

DRAFT

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CALFED Bay-Delta Program Draft Delta Conveyance and Storage Components

Linkages

In laying out the following preliminary component configurations, a number of linkages were considered, including:

- Flood risk
- Water quality
- Fisheries: First paradigm--Keep fish in the Sacramento River by screening diversions from the river
- Fisheries: Second paradigm-- Make the interior Delta more hospitable to anadromous fish by creating slow-moving cross-Delta flow with a large and diverse expanse of habitats
- Utilities: Pipelines, radio towers, gas wells, power lines, etc.
- Transportation: Highways and bridges
- Land use, agriculture, and wildlife habitat: First paradigm-- Minimize change in Delta configuration and loss of agricultural land from production. Preserve current agricultural land for its wildlife habitat value. Allow market forces and cooperative management agreements to dictate land use patterns.
- Land use, agriculture, and wildlife habitat: Second paradigm-- Seek extensive conversion of agricultural land to open water, shallow water habitat, riparian forest, wetlands, and dedicated wintering waterfowl habitat because it represents a net improvement in environmental quality. Recognize that current agricultural trends in Delta region include rapid loss of pasture and row crops to viticulture; decreasing concentrations of waste grain due to better harvesting techniques, and urbanization.
- Topography (Hills, land surface elevations, etc.)
- Geology: seismic risk, soils, foundation conditions, depth of peat
- Sociological impacts: Presence of cities, farms, and other infrastructure along facilities alignments. Compatibility with local land use plans (example: San Joaquin County plans for population growth on New Hope Tract)
- Recreation: Separation of recreationists from landowners, channel island destination sites, separation of fast and slow boat traffic, boat wakes, law enforcement
- Navigation: Preservation of navigation access for levee repair, commerce, and recreation
- Climatic effects: Wind waves, sea surface rise
- Seepage: Impacts on areas adjacent to flooded areas

Adaptive Management

Is alternative amenable to incremental implementation? How easily can one backtrack or take a different approach if expected results do not occur?

I. Through Delta Options

A. Through-Delta Option 1: Extensive Habitat, Low Velocity

Screened Intake at Hood: Offstream folded "V"

- Relocation of Highway 160 and new bridge over diversion
- Trashrack
- Flood Gates or stoplogs
- Crane
- Levees
- Sedimentation Basin
- Pumping Plant and discharge pipes over levee
- Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
- Control Building, Parking, Access, Lighting, Fencing
- Capacities: 5,000 cfs, 10,000 cfs, 15,000 cfs

Unscreened Gravity Diversion at Hood

- Relocation of Highway 160 and new bridge over diversion
- 200 foot long concrete sill, with wingwalls and piers to support stoplogs or radial gates, crane
- Inflatable rubber dams to control overflow into diversion channel
- training levees with rip-rap to guide flow to channel
- sedimentation basin
- upstream migrant passage facilities

Open Channel, Hood to Lambert Road along old PC alignment

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3 waterside and landside slope, 20 foot crown width. Maximum channel depth 20 feet
- Discharge structure, including at least 2 radial gates
- Bridge, for Lambert Road
- Upstream Migrant Passage Structure: Attraction, collection, and transport

Glannville Tract Setback Channel

- Purchase Glannville Tract
- Construct new setback levee, southwestern corner of Glannville Tract, 2000 feet east of existing alignment
- Extend Twin Cities Road bridge. Assume elevated causeway 1000 feet long

- Breach existing levees at north and south end of channel island west of Glanville Tract, to allow full 2000 foot width channel
- Protect east slope of remaining west levee, which would become a channel island
- Purchase or rebuild gas wells which would be inundated by the new setback levee channel
- Create habitat or cooperative wildlife management practices on land between I-5 and new setback levee

McCormack Williamson Tract Floodway

- Purchase entire McCormack-Williamson Tract
- Remove east levee, 2000 feet of north levee on western end of tract, remove 3000 feet of south levee
- Breach existing levees at north and south end of Glanville Tract, to allow full 2000 foot width setback channel.
- Protect remaining interior levee slopes with rip-rap; remaining levees would become channel islands
- Construct appropriate works to allow continued access and maintenance, transmitter tower, including elevated access road

Create New Hope Tract Setback Channel(Habitat Emphasis)

- Purchase western half of New Hope Tract for habitat creation
- Construct new setback levees north to south from Mokelumne River to Beaver Slough, 2000 feet east of existing alignment
- Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
- Remove existing levee sections where they would obstruct new channel, west and south levee sections
- Construct new 2000 foot bridge across setback channel, with sufficient elevation to allow small craft passage
- Rebuild existing New Hope Tract levee, from Mokelumne River at I-5 crossing to junction with setback levee on northwest side of levee
- Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
- Reinforce Beaver Slough levee
- Construct seepage interception wells along Beaver Slough levee
- Reinforce Beaver Slough levee
- Construct seepage interception wells along Beaver Slough levee
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

Canal Ranch Tract Wetlands

- Purchase Canal Ranch Tract
- Remove 2000-foot sections of levee at west end of Beaver Slough and Hog Slough
- Protect remaining interior levee slopes with rip-rap; remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
- Relocate gas pipelines and other utilities as required

Brack Tract Wetlands

- Purchase Brack Tract

- Remove 2000-foot sections of levee at west end of Hog Slough and Sycamore Slough
- Protect remaining interior levee slopes with rip-rap. Remaining levees would become channel islands, and would help protect adjacent tracts from wave wash
- Relocate gas pipelines and other utilities as required

Terminus Tract Setback Channel

- Purchase 2000-foot wide section at northwest corner of Terminus Tract
- Remove 2000-foot sections of levee at west end of Sycamore Slough and on the east bank of the South Mokelumne River to create flow path
- Construct new setback levees north to south from Sycamore Slough to South Mokelumne River, 2000 feet east of existing alignment
- Protect east slope of remaining west levee along the South Mokelumne River, which would become a channel island
- Reinforce existing levee along Sycamore Slough
- Place seepage interception wells along Sycamore Slough levee, South Mokelumne levee, and Little Potato Slough levee
- Construct new, relocated irrigation diversions and drainage pumps

Staten Island Setback Channel

- Purchase 2000-foot wide section at the southeast corner of Staten Island
- Remove 2000-foot sections of levee along west bank of South Mokelumne River north of Terminus and on north bank west of Terminus to create flow path
- Construct new setback levee north to south to cut off southeast corner of Staten Island creating 2000 foot wide channel
- Protect west slope of remaining levee along the South Mokelumne River with rip-rap; this levee would become a channel island
- Reinforce existing levee along entire length of South Mokelumne River
- Place seepage interception wells along South Mokelumne River

Bouldin Island Aquatic Habitat

- Purchase Boulding Island, including 4 homes along north levee
- Remove 2000-foot section of levee, south bank of South Mokelumne River, just west of Terminus.
- Remove 2000-foot section of levee, north bank of Potato Slough, west end, at junction of Potato Slough and San Joaquin River
- Protect remaining interior levee slopes of island with rip-rap; these would become channel islands and help protect adjacent islands against wave wash
- construct 3 miles of elevated embankment roadway for Highway 12, beginning at the Terminus Bridge access ramp. Protect both north and south sides with rip-rap.
- Construct 2,000-foot bridge in center of Boulding Island to facilitate flood and transfer flows to move from South Mokelumne River to San Joaquin River

Brannan Andrus Island, Venice Island, Empire Tract, Terminus Tract, Staten Island

- Construct seepage interception wells along channels adjacent to Bouldin Island

Palm Tract

- Purchase 3000-foot alignment on eastern portion of Palm Tract
- Remove 3000 feet of levee on Rock Slough from Old River westward
- Remove 3000 feet of levee on southeast corner of tract from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island

Orwood Tract

- Purchase 3000-foot alignment on eastern portion of Orwood Tract
- Remove 3000 feet of levee on northeast corner from Old River westward
- Remove 3000 feet of levee on Indian Slough from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island

Byron Tract

- Purchase 3000-foot alignment on eastern portion of Byron Tract
- Remove 3000 feet of levee on Indian Slough from Old River westward
- Remove 3000 feet of levee on Italian Slough from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island
- Construct new 3000-foot causeway over new setback channel and new bridge and alignment over Old River

Clifton Court Forebay

- Construct new intake at northern end of Clifton Court
- Construct new, state-of-the-art fish screens at the Skinner Fish Facility

Tracy Pumping Plant

- Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
- Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake.

Bacon Island, Woodward Island, and Victoria Island

- Construct seepage interception wells along Old River levees

B. Through-Delta Option 2: Minimize Change in Delta Configuration

Enlarge Delta Cross Channel

- Purchase 300 foot alignment along north Bank of Delta Cross Channel

- Construct new Highway 160 Bridge
- Construct 2 new radial gates north of existing gates, in supplemental intake channel
- Construct new setback levee, 200 feet back from existing north levee
- Relocate radio tower cable anchors as necessary
- Remove existing north levee

Delta Cross Channel Fish Screen

- Construct multiple folded "V" fish screen installation in Delta Cross Channel downstream of radial gates
- Construct low lift pump station downstream from fish screens to control hydraulic performance of fish screens
- Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
- Control Building, Parking, Access, Lighting, Fencing
- Capacities: 5,000 cfs, 10,000 cfs, 15,000 cfs

Snodgrass Slough-Dead Horse Cut Setback Channel

- Purchase 600 foot alignment along Snodgrass Slough and Dead Horse Cut, on McCormack Williamson Tract, to New Hope Landing
- Construct new setback levees along Snodgrass Slough and Dead Horse Cut, on McCormack Williamson Tract, to New Hope Landing
- Remove existing levee sections where they would obstruct new channel at junction with new levee, north and south end
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

New Hope Tract Setback Channel(conveyance emphasis)

- Purchase 600 foot alignment along Mokelumne River, I-5 to New Hope Landing
- Construct new setback levees from I-5 to New Hope Landing, set back 500 feet from existing channel
- Relocate New Hope Landing and Wimpy's Marina to coincide with new setback levee
- Remove existing levee sections where they would obstruct new channel, west and south levee sections
- Construct new 500 foot bridge across setback channel, with sufficient elevation to allow small craft passage
- Rebuild existing New Hope Tract levee, New Hope Landing to Beaver Slough
- Construct new, relocated irrigation diversions and drainage pumps for New Hope Tract
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

North Mokelumne Setback Channel

- Purchase 600 foot alignment along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown

- Construct new setback levees along North Mokelumne River, New Hope Landing to south end of Tyler Island, alternating between Staten Island and Tyler Island sides as shown
- existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
- Construct new 500 foot bridge, Thornton-Walnut Grove Road across setback channel, with sufficient elevation to allow small craft passage
- Construct new, relocated irrigation diversions and drainage pumps for Staten Island and Tyler Island
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

Lower Mokelumne Setback Channel

- Purchase 600 foot alignment along lower Mokelumne River on western portion of Bouldin Island
- Construct new setback levees along lower Mokelumne River on western portion of Bouldin Island, approximately 500 feet east of existing levees, as shown
- Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion
- Construct new 500 foot bridge, Highway 12 crossing of lower Mokelumne River across setback channel, with sufficient elevation to allow small craft passage
- Construct new, relocated irrigation diversions and drainage pumps for western portion of Bouldin Island

Interim South Delta Program Improvements

Refer to DEIR/EIS

Through Delta Option 3: Tyler Island Habitat

Andrus Island Setback Channel

- Purchase Alignment, northeast corner of Andrus Island
- Construct setback levee, 500 feet west of Georgiana Slough, from Sacramento River to weir intake as shown
- Excavate existing levee sections where they would obstruct new channel, at each junction of new setback levee with existing levee, as shown
- Construct new 500 foot bridge and elevated roadway from Georgiana Slough swing bridge to junction with existing Isleton Road, with sufficient elevation to allow small craft passage
- Convert existing levee into channel island; place rip-rap on previous land side to prevent erosion

Dead Horse Island Floodway and Habitat

- Purchase Dead Horse Island (200 ac) including 1 residence
- Excavate levee on southwest side of Dead Horse Island, 600-foot width
- Excavate levee on northeast side of Dead Horse Island (adjacent to Dead Horse Cut), 600-foot width
- Place erosion control rip-rap on remaining interior levee slopes

McCormack-Williamson Tract Floodway and Habitat

- Purchase McCormack-Williamson Tract
- Excavate levee on northeast end, near I-5, 600-foot width
- Excavate levee on southwest, adjacent to Dead Horse Cut, 600-foot width
- (Don't rip-rap interior slopes, due to general elevation above sea level)
- Build bridge and secure access road to radio tower control building

Tyler Island Aquatic Habitat

- Construct 600-foot wide North Weir in levee near northwest section of Tyler Island, with inflatable rubber dam to control weir elevation
- Construct bridge across North Weir apron for maintenance access and access to levee road
- Construct channel section control in Georgiana Slough to prevent accelerated erosion of channel bottom; armoring with rip-rap or gabion baskets across entire section, for 100 feet
- Construct 600-foot wide South Weir in levee near south end of Tyler Island
- Construct bridge across South Weir apron for maintenance access and access to levee road
- Place rip-rap along interior levee slopes of remaining levees around island to protect against wave wash. Georgiana Slough levee must remain intact to maintain flood flow distribution
- Breach 600 feet of levee on northeast side of island
- Construct new levee from North Weir to breach of levee on northeast side of island
- Construct bridge over new flood channel created by northeast levee breach

Bouldin Island

- Purchase Boulding Island, including 4 homes along north levee
- Remove 2000-foot section of levee, east bank lower Mokelumne, north of Highway 12
- Remove 2000-foot section of levee, north bank of Potato Slough, west end, at junction of Potato Slough and San Joaquin River
- Protect remaining interior levee slopes of island with rip-rap; these would become channel islands and help protect adjacent islands against wave wash
- Construct elevated embankment roadway across Boulding Island, except for new bridge; protect both north and south sides with rip-rap.
- Construct 2,000-foot bridge at west end of Bouldin Island to facilitate flood and transfer flows to move to San Joaquin River

Brannan Andrus Island, Venice Island, Empire Tract, Terminous Tract, Staten Island

- Construct seepage interception wells along channels adjacent to Bouldin Island and Tyler Island

Palm Tract

(No change)

- Purchase 3000-foot alignment on eastern portion of Palm Tract
- Remove 3000 feet of levee on Rock Slough from Old River westward
- Remove 3000 feet of levee on southeast corner of tract from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island

Orwood Tract

(No change)

- Purchase 3000-foot alignment on eastern portion of Orwood Tract
- Remove 3000 feet of levee on northeast corner from Old River westward
- Remove 3000 feet of levee on Indian Slough from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island

Byron Tract

(No change)

- Purchase 3000-foot alignment on eastern portion of Byron Tract
- Remove 3000 feet of levee on Indian Slough from Old River westward
- Remove 3000 feet of levee on Italian Slough from Old River westward
- Construct setback levee parallel with Old river, set back about 3000 feet to the west
- Construct new, relocated irrigation diversions and drainage pumps
- Place rip-rap on west side of Old River levee, which becomes a channel island
- Construct new 3000-foot causeway over new setback channel and new bridge and alignment over Old River

Clifton Court Forebay

(No change)

- Construct new intake at northern end of Clifton Court
- Construct new, state-of-the-art fish screens at the Skinner Fish Facility

Tracy Pumping Plant

(No change)

- Construct interconnection with Clifton Court Forebay, with radial gates and 10,300 cfs capacity
- Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake.

Bacon Island, Woodward Island, and Victoria Island

(No change)

- Construct seepage interception wells along Old River levees

D. Through Delta Option 4. Herbold Intake Option

To be completed

II. Isolated Conveyance Options

A. Isolated Conveyance Option 1: Hood to Clifton Court Open Channel, 5,000cfs, 10,000 cfs, and 15,000 cfs

Screened Intake at Hood: Offstream folded "V"

- Relocation of Highway 160 and new bridge over diversion
- Trashrack
- Flood Gates or stoplogs
- Crane
- Levees
- Sedimentation Basin
- Pumping Plant and discharge pipes over levee
- Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
- Control Building, Parking, Access, Lighting, Fencing
- Capacities: 5,000 cfs, 10,000 cfs, 15,000 cfs

Open Channel, Hood to Lambert Road along old PC alignment

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3 waterside and landside slope, 20 foot crown width. Maximum channel depth 20 feet
- Siphon under Snodgrass Slough

Open Channel, Glannville Tract

- Acquire land along alignment, 2000-foot swath, include existing borrow pits 1-4
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Siphon under Mokelumne River floodway
- Check structures as required

Open Channel, New Hope Tract

- Acquire land along alignment, 2000-foot swath, include existing borrow pit 5
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Barber Road bridge
- Thornton-Walnut Grove bridge
- Siphon under Beaver Slough

- Check structures as required

Open Channel, Canal Ranch

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Siphon under Hog Slough
- Check structures as required

Open Channel, Brack Tract

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Woodbridge Road bridge
- Siphon under Sycamore Slough
- Check structures as required

Open Channel, Terminous Tract

- Acquire land along alignment, 2000-foot swath, include existing borrow pits
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Highway 12 bridge
- Check structures as required

Open Channel, Shin Kee Tract

- Acquire land along alignment, 2000-foot swath, include existing borrow pits 9-12
- White Slough local drainage structures
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Check structures as required

Open Channel, Rio Blanco Tract

- Acquire land along alignment, 2000-foot swath, include existing borrow pit 13
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Telephone Cut, Relocate pumping station and cut off easterly end of Telephone Cut
- Check structures as required

Open Channel, Bishop Tract

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Eightmile Road bridge
- Siphon under Disappointment Slough
- Check structures as required

Open Channel, Wright Tract

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Brookside Road bridge
- Siphon under San Joaquin River
- Check structures as required

Open Channel, Roberts Island

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- House Road bridge
- Relocation, Mokelumne River Aqueduct
- Jacobs Road bridge
- Inland Road bridge
- Atchison Topeka RR bridge
- Highway 4 bridge
- Kngston School Road bridge
- Siphon under Middle River
- Check structures as required

Open Channel, Union Island

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Bonettin Road bridge
- Siphon under Old River
- Check structures as required

Open Channel, Coney Island

- Acquire land along alignment, 2000-foot swath
- Open channel construction, side slopes 1:8, 15 foot wide waterside berm, levees 1:3
- Siphon under West Canal

Clifton Court Forebay

- Gate structure at end of West Canal Siphon

Tracy Pumping Plant

- Construct interconnection with Clifton Court Forebay, with 2 sets of radial gates and 10,300 cfs capacity
- Construct new, state-of-the-art fish screens at the Tracy Pumping Plant intake (for 5,000 cfs and 10,000 cfs options)

B. Isolated Conveyance Option 2: Hood to Clifton Court Pipeline, 5,000cfs, 10,000 cfs, and 15,000 cfs

(See separate report by Buer, 12/95)

C. Isolated Conveyance Option 3: Chain of Lakes, 5,000cfs, 10,000 cfs, and 15,000 cfs

D. Isolated Conveyance Option 4: Deep Water Ship Channel and west Delta Tunnel, 5,000cfs, 10,000 cfs, and 15,000 cfs

Screened Diversion from Sacramento River

- Trashrack
- Flood Gates or stoplogs
- Crane
- Levees
- Sedimentation Basin
- Pumping Plant and discharge pipes into turning basin
- Fish Bypass System: Pump, Evaluation Facility, Return Pipe, Discharge Structure
- Control Building, Parking, Access, Lighting, Fencing
- Capacities: 5,000 cfs, 10,000 cfs, 15,000 cfs

Sacramento River Deep Water Ship Channel Closure and Pumps

- Sub-option 1: Close Port of Sacramento. Purchase port facilities and channel from Corps and Port Authority. Build rock dam at mouth of ship channel, near mile 18.7
- Sub-option 2: Assume continued large boat traffic which requires construction of a lock at mile 19, to protect water quality and prevent fish passage into channel

Unscreened Pumping Plant at mile 18.7

Build elevated foundation pad and access road down west ship channel levee
Construct unscreened pumping plant to pump water to Brentwood via pressure pipeline.
Dual intake option included: Can draw from downstream or upstream of dam/lock structure.

Valve structure: Two incoming pipelines-- from Berryessa Intertie and to Brentwood.
Facility should have capability of pumping to Berryessa Intertie, to Brentwood, allowing flow to go from Berryessa Intertie to Brentwood, or be released into Ship Channel or Cache Slough

Sipon under Cache Slough

Pipeline to Sacramento River d/s of Rio Vista

Siphon under Sacramento and San Joaquin River, west end of Sherman Island

Pipeline terminus structure at Brentwood

Open channel to CCFB (more detail on road crossings and infrastructure needed)

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