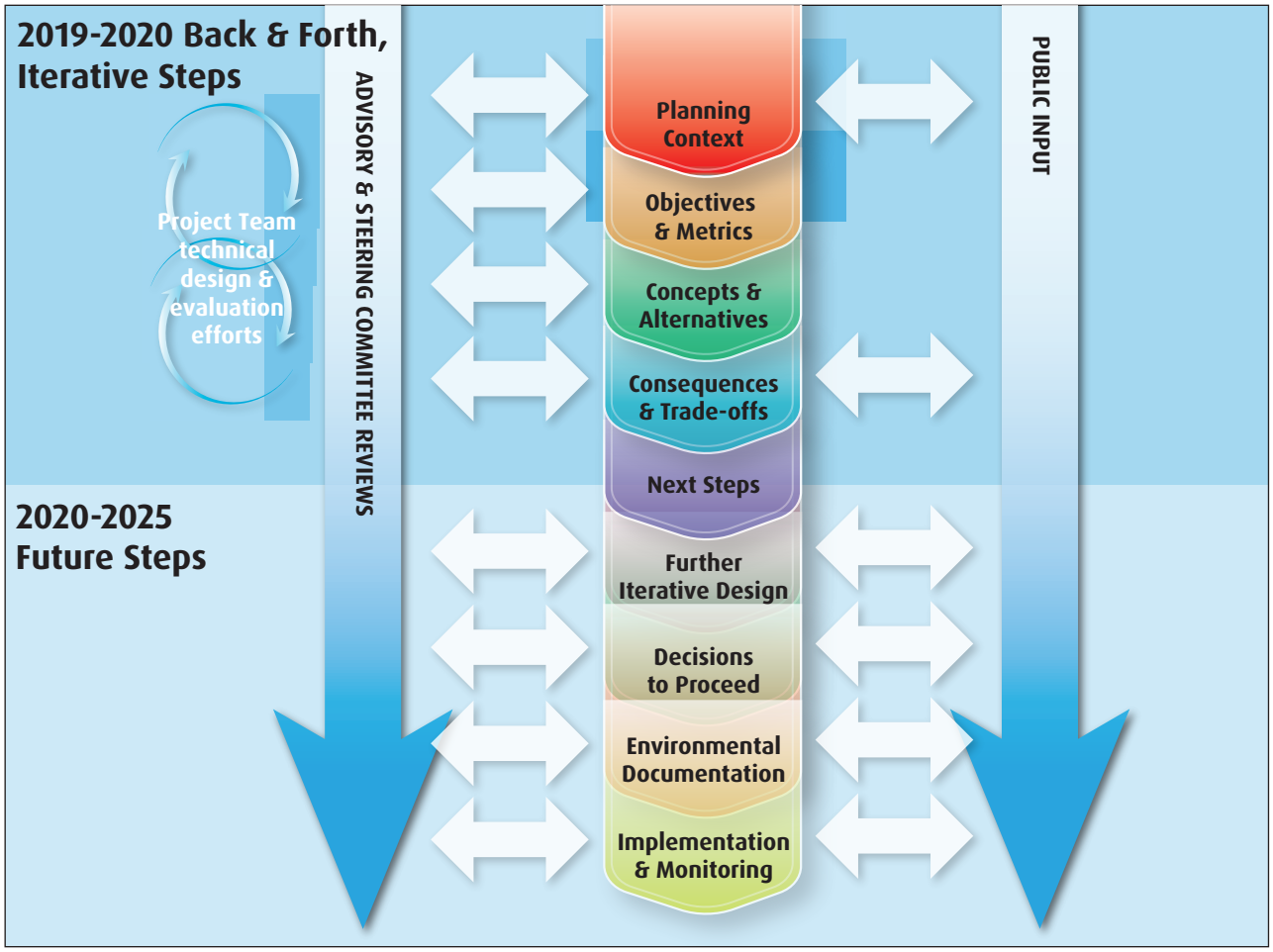
Basic iterative steps

- Clarify the decision making context – make clear what is in and out of scope, who the decision makers are, and how this planning process interrelates with other planning initiatives.
- Define clear goal, objectives and metrics – get to the root of 'what matters' and develop specific metrics (or evaluation criteria) that will be used to compare alternatives.
- Develop alternative concepts – iteratively develop and improve on the alternative concepts and detailed design features that best address the full range of objectives.
- Estimate consequences – use the best available data and analyses to describe how well the alternative concepts might perform with respect to the objectives and metrics, while documenting key uncertainties.

Objectives for Franks Tract's Future

Resource Area	Project Objectives
Recreation	• Enhance recreation opportunities for fishing, motorized and non-motorized boating, waterfowl hunting, and shoreline recreation while minimizing impacts to existing recreational uses.
Navigation	• Minimize impacts to current boating travel times between key locations. • Maintain minimum depths for safe navigation around the Tract. • Reduce boating hazards and nuisance conditions.
Local Economy	• Maintain or enhance local economic benefits.
Ecology	• Maintain or enhance habitat for fish species of interest, specifically largemouth bass, Chinook salmon, striped bass and Delta smelt. • Minimize the risk of entrainment of special status fish species into Old River and the south Delta. • Minimize conditions that could result in the spread of undesirable invasive species. • Benefit a range of native species by establishing large areas of tidal marsh and associated habitats.
Water Quality & Supply	• Maintain or enhance water quality for human uses such as irrigation and drinking water. • Improve water supply reliability by reducing entrainment at the South Delta pumps. • Reduce the disruptions and costs associated with installation of emergency drought barriers.
Levee & Flood Protection	• Improve levels of flood protection, where possible, and avoid any adverse flood impacts.
Project Cost	• Minimize construction costs within the context of other project objectives. • Minimize long term total costs for ongoing operations and maintenance within the context of other project objectives.
Other	• Minimize impacts associated with project construction.

Reimagining Franks Tract



What's included in project scope?

In Scope	Out of Scope
• Full consideration of a No Action or "business as usual" alternative • Enhancement of opportunities for fishing, motorized and non-motorized boating, waterfowl hunting, and shoreline recreation • Navigation routes and boating travel times • Creation of tidal marsh for a range of ecological benefits • Control of undesirable aquatic invasive species • Potential water quality and supply reliability benefits • Wave sheltering of flood protection levees to reduce erosion risk • Local economic benefits • Consideration of alternatives representing a variety of CDFW, stakeholder and community interests	• Water operations decisions • Water quality standards decisions • Direct improvement of existing flood protection levees (indirect improvements from wave sheltering are in scope) • Local area infrastructure planning (roads, etc.)

- Evaluate trade-offs and preferences – evaluate the potential trade-offs and which alternative concept(s) deliver the best balance across the multiple objectives.
- Guide next steps – describe what the next steps in the planning process are, and – should a project move forward – how the detailed design, environmental documentation and implementation occur.

The decision making context and project goals and objectives (Steps 1 and 2) are described above. The planning team also developed detailed metrics for use in evaluating the performance of each proposed design concept relative to the project objectives (Step 2). Other sections in this report detail these metrics, as well as how alternatives were developed, consequences estimated, trade-offs and preferences evaluated, and next steps explored (Steps 3, 4, 5, 6).

From an engagement perspective, the project team planned workshops and outreach activities to extensively integrate stakeholders' interests, gather detailed input, share the consequences of different concepts with transparency, and openly engage in the discussion of potential trade-offs (see also Section 3).

Key benefits of this engagement approach

- Leveling the playing field – by explicitly defining everything that matters as objectives and distilling all technical analyses into an understandable set of evaluation criteria, everyone with a stake in the planning process can participate at an appropriate level, whether they have technical expertise or not.
- Facilitating joint learning – by transparently exploring a range of alternative design concepts and listening to expert and public opinions about any potential consequences and trade-offs, all participants learn together and actively contribute toward iterative improvements that seek to achieve the best balance for a feasible design.

From a technical design and analysis perspective, the project's team of experts in various fields applied the best available information and analysis methods to develop alternative designs. They then evaluated how concepts performed in achieving the project objectives, and refined specific design features (such as navigation channel widths and depths) based on committee and public feedback (see Section 5).

Key benefits of this technical approach

- Adding rigor and defensibility – while the technical analysis is still at the feasibility stage, a rigorous approach was taken toward each aspect of design and analysis, adding defensibility to the holistic planning process.
- Applying a structured framework – consistent and systematic methods of documentation and presentation enabled large amounts of information to be distilled into the key messages to inform judgements and understanding.

The figure on p. 27 shows how integrated planning, technical design and engagement unfolded over the duration of the 2019-2020 project as guided by the structured decision making approach. Over the year-long process, four formal workshops with the Advisory Committee and Steering Committee served as cornerstones of engagement as described above.

In sum, this report describes in detail how both engagement and technical design efforts have occurred in a collaborative, integrated manner. The next steps point toward a potential future planning phase in which further iterative design and environmental documentation would be developed with a similar commitment to engagement and collaboration.

Public workshop. Photo: UCD

5 Developing Design Concepts

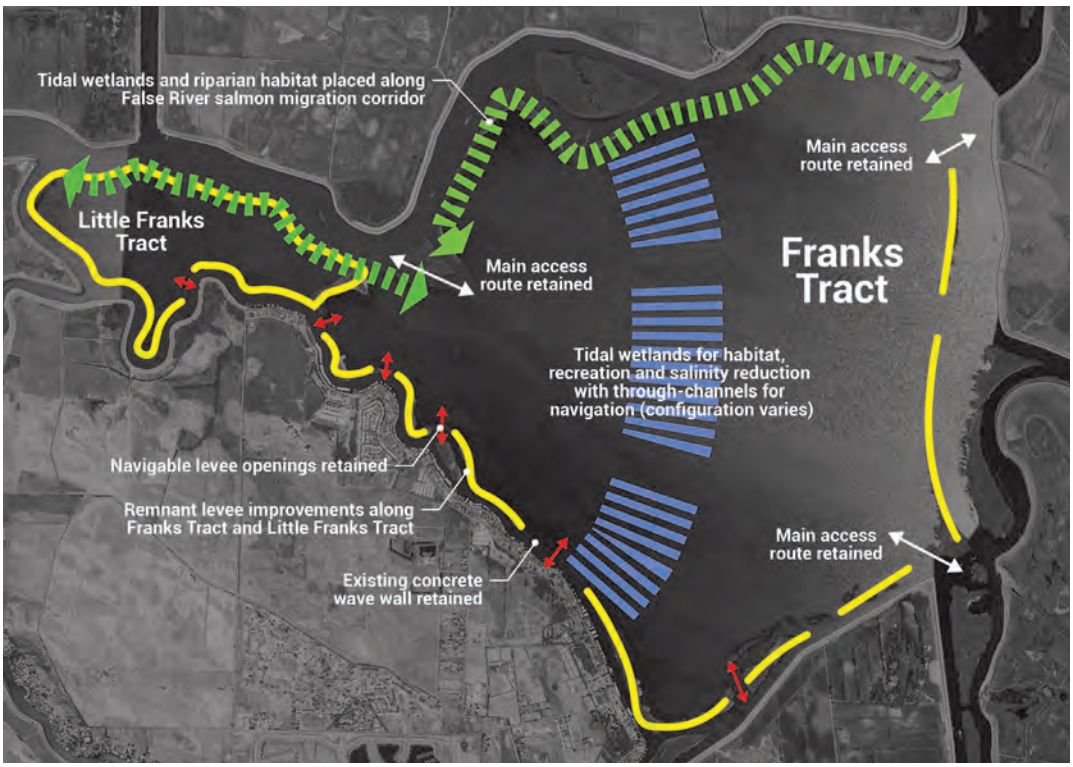
The Franks Tract planning team developed and evaluated a variety of different ways to achieve the project goals and objectives for enhancing this 3,300-acre flooded area. The process resulted in seven alternative designs for adding new land masses, redefining channels, and reshaping shorelines and levees. Each design concept integrated diverse features intended to improve public access, recreation, and water quality and supply reliability, as well as to enhance habitat for fish and wildlife.

The project generated four rounds of design concepts for review and evaluation by the Advisory and Steering committees, the public, and team experts (see also Sections 3 and 4). The team began by screening seven initial concepts, then developed three concepts in more detail, then refined those concepts. Each round included a No Action alternative for comparison. The year-long process — which occurred between the summers of 2019 and 2020 and included workshops, charettes, surveys, and questionnaires — culminated with selection of one preferred concept by the committees and the public.

Features Common to all Design Concepts

To guide development of the design concepts, the planning team began by identifying the following preliminary list of common features that would be a part of any future for Franks Tract (see figure below).

- Retain the existing breaks in the remnant levee between Piper Slough and adjacent Franks Tract open water and in select additional locations for navigation.
- Retain the existing fast water navigation paths in approximately their current positions, as much as possible.
- Retain the existing Bradford Island Ferry location.



- Create extensive tidal wetlands and deepened open water areas to enhance habitats for native fish and popular sport fish. Re-establishing tidal marsh and associated channels will require raising selected areas 8 to 11 feet.
- Enhance Chinook salmon habitat by creating a band of tidal wetland along the False River channel (in green). Tidal marsh in these areas will provide places for salmon fry to feed and grow. The wetlands will also provide refugia for juvenile Chinook salmon along their outmigration path.
- Enhance habitat for Delta smelt by creating open water, and possibly turbid areas, fringed by tidal marsh in Little Franks Tract, closest to primary smelt habitats in the west Delta.
- Reduce the potential for aquatic invasive plants by converting existing shallow water areas to intertidal marsh and deep water (borrow) areas (see Background Primer, p.14).
- Limit or otherwise manage exchange of flow between the northwestern part of Franks Tract at the "nozzle" and the southeast corner at Old River to improve water quality, reduce entrainment of regulated fish, and improve water supply reliability. In general, this means locating restored marsh or a berm to divide the Tract in two between these locations.
- Build up the remnant Franks Tract and Little Franks Tract levees to provide wave sheltering for adjacent (maintained) levees on Bethel Island and other adjacent islands.
- In general, Little Franks Tract is prioritized for non-motorized boating and native fish species, while Franks Tract proper is prioritized for sport fish, motorized boat recreation, and destination beach and recreational areas.

Photo: Brett Milligan

Four Rounds of Design and Public Input

Round 1 Concepts

At the first Advisory and Steering Committee workshop on August 29, 2020, participants provided input on the project goals and objectives, the No Action alternative, and the first round of seven design concepts presented by the planning team (see timeline opposite). These "Round 1" concepts built on earlier concepts developed for the 2018 Franks Tract Futures feasibility study, including the locally preferred plan, and those developed for a 2018 landscape design studio hosted by UC Davis with select stakeholder and state agency input.

An interactive design charrette enabled participants to discuss and evaluate the seven Round 1 concepts, providing useful and detailed input on preferences and concerns about each one. The planning team used input from the design charrette, as well as written evaluation forms, to rank least and most preferred concepts and to refine concepts for the next round. The four concepts that moved forward in design and evaluation (Round 2), in order of most to least preferred (1-4) were:

1. Eastern Landmass and Central Island
2. Central Landmass
3. Combination of the Open Water Berm and Channel concept and Bays and Channels concept
4. No Action Alternative

The team dropped two designs after the first round of evaluation. The "light touch" or No Action Alternative Plus concept, which included dredging and levee fortification, failed to move forward because it did not meet water quality and ecological goals. The northern archipelago was dropped because participants did not like the layout of tidal marsh directly in front of Bethel Island for aesthetic and navigability reasons, as well as concerns for property values. This concept was also unlikely to meet the water quality goals.

Round 2 Concepts

For the second Advisory and Steering Committee workshop on November 6, 2020, participants provided input on three Round 2 concepts and the No Action alternative. In addition to design review, participants reviewed and commented on draft evaluation methods and criteria (see opposite). The planning team presented three more detailed and refined concepts for improving Franks Tract. Refinements reflected technical input for constructability, initial assessment of water quality improvements, and further detailing of potential public access features.

Over 14 months, the planning team worked through a public process on four rounds of concepts for redesigning Franks Tract. The first round consisted of 7 potential project designs plus the No Action (no project) alternative. Input from committees and the public narrowed the field down to 3 designs, and more recently to a preferred concept (see next page).

Co-Design Timeline 2019-2020

2019

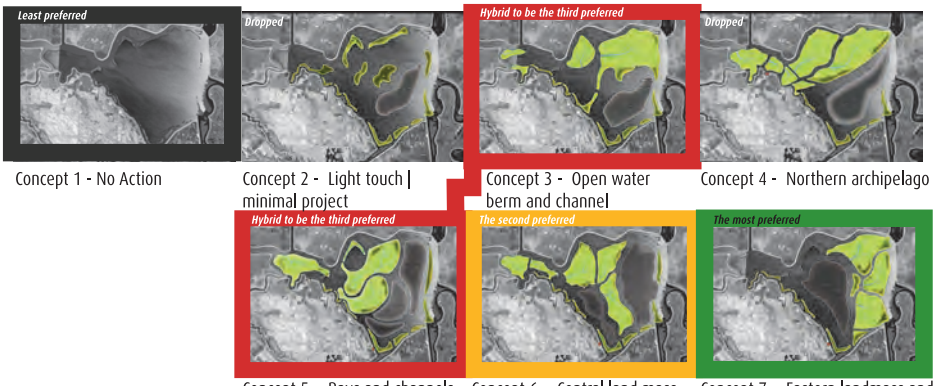
07/11 Kick off Meeting (public)

Project background and planning process overview.
Introduction to ESA-led team and overall project approach.

08/29 The First AC/SC Workshop

Reviewed and received input on the project goals and objectives
Reviewed and received input on the No Action alternative scenario
Shared the initial results of the (online) Stakeholder Survey
Conducted a design charrette to receive input on the first round of design concepts

ROUND 1

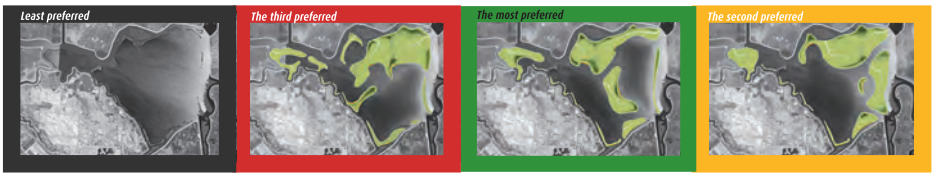


Concept 1 - No Action
Concept 2 - Light touch | minimal project
Concept 3 - Open water berm and channel
Concept 4 - Northern archipelago
Concept 5 - Bays and channels
Concept 6 - Central land mass
Concept 7 - Eastern landmass and central island

11/06 The Second AC/SC Workshop

Reviewed and received input on the revised design concepts
Reviewed and received input on the draft evaluation methods and criteria
Shared the initial results of hydraulic modeling, received input on the initial recreational features design ideas and marsh aesthetic surveys
Conducted a design charrette to receive input on the next round of design concepts

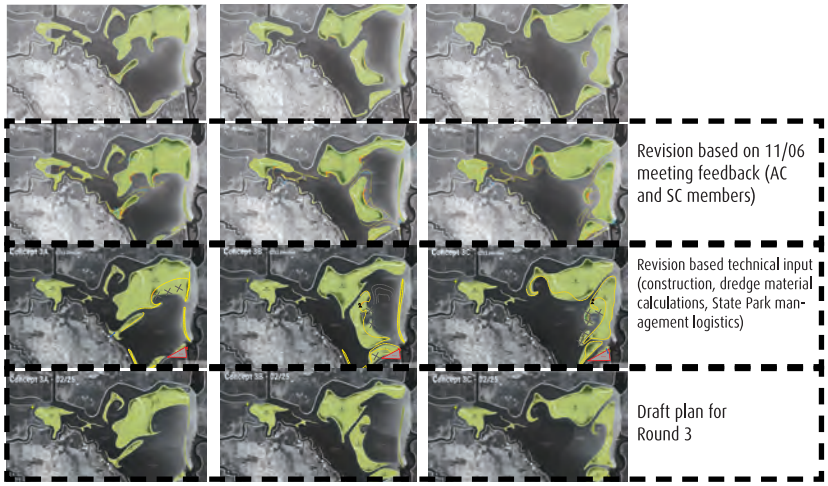
ROUND 2



Concept 2A - Open water berm and channel
Concept 2B - Central land mass
Concept 2C - Eastern landmass and central island

ROUND 3

In between 11/06 and 03/04 meeting: detailed design refinement and modeling



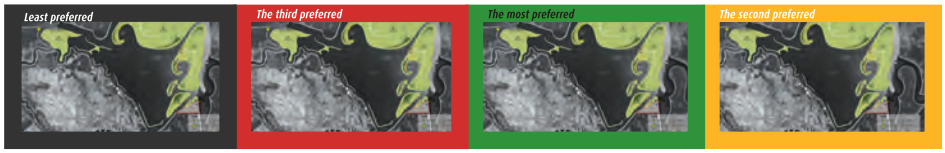
Revision based on 11/06 meeting feedback (AC and SC members)
Revision based technical input (construction, dredge material calculations, State Park management logistics)
Draft plan for Round 3

2020

03/04 The Third AC/SC Workshop

Reviewed and received input on the revised, 3rd round of design concepts
Reviewed the performance of the three concepts in meeting the project objectives
Conducted a design charrette to receive input on the next round of design concepts

ROUND 4



Concept 1 - No Action
Concept 3A - Open water berm and channel
Concept 3B - Central land mass
Concept 3C - Eastern landmass and central island

process is ongoing

Evaluation of the Round 2 concepts suggested:

- Design of Little Franks Tract could be held consistent between all concepts for ecological benefits and as a focal area for non-motorized recreation,
- The entry to Franks Tract from Roosevelt Cut in the southeastern part of the site should be reconfigured to improve navigability at a dangerous boating intersection and to improve the quality of water moving into the south Delta,
- The widths of the through-channels – the channels that allow boat access between land masses onsite – are critical to navigation and require further hydrodynamic modeling to identify the appropriate balance between fast-water navigation safety and water quality benefits,
- The size of tidal marsh landmasses should be reduced to limit the amount of fill material and associated costs.

Feedback on the Round 2 concepts during the charrette, and results of a written questionnaire completed by workshop participants, indicated a shift in preference to the Central Landmass, or Concept 2B. Members of both committees liked the combination of open water adjacent to Bethel Island; relative proximity of the beaches, day use area and other land-based recreational features to Bethel Island (compared to the Eastern Landmass); and the creation of two open water areas, each relatively protected from waves since the central landmass would shelter the eastern open water area, which is currently prone to waves. The second preferred concept was the eastern landmass, or Concept 2C, followed by the open water berm and channel, Concept 2A. The No Action alternative remained the least preferred.

Rounds 3 and 4 Concepts

The planning team presented three Round 3 revised concepts and the No Action alternative at the third Advisory and Steering Committee workshop on March 4, 2020. In the presentation, the team retained the general approach of the Round 2 concepts - open water with berm, central land mass and eastern landmass – but made refinements to the through-channel widths, recreational features, and other adjustments to improve project performance.

After another workshop, the team made minor adjustments to the Round 3 concepts. To avoid confusion, the project team called these the Round 4 concepts, though they are very similar to Round 3.

Rating the Design Concepts

In the evaluation process, the planning team developed a detailed set of metrics, or evaluation criteria, to measure the performance of each design concept relative to the eight project objectives (see Section 4). Technical experts on the team then rated concepts with respect to each objective based on detailed site conditions, hydrodynamic model results, and input from committee members with specific expertise. To help facilitate overview comparisons, the team summarized evaluation criteria for each project objective using a 1 (worst) to 10 (best) rating scale. The team solicited committee member and other stakeholder input to develop the evaluation criteria and ratings.

By way of example, one navigation objective is to minimize impacts to current boating travel times between key locations. Planning team members worked with local boaters on the Advisory Committee and used data from the project's User Survey to identify six key travel routes through the site. They measured and compared the distance of each of these routes for each project concept and the No Action alternative. Since the project commitment is to provide fast water access along these routes (e.g., no "no wake" zones), distance is considered a reasonable proxy for relative travel time. The team then rated overall performance for travel distance on a 1 to 10 scale for comparison between concepts.

Using this overall approach, the team created a summary consequence table rating each concept based on each primary objective (see p. 29). All consequence tables were color-coded on a scale from worst (1-red) to best (10-green). The range of scales and colors is based on all seven concepts evaluated during the iterative planning process. At a glance, the colors highlight potential trade-offs and the need for detailed discussions.

Ratings and evaluations provided in the following pages refer to Round 4 concepts. Ratings were updated with each round of concept development.

Ultimately, how one design concept and vision for Franks Tract's future layout compares to another depends on the values attached to different aspects of concept performance. Values vary by individual, reflecting their individual priorities.

At the highest level for consideration, overall ratings indicate that a redeveloped Franks Tract offers an opportunity for improvements in recreation, ecology, and water quality and potentially other objectives. Of course, the evaluation also finds there would be some unavoidable trade-offs, especially with respect to costs and construction impacts. More details and finer scale considerations are explored in the following tables (see p.29) as well as Appendix A.

OVERALL SUMMARY

At the highest level for consideration, a redeveloped Franks Tract offers an opportunity for improvements in recreation, ecology, and water quality and potentially other objectives. Of course, the evaluation also finds there would be unavoidable trade-offs, especially with respect to costs and construction impacts. More details are explored in the following tables. A complete description of evaluation criteria and ratings can be found in Appendix A.

Worst — Best

Objectives	No Action	Concept A	Concept B	Concept C
Navigation	7.4	6.1	7.2	7.3
Recreation	2.3	5.3	6.1	5.6
Local Economy & Community	4.5	5.2	6.2	6.4
Ecology	2.5	6.0	6.2	6.0
Water Quality & Supply Reliability	3.3	7.3	7.0	6.7
Flood Protection	4.0	7.5	7.5	7.5
Construction Impacts	6.0	4.0	4.0	4.0
Total Cost: Construction and O&M	$	$$$	$$$	$$$

NAVIGATION

Project objectives call for minimizing impacts to current boating travel times between key locations and improving boating safety. Ratings from the evaluation confirmed that the current wide-open Franks Tract offers the shortest travel distances in any direction. Next best, in order of performance, were design Concepts C, B and finally A, which would create the largest increase in navigation distances. These potential increases need to be weighed against improvements to boating safety within the Tract, with the three concepts maintaining minimum depths for safe navigation and reducing boating hazards. Another important consideration will be potential increases in conflicts between fast water navigation and recreation activities in any new multi-use recreation area.

Objectives	No Action	Concept A	Concept B	Concept C
Navigation	7.4	6.1	7.2	7.3
Travel Distance	10.0	6.4	8.4	8.8
Boating Safety	4.7	5.7	6.0	5.7

RECREATION

Project objectives call for enhancing recreational opportunities for fishing, boating, waterfowl hunting, and shoreline recreation, and minimizing impacts to existing recreational uses. Ratings from the evaluation suggest diverse recreational opportunities (such as beaches, mooring sites, and shoreline access) could be designed into any of the three new concepts, with Concept B offering the greatest opportunity for sheltered open water boating areas. In terms of fishing, the rating is based on both sportfish habitat and access to a quality fishing experience (potential changes to the fishing experience warrant further review). In terms of the future hunting experience, which could include both open water and marsh-based blinds, further input from the hunting community is still needed on how this new, more diverse system would work best.

Objectives	No Action	Concept A	Concept B	Concept C
Recreation	2.3	5.3	6.1	5.6
Fishing	5.1	6.0	6.2	6.3
Motorized Boating	2.0	5.0	8.0	5.0
Non-Motorized Boating	1.0	5.5	5.5	6.0
Shoreline Recreation	1.0	4.5	4.5	5.0
Waterfowl Hunting				

LOCAL ECONOMY

Project objectives call for providing local economic benefits where possible and for minimizing disruptions to the local economy and community. Ratings from the evaluation, with a specific focus on Bethel Island, suggest significant interest in maintaining or improving effects on local businesses, real estate and aesthetics. One aesthetic priority is to preserve current open water views from Bethel Island. Each concept rates differently in that regard, but all preserve open water adjacent to Bethel Island. All concepts would add naturalistic features to views, like tidal wetlands, and reduce nuisance aquatic weeds, both considered potential benefits. Both real estate values and local business effects are seen to be linked with these aesthetic conditions, as well as being dependent on the overall navigation and recreation opportunity ratings discussed above.

Objectives	No Action	Concept A	Concept B	Concept C
Local Economy & Community	4.5	5.2	6.2	6.4
Business Effects	4.9	5.7	6.7	6.5
Real Estate	4.6	5.4	6.3	6.4
Aesthetics	4.0	4.7	5.7	6.3

ECOLOGY

Project objectives call for benefits to both native and sport fish by creating tidal marsh and other habitats, reducing the spread of undesirable invasive species, and minimizing the risk of entrainment of special status species into the south Delta. Ratings from the evaluation suggest that all three new concepts present a significant opportunity to improve the overall ecological conditions, especially for special status native species (Chinook salmon, Delta smelt). The area supporting aquatic invasive species would also be reduced, another improvement in conditions. How the concepts would change conditions for sportfish needs more evaluation. While the overall sportfish ratings for the three concepts compare fairly evenly with the No Action Alternative, there would be a significant shift away from open-water shallow habitat toward more open-water deep-to-shallow edge and marsh-edge habitats with increased velocity gradients.

Objectives	No Action	Concept A	Concept B	Concept C
Ecology	2.5	6.0	6.2	6.0
Special Status Species	2.5	6.8	6.2	6.2
Sportfish Habitat	5.4	6.2	6.5	5.8
Conditions for Native Species	1.0	4.0	5.0	5.0
Conditions for AIS Spread	1.0	7.0	7.0	7.0

WATER QUALITY

Project objectives call for enhancing water quality for human uses (such as irrigation and drinking water), improving water supply reliability by reducing fish entrainment at the water project pumps, and reducing disruptions associated with emergency drought barriers. Ratings from the evaluation suggest improved water quality and supply reliability with all three new concepts performing much better than the No Action alternative. There would be improvements in salinity conditions for water use and consumption under a variety of flow conditions, as well as a net reduction in potential entrainment of protected fish, which currently limits the reliability of water operations. In addition, the project is projected to reduce the need for salinity control barriers on False River under severe drought conditions.

Objectives	No Action	Concept A	Concept B	Concept C
Water Quality & Supply Reliability	3.3	7.3	7.0	6.7
Water Quality: Human Uses (salinity)	3.0	8.0	7.0	6.0
Emergency Drought Protection	2.0	7.0	7.0	7.0
Supply Reliability (entrainment)	5.0	7.0	7.0	7.0

FLOOD PROTECTION

Project objectives call for improved flood protection, where possible, and avoidance of any adverse flood impacts. Ratings from the evaluations suggest all three concepts would benefit flood protection levees by enhancing remnant historic levees around the Tract that provide wave sheltering. Flood modeling suggests that none of the three project concepts significantly alter high water levels compared to the No Action alternative.

Objectives	No Action	Concept A	Concept B	Concept C
Flood Protection	4.0	7.5	7.5	7.5
Sheltered Levee	3.0	10.0	10.0	10.0
Flood Risk Reduction	5.0	5.0	5.0	5.0

CONSTRUCTION

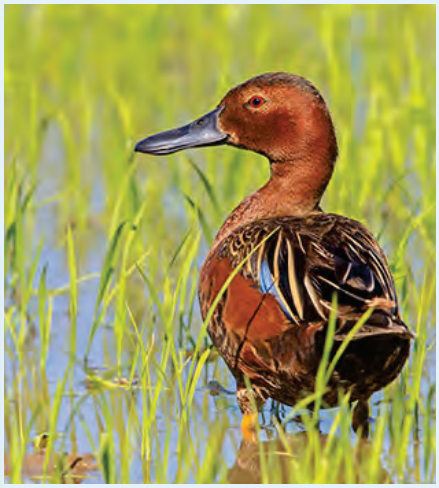
Project objectives are to minimize or mitigate construction impacts in both the near and long term. Ratings from the evaluation leave no doubt that the construction period for any of the three proposed concepts would have near-term impacts on the local community and use of Franks Tract. Activities such as dredging and materials transport would be ongoing over a period of years, as would noise and changes in navigable routes. Staging future construction to accommodate tract uses and key hunting or fishing periods could help mitigate impacts. On the benefit side, as discussed above, the project would reduce periodic impacts over the long term from construction of emergency drought barriers.

Objectives	No Action	Concept A	Concept B	Concept C
Construction Impacts	6.0	4.0	4.0	4.0
Construction Period Impacts (short term)	10.0	1.0	1.0	1.0
Drought Barrier Impacts (long term)	2.0	7.0	7.0	7.0

PROJECT COSTS

Project objectives call for minimizing construction costs, as well as long term operations and maintenance costs. Though detailed cost estimates are not yet available, any evaluation would conclude that both construction and long-term operations and maintenance costs would be much higher for any of the three Concepts relative to the No Action alternative. As described above, however, the project would reduce long term costs for levee maintenance, and drought barrier construction and removal. Costs could potentially be reduced for nuisance weed management. As the project evolves, 'who pays' needs to be aligned with the agencies and organizations with the most to gain. A commitment to long-term operations and maintenance funding would also need to be in place before any project could move forward. A major consideration for the project overall is whether the potential increased costs are warranted by the potential for multiple objective project benefits.

Objectives	No Action	Concept A	Concept B	Concept C
Total Cost: Construction and O&M	$	$$$	$$$	$$$
Construction Costs	0.0	$$$	$$$	$$$
Operations & Maintenance Costs	$$	$$$	$$$	$$$



Arriving at a Preferred Concept

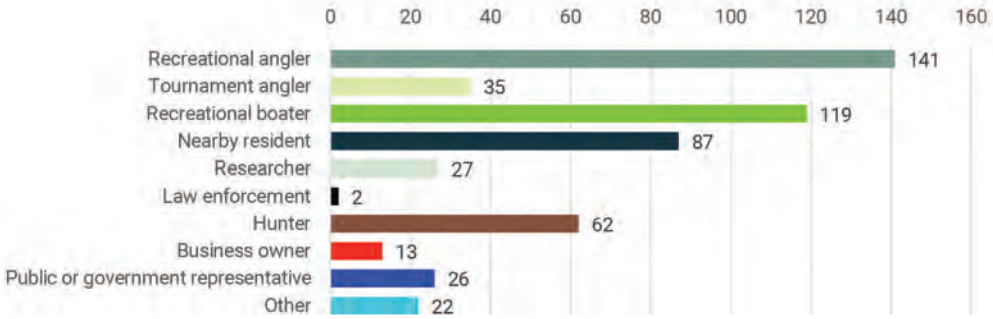
In spring 2020, the Advisory and Steering committees selected Concept B as offering the best balance between project objectives and the best opportunity to improve local conditions. According to the results of a written questionnaire completed by committee members in the March 2020 workshop, Concept B ranked first, followed in order of preference by C, A and the No Action alternative. In Concept B, committee members like the combination of open water adjacent to Bethel Island; relative proximity of the beaches, day use area and other land-based recreational features to Bethel Island; and the creation of two open water areas, each relatively sheltered from waves. This preference was confirmed based on the evaluation and rating results, as interpreted and weighed through the values of each committee member.

Later in spring and summer of 2020, the planning also solicited public preferences, comments and questions on the design concepts and No Action alternative through an online survey platform. Some of the results of the survey appear in the charts and maps on the following pages, but are detailed in Appendix A.

The survey asked respondents to rank the three landscape design concepts and the No Action alternative (NAA) for Franks Tract in terms of preference on a scale of 1-4. As shown in the chart below on average, the NAA was the lowest-ranked, but only by a small margin with concepts A and C slightly more preferred. Currently. Design Concept B (Central Landmass) is the most preferred by survey respondents, which was also the most preferred concept among the Advisory and Steering committees. The committees' Concept B was preferred by a considerably larger majority, however.

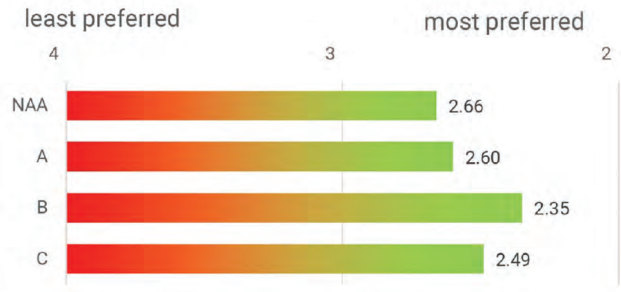
Which of the following categories do you most identify with?
(multiple answers can be given)

Total single category count



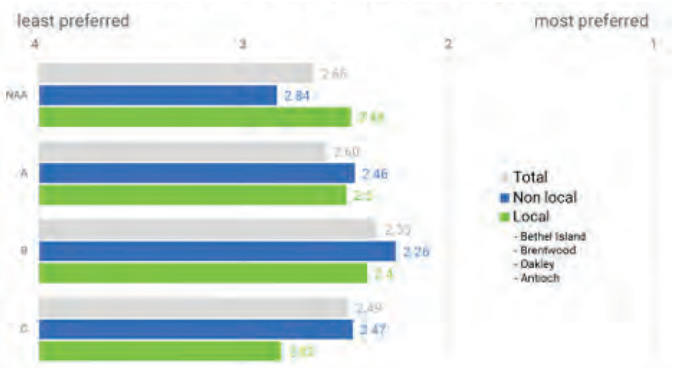
Users were asked to pick multiple categories they identify with, which resulted in a plethora of hybrid categories (see Appendix A).

Final Rankings of Design Concepts from Public Survey



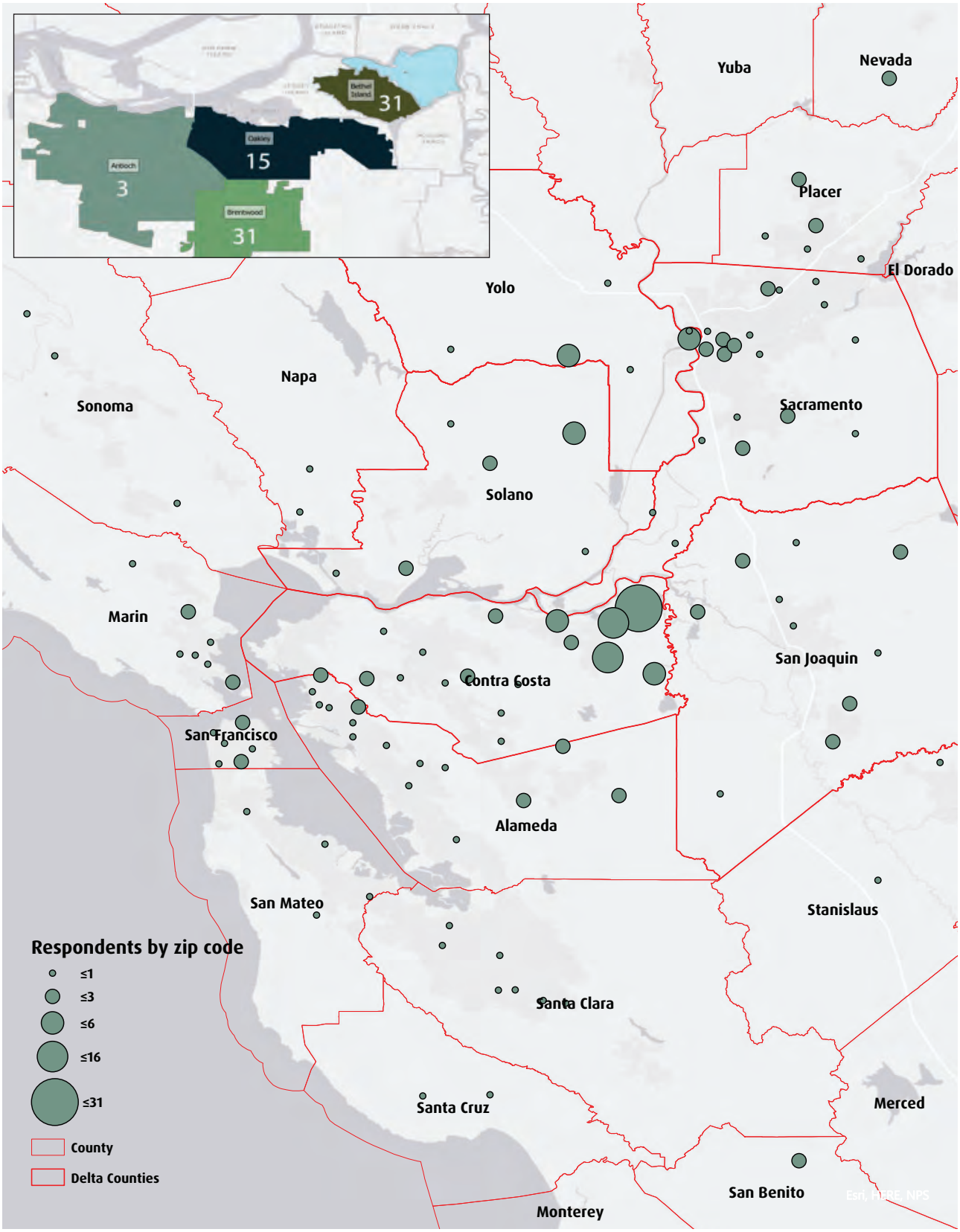
Concept B was the most preferred design by survey respondents. On average, there was similar support across the NAA and concepts A through C. Although 36 (39%) respondents chose the NAA as their most preferred option, over two times as many people (75) selected at least one of the three design concepts as their most preferred, suggesting significantly higher preferences overall for the design concepts.

Overall Comparative Ranking of Design Concepts: Local vs. Regional



Ranking based on the respondent's zip code location,comparing local (Bethel Island, Oakley, Antioch, Brentwood) responses (32%) to non-local respondents (68%). The preference for the NAA was slightly higher among local respondents compared to non-local. A similar difference was observed between respondents from Delta and non-Delta Counties. Thus although the overall top preference for Concept B was consistent across all geographic scales of respondents (local, Delta, and regional) preference for Concept B was greatest at the regional scale.

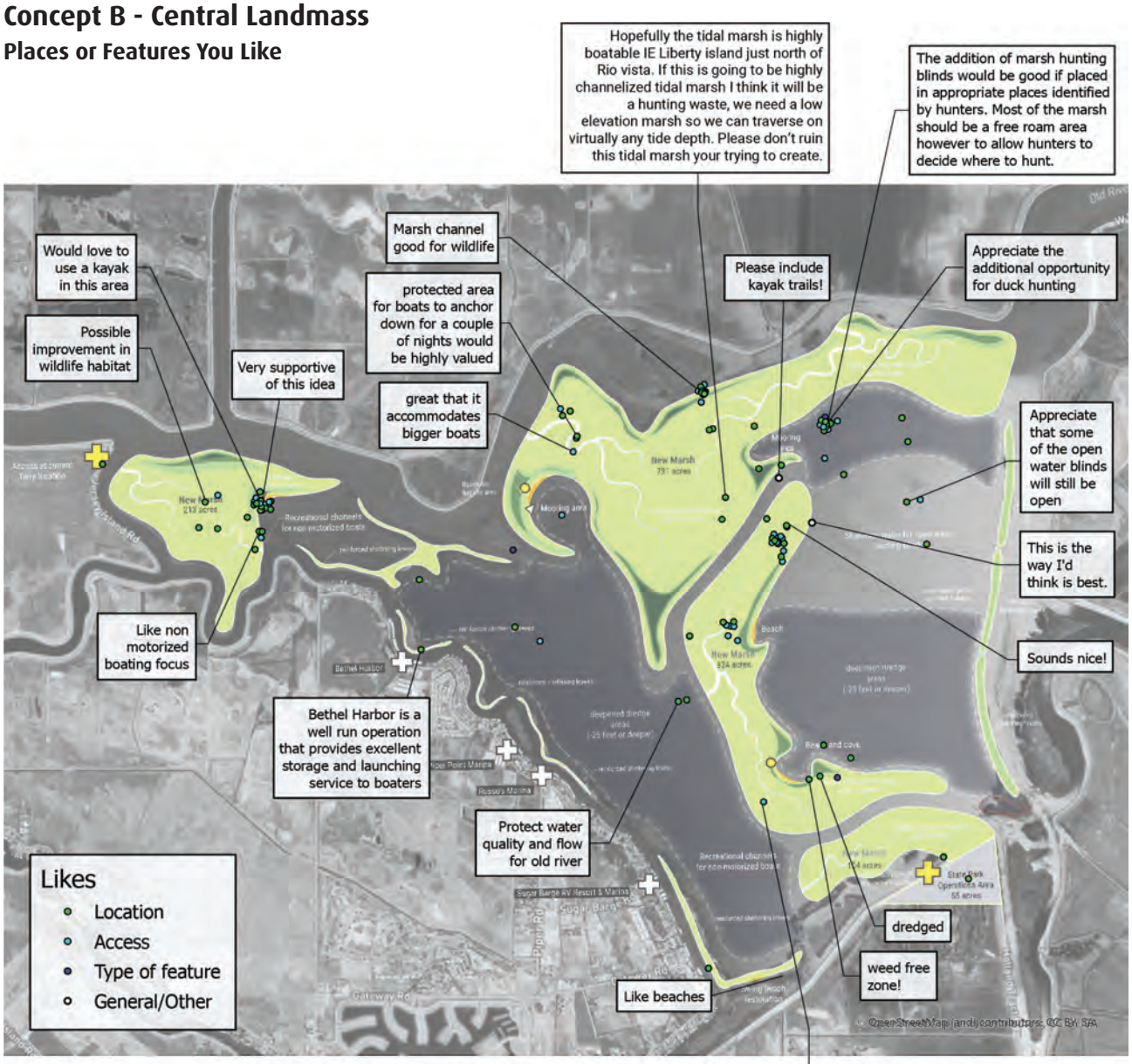
Residential Zipcode of Survey Respondents



Map showing survey respondent count by zip code. Delta counties are shown in darker red. Approximately 72% of respondents listed a zip code located within a Delta County; 32% of respondents were from Bethel Island, Brentwood, Oakley, or Antioch, and therefore considered local.
INSET: Number of local survey respondents (in white) from the cities of Bethel Island, Oakley, Antioch, Brentwood), which we defined as 'local' to Franks Tract for the survey analysis. Together these local cities accounted for approximately ⅓ of respondents.

Concept B - Central Landmass

Places or Features You Like



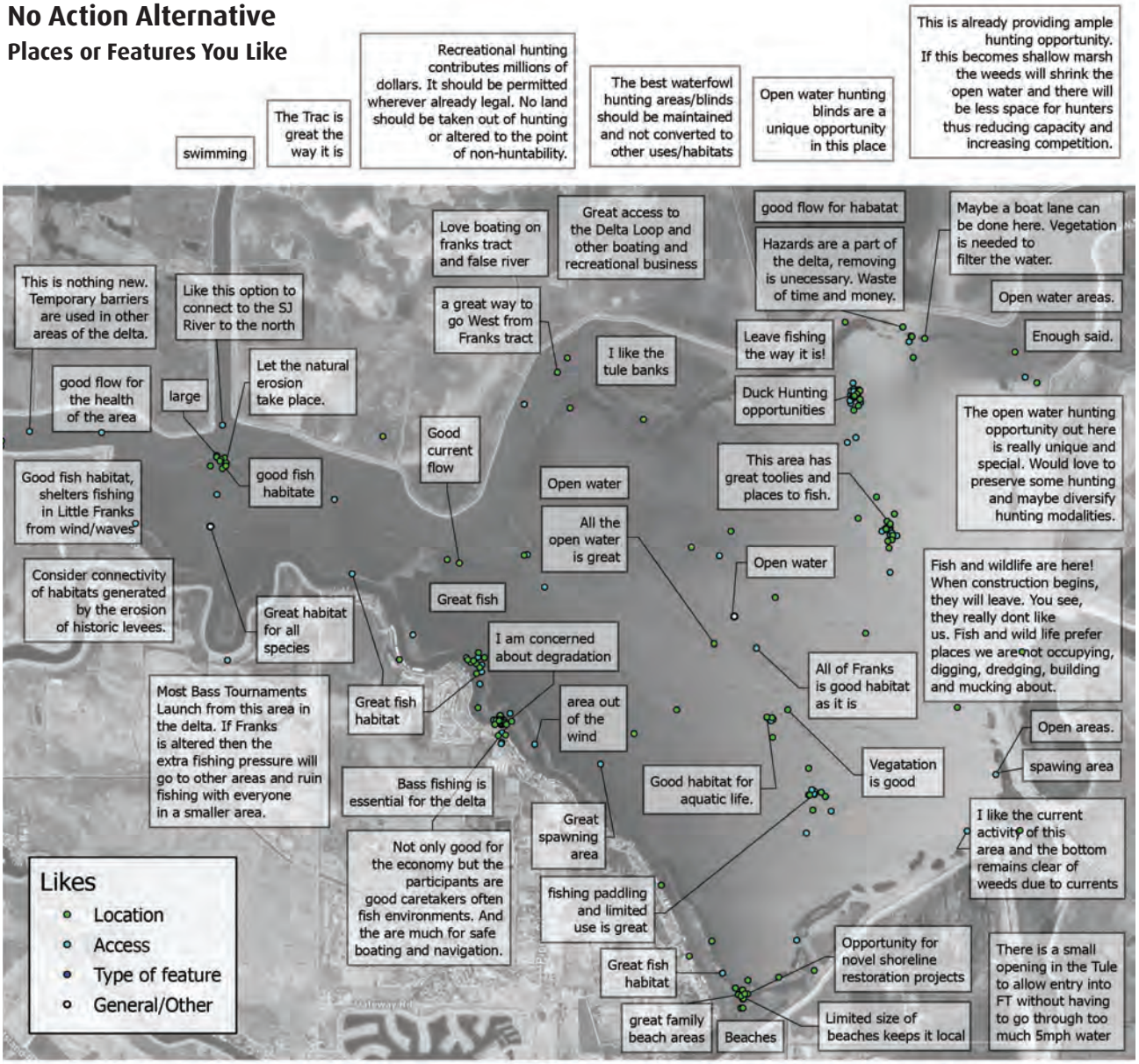
Interactive Mapping Responses

The planning team asked survey participants to mark the places and features they liked and disliked on interactive computer maps of all three design concepts, as well as the No Action alternative. Upon placing a pin, participants were asked as multiple choice questions on why they liked or disliked a feature.

The choices for the like and dislike related to location, feature, and access. Participants were also given the opportunity to make other comments and ask questions. The maps shown on these pages offer one set of examples of actual responses (see Appendix A for all 12 maps).

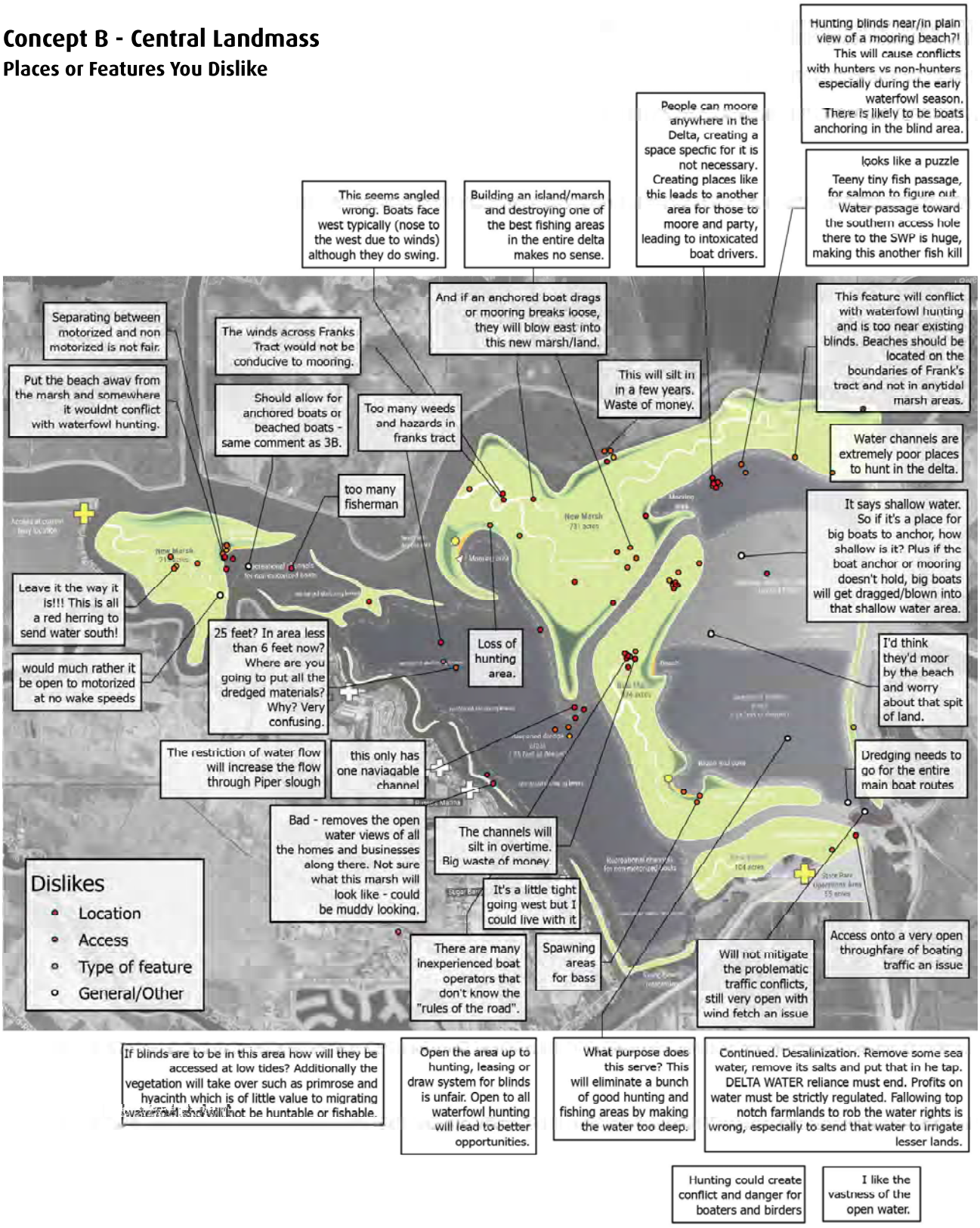
No Action Alternative

Places or Features You Like



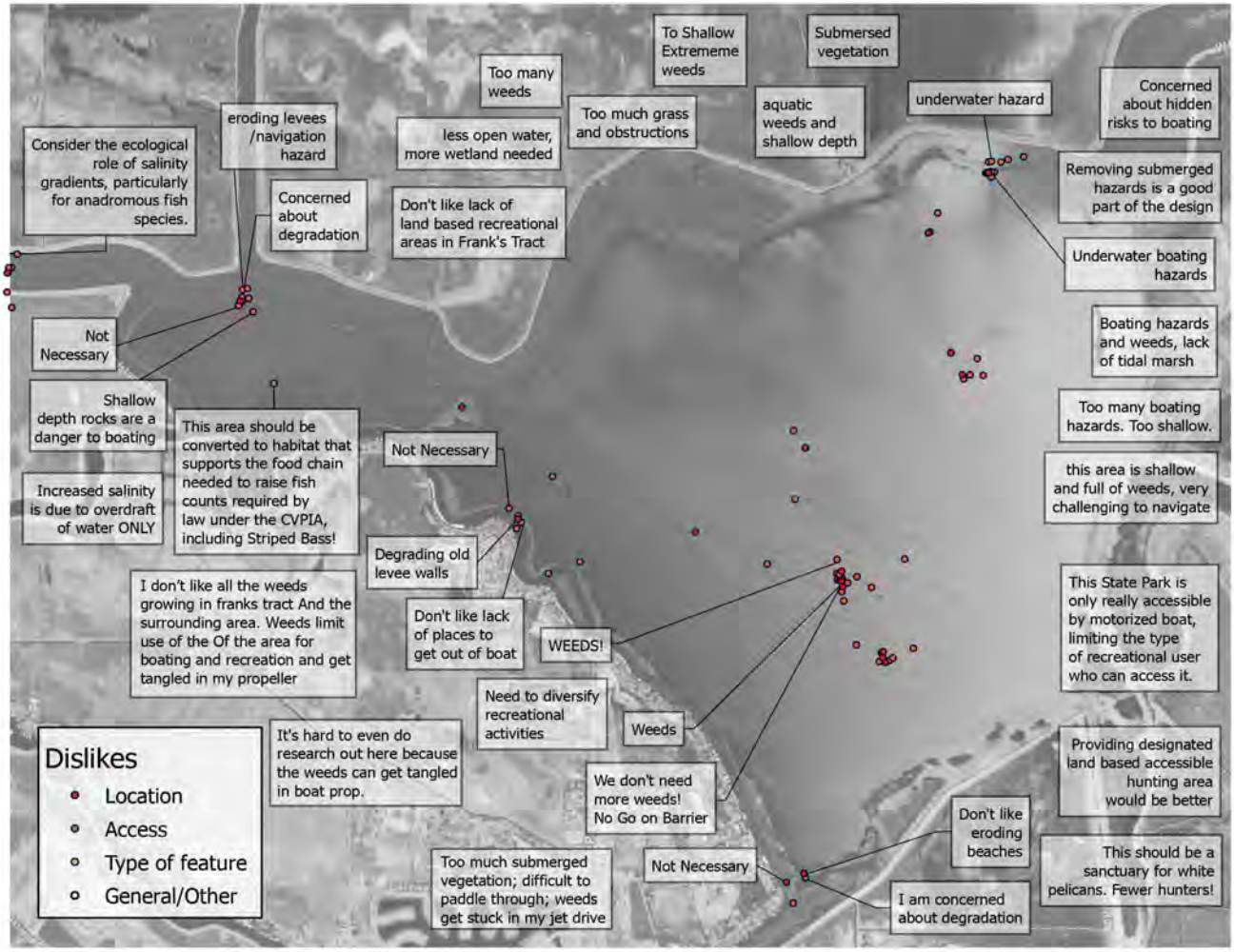
Concept B - Central Landmass

Places or Features You Dislike



No Action Alternative

Places or Features You Dislike



Take Homes from Map Mark Ups

The map-based survey results indicate that respondents provided substantial and detailed consideration (likes and dislikes) of the design concepts. This represents a significant change from the first survey for the initial feasibility study where most respondents provided only negative/dislike comments. Overall, some concerns still remain for a portion of respondents, and there are detailed design questions (such as placement of features, the design of tidal marsh land masses to optimize recreational and ecological benefits) that would need to be worked through, should the Franks Tract landscape redesign project progress forward. Based on results, the potential for a co-designed, multifunctional design concept that is able to preserve and enhance existing desirable features while developing new benefits is becoming more widely embraced.

Public Survey

Comment Summary from Map Mark Ups

No Action Alternative

When asked what they currently like in Franks Tract, respondents commented on fish habitat, fishing quality, bass tournaments, open water, waterfowl habitat, hunting opportunities, "good" vegetation, access and flow. When asked what they do not like in the Tract, respondents commented on aquatic weeds, shallowness, levee degradation, boating hazards, eroding beaches, the lack of access, dangerous currents, too much open water, salinity intrusion, and a need to diversify recreational opportunities.

Not everyone likes and dislikes the same thing. Some people find open water attractive while others prefer more marsh and shallowness, which is seen as necessary for good waterfowl habitat, but also creates boating hazards. The tract is large enough to support a diversity of features, including those where preferences are divided.

Overall Commonalities and Differences across the NAA and Design Concepts

Participants made supportive comments about the NAA focused on unique features such as open water, spawning areas, fishing, hunting, good flows, and access. Some respondents were concerned that these features might be lost or diminished if a design concept were implemented. Participants also made supportive comments regarding potential modifications that could enhance these unique existing features, address current concerns, and create new opportunities and improve Franks Tract.

Beaches were a common liked feature across the design concepts. However, there were concerns voiced about their proximity to hunting areas and the potential for them to become too popular and thus an attractive nuisance.

There was a recurrent concern voiced regarding the channel widths and navigability in the design concepts. Comments to this effect raised concerns about inexperienced boaters, the narrowness of the channels (and whether they would silt up over time), and the hazard created by adjacent tidal marsh.

In general, there was widespread support for the proposed modifications to Little Franks Tract. Some were concerned about the potential exclusion of motorized boats in the area, while others were supportive of the idea of exclusion in one portion of the Tract. Others questioned the accessibility of Little Franks Tract for non-motorized boaters.

Participants made many comments across all concepts related to hunting. Several voiced concerns about the potential eradication of existing hunting opportunities, where others appeared supportive of new marsh-based hunting opportunities, often contingent upon the resolution of access issues, and the inclusion of hunter preferences in the marsh habitat design.

The proposed modification to Holland Tip to improve navigation, which varied amongst concepts, drew many comments. Despite considerable efforts made in all the design concepts, with input from the advisory committee, to minimize risks and enhance safety, there remain concerns regarding fetch, wind, navigability, and traffic-related hazards at this dangerous corner.

Comments diverged regarding the benefits of creating marshlands and dividing the Tract into two separate water bodies. While many supported the idea based on improved navigability, habitat, and recreation, others were concerned about navigation, local businesses, aesthetics, and existing recreational opportunities. Concerns were voiced regarding mosquitoes and the marsh smell, which have been recurrent throughout the process.

Take Homes for Next Planning Round?

Based on respondent comments, the next round of planning should focus on the following:

- Resolving the issues related to the dangerous corner at Holland Tip.
- Including duck hunters, and others in the design and management plans for the proposed marshlands.
- Continuing to include stakeholders in discussions related to marsh aesthetics and the experience of boating through a channel between landmasses.
- Discussing conflicts between potential recreational activities and creatively imagining solutions based on the separation of conflicting activities by distancing them in time and space.
- Undertaking further detailed design of land-based recreation opportunities such as picnic areas, campgrounds, wildlife viewing platforms, etc.
- Developing a clearer design for a State Parks facility somewhere in the vicinity of the Tract. Holland Tip has been identified as a potential location, however, there may be others, such as Jersey Island that may warrant consideration as well.
- Building upon the significant consensus regarding the design of Little Franks Tract, consider key issues including non-motorized boating access; possible exclusion of motorized boating; habitat value for smelt and other desirable species; relationship to Jersey Island and Bradford Island, and the ferry connecting the two (including maintaining the Bradford Island terminal).

6 Preferred Design Concept

Overview

The project design for Franks Tract and Little Franks Tract establishes a large area of intertidal marsh with channels, deepens open water areas to discourage nuisance submerged aquatic vegetation, and creates water and land based recreational opportunities. The design attains all project goals, discussed in detail throughout this section.

The preferred design concept was chosen by stakeholders, advisors, and the public after a year-long collaborative process (see Sections 3-5). The preferred concept creates two, large open water areas in Franks Tract, connected by tidal wetlands and deeper navigable channels. The eastern water body features sheltered coves and recreational features, with the marsh landmasses helping to reduce prevailing winds and waves.

Re-establishing tidal marsh and associated channels would require raising selected areas 8-11 feet as Franks Tract is currently subsided below sea level. Water depths at the lowest tides range from 6-8 feet (MLLW). To fill proposed new landmasses to elevations where marsh plants can grow, some areas of the Tract would be dredged (see Section 7).

The preferred concept would restore 1,370 acres of intertidal habitats, marsh and tidal channels within Franks Tract and Little Franks Tract. About 1,900 acres of shallow water (less than 6-8 feet) and 1,000 acres of deep open water would remain on the Tract.

KEY ELEMENTS OF THE DESIGN

Build a central tidal marsh landmass which maintains open water in front of Bethel Island, creates accessible land-based recreation, and impedes salt water movement from the western Delta to the south Delta.

Use over 37 million cubic yards of on-site fill material to create approximately 1,370 acres of emergent marsh, tidal channels, and associated upland habitat and 1,000 acres of deep water (greater than 20 feet) habitat.

Creates approximately 21 miles of tidal marsh channels.

Create 5 sheltered beach locations.

Establish a designated non-motorized recreational area.

Improve 12 miles of remnant levees around Franks Tract and Little Franks Tract to shelter flood protection levees and adjacent waterways from waves.

Recreational access would be maintained from the Bethel Island marinas. Additional public access is proposed at a new 55-acre State Parks Operations Area at the northern tip of Holland Tract.

The project design also divides the Tract in a way that improves water quality conditions and reduces salinity intrusion in the central Delta while maintaining navigation routes through Franks Tract to surrounding areas from Bethel Island. One big change in the landscape configuration from earlier (2018) designs is that False River remains an open, navigable channel, with enhanced connection to new tidal marsh.

This chapter discusses how the preferred concept performs in meeting objectives for navigation, recreation, local economy, ecology, water quality and supply reliability, and flood protection. Construction objectives for the preferred concept are discussed in Section 7.

NAVIGATION

Overview

Franks Tract is heavily used and valued by boaters due in part to its fast water channels and easy access to multiple destinations. Boaters use Franks Tract as a way to get from one side of the Delta to another, taking many different routes to access a variety of locations. Creating the proposed tidal marsh landmasses within Franks Tract will affect most navigation routes, but properly located and designed channels through the future landmasses will allow fast water boating to continue.

Boating on Franks Tract does not come without challenges and dangers. Parts of Franks Tract are very shallow; many have become choked with aquatic weeds. In addition, remnant tree stumps and branches protrude above the water level at low tide, or worse, lie hidden right below the water surface. Other hidden hazards include degraded remnant levees and riprap. Boaters who are "in the know" avoid the worst of these areas, however new boaters are often caught unaware. The California Division of Boating and Waterways works to minimize weed growth and to remove weeds and boating hazards, however the high acreage of hazardous area across the Franks Tract makes it challenging to sustain an effective level of management.

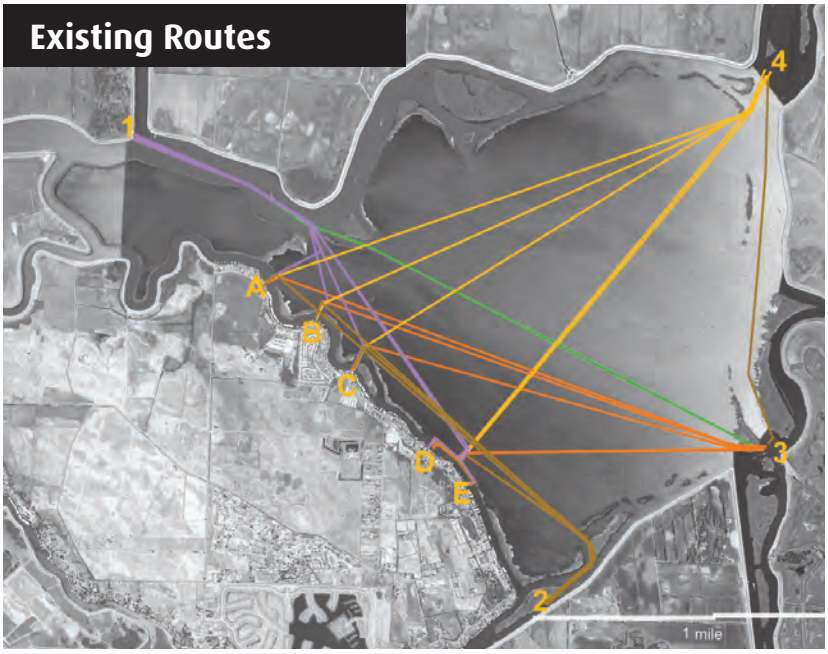
Boaters also enter and traverse Franks Tract through numerous levee breaks, where conditions can be dangerous. Boaters passing through these breaks often enter directly into waves that form across the vast open water of the Tract. Challenging boating conditions are

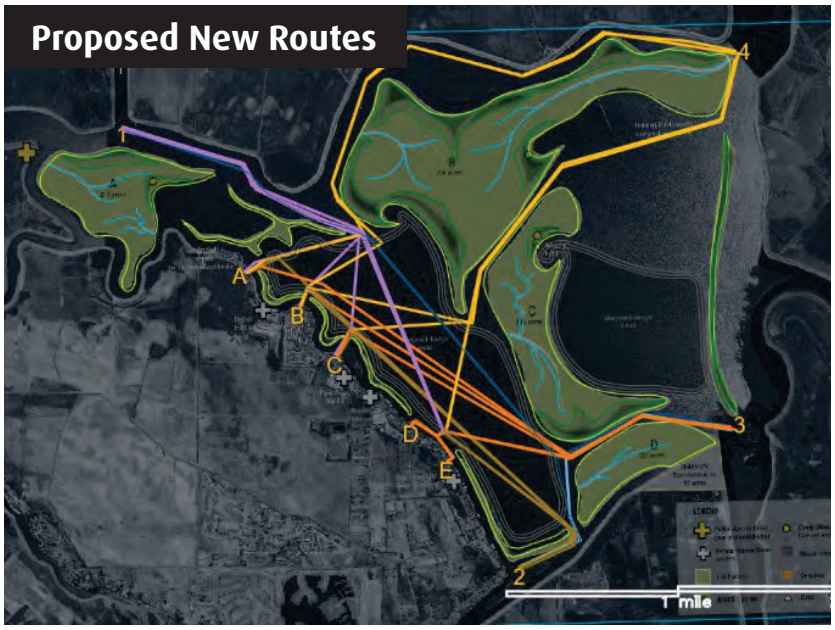
Photo: Brett Milligan

compounded at the southeastern corner of Franks Tract, where four navigation channels intersect in a location with limited visibility.

Objectives of the Franks Tract project include maintaining or improving the navigability of Franks Tract and minimizing potential conflicts between navigation and recreation.

The preferred design concept maintains open fast water channels, and easy access to multiple destinations. Other navigational benefits would be a reduction in existing hazards and nuisance conditions such as aquatic weeds and submerged hazards left over from flooding of the Tract, as well as a reduction of hazards at a variety of entry points to Franks Tract.





Boating Travel Distances

Fast water navigation routes between key locations are critical to local boaters and recreational users. Finding a way to allow for fast and safe boat navigation through Franks Tract while meeting the water quality objectives was a key planning concern.

Key locations for boat travel were determined with input from stakeholders and the public on Existing Routes map. Key navigation routes are:

- North Bethel Island to south Bethel Island (parallel to Piper Slough) (1 to 2)
- Bethel Island openings to southern corner of Franks Tract (Roosevelt Cut) (ABCDE to 2)
- Bethel Island openings to Holland Cut (ABCDE to 3)
- Bethel Island openings A, B, C, D, and E to NE corner of Franks Tract (ABCDE to 4)
- Bethel Island openings to Fisherman's Cut (ABCDE to1)
- Fisherman's Cut to Holland Cut (1 to 3)

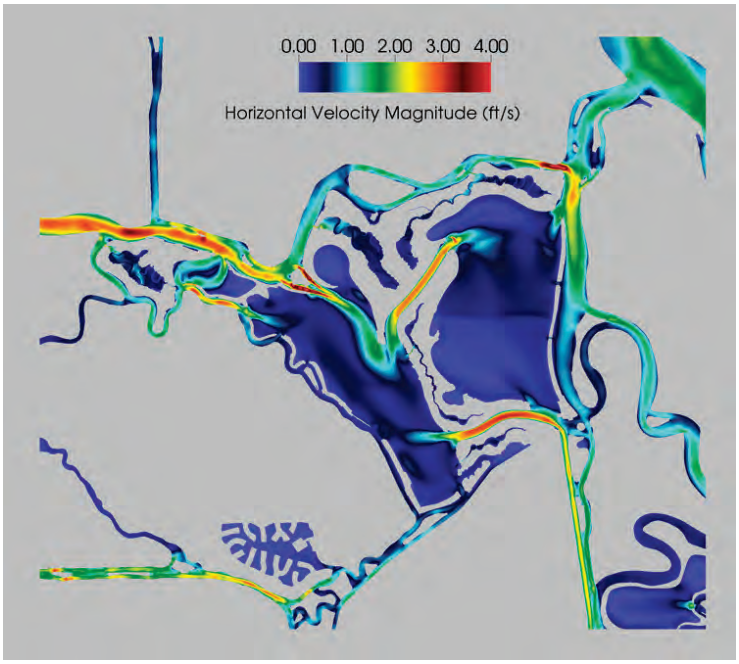
The planning team calculated the boating distance for each key navigation route under both existing conditions and the preferred design concept.

The preferred design concept maintains primary routes through the Tract with slight increases in travel distance. The preferred design concept maintains all boating routes as fast water without no wake zones. With these considerations, the preferred concept adds an average 8% increase in travel distances for key navigation routes, while improving the navigability of these routes through channel deepening and weed reduction.

Designing Channels for Fast Water Navigation

Different types of boats navigate and pass through Franks Tract, including motorboats, bass boats, ski boats, non-motorized kayaks and sail boats. These vessels can take any route, however most routes are compromised by snags, debris, or submerged vegetation. Creating tidal marsh landmasses, as proposed in the preferred design concept, will limit navigation to the through-channels between the landmasses. In designing for continued fast water navigation through these channels and the proposed marshes, the planning team made the channels as wide and deep as possible, while still meeting the project goal for water quality.

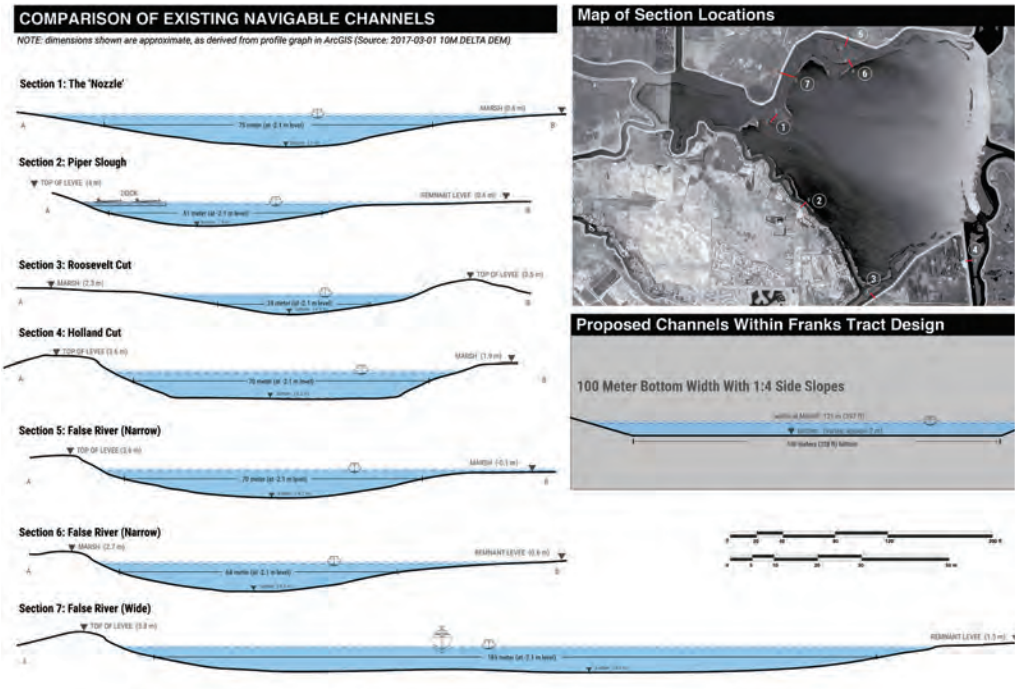
The preferred design concept includes through-channels 100 meters (330 feet) wide (similar in width to nearby Holland Cut) and 7-8 feet deep, sized to allow fast, two-way boat travel. The planning team modeled channel widths to confirm consistency with meeting the project goal for water quality (see below). The preferred concept also improves navigation by deepening channels, creating conditions unfavorable to the colonization of aquatic weeds, and removing hazards.



Modeled velocities at new entry points and intersections within a redesigned Franks Tract.

Boating Hazards

Boat entry into and out of Franks Tract can be somewhat hazardous from the east into Franks Tract, including from Old River on the northeast, Old River on the east, and Holland Cut on the southeast. Local stakeholders note that the long fetch and subsequent high waves at the eastern end create these hazardous conditions. In addition, the entry at the southeast corner of Old River/Holland Cut is especially hazardous due to impaired visibility at the intersection of five major channels. At another entry point, from False River on the northwest, high water velocities and existing levee remnants and snags create more hazards. As described above, submerged debris and snags, shallow water, and aquatic vegetation augment boating hazards throughout Franks Tract.



The preferred design concept calls for dredging to create landmasses and improve channels, which would remove many existing boating hazards. Dredging to create more extensive deeper areas on the Tract will reduce the potential for the shallow water weeds. The preferred concept includes other measures to improve boating safety such as removing existing underwater snags and hazards, sheltering the more wave-exposed eastern entrances to the Tract, and redesigning a safer entry from the southeast corner. Velocity models indicate that typical flows through the designed channels will be safe for motorized boating in all but rare extreme conditions, comparable to velocities in existing channels in the vicinity.

Minimizing Navigation and Recreational Use Conflicts

Maintaining navigation and improving recreation are both objectives of the Franks Tract Futures project. Water based recreation in Franks Tract takes diverse forms (see also next section). For example, bass boaters in a tournament may zoom from one side of the Tract to the other, searching out the best fishing spot, or aiming to get their catch in before deadlines. Kayakers may want to paddle slowly and watch birds, or sit in one place and fish. Larger motor craft may want to cruise up north to reach other recreation destinations. Meanwhile, visitors to any new beaches or shoreline amenities may want to launch kayaks or stand up paddleboards, or water ski. Allowing for all uses can be done within properly designed and sited areas that minimize placement of fast water channels adjacent to areas designed for other recreation activities. Nevertheless, if boat traffic is increased dramatically and holding capacity is exceeded due to increased recreation, conflicts may arise.

The preferred design concept sites recreation uses so as to minimize conflicts with fast water navigation. The planning team designed Little Franks Tract for non-motorized craft with no fast water navigation channels. They also placed mooring areas away from fast water navigation channels, and protected beaches from wind, waves and fast water.

RECREATION

Overview

Franks Tract supports a wide variety of recreation uses, including a world class bass fishery, waterfowl hunting, and various motorized and non-motorized boating activities. Before surrounding levees eroded, they provided boat-in access to fishing, walking, and nature viewing on their remnant shorelines.

Franks Tract also includes a State Recreation Area. Recreational use of the area is limited to boaters, anglers, and hunters. A General Plan for the area was prepared in 1988 (see Section 2, p.11) and has not been updated since that time. The 1988 plan identified a lack of a recreational land base, and thus its land use and development goals call for additional landforms, including the creation of beaches and vegetated upland areas for low intensity recreational use, while limiting the area to boat-in visitors.

Delta waterways have long been favored for recreation, primarily boating and water sports, along with fishing, hunting and day use picnicking and camping. These traditional activities and patterns of use should all be considered in planning for a future Franks Tract, however the design process opens up some new opportunities. New waterway and water body shapes, sizes and orientations could make the area more amenable to new types of recreation and safer and more pleasant for traditional activities.

A Franks Tract project objective is to enhance existing recreation uses, as much possible, while creating or expanding opportunities for new types of recreation.

The preferred design concept integrates diverse recreational improvements with consideration for, and benefits to, the local economy. The scale and diversity of these features has the potential to foster unique and regionally distinctive recreational experiences and a sense of place.

Fishing

Franks Tract currently supports a world-class bass fishery and many annual bass fishing tournaments (including striped bass, largemouth bass and other black basses). Other sportfish caught in Franks Tract include salmon, catfish, perch, and sunfish/panfish. There is no shoreline fishing activity within Franks Tract as there is no legal access to the shores.

Maintaining, improving, and creating recreation areas are companion goals to goals for tidal marsh restoration in the Franks Tract 2020 project. Restoring tidal wetland habitat will support native fisheries and improve recreational fishing.

The preferred design concept improves the recreational fishing experience at Franks Tract, primarily through enhanced sportfish habitat (see Ecology, p.54). Access to fishing from a boat at Franks Tract is presently through private marinas, predominantly on Bethel Island. In order to help maintain and enhance the local economy, no additional public boat launch points are planned on Bethel Island. The project plan does propose shoreline fishing access on Jersey Island, and perhaps Holland Tract along with non-motorized boat access. The project may increase conflict between anglers and other recreationists or boaters, depending on the popularity of proposed additional features in the project.

Motorized Boating

Water sports areas require a large open body of water somewhat sheltered from waves (with shorter fetch), ideally adjacent to beaches and mooring areas. The open water area should be large enough to allow for fast boats navigating across, water skiing/wakeboarding, as well as have quiet edges for fishing and non-motorized boating.

The Delta has a shortage of beaches, as well as places to simply get out of a boat and walk around.

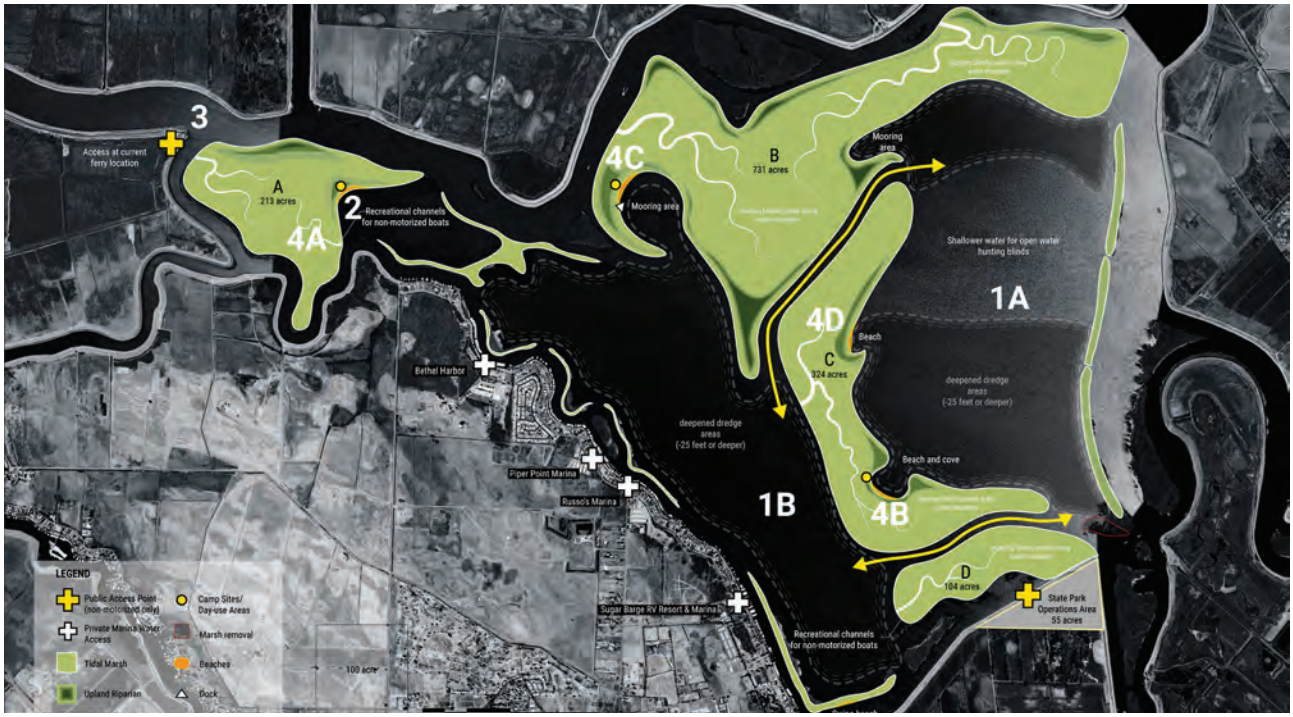
Based on input from the Advisory Committee, a good beach should include sandy surfaces adjacent to active water sports pools and sheltered from winds coming from the west and northwest by landmasses and vegetation. A good beach should also be close to (but safe from) take-off and landing spots for water-skiers and wake-boarders.

Day use facilities should be large enough to accommodate multiple and various users, and include shade (either trees and/or shade structures), picnic tables, access to beaches, and perhaps a barbeque and coal disposal facility.

Mooring facilities should allow larger boats that cannot be directly beached to tie off and access beach and/or day use areas. Facilities should only be for larger boats (>20′) and would allow for a reservation system for day or overnight. Mooring areas should be protected from wind and waves.

All of the above should also be situated whenever possible near restrooms.

The preferred design concept offers desirable water and sculpted landforms for recreation. It features two major open water areas perpendicular to the prevailing summer winds, providing shelter from wind and waves (see 1a and 1b on map). The project sites the widest pool on the eastern side, encouraging most of the water sports activity to locate in that area. The marsh islands between the two pools could accommodate land recreation activities with a desirable east facing orientation, sheltered from afternoon glare and wind. Marsh Islands would also provide opportunities for water-based recreation in and along their channels, such as birding, nature observation and seasonal hunting (discussed below).



The preferred concept would create two open water areas east (1A) and west (1B) of the central landmass, a sheltered water area in Little Franks Tract for non-motorized boating (2), a potential public access point on Jersey Island (3), four new beaches (4A, B, C, D) and improvements to Swing Beach, mooring areas (triangles), and several potential day use areas (circles).

The preferred design concept has three focal points for boat-to access to recreational activities that would attract three different user groups. The design pairs the eastern open water area with the active water sports enthusiasts; the Little Franks Tract with non-motorized boaters and paddlers; and the north end of the western open water area with those operating larger boats (see map above). The project proposes a cluster of facilities in each location to serve these users. All three have a beach and day use facilities and the two adjacent to the larger open water areas also have a protected area for boat mooring.

The preferred design concept also provides smaller boat-to sites, including four potential new beaches. Nearly all of the Delta shorelines and levees are privately-held and the most common request from the public and stakeholders is for shoreline destinations.

Non-motorized Boating

Boats without motors, including kayaks, stand up paddleboards, canoes, and sailboards, are increasingly popular. Many sports enthusiasts enjoy combining motorized boating with non-motorized boating (such as paddle boarding while moored) and non-motorized boating with nature viewing. Little Franks Tract was a destination for nature lovers in these kinds of boats until it became unnavigable.

The preferred design concept creates natural and restored wetlands that include destination areas with beaches, where people may want to pull small boats ashore to picnic, swim, or launch stand up paddleboards or kayaks. The design specifies Little Franks Tract as an area for non-motorized boating with a no-wake zone. The design includes a day-use and beach area oriented for non-motorized recreation, providing a focal point for access to restored tidal lands with slow channels for wildlife viewing.

Shoreline Recreation

As described above, Franks Tract has historically offered little access to the shoreline for hikes, picnics or shoreline fishing. Day use facilities and campsites would attract more visitors to Franks Tract and should be designed to accommodate multiple and various types of users.

The preferred design concept allows for shoreline recreation from Jersey Point and/or Holland Tract, but not from Bethel Island. This design protects the existing Bethel Island businesses who provide water access to the Tract. Any new shoreline facilities could include fishing piers, restrooms, picnic tables, wildlife viewing trails, shade structures, parking, and non-motorized boat access.

Hunting

Waterfowl hunters have historically visited Franks Tract for sport through a regulated system of permits for use of state hunting blinds, small structures that hide hunters from wildlife. Administering the permits for this unique system is one of State Park's primary management activities in the State Recreation Area. Management entails running the permit process for 54 hunting blind locations, as well as patrol and enforcement during the hunting season. Local hunters highly value the current hunting blind registration system and would like to see it maintained into the future.

The Franks Tract project would significantly change recreational hunting activity. Impacts to current shallow water hunting locations could be somewhat mitigated through the creation of marsh-based and free-roam hunting opportunities, as well as open water blinds in new deeper water areas and new upland habitats for breeding waterfowl.

The preferred design concept reduces the number of existing hunting blinds but improves upland habitat for breeding waterfowl and potentially creates new blinds in deeper water and opportunities for marsh-based hunting. The preferred concept assumes the loss of between 29 (62%) and 36 (77%) of existing open water blind locations, depending on the viability of deeper water blinds. Blinds could potentially be installed in the new deeper water areas but would require different techniques for securing them (such as floating blinds and/or the use of a buoy system). The deeper open water areas created by dredging will attract different waterfowl (diving ducks) than shallow water areas (dabbling ducks).

Approximately 50 new marsh-based hunting blinds could be created around constructed ponds and along the new marsh channels. As designed, the result would be a net gain of between 14 and 21 blinds above the current 54 maximum permits. Alternatively, a lesser number of fixed blinds could be permitted within the new marshes to allow for free range hunting opportunities. Free range hunting enables hunters who might not have the resources to own or create blinds to hunt, as well as allowing for movement and creativity in hunting techniques not afforded by blinds.

Interviews with hunters suggest that many will be interested in taking advantage of new marsh-based hunting opportunities, but current hunters would face a change and reduction in conditions they value. By maximizing the number of open water blinds (by adjusting the current grid to optimize for the new configuration of the Tract) the preferred design can retain hunting capacity in the area.

Strategically placed upland areas, adjacent to brood ponds, could support more local waterfowl breeding (further consultation will be required to inform the design of upland-pond complexes to optimize breeding potential).

The preferred project encourages continued hunter stakeholder input in the development of any new hunting opportunities and protocols. Stewardship opportunities - such as hunter management of hunting ponds – could provide mutual gain among agencies, hunters and members of the general public.

LOCAL ECONOMY

Overview

Photo: Brett Milligan

An economic assessment conducted for the Franks Tract 2020 project explored current conditions and potential impacts on the local economy, which revolves around Bethel Island. Bethel Island businesses benefit from proximity to visitors from the urbanized Bay Area but the island is not a traditional business location. Indeed, the economic wellbeing of Bethel Island is reliant on the popularity of outdoor recreation in the central Delta, particularly boating and fishing. Jobs data show that approximately half of the employment on Bethel Island is directly tied to recreation. Accommodation and food service are the most significant employers (pre Covid-19). Despite the Bay Area's strong recovery from the 2008-9 recession, the local Bethel Island economy supports roughly 15 percent fewer jobs than it did about 15 years ago.

While the local economy has contracted, some local businesses on Bethel Island are thriving today. A number of marinas reported successful business models that focus on unique customer groups. The popularity of largemouth bass fishing tournaments has also been a boon for Bethel Island. While participation in fishing is waning nationally and in California, largemouth bass fishing has continued to grow in popularity. With various Delta tournaments occurring weekly during fishing season, Franks Tract has been and could continue to be a central hub for this economic activity.

The Franks Tract project planning team reviewed all available economic data and also conducted in-person and telephone interviews with business owners, association members, recreation guides and participants, and residents to better understand how the project could affect the local economy, with a focus on Bethel Island. Interviews explored whether the proposed recreation and restoration plan could be good or bad for business, increasing or decreasing customer volume, spending, or other business factors (pre-Covid).

Overall, the key objectives of Franks Tract project are in line with local business goals and economic development. The project seeks to improve water quality, restore native ecology, and enhance recreation. And with the Bethel Island economy tied to the quality of local environmental conditions and recreational opportunities, specifically factors that influence boating and fishing, the proposed project is expected to sustain and grow local economic opportunity. The economic analysis is provided in Appendix C.

Improved Navigation & Safety

The current and ongoing degradation of environmental conditions in Franks Tract is a business risk, with invasive aquatic weeds generating the most concern. Likewise, conditions in some fast-water channels and intersections can be treacherous, while submerged snags and thick weeds continue to pose navigational hazards. Recent trends in environmental quality at Franks Tract and the Delta have been detrimental to recreation. While the state has taken actions to reduce invasive plants in the Delta, such as spraying herbicides, locals worry that control measures may harm fish populations and fishing.

For local businesses, if the boating and fishing conditions are first-rate, and navigation and access are sustained or improved, the prospects for ongoing local business success are strongest.

The preferred concept will benefit the local economy by improving environmental conditions and navigational safety (see Navigation p.44). The possibility that the water depths achieved by the Franks Tract project could reduce invasive weeds is seen as a positive for recreation and related businesses.

Environmental Quality

Water quality in Franks Tract is of significant concern to local business. The continued spread of aquatic weeds and increasing herbicide use are often cited as worrisome. Warmer water and continued weed growth can also result in harmful algal blooms, odors, and fish kills that aren't good for boating- and fishing-based businesses. Business owners also mentioned increasing intrusion of salt water as a concern.

The preferred design concept would improve water quality by dredging and deepening areas plagued by aquatic weeds. The project could also reduce herbicide use depending on management. The project avoids creating areas of poor circulation that would be prone to harmful algal blooms and associated problems. The project acts to block salinity intrusion with new land masses, though the small changes in salinity associated with the project are meaningful only in terms of water quality for human use. Even with nearly two feet of sea-level rise (see Water Quality p.55), salinities are still generally considered "fresh water" in terms of effects on environmental and recreational uses. The project, however, might reduce the need for emergency drought barriers disruptive to the local and state economy.

Access, Amenities & Leisure

Easy access to Bethel Island across Franks Tract is essential to the local economy. Bethel Island's historical success as a recreation economy is largely due to its central location within the Delta and convenient access to major waterways. For boaters driving in from the Bay Area, it is among the best launch locations for trips into the heart of the Delta.

The Bethel Island business community acknowledges that the Delta remains somewhat undiscovered and that the natural beauty and recreational opportunities are not well marketed. While there is some concern that increased consumer awareness of Franks Tract and economic growth could erode the tightknit community and the rustic character that makes Bethel Island so special, locals seem to agree that the economy will benefit from investment, along with marketing and branding to leverage that investment.

For boating in particular, the project introduces significant opportunities for improvement, by increasing access and re-establishing Franks Tract as a compelling destination recreation area within the Delta. Boaters, including power boaters, sailors, and paddlers, seek outings that are structured around a place to go, and the Franks Tract project could become a must-visit point of interest.

The preferred design concept increases the attractiveness and draw of Franks Tract for leisure activity, and businesses likely will benefit from new visitors (see Recreation p.43). The concept includes significant enhancements to the existing State Recreation Area. The recreation components of the preferred design include new day use areas with picnic areas and restrooms, overnight camping, mooring fields for day and overnight use, docks, beaches, and enhanced public access. These recreational improvements, in combination with successful environmental restoration and improved navigation, have the potential to increase visitation and economic activity on Bethel Island.

Competition

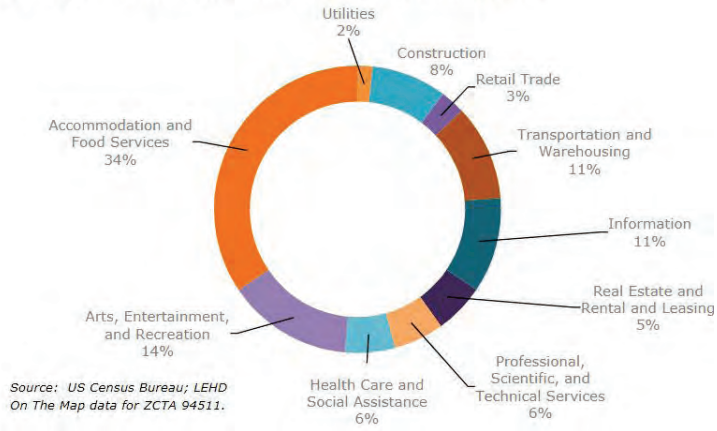
Locals are concerned that new recreational amenities will compete with local business. The most frequently voiced concern was the possibility of public boating access on Bethel Island, be it non-motorized or motorized. Stakeholders expressed similar concerns about motorized boating access on North Holland Tract at a parks facility, but were not concerned about potential non-motorized boating access at that location. The launch business is an important source of revenue for Bethel Island businesses.

The preferred design concept does not include a public boat launch on Bethel Island.It does propose a potential new non-motorized boat launch facility that would improve accessibility to Franks Tract's expanded recreational amenities. Details of this facility would need to be explored in future planning phases.

Real Estate Values

Economic research reveals that real estate with scenic or water views, nearby open spaces, and recreational opportunities achieves a price premium in the market. Residential and commercial properties on the northeast shore of Bethel Island enjoy expansive views of Franks Tract. Vegetation at the edge of Piper Slough interrupts the view slightly, but beyond that, one can see the vast waterbody and distant horizon.

Figure 5 The Bethel Island Economy—Jobs by Industry (2017)



Source: US Census Bureau; LEHD On The Map data for ZCTA 94511.

Local experts confirm that boat access to fast water and scenic views of open water are key determinants of residential real estate value on Bethel Island. Accordingly, home prices on the northeast side of Bethel Island enjoy a premium over other locations. While the west side of the Island has sunset views, Taylor Slough is weedy and westward horizon views are partially obstructed by utility lines, which undermine values.

The preferred concept locates new landmasses away from the Bethel shoreline, protecting property values derived from open water views. Despite some potential for viewshed impacts, if boating navigation improves dramatically as a result of the project, that could have a positive, offsetting effect on property values. Property values may also increase with new amenities and wildlife habitats in their vicinity.

Construction & Maintenance

Construction and maintenance of the Franks Tract project could bring new jobs to the area, and support local restaurants, services, and businesses in Bethel Island.

The preferred concept, as a design proposal, does not yet implement operations and maintenance of the Franks Tract Futures project. If the project is developed successfully but poorly managed, there could be negative impacts. If the project is well-run and maintained to high standard, with sufficient safety services, public information, and capacity control, the benefits to the local economy could be significant.

Any construction team would need to address concerns about one time impacts such as inhibited business activity, disturbed fisheries, displaced bird populations, compromised navigation, and other issues during the construction period. Strategies to minimize recreation and business impacts from construction would be implemented extent practicable (see Section 7).

Collective Benefit

Businesses on Bethel Island are working together to advocate for Franks Tract and the Delta. There is a realization among business owners that collective action is needed to avoid further deterioration of environmental quality and the local economy. Significant public investment in Franks Tract is perceived to be beneficial to the community broadly. Many of the perceived local economic benefits are derived from improved recreational opportunities, without which the project would lose support from local business owners, residents, and longtime recreational users.

The preferred concept does not create disproportionate impacts on any particular business type or location on Bethel Island. The well-distributed potential benefits of the Franks Tract project support continued business collaboration. Cohesion within the business community on Bethel Island is a positive attribute of the local economic fabric that may be leveraged to increase benefits from the Franks Tract project. The planning team recognizes that the combined depth of knowledge in the business community offers an invaluable resource for any future project development and implementation.

ECOLOGY


Photo: Rick Lewis

Before humans reclaimed vast marshy flats in the Delta to convert them to farmland and build towns, the region featured a complex network of rivers, sloughs, and tidal wetlands. The historical landscape supported native estuarine fish like Delta smelt and juvenile Chinook salmon, providing food, shelter, and migratory corridors along the marsh channels and through adjacent open water areas.

Today, the Delta's aquatic landscape is a highly altered system of levees and channels. In addition to native species, it now a supports a prized sport fishery. Approximately 97% of the historic tidal marsh has been lost (SFEI 2016). Small remnant islands of tidal marsh within False River and some of the surrounding channels are all that remain.

Characteristics of a healthy Delta ecosystem, according to the Delta Reform Act, include diverse and biologically appropriate habitats and ecosystem processes, functional corridors for migratory species, and viable populations of native species (California Water Code section 85302[c]).

Objectives of the project include establishing large areas of tidal marsh habitat for fish species of interest.

The preferred design concept would restore lost tidal marsh habitat to benefit a range of species, maintain or enhance habitat for native and recreationally important fish species, and discourage nuisance, invasive aquatic weeds.

Tidal marsh

Tidal marsh is important habitat for both aquatic and terrestrial species. Freshwater emergent vegetation grows in the marshes of this part of the Delta, predominantly consisting of tules (*Schoenoplectus spp.*), bulrushes (*Bolboschoenus spp.*), and cattails (*Typha spp.*). In the adjacent shallows, primary production processes produce dissolved organic matter, phytoplankton, zooplankton (e.g. copepods, cladocerans, mysid shrimp), insects, and detritus. Increasing this primary production, by reintroducing tidal action to Delta landscapes, supports the aquatic food web (Sherman et al. 2017). Native fish, waterfowl, and diverse local wildlife all benefit from the inputs of primary producers in tidal marsh.

The preferred design concept proposes to create approximately 1,370 acres of new tidal marsh, including vegetated (emergent) tidal marsh plain and tidal channels, with smaller areas of adjacent upland habitat. Tidal channels will consist of multiple dendritic dead-end channels ranging in sizes, similar to channels of the historic Delta marshes. Channels will be largest (deepest and widest) where they enter the marsh (e.g., adjacent to False River), and smallest at their termini inside the marsh.

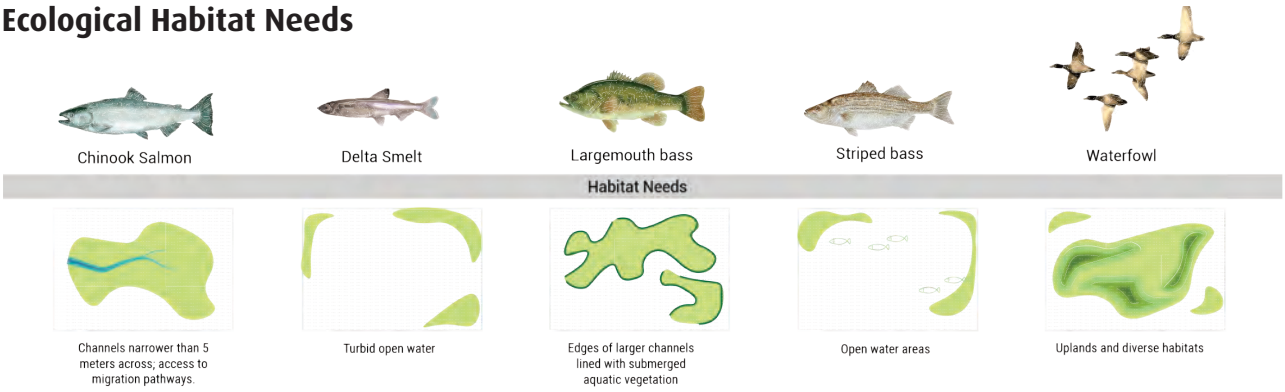
The marsh plain would be integrated with new riparian areas created along higher ground at the edges of major tidal channels to promote habitat diversity. Riparian habitat would consist of cottonwoods (*Populus fremontii*), arroyo willow (*Salix lasiolepis*), black willow (*Salix gooddingii*), box elder (*Acer negundo*), or other native Delta trees and shrubs. Though project planners have not yet developed a revegetation plan, the objective would be to reestablish native tidal marsh and riparian vegetation relying on a combination of natural vegetation colonization processes and planting of native plants. Some level of planting of native plants would be required to minimize the colonization of invasive weeds that may invade suitable unvegetated areas. Any revegetation effort would include a planting design detailing the types and locations of native plant species. The additional acreage and diversity of tidal marsh habitat planned for Franks Tract under this preferred concept would benefit both aquatic and terrestrial organisms.

Habitat for Special Status Native Fish

As noted in the prior section, the shallow-water habitats with dendritic channels and emergent wetland vegetation present in the Delta historically provided refuge and food resources for many native fish species. Current conditions represent a heavily altered ecosystem with reduced habitat and increased abundance of invasive plants and nonnative predatory fish, low food productivity, and continued risk of fish entrainment into the south Delta region (Baxter et al. 2008, Grimaldo et al. 2009). These conditions have led to a less favorable habitat for native species.

The proposed habitat enhancements for Franks Tract focus on two special-status fish species: Delta smelt (*Hypomesus transpacificus*) and Chinook salmon (*Oncorhynchus tshawytscha*). In addition to creating new tidal marsh habitat and associated food web support, planners designed the preferred concept to alter the hydrodynamics of Franks Tract to reduce regional south Delta reverse flow effects. This

Ecological Habitat Needs



change would reduce the associated risk of special-status fish species entrainment towards the state and federal water projects (pumping facilities) in the south Delta.

Delta smelt is a small fish, endemic to the San Francisco Estuary in California with a typical life cycle of one year, although some adults may live to a second year. Juvenile and adult Delta smelt are a euryhaline species (tolerant of a wide salinity range) that inhabit freshwater portions of the Delta and extend into low salinity portions of Suisun Bay. Adult smelt migrate upstream from the brackish water habitat of the low salinity mixing zone to spawn in freshwater areas. These spawning areas are primarily in the north Delta, but also include Franks Tract, beginning in December to July and August (Sommer and Mejia, 2013). After the eggs hatch, river flows and tides distribute larval smelt downstream into low-salinity habitats of the central Delta where they continue to rear through summer and fall (Moyle, 2002).

Once abundant throughout the Delta, a variety of environmental factors have led to the decline of Delta smelt, including changes in species composition and abundance of zooplankton prey species, increased potential for entrainment into south Delta water diversions, and increased predation by other fish species. Today, Delta smelt are rarely detected in state and federal sampling programs. The decline of the species has led to special-status species listings as endangered under the California Endangered Species Act (CESA) and threatened under the Federal Endangered Species Act (FESA).

Critical habitat was designated for Delta smelt in 1994 and became effective on 18 January 1995. Critical habitat is designated as Suisun Bay and Marsh and the existing contiguous waters contained within the Delta (including Franks Tract), as defined in Section 12220 of the California Water Code.

Creation of Tidal Marsh & Native Fish Habitat at Little Franks Tract

The preferred design concept restores Delta smelt habitat, consistent with goals of the 2016 Delta Smelt Resiliency Strategy and actions outlined in the U.S. Fish and Wildlife Service's 2008 Delta Smelt Biological Opinion, which requires the restoration of 8,000 acres of tidal marsh habitat. The restoration creates 113 acres of tidal marsh habitat in Little Franks Tract and additional tidal marsh in Franks Tract.

Within the tidal marsh landmass in Little Franks Tract, the design incorporates dendritic, tidal marsh channels with connectivity to Piper Slough, False River, and open water habitat in Little Franks Tract. The western portion of Franks Tract, including Little Franks Tract, is expected to offer the best restoration opportunity for improving Delta smelt habitat because it is farthest westward and closest to areas of the estuary that experience fluctuations in salinity. It is also largely separate from areas enhanced for recreationally important nonnative predator fish habitat in Franks Tract.

Riparian willow.

Chinook salmon are an anadromous fish species, spawning in freshwater and spending a portion of their life cycle in the ocean. Chinook salmon spawn upstream of the Delta in cool, clean, and well-oxygenated waters that contain adequately sized spawning gravel, instream cover, and riparian shade. Chinook salmon use the Delta, including Franks Tract, during adult upstream migration, smolt emigration, and juvenile rearing (Moyle, 2002). There are four runs of Chinook salmon within California's Central Valley that vary in migration timing and reproduction behavior, two of which are state and federally listed.

Sacramento River Winter-Run Chinook salmon are listed as endangered and Central Valley Spring-Run Chinook salmon are listed as threatened under FESA and CESA. Designated critical habitat also includes portions of Franks Tract for both special-status Chinook salmon runs. Additionally, essential fish habitat as required by the Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 USC 1801 et seq.) has been designated for all four runs of Chinook salmon. Essential fish habitat includes migration, holding, and rearing habitat in the Delta, including Franks Tract, Sacramento River, and major tributaries.

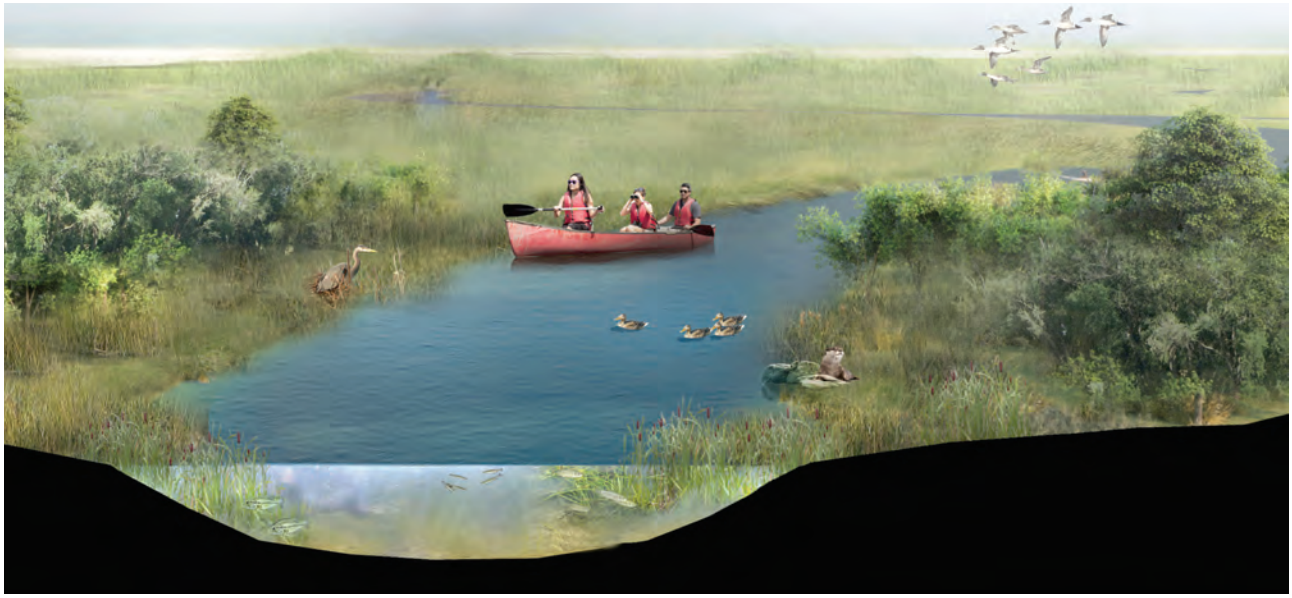
The preferred design concept would create 760 acres of tidal marsh habitat along the northern part of Franks Tract. Planners placed this northern landmass adjacent to False River with the objective of creating a protected, migratory corridor for Chinook salmon along the northern extent of the Tract. The design provides narrow, tidal marsh channels suitable as refuge and rearing habitat for outmigrating juvenile salmon. It also connects tidal channels and the marsh plain to adjacent open water, potentially increasing marsh-derived primary productivity.

Habitat for Recreationally Important Fish

People come from all around the world to fish Franks Tract for largemouth bass and striped bass. As mentioned in earlier sections on recreation and the local economy the Tract hosts numerous tournaments each year. Restoration designs for Franks Tract aim to not only improve habitat for native fish such as Delta smelt and Chinook salmon, but also maintain habitat for species important to the sport fishery.

Largemouth bass were introduced to California in the late 1800s for their sport fishing appeal. Since their introduction, largemouth bass have expanded their distribution throughout the state and are now abundant everywhere in the Delta. This warm, freshwater species prefers salinities less than three parts per thousand and shallow (generally less than 20 feet deep) open water habitats with little water current (Moyle 2002). This species also favors relatively dense areas of submerged aquatic vegetation, which Franks Tract currently offers (Conrad et al., 2016; Young et al., 2018).

The preferred design concept creates increased areas of shallow, edge habitat along tidal marsh land masses with depths less than 20 feet. Some portion of these shallow, edge habitats will likely be colonized with submerged aquatic vegetation. These edge habitats and vegetation provide largemouth bass with potential spawning habitat and foraging habitat for juveniles. Submerged vegetation supports a variety of aquatic macroinvertebrates (e.g. amphipods) which are an important component in largemouth bass diets (Weinersmith et al. 2019). Anticipated water quality improvements are not likely to substantially influence the presence or health of bass species.



Striped bass is another popular species among anglers within Franks Tract and the Delta. Introduced to the California in 1879, striped bass are now abundant throughout today's altered Delta ecosystem. Juveniles feed along channel edges while adults occupy open water, pelagic habitat. Striped bass are naturally anadromous, regularly moving between marine and freshwater environments, and spending most of their lives in estuarine conditions. Key habitat elements for striped bass include large, cool river environments with enough flow to distribute suspended larvae into the estuary, an open body of water with abundant prey fish, and protected areas for juveniles to grow by feeding on invertebrates (Moyle 2002). Velocity gradients, where there is a change in water velocity into an open water area, were expressed as desirable by the local fishing community. Such velocity gradients occur at several existing confined open water connection points between False River and Franks Tract.

The preferred design concept creates several locations with velocity gradients that are expected to be favorable for striped bass (see p.46). One location is in the north of the Tract, where velocity gradients are maintained at existing connection points. The preferred concept creates additional velocity gradient locations on either side of the central landmass and along the breaks in the eastern most enhanced levee. Planners predict that additional velocity gradients would attract striped bass similar to the existing connection points. The design also includes dredging and deepening of the open water areas expected to support striped bass.

Invasive Aquatic Vegetation

Invasive aquatic vegetation grows both on the surface (floating) and underwater (submerged) in channels and shallow waters throughout the Delta. In addition to being a boating hazard, invasive submerged and floating vegetation are ecologically undesirable for native fish species and can exacerbate algae blooms and other water quality problems by reducing circulation.

Submerged aquatic vegetation (SAV) typically consists of rooted vascular plants within slow-moving or still waters. The depth in which SAV can persist is primarily dependent on how deep sunlight penetrates into the water. The shallow depths of Franks Tract allow for SAV colonization, resulting in dense stands throughout the interior of the Tract. SAV in Franks Tract is dominated by the invasive species Brazilian waterweed (*Egeria densa*), Eurasion watermilfoil (*Myriophyllum spicatum*), water primrose (*Ludwigia spp.*), and coontail (*Ceratophyllum demersum*).

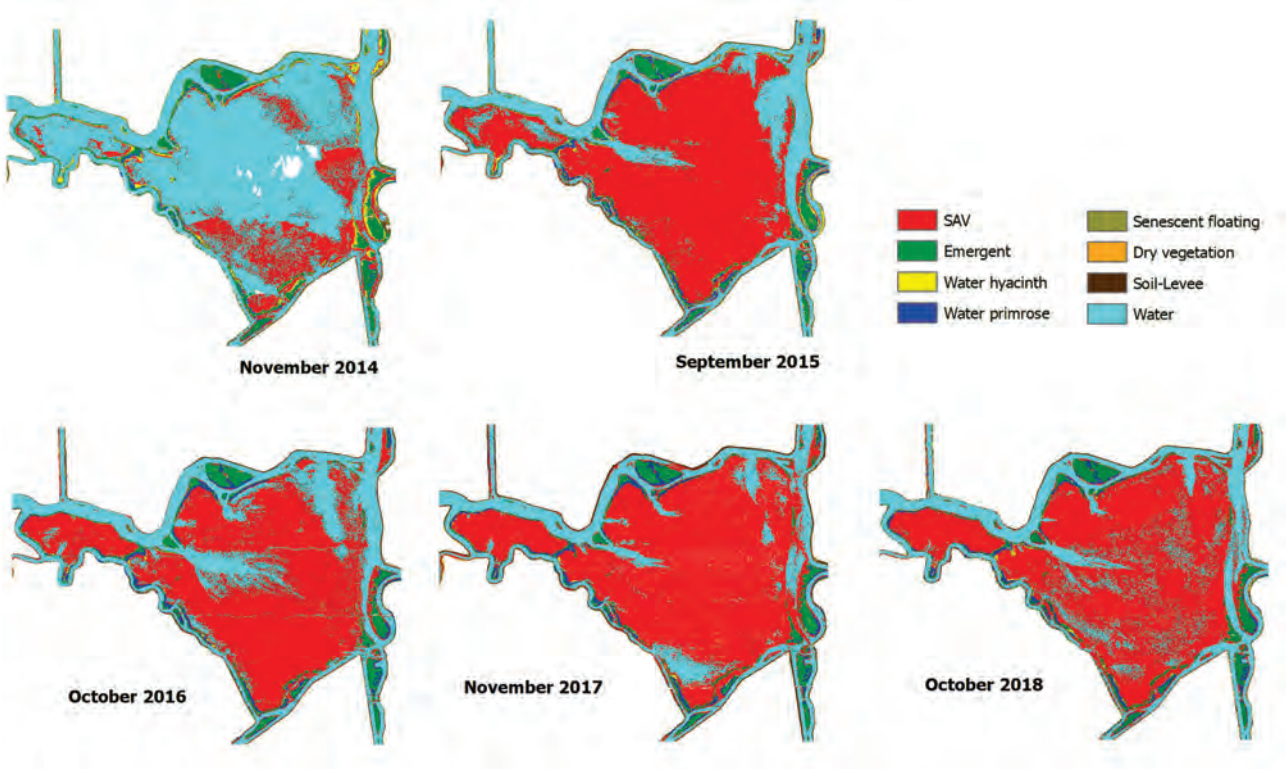
Floating aquatic vegetation (FAV) is non-rooted, free floating plants at the water's surface or within the water column. Wind, currents, and tides can circulate and redistribute these floating mats of vegetation. Within Franks Tract, water hyacinth (*Eichhornia crassipes*) is the most common species of invasive FAV. Dense mats of water hyacinth are especially a nuisance, restricting navigation, presenting boating safety hazards, and clogging waterways and marinas.

Submerged and floating aquatic vegetation covers a large portion of Franks Tract. Research by the Center for Spatial Technologies and Remote Sensing at the University of California, Davis shows trends of increasing densities of aquatic vegetation within the central Delta including Franks Tract (Ustin et al. 2017)

The preferred design concept could reduce the establishment of SAV and FAV in some areas of the project. Creating tidal marsh landmasses, for example, would reduce the total area of open water available for colonization by these aquatic weeds. Deepening portions of the remaining open water would also discourage establishment of rooted SAV.

While the preferred concept seeks to reduce the establishment of invasive aquatic vegetation, some level of continued management is expected to be necessary. The Department of Boating Waterways has been managing aquatic vegetation since 2006. Land use changes embodied in the preferred concept may allow the department to more effectively manage the site for weed control within their existing level of funding, potentially resulting in fewer nuisance weeds. If restoration were to occur, funding for weed management would need to continue.

Infrared Mapping of Submerged Aquatic Vegetation in Franks Tract



Source: Ustin S. L., Khanna S., Lay M., and Shapiro K., 2019.

WATER QUALITY

Overview

Franks Tract plays a central role in the exchange of salt, food, sediment and biota between the west, central, and south Delta. The geometry of Franks Tract contributes to a mixing phenomenon called tidal pumping, a mechanism that traps and disperses saline water and fish from False River into Franks Tract and on to the south Delta (see below).

The Franks Tract region is also a nexus of regulatory control. State Water Quality Control Board Decision D-1641 prescribes water quality standards for agriculture and water exports at locations throughout the Delta, but standards at sites in the vicinity of Franks Tract are frequently the ones that limit the amount of fresh water the state and federal water projects can divert. As sea levels rise, the water cost (associated with upstream reservoir releases) of compliance with Delta standards is expected to increase.

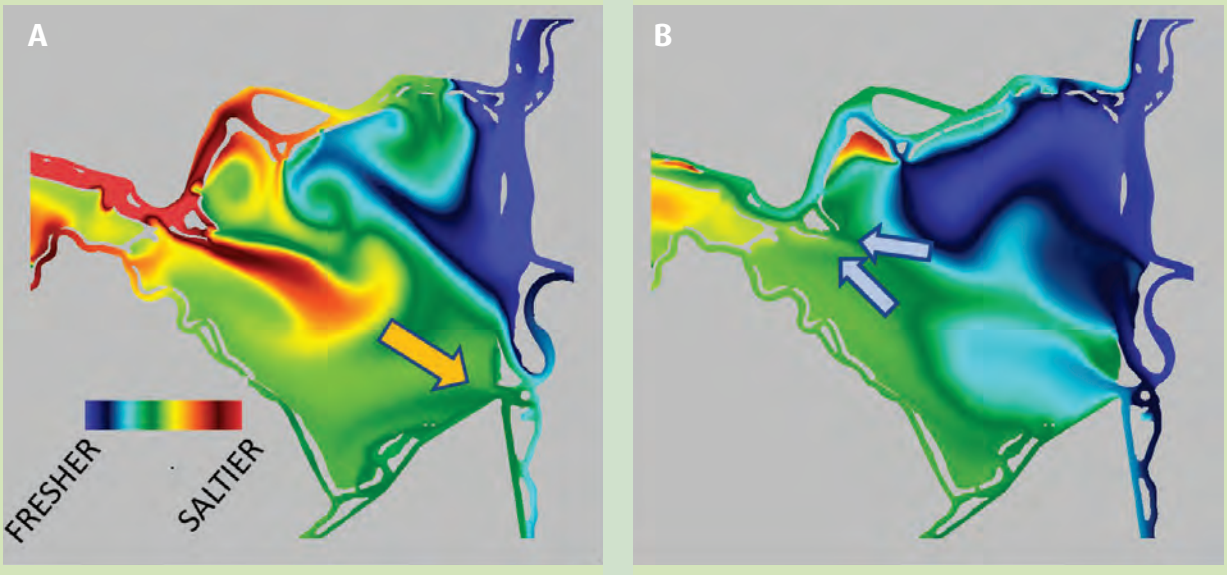
Water quality problems and difficulty meeting standards can increase with drought. Additional management measures are sometimes required to protect the fresh water corridor from salinity intrusion. In 2015, an emergency drought barrier was constructed in west False River to limit salinity transport into Franks Tract and subsequently into the central Delta. The barrier minimized salinity intrusion but was costly. It also negatively affected navigation and recreational uses of the Delta, especially in the vicinity of Franks Tract (see also p.14).

In addition to trapping and transporting salt, tidal pumping at Franks Tract can also entrain state or federally protected fish species towards the south Delta pumping facilities where chances of survival are reduced (see prior section). Presence or salvage of

Why is Franks Tract so Important to Salinity Intrusion?

Franks Tract is important to salinity transport through a mechanism called tidal pumping. Tidal pumping is a phenomenon that occurs when small inlets constrict flow entering an open water body. The figure below uses snapshots from a model simulation to illustrate this phenomenon as it occurs within the current geometry of Franks Tract. In Panel (a) a strong and narrow jet of higher salinity (red) water can be seen entering Franks Tract from False River on a flood tide through an aperture sometimes referred to as "The Nozzle." Salinity in this jet is most influenced by the San Joaquin River at Jersey Point, which in summer is higher than that of Franks Tract. Panel (b) shows the return flow from Franks Tract. It is fresher (blue and green) because the salty jet of water will have mixed with ambient water in Franks Tract and ebb flow draws from a broader area of more diluted water. Even if the volume of flow is the same in both directions, the asymmetry between a salty flood and a fresher ebb adds up and causes a net transport of salt into the central Delta.

Tidal Pumping



protected species at the south Delta pumping facilities can trigger Old and Middle River reverse flow restrictions and curtail pumping. Fish entrainment is thus both a water supply reliability consideration, as well as an ecological consideration for Franks Tract design concepts.

Objectives of the Franks Tract project include improving water quality and supply reliability.

The preferred design concept reduces trapping and transport of salts through Franks Tract, based on hydrodynamic modeling. The project improves water quality in the central Delta and reduces fish entrainment potential from the west. The project could also reduce water release from reservoirs that would otherwise be necessary to improve water quality in the central Delta. The project provides significant drought protection as well, reducing the frequency with which a salinity barrier may be needed.

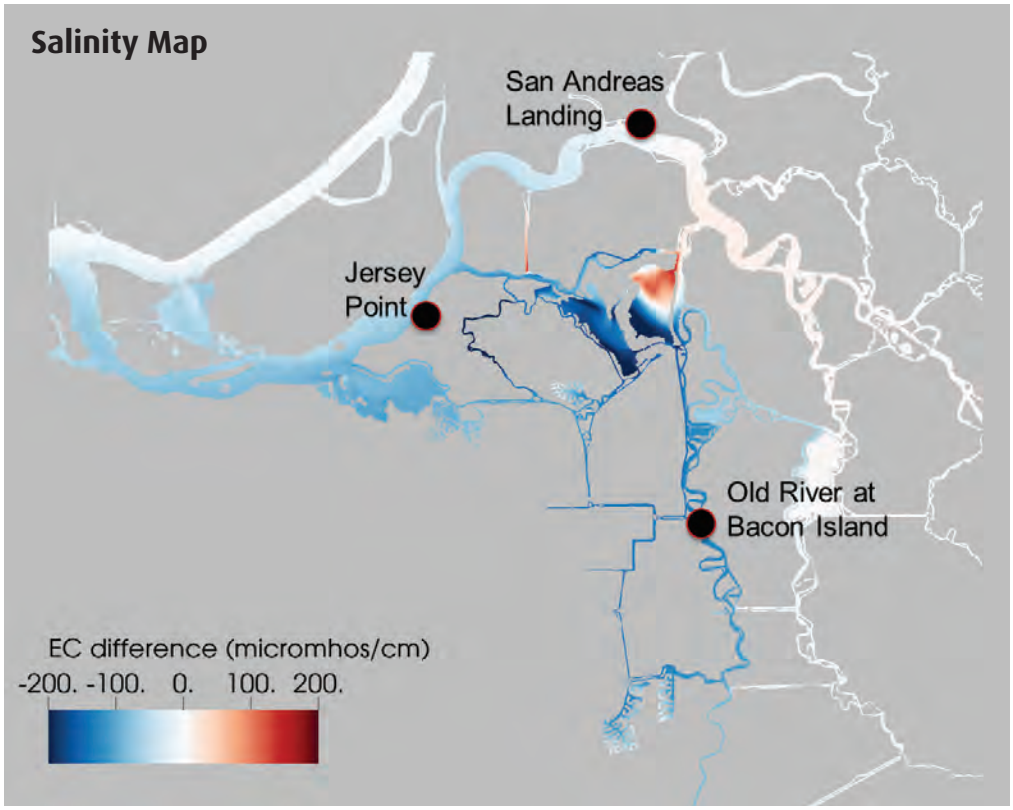
As noted, the Franks Tracts futures project has no influence over water project operations, Delta exports, or proposals for alternative conveyance.

Salinity Control

Salinity intrusion from the Bay usually reaches the western Delta in late summer or fall depending on Delta outflow conditions. Under these conditions, water quality negatively affects beneficial uses of the State's waters (for human uses, agriculture, fish and wildlife habitat, etc.) and plays a controlling role in water project management. Water quality standard locations include the San Joaquin River at Jersey Point and Old River at Bacon Island near Rock Slough where the Contra Costa Water District maintains an intake.

The preferred design, as modeled, would improve regional water quality (salinity) conditions.

The salinity map shown below, is a change map from the Bay-Delta SCHISM model (see Appendix D) that illustrates the projected spatial distribution of salinity difference (Preferred Concept minus No Action alternative) averaged over August 1-14, 2009 using historical hydrology. The year is categorized as Dry. Results are expressed in units of electrical conductivity (or µS/cm, as saltier water conducts electricity better than fresh and conductance is often used as a surrogate measurement for salinity). Areas shown in blue are fresher — reductions in salinity occur around Franks Tract particularly upstream on the Old River system. Few areas are degraded significantly (i.e., by more than 10-20µS/cm).



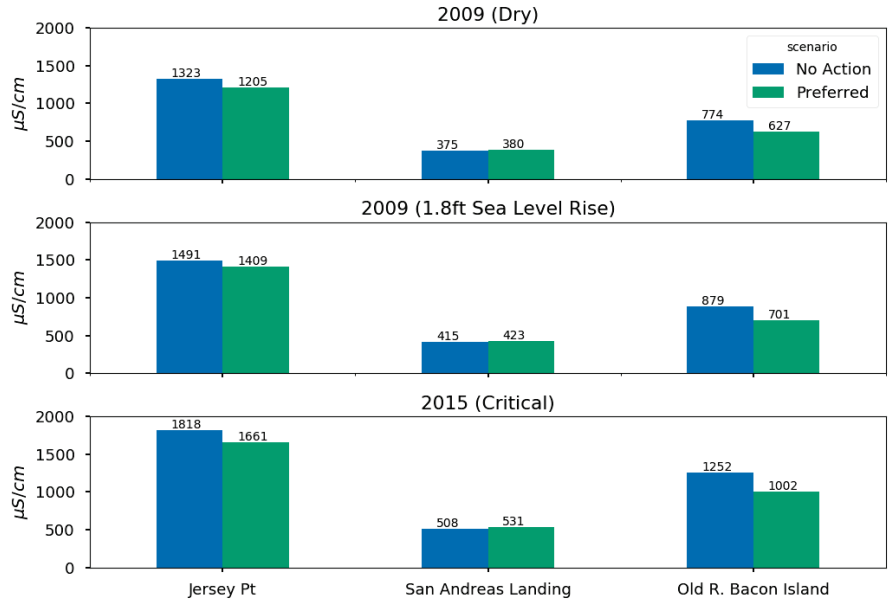
The salinity bar chart, opposite, compares model salinity changes at three locations used as indicators for the structured decision making process (see Section 4, p.25). Several hydrologic scenarios are shown – the 2009 dry year historical hydrology was used as the basis for general salinity assessment and design comparisons. Results are averaged between August 1 and November 30, 2009, a large fraction of the season when salinity is a compliance issue in the region. Some site-specific notes are as follows:

Old River at Bacon Island: The station on Old River at Bacon Island was used as the primary station to determine the effectiveness of the project. It is representative of the region of greatest benefit upstream (south) of Franks Tract, and is also proximate to Rock Slough, a D-1641 compliance point. Old River concentrations are also a predictor of ocean salinity effects farther south near the state and federal water projects. The persistent 150-200µS/cm freshening at this location represents an improvement compared to No Action as great as 20-25 percent.

Jersey Point: Jersey Point, also a D-1641 station, is located on the San Joaquin River downstream of Franks Tract where an agricultural water quality objective often governs water management through August 15. Jersey Point is more indirectly affected by changes in dispersion and tidal energetics in Franks Tract, and it was not known before changes were modeled that this location would be freshened. The projected salinity improvement at Jersey Point is modest in relative terms but nevertheless an important finding because it implies there is no tradeoff between downstream and upstream objectives.

San Andreas Landing: San Andreas Landing is a D-1641 compliance station, but one that has rarely been a compliance limiter under historical conditions. It was included as a precautionary measure — model-

Salinity Bar Chart



Potential Water Project Operations Response to Franks Tract Project

As noted above, the project does not influence water project operations directly. However, the Advisory Committee has requested that the planning team qualitatively consider how water operations may evolve in response to the proposed Franks Tract project and whether there would be any effect on project benefits. In particular, there is interest in how the project would perform with potential Delta Conveyance Project (tunnel) operations to the extent that these operations have been defined.

Any operational adjustment to the Franks Tract project would vary by season, hydrology, water demand and the myriad other factors that influence water project operations. The planning team considered various seasonal and flow scenarios (see Modeling Appendix; in progress) and concluded that changes in water project operations in response to the project are unlikely to significantly offset water quality benefits in the central Delta for most seasons across a range of wet and dry hydrologies. The exception is from August 15 though the fall in drier years, when the project would make maintaining the required salinity in the central Delta achievable with less outflow. Operators could reduce upstream reservoir releases or increase diversions at Clifton Court, keeping Central Delta water quality closer to without project levels. Standards and agreements upstream and downstream of the Franks Tract enhancement project would determine the extent and feasibility of this type of change.

The Delta Conveyance Project (tunnels) introduces effects that are largely independent of the operational changes sketched above. The tunnels do not alter the Delta outflow required to meet managerial requirements nor do they free the agencies from their obligations to do so. The scenario in which Franks Tract and any Delta Conveyance project would most likely have to be considered together is the fall post-August scenario described above. If the tunnels were in place, operators might implement reduced outflow by diverting flow at the tunnel intakes rather than reducing upstream reservoir releases or increasing exports in the south Delta which are the current options.

The water quality study conducted for this project provides qualitative consideration of operational adaptations. Quantifying operational responses more specifically would require more detailed assessment and use of a statewide water operations planning model. The modeling done for this Franks Tract enhancement project is a prerequisite for such an effort and further planning phases.

Photo: Christina Sloop

Emergency drought barrier on False River. Photo: Christina Sloop

ing performed in prior rounds of restoration designs and in support of the 2015 emergency drought barrier suggested that when tides are strongly deflected at False River, energy can be diverted around Bradford Island and cause San Andreas Landing to be saltier. The preferred design appears to dampen the tides at False River sufficiently enough to not cause this type of salinity response.

Sea level sensitivity: The salinity bar chart on p. 61, compares salinity at the three index stations between the No Action and preferred concept scenarios under a modified scenario with 1.8 feet sea level rise. According to the California Ocean Protection Council (2018), this increment represents a 2040 water level under a high greenhouse gas emissions scenario suitable for use in planning for extremely risk averse land uses. As the table shows, sea level rise results in higher values at all three tabulated stations under both geometries. However, the sea level response at Old River at Bacon Island is muted under the preferred design compared to the No Action. This means that in terms of water quality, the project may serve as adaptation to sea level rise.

Drought Protection and Emergency Barrier Deployment

Protection of water quality becomes an elevated management concern during droughts in the central Delta. Whereas salinity encroachment along the main stem of the Sacramento and San Joaquin Rivers can be reversed with increased upstream releases of water and increased flow or a reduction in south Delta pumping, flow management options are limited during a prolonged and extreme drought. Moreover, if salinity does penetrate the freshwater corridor in high concentration, the effect would be largely irreversible. For this reason, the California Department of Water Resources has constructed a barrier to try to limit the transport of salt under extreme circumstances, most recently on False River in 2015 (see also p. 18). The 2015 False River Emergency Drought Barrier achieved its salinity control purpose, but the temporary rock structure was expensive and negatively affected navigation and recreational uses. More ambiguously, the barrier may have also contributed to nuisance invasive vegetation and bivalve population growth (Kimmerer, 2019).

The preferred concept is estimated to provide a significant fraction of the salinity protection of the 2015 emergency drought barrier, and thus can be expected to narrow the range of hydrologic conditions under which a barrier would have to be constructed. Even in a more significant drought, the monolithic design at False River would likely be unnecessary– any structure could be smaller, less costly, and sited to have smaller impacts to regional navigation.

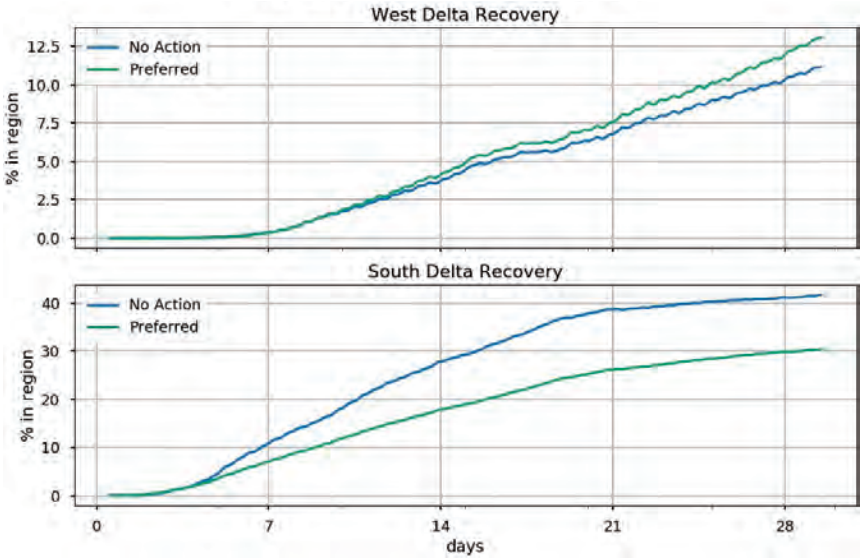
The salinity bar chart on p. 61 depicts the salinities (expressed in units of specific conductivity) resulting from a 2015 simulation under the No Action and preferred concept configurations. Under the preferred concept, salinity at Old River at Bacon Island achieves the basic municipal and industrial criteria of D-1641 (simplified here in terms of conductance as 1000uS/cm) and is 25% lower in concentration than in the No Action without a barrier. With minimal changes, water operations would likely have been able to comply with the regulatory constraints that year, although there would have been little margin for more ambitious targets such as provision of low bromide water for mixing into municipal supplies.

Fish Entrainment and Water Supply Reliability

Entrainment of fish represents not only an ecological risk to listed species, but also a reliability issue for water operations. Under the CDFW (2020) Incidental Take Permit for the State Water Project and federal Biological Opinions by NMFS (2019) and USFWS (2019), presence or salvage of salmon, Delta and longfin smelt and other species at export facilities can trigger Old and Middle River flow restrictions and these limitations are realized through export reductions. Additional entrainment surrogates, such as turbidity triggers, are included for Delta smelt in the permit due to their low population.

Tracking Particles to Simulate Fish Entrainment

March 2015 Release on San Joaquin River near False River



In order to evaluate the effect of the altered flow patterns on entrainment, the planning team performed particle tracking modeling simulations under a variety of hydrologic conditions using three injection sites on the San Joaquin near False River, the mouth of Old River and Turner Cut.

The study does not consider biological behavior but evaluates hydrodynamics that could indicate potential influence on the movement and/or transport of organisms.

The preferred concept reduces potential entrainment influences from the west. The underlying mechanics are the same as those for salinity – the preferred design reduces dispersion from False River to Franks Tract and on to the south Delta.

As shown in the particle tracking chart above, the preferred concept is estimated to reduce potential entrainment influences from west of Franks Tract. For example, in the March 2015 case shown in the chart, the fraction of neutrally buoyant particles injected at Jersey Point that were entrained at the pumping facilities is reduced from slightly over 40 percent to 30 percent. By contrast, potential entrainment influences increase by 3 percent for particles injected on the east side of Franks Tract near the mouth of Old River under similar circumstances, consistent with increases in tidal range of flow at that site. The project has an insignificant effect on potential entrainment influences on Turner Cut, and the specific Franks Tract concepts considered were not particularly influential on particle fate in the western Delta near Suisun.

Particle tracking results do not indicate any reduction in entrainment potential from the Old River/Mokelumne side of Franks Tract.

Particle Tracking Scenarios

30-day Period from	Characteristics of the period	DTO (cfs)	OMR (cfs)
2010-02-24	High outflow, med OMR	21,231	-4,455
2015-02-25	Low outflow, med OMR	5,349	-3,183
2015-05-01	Low outflow, low OMR	5,163	-1,471

FLOOD PROTECTION

Overview

Two kinds of levees surround the open water areas of Franks Tract: abandoned ones that used to protect Franks Tract and Little Franks Tract from flooding but are no longer maintained, and ones maintained for flood protection that are increasing important as the Delta continues to subside and sea levels rise. The existing, remnant levees of Franks Tract and Little Franks Tract, though breached and eroding (see Introduction p. 5), continue to provide critical wave sheltering for the surrounding intact flood protection levees (e.g., the levees surrounding Bethel Island, Webb Tract, Mandeville Island, and other surrounding islands) in use today.

Waves form on Franks Tract during high wind events. The wave-sheltering effect of the remnant levees reduces the risk of wave-induced erosion and overtopping of critical flood protection levees. The Bethel Island Municipal Improvement District and others are interested in project features that enhance the remnant levees in order to reduce required flood protection levee maintenance activities and associated costs.

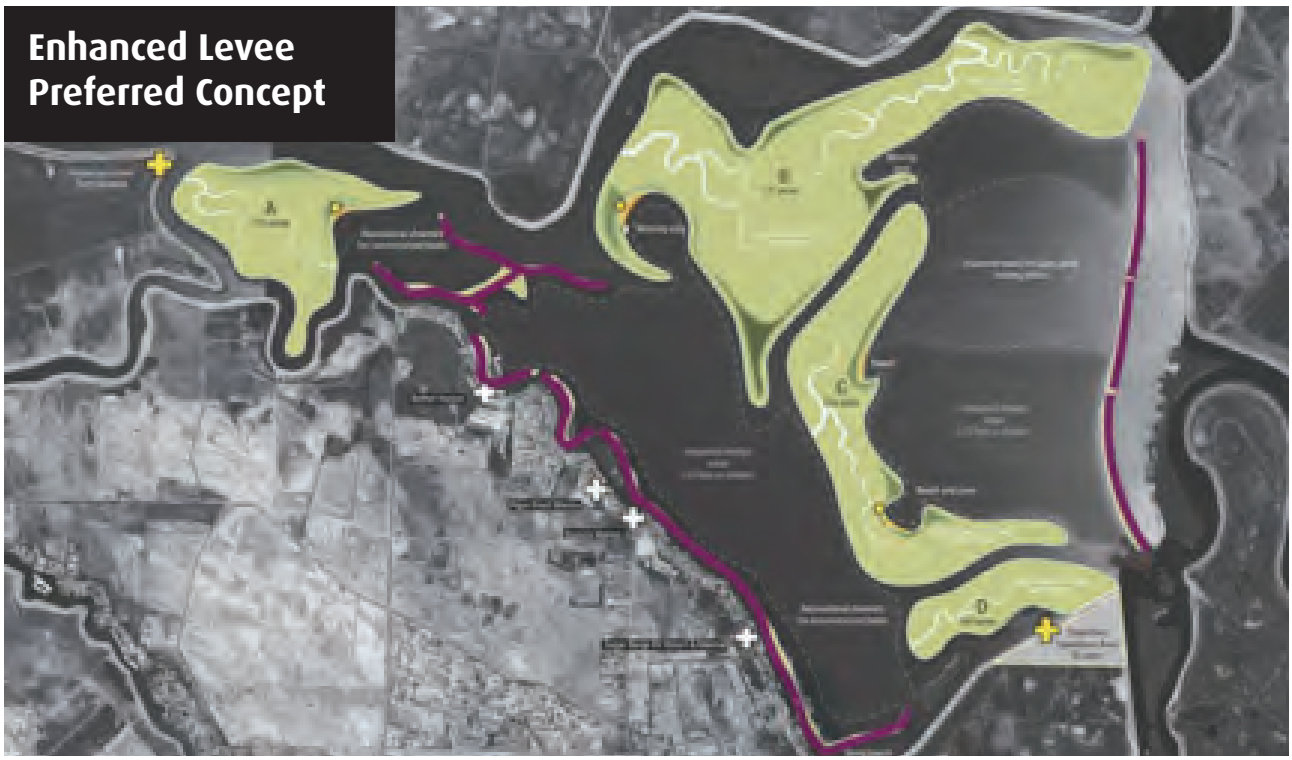
Objectives of the Franks Tract project include improving levels of flood protection, and where possible, avoiding adverse flood impacts. Any project must not worsen flooding during large flood events. If improperly designed, the project could result in higher flood elevations by blocking flow of large runoff events through Franks Tract. Though less likely, the project could also potentially result in higher ocean-driven flood elevations by blocking flow from extreme coastal storm surge events.

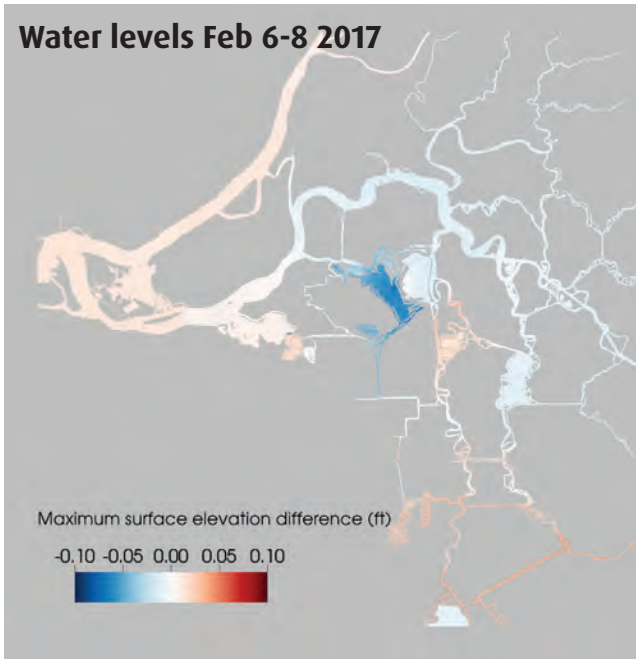
Photo: Brett Milligan

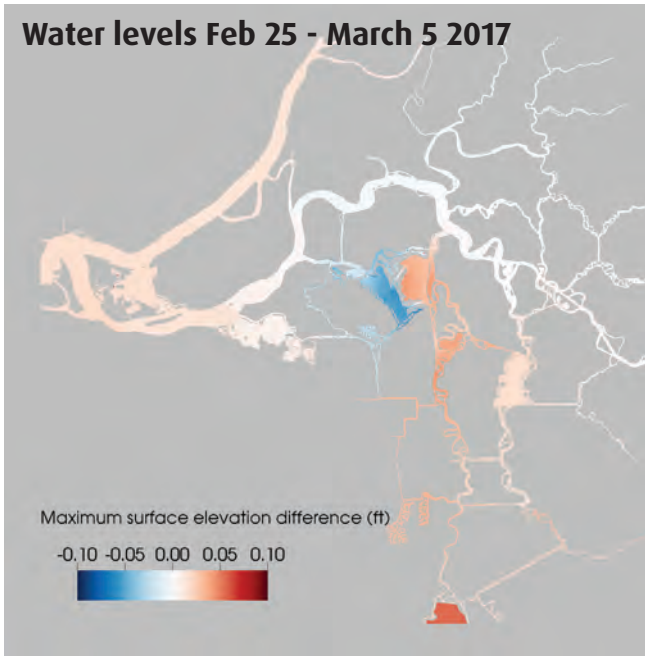
The preferred design concept proposes to enhance 12 miles of remnant, sheltering levee around the Tract. The project would raise and widen the remnant levees with dredge or other material, and fill many of the gaps that have eroded in the existing levees over time while retaining key gaps used by boaters.

Flood modeling was conducted on the preferred concept using 2017 flood season data to simulate flood water levels throughout the Delta. Results indicated the preferred concept does not significantly alter flood conveyance or high water levels.

Enhanced Levee Preferred Concept







The figures above show plots of the difference in maximum water stage for the preferred concept compared to No Action during the winter 2017 flood season. Changes were less than 0.1 feet everywhere, and mostly less than 0.05 feet. Some areas experience lower peak water levels, some higher. The result that flood conveyance is relatively unaltered generalizes to successive peaks caused by king tides, larger outflows and increased Old and Middle River flows. Subtle differences are apparent based on the watershed origin of the flood waters. The two time periods in Figures 3 and 4 – February 6 through 8 (three days of peak flood levels) and February 25 to March 5 (9 days of high flows on the San Joaquin River), 2017 - show somewhat different results. The latter period resulted in higher differences in the eastern Franks Tract and the south Delta, compared to the early February period. This is believed to be due to high flows in the San Joaquin River.

7 Construction Outlook

Rearranging a vast shallow open water area into a new landscape of deeper open water, tidal marshes, new landmasses, navigation channels, recreational beaches, and enhanced remnant levees is an ambitious construction task. The Franks Tract 2020 project conducted an assessment of construction options, reviewing feasibility and engineering constraints, types of onsite fill material, duration of construction, and unit rates for movement of material.

The assessment concludes that the preferred design concept is feasible to construct. About 37 million cubic yards of earth would need to be moved. Planners estimate construction costs of about $560 million. Costs could be lowered by reducing the area of constructed land mass in Franks Tract and Little Franks Tract. The duration of the construction period is estimated at four to nine years minimum.

This assessment builds on and updates methods developed for the 2018 Franks Tract Futures feasibility report. The prior study considered multiple sources of fill material and concluded that using local material dredged from Franks Tract was the least cost alternative; this approach has been integrated into the 2020 effort.

Constructability

Marine Equipment

As there are no roads to Franks Tract, or any access over land to the project area, construction would be accomplished using marine-based construction equipment. Shallow water depths hamper access. Access via navigable water includes False River, West False River, the San Joaquin River, Old River, and Piper Slough. Construction equipment would not make use of Piper Slough, in order to protect access to that waterway by Bethel Island residents and boaters in the area.

Island construction with dredge material. Image courtesy USACE Mobile District, Ship Island Restoration

Local Fill

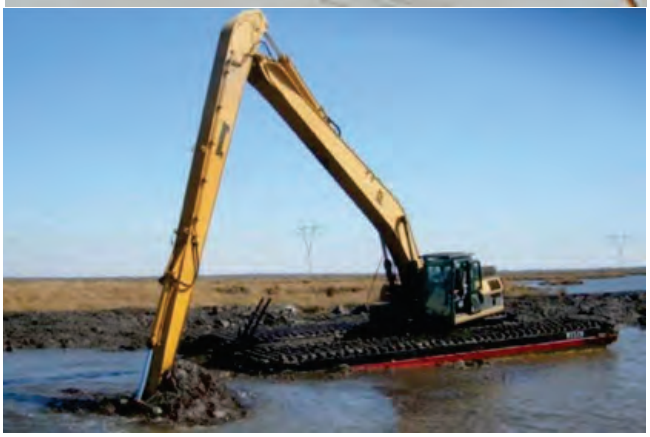
The construction approach is to use local material dredged from within Franks Tract, deepening select areas to create the proposed land masses. Local material dredged from within the Tract is the least cost source of fill and is available in sufficient quantities to construct the preferred concept. This approach achieves the shortest distance between the dredging and placement areas.

Using local material reduces the cost of transportation and handling of material, and energy usage and emissions, compared to other construction methods. Sourcing the material from within the Tract also saves costs, in terms of buying and importing sand, and saves time in the overall construction schedule. As such it is the least cost method.

Based on past land uses, the dredge material is expected to be clean and suitable for use in creating the tidal marsh land masses and other features. Sand is an ideal material for building up the proposed landforms, and the peat content will aid in propagation of marsh habitat.

Building the Land Masses

The planning team envisions using a large cutter suction dredge to remove and place the material to create the new landmasses. This vessel has the ability to dredge to the required depths. This dredge uses a cutter-head attached to the end of a long boom or pipe mounted to the bottom of the vessel (termed a ladder). In terms of equipment, the cutter-head is particularly suited to dredging the material at Franks Tract, which includes poorly graded sand, silty sand, and peat. Most large cutter suction dredges for this type of project work 24 hours per day 7 days per week.



TOP: Cutter suction dredge and floating pipeline. Image courtesy Van Oord. UPPER MIDDLE: Dredge material placement. Image courtesy USACE Mobile District, Building Ship Island. LOWER MIDDLE: Pipeline spread for dredge material placement. BOTTOM: Low ground pressure amphibious excavator.

Construction crews will move material from the dredge vessel to the point of discharge on the new landmasses via a floating pipeline. The discharge end of the pipeline will be mounted on a flat deck barge, which enables the pipeline to be positioned near the material placement site. The dredged sand and peat will be transported in the pipeline in the form of a slurry, which contains about 15 to 35 percent dredge material by weight mixed with water.

A large cutter-suction dredge should have sufficient pump capacity to transport the material over the distances required. In the event that additional pump capacity is required, crews can deploy a booster station. This consists of an additional pump mounted on a floating platform to augment pumping capacity.

In sum, gross placement of material for the landmasses will be via the dredge and mobile discharge point (barge). Once crews have established the basic form of the landmasses, they will use a spread of pipeline segments for additional shaping and placement. Final shaping of the landmasses will be completed using low ground pressure construction equipment (dozers and excavators).

Working on Levees, Channels & Beaches

The preferred design concept calls for upgrading the remnant perimeter levees to a 25-foot-wide crest at an elevation of approximately +9 feet NAVD88, or high enough not to be overtopped during high water but low enough not to obstruct views. Crews will use dredge equipment to pump and discharge construction material along the levee crest where a dozer will push the material out along the levee. An excavator will work to shape the side slopes of the levee and create the final profile. Where the design calls for more detailed material placement, an excavator will pick up and place material from a barge brought in alongside the levee (see photos).

The design also calls for the excavation of marsh channels during final shaping of the landmasses using low ground pressure excavators capable of operating on the material placed for the landmasses and at elevations subject to tidal variation.

The easiest way to construct the through-channels may be to place the gross material for the landmasses first, and subsequently use the dredge or an excavator to cut the through channels. This will allow better control over the location of the channel edge, desired channel dimensions, and creation of the target 4H:1V side slopes. Final grading of the channel side slopes will require an excavator.

Building public use beach areas may require "clean sand." If beach building requirements cannot be met with sand dredged from Franks Tract, it may need to be imported. Local sand may include too much peat or silt, or be too fine or coarse, or the wrong color, for desired beach aesthetics.

Peat Thickness. *Average peat layer thicknesses across Franks Tract. The data derives from borings within Franks Tract (HLA 1990), from adjoining islands and tracts (USGS 1982), and Jersey Island and Bouldin Island quadrangle sheets. The data suggests that the deepest peat deposits exist around the northeast extent of Franks Tract, with layer thicknesses of around 25 feet deep. Going east to west, the thickness of the peat deposits decreases gradually to around 10 feet deep in the center of Franks Tract, down to less than five feet at the transition to Little Franks Tract. By comparison, peat deposits on Sherman Island on the west side of the San Joaquin River are as much as 55 feet deep. Source: Moffat & Nichol 2017.*

Construction Fill Quantities

The estimated volume of material needed to construct the proposed alternative is on the order of 37 million cubic yards (mcy). Dredge volume is the amount of material dredged onsite to build up landmasses and enhance the existing remnant perimeter levees. The planning team calculated volume as the difference between constructed and existing grade, including an allowance for settlement. Constructed grade for the marsh surface generally ranges from 3.5 to 6.5 feet NAVD88, 8 to 11 feet above typical existing grade.

Gross Quantities for Fill Areas for the Preferred Concept

Restoration Quantity	Preferred Concept
Marsh Area (acres)	1,370
Recreational Use (acres)	12
Fill to Grade (CY)	25,834,000
Consolidation (CY)	11,401,000
Total Fill/ Dredging (CY)	**37,235,000**

CY = Cubic Yards

The planning team augmented fill quantities to compensate for consolidation, which will occur during landmass construction. The added weight of the fill causes underlying layers of peat to consolidate, requiring more fill to reach target elevations for marsh. The precise dredge and fill quantities will depend on the finalized concept, detailed design for construction, and geotechnical analysis to confirm the extent of sand and peat within the Tract (see peat contours map above). The preferred concept for landscape redesign at benefits from landmasses being mostly located in areas of shallow peat deposits, which reduces the amount of fill needed to compensate for consolidation.

Schedule

Project construction would likely take 4 to 9 years if allowed year-round, and longer depending on environmental windows protective of fish. The amount of peat involved could present considerable engineering challenges. More detailed analyses could clarify these challenges before construction.

The shortest construction duration assumes work 24 hours per day, 7 days a week. The longer duration estimate assumes construction occurring on weekdays only, with no weekend or nighttime construction. The shortest construction duration may be achievable if noise and visual impacts can be limited to an acceptable level for local communities. Lights would be needed during nighttime construction. A 24-7 approach is the most efficient in terms of the use of the dredge and construction equipment.

Noise associated with construction will primarily be from pumps and conventional diesel-powered equipment. Conventional equipment is currently being modernized, however, allowing options to diesel that could benefit the project. Hybrid construction equipment can run with a smaller engine at a lower rpm. Fully electric systems run on rechargeable lithium-ion batteries. Electric pumps of the size needed for the project are already available on the market. While delivery of electrical power to the site poses a unique challenge, use of hybrid or all-electric equipment would mean a significant reduction in construction noise and particulate emissions.

The schedule will additionally depend on environmental windows protective of fish. In-water work should occur during standard in-water work windows. The in-water work windows are August through November for Delta smelt and July through October for salmonids.

The schedule could also be affected by efforts to minimize impacts on hunting, fishing and other seasonal activities important to local residents and the economy.

Construction Costs

The planning team estimates unit costs for the project on the order of $15.35 to $16.45 (circa 2020) per cubic yard placed. This includes the contractor's mobilization, transfer of the dredge and floating pipeline to the site, contractor's marine equipment, installation of silt curtains for turbidity control for fisheries, construction of the tidal marsh land masses, enhanced remnant perimeter levees, beaches and other public areas; demobilization, and indirect costs, bonding, and insurance.

These unit costs are based on:

- One mobilization and one de-mobilization, i.e. contractor's equipment remains at the construction site from start to completion.
- No standby time is included for settlement of the placed fill. Construction may be scheduled so that settlement of fill material placed for one island can go on while construction continues on other islands.
- All equipment is assumed to be conventional diesel-powered equipment (though cleaner newer hybrid equipment may be preferable if affordable), with the following fuel factors: Diesel ($/Gal): 2.75; Gasoline ($/Gal): 3.10; Electricity ($/kW): 0.087; Offroad ($/Gal): 2.90.
- Costs for permits, engineering, design, and geotechnical exploration are not included.
- Costs for revegetation are not included. Revegetation would rely on a combination of natural vegetation colonization processes and planting of native plants. Adding planting efforts would increase the overall cost estimate.
- Weed abatement efforts would be higher during the initial period of native plant establishment. The incremental costs of initial abatement are not included. Long-term weed abatement costs are discussed in Operations and Maintenance (p.67).
- Dredging and fill operating on a 24 hour per day, 7 day per week schedule. Any limitations on a 24 hour per day, 7 day per week schedule would lengthen the overall construction schedule and increase costs.

A breakdown of costs for the construction activities described above is included in the table opposite.

Construction Activity	Cost Estimate
Dredging operations[1]	$358,426,000
Management of fill to build up levees and create tidal marshes	$147,349,000
Shaping and excavating channels in tidal marshes[2]	$51,619,000
Construction of beaches and public areas (5 beach areas)	$1,970,000

1 - Does not include costs for maintenance dredging. The dredge areas, tidal marshes, and channels are assumed to be self-sustaining and not require maintenance dredging.
2 - Based on excavation of 7,092,000 cubic yards of material. Slope armoring (if any) and revegetation costs are not included.

Construction Impacts

Short term disruptions would occur during construction of the project. Activities such as dredging and land mass shaping would be ongoing over a period of several years with associated noise, navigation re-routings, etc. Staging construction (building one land mass at a time) could minimize impacts but also affect the duration of the project. If a project were to be implemented, further discussion would be needed to determine how to best schedule and sequence any future construction to accommodate existing Franks Tract uses (e.g. localized shutdowns during key hunting or fishing periods, weekend shutdowns, etc.) and how to best mitigate or abate any short term construction related impacts.

Photo: Brett Milligan

Operations & Maintenance

A commitment to operations and maintenance of project features is a key component and cost of its long-term success. Ongoing demands would include maintenance of the proposed recreational facilities, and ongoing aquatic weed management. However, the project also has the potential to reduce other kinds of activities such as periodic deployment of an emergency drought barrier and maintenance of flood protection levees on surrounding islands.

Ongoing activities are envisioned to include maintenance and upkeep of the public access points, docks, camp sites, day-use areas, picnic and beach areas, restroom facilities, and trash receptacles. Costs may include labor for State Parks staff, equipment, boat, supplies, materials, and services. These operations and maintenance costs for new amenities are estimated at approximately $370,000 per year (2020 cost without escalation).

Continued treatment of submerged and floating aquatic vegetation will also be critical to effective site management. The project would not necessarily change the cost of ongoing aquatic weed management. The project would, however, change the types of habitats and water depths at the site, helping weed management dollars go further. The preferred concept will reduce the amount of area at high risk for aquatic weed colonization, therefore, the same level of effort could be applied to the tract with more beneficial results. The current level of effort for weed control at Franks Tract is approximately $4-8 million/year, based on the treatment of approximately 1,000 – 2,000 acres of submerged aquatic vegetation in Franks Tract at a cost estimate of $4,000 per acre (Conrad, 2019 and L. Anderson, personal communication).

The project could also reduce the operation and maintenance costs of deploying emergency drought barriers (see p.18). Salinity improvements with the proposed Franks Tract project will tend to reduce the frequency of conditions likely to result in new barrier deployments. Even a modest reduction in deployment frequency could be significant from a cost and disruption perspective.

Finally, the project will reduce near-term maintenance of flood protection levees. Enhancement of the remnant perimeter levees will provide continued wave sheltering to the nearby flood protection levees serving surrounding communities (e.g., the levees on Bethel Island maintained by the Bethel Island Municipal Improvement District). Consequently, adjacent levee maintenance districts and reclamation districts are expected to benefit from lower levee maintenance

8 Outlook for the Future

The landscape redesign and enhancement actions developed and selected through the 2019-2020 co-design process described in this report suggest a bold, sustainable change in the heart of the Delta. Stakeholders recognize that any feasible project must achieve multiple benefits to generate sufficient public and financial support for what would be a major construction effort. In addition, any project must ultimately be supported by the local community to move forward.

Key Findings

- *At the highest level for consideration, a redeveloped Franks Tract offers an opportunity for improvements in recreation, navigation, ecology, water quality and other community benefits.*
- *The Project Team, Advisory Committee, Steering Committee and the public agree that Concept B Central Landmass currently offers the best balance and best opportunity to build upon for a reimagined Franks Tract moving forward.*
- *Stakeholder and public preference evolved over the course of this approximately one-year planning effort. For the Advisory Committee and Steering Committee, initial support for the No Action alternative and early versions of Concept C Eastern Landmass shifted to selection of Concept B as the Preferred Concept. Early public preference was overwhelmingly for the No Action alternative; later public preference was for some version of a project at Franks Tract.*
- *There would be unavoidable trade-offs with any project, especially with respect to costs and construction impacts. Both construction and long-term operations and maintenance costs would be much higher for any of the three concepts relative to the No Action alternative. There are, however, opportunities to reduce long-term costs associated with levee maintenance and emergency drought barriers, and the opportunity to achieve more benefits with a fixed budget for aquatic weed removal.*

What's Next?

- Identification of responsible agencies and sources of funding would be necessary next steps if the project is to move forward. Figuring out 'who pays' would need to be aligned with the agencies and organizations with the most to gain.
- Before any project would move forward, a commitment to long-term operations and maintenance funding would need to be put in place. The development of recreational features and uses is dependent on securing a sustained funding source to develop, manage and maintain them. Likewise, the development of ecological and water quality features is dependent on the identification of responsible agencies and sources of funding for construction and ongoing management.
- Since cost remains a high-level feasibility issue, the next phase would explore project refinements to reduce overall costs.
- Stakeholder and public engagement were critical to shaping the final concepts to reflect community values for this phase of planning and will need to be carried into any future work to ensure consistency with project goals and objectives.
- Enhancing recreational opportunities is a must to the local community. A project without a robust recreational component and reliable sources of funding to maintain this component will lose community support.
- Various important finer scale considerations – such as detail for the recreational amenities, revegetation plans, etc. – would need to be explored in any future planning, design and environmental review process.

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