

From: [Michael Bryan](#)
To: [Pierre, Jennifer](#); [susie_tharratt@fws.gov](#); [Michele Palmer](#); [Wilder, Rick](#); [Gwendolyn.Buchholz@ch2m.com](#); [leanna_zweig@fws.gov](#); [Derek Hiltz](#); [Steven_Culberson@fws.gov](#); [Matt_Nobriga@fws.gov](#); [Jones, Gardner@DWR](#); [larry_rabin@fws.gov](#); [Christopher.Geach@water.ca.gov](#); [Ellis, Gregg](#); [Theresa Olson](#); [Patrick.Coulston@wildlife.ca.gov](#); [heather_swinney@fws.gov](#); [Kim Squires](#); [tiffany_heitz@fws.gov](#); [Turner, Kim](#); [carl.wilcox@wildlife.ca.gov](#); [Chandra.Chilmakuri@CH2M.com](#); [jhassrick@usbr.gov](#); [Michael.Eakin@wildlife.ca.gov](#); [tolson@usbr.gov](#); [Mitchell, Bill](#); [Keith Whitener](#); [Michael Tucker - NOAA Federal](#)
Subject: "Bridge" Tables
Date: Friday, July 24, 2015 4:54:55 PM
Attachments: [image001.png](#)
[DFT Table 1. Bridge from DA to Effect Mechanisms.docx](#)
[DFT Table 2.Bridge to Effects Analysis.V1.docx](#)
[DFT Table 2.Bridge to Effects Analysis.V2.docx](#)
[Attachment 1 - Deconstruction Flowcharts-6-29-15.pptx](#)

All:

Attached, please find two "bridge" tables for your review, based on our discussions on Tuesday of this week. The second table is presented in two versions (hence three separate files).

The concept is as follows.

The first table "bridges" between the **Deconstructed Action** (as shown by the RBI charts – also attached) and the **effect mechanisms** (e.g., inc. turbidity, inc. contaminant levels, inc. predation, etc.). The second table "bridges" between the identified **effect mechanisms** and the **effects analysis** that determines the magnitude to which each effect mechanisms actually would impact a given fish species and life stage.

We have prepared two versions of the latter table. Version 1 is organized by the **effect mechanisms**, as is the EIR/EIS Aquatics construction impact assessment. As such, turbidity effects are shown in a single place within the table for all components and sub-components of the Proposed Action. This format allows reviewers to easily see (in one location) which sub-components of constructing the N. Delta Intakes, for example, affect turbidity, and which do not.

Version 2 of this table is organized by the **components and sub-components of the action**, which is how the current outline for Chapter 5 (BA) is organized, but not how the EIR/EIS impact analysis for construction is organized. As such, turbidity effects will come up numerous times throughout this table (i.e., not all in one place). Please also see notes at the end of each attached file that explain these concepts further.

Please review and we can discuss at Tuesday's meeting.

Thanks.

Michael Bryan, Ph.D.



*9888 Kent Street
Elk Grove, CA 95624*

Office (Direct): (916) 714-1802

Mobile: (916) 261-4043

Fax: (916) 714-1804

www.robertson-bryan.com



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Solutions for Progress

TABLE 1. BRIDGES FROM THE DECONSTRUCTED ACTION CHARTS TO THE POTENTIAL EFFECT MECHANISMS.

Action	Sub-Action(s) (see p. 4-5 of Deconstruct. Action Charts)	Location	Timing of the sub-action	Duration of the Construction Activity (days, weeks, months, years)	Potential Effect Mechanism(s) (changes/actions that could adversely affect individual fish or their habitat)	Nature of Effect to Listed Fishes	Conservation Measures/ Env. Commitments to Minimize Adverse Effects
North Delta Intakes	Cofferdam placement/removal; Dredging; Bank stabilization/levee grading	Clarksburg/Hood	Jun 1-Oct 31 construction window	??	Temporary, localized increases in turbidity	Fish gill abrasion; decreased ability to feed	SWPPP; Constr. site monitoring plan; Erosion/sed. control plan
“	Cofferdam placement/removal; Channel dredging; In-water construction activities; Staging areas	“	“	“	Temporary, localized increased contaminant levels from accidental spills and disturbance of contaminated sediment	Toxicity resulting in mortality or sublethal effects such as reduced growth rates	SWPPP; Constr. site monitoring plan; Erosion/sed. control plan; Haz. Materials mgt. plan; Spill prevention, containment, and countermeasure plan
“	Cofferdam placement, Foundation Constr. by pile driving	“	“	“	Underwater noise	Mortality or injury from sound waves	Maximize use of vibratory pile driving and minimize use of impact pile driving
“	Cofferdam placement/dewatering	“	“	“	Fish stranding within enclosed cofferdam area	Injury/mortality of stranded fish	Fish Rescue and Salvage Plan
“	Intake Facility Constr. within channel/	“	“	“	Modification of 2.6 miles of Sacramento River channel margin habitat	Reduction in habitat availability/quality	Minimize footprint of on-channel facilities

TABLE 1. BRIDGES FROM THE DECONSTRUCTED ACTION CHARTS TO THE POTENTIAL EFFECT MECHANISMS.

Action	Sub-Action(s) (see p. 4-5 of Deconstruct. Action Charts)	Location	Timing of the sub-action	Duration of the Construction Activity (days, weeks, months, years)	Potential Effect Mechanism(s) (changes/actions that could adversely affect individual fish or their habitat)	Nature of Effect to Listed Fishes	Conservation Measures/ Env. Commitments to Minimize Adverse Effects
“	Placement of riprap for bank stabilization	“	“	“	Riprap placement/ Habitat alteration	Injury or mortality of fish/ habitat modification	Minimize footprint of on-channel facilities and thus area needing bank riprap
“	Existence of structure within channel	”	“		Increased localized predatory fish abundance (predation)	Increased predation losses	Predatory fish reduction plan near facilities
Tunnels	Launch Pad and Shaft construction	Various locations - No in-water work			None	None	
	Tunnel Excavation and Support	Under ground			None	None	
	Concrete Batch Plants	Various locations - Away from waterways			None	None	
	Storage, dewatering, and transport of tunnel material	Various locations			None	None	
	Culvert siphons						
	Construction of Barge Landings at the tunnel	5 sites	Jun 1-Oct 31 Constr. window	weeks	Temporary, localized increases in turbidity	No adverse effect expected	SWPPP; Constr. site monitoring plan; Erosion/sed. control plan

TABLE 1. BRIDGES FROM THE DECONSTRUCTED ACTION CHARTS TO THE POTENTIAL EFFECT MECHANISMS.

Action	Sub-Action(s) (see p. 4-5 of Deconstruct. Action Charts)	Location	Timing of the sub- action	Duration of the Construction Activity (days, weeks, months, years)	Potential Effect Mechanism(s) (changes/actions that could adversely affect individual fish or their habitat)	Nature of Effect to Listed Fishes	Conservation Measures/ Env. Commitments to Minimize Adverse Effects
	shafts						
	“	“	Jun 1-Oct 31 Constr. window		Underwater noise	Potential Injury or mortality due to sound waves	
	Existence of Barge Landings	“	Year-round	Years (barge landings removed after construction is completed)	Modification of 15,000 sf of channel margin habitat at each of the 5 barge landing sites	Habitat modification / loss	
	Barge operations	Various/5 barge landing sites	Year-round use		Temporary, localized increases in turbidity and disturbance of benthic habitats due to propeller wash	Temporary turbidity increases and disturbance of rearing habitat	EC-6: Channel Margin Enhancement; Barge operations plan
	“	Various/5 barge landing sites	Year-round use		Underwater noise	Temp. altered behavior, but no injury or mortality	Barge operations plan
Head of Old River Barrier	Cofferdam placement/ removal;	Head of Old River at San	Aug 1-Nov 30 Constr. window	??	Temporary, localized increases in turbidity	No adverse effect expected	SWPPP; Constr. site monitoring plan; Erosion/sed. control plan

TABLE 1. BRIDGES FROM THE DECONSTRUCTED ACTION CHARTS TO THE POTENTIAL EFFECT MECHANISMS.

Action	Sub-Action(s) (see p. 4-5 of Deconstruct. Action Charts)	Location	Timing of the sub- action	Duration of the Construction Activity (days, weeks, months, years)	Potential Effect Mechanism(s) (changes/actions that could adversely affect individual fish or their habitat)	Nature of Effect to Listed Fishes	Conservation Measures/ Env. Commitments to Minimize Adverse Effects
	Dredging; Bank stabilization/ levee grading	Joaquin River					
	Cofferdam placement/ removal; Channel dredging; In- water construction activities; Staging areas	“	“	“	Temporary, localized increased contaminant levels from accidental spills and disturbance of contaminated sed.	Chemical toxicity	
	Cofferdam placement, Foundation Constr. by pile driving	“	“	“	Underwater noise	Mortality or injury from sound waves	
	Cofferdam placement/de- watering	“	“	“	Fish stranding within enclosed cofferdam area	Mortality of stranded fish	
	Barrier construction within channel	“	“	“	Loss of habitat	Reduction in habitat availability	
	Existence of structure within channel	”	“		Increased localized predatory fish abundance	Reduced survival	

TABLE 1. BRIDGES FROM THE DECONSTRUCTED ACTION CHARTS TO THE POTENTIAL EFFECT MECHANISMS.

Action	Sub-Action(s) (see p. 4-5 of Deconstruct. Action Charts)	Location	Timing of the sub-action	Duration of the Construction Activity (days, weeks, months, years)	Potential Effect Mechanism(s) (changes/actions that could adversely affect individual fish or their habitat)	Nature of Effect to Listed Fishes	Conservation Measures/ Env. Commitments to Minimize Adverse Effects
Interm. Forebay	Soil Testing	Snodgrass Slough, north of Delta Cross Channel			None	None	
	Dewatering, excavation, and spoil storage	“	“		None	None	
	New Intermediate forebay embankment	”	“		None	None	
Clifton Court Forebay	Dredging	Clifton Court Forebay					
	Cofferdam placement, dewatering, and removal				Temporary, localized increases in turbidity	Fish gill abrasion; decreased ability to feed	SWPPP; Constr. site monitoring plan; Erosion/sed. control plan
	Cofferdam placement, dewatering, and removal				Temporary, localized increased contaminant levels from accidental spills and disturbance of contaminated sediment	Toxicity resulting in mortality or sublethal effects such as reduced growth rates	SWPPP; Constr. site monitoring plan; Erosion/sed. control plan; Haz. Materials mgt. plan; Spill prevention, containment, and countermeasure plan

TABLE 1. BRIDGES FROM THE DECONSTRUCTED ACTION CHARTS TO THE POTENTIAL EFFECT MECHANISMS.

Action	Sub-Action(s) (see p. 4-5 of Deconstruct. Action Charts)	Location	Timing of the sub-action	Duration of the Construction Activity (days, weeks, months, years)	Potential Effect Mechanism(s) (changes/actions that could adversely affect individual fish or their habitat)	Nature of Effect to Listed Fishes	Conservation Measures/ Env. Commitments to Minimize Adverse Effects
	Pile installation				Underwater noise	Mortality or injury from sound waves	Maximize use of vibratory pile driving and minimize use of impact pile driving
	Embankment Construction						
	Pumping Plant, spillway, and stilling basin construction						
	New Forebay structures (inlets, outlets, and control structures)						
Connection to Banks/ Jones Pumping Plants	Temporary re-route of Byron Hwy and SPRR						
“	Culvert siphon construct.						
“	Radial gates construct.						

TABLE 1. BRIDGES FROM THE DECONSTRUCTED ACTION CHARTS TO THE POTENTIAL EFFECT MECHANISMS.

Action	Sub-Action(s) (see p. 4-5 of Deconstruct. Action Charts)	Location	Timing of the sub-action	Duration of the Construction Activity (days, weeks, months, years)	Potential Effect Mechanism(s) (changes/actions that could adversely affect individual fish or their habitat)	Nature of Effect to Listed Fishes	Conservation Measures/ Env. Commitments to Minimize Adverse Effects
“	New Canal construct.						
Power supply & grid connect.	Tower and Pole Construction						
	Line stringing						
Mitigation Sites							
Studies to Est. Biol. Baselines	Baseline predator density & distribution						
	Reach-specific baseline juv. Salmonid survival rates						
	Baseline fish surveys						

This Table 1 “bridges” from the Deconstructed Action charts to the Potential Effect Mechanisms (i.e., how each of the components of the deconstructed action could impact fish).

Table 2 v1. Delta Smelt - Bridges from the identified **Potential Effect Mechanisms to the Effects Analysis**, where the impacts to the species are identified and quantified as to magnitude.

Potential Effect Mechanism (changes/actions that could adversely affect individual fish or their habitat)	Components of the Proposed Action contributing to Environ. Effect	Sub-Action(s) (see p. 4-5 of Deconstructed Action Chart)	Location of Sub-action	Timing of the sub-action	Period/ Magnitude of Fish Exposure	Life Stage(s) Affected/ how they are affected	Response/Rationale for Magnitude of Effect	Magnitude of Effect (High, Medium, Low, Negligible, None)	Weight of Evidence for Effect (High, Medium, Low)	Mitigation for Impacts that can't be sufficiently avoided or minimized	Magnitude of combined effect from all components of the Proposed Action (High, Medium, Low, Negligible, None)
Turbidity – Temporary, localized increases	North Delta Intakes	Cofferdam placement/ removal; Dredging; Bank stabilization/ levee grading	Clarksburg/ Hood	Jun 1-Oct 31 Constr. window	June-July/ Low exposure due to few delta smelt occurring at these locations	Adults, Eggs and Larvae (Juv. Life stage not present at location)/ Fish gill abrasion; decreased ability to feed; reduced growth rates	Delta smelt are adapted to life in turbid waters, and thus are not expected to experience gill abrasion or reduced feeding success from the anticipated temporary increases in turbidity	Negligible	High	Creation of X acres of tidal wetland habitat	
“	Barge Landings		5 sites	“	??	“	“	Negligible	High	“	
“	HOR Barrier		Head of Old River, at San Joaquin River	“	??	“	“	Negligible	High	“	
“	Clifton Court Forebay	Dredging; Cofferdam placement/ removal; dewatering; embankment construction; pile driving	Clifton Court Forebay	“	??	“	“	Negligible	High	“	
	Pre-Construction Actions	Geotechnical activities, site preparation (excluding barge landings), and studies to inform design criteria	Various, but all on land with no in-water work	Year-round	None	None	N/A	None	High	N/A	
	“	Studies to establish biological	Various, and all involving	??	??	Studies to establish biological	N/A	None	High	N/A	

Table 2 v1. Delta Smelt - Bridges from the identified **Potential Effect Mechanisms to the Effects Analysis**, where the impacts to the species are identified and quantified as to magnitude.

Potential Effect Mechanism (changes/actions that could adversely affect individual fish or their habitat)	Components of the Proposed Action contributing to Environ. Effect	Sub-Action(s) (see p. 4-5 of Deconstructed Action Chart)	Location of Sub-action	Timing of the sub-action	Period/ Magnitude of Fish Exposure	Life Stage(s) Affected/ how they are affected	Response/Rationale for Magnitude of Effect	Magnitude of Effect (High, Medium, Low, Negligible, None)	Weight of Evidence for Effect (High, Medium, Low)	Mitigation for Impacts that can't be sufficiently avoided or minimized	Magnitude of combined effect from all components of the Proposed Action (High, Medium, Low, Negligible, None)
		baseline	in-water sampling			baseline will not affect turbidity levels					
	Tunnels	All – See p. 5 of Deconstructed Action Chart	Various, but all on land with no in-water work	Various	None	None/ Not affected by sub-actions	N/A	None	High	N/A	
	Intermediate Forebay	Soil testing; dewatering, excavation, and spoil storage; new intermediate forebay embankment	Adjacent to Snodgrass Slough, north of Delta Cross Channel	Year-round	None	None	N/A	None	High	N/A	
	Connection to Banks/Jones Pumping Plants	Re-routing of Byron Hwy and SPRR; culvert siphon construction; radial gates construction; new canal construction	At Banks/Jones pumping plants		None	None	N/A	None	High	N/A	
“	Power Supply & grid connections	Tower and pole construction; line stringing	Various	“	None	None	N/A	None	High	N/A	
	Mitigation Sites		TBD								
Increased Contaminant Levels – Temporary, localized increased contaminant levels	North Delta Intakes	Cofferdam placement/removal; Channel dredging; In-water construction activities; Staging	Clarksburg/Hood	Jun 1-Oct 31 Constr. window	June-July/ Low exposure due to few delta smelt occurring at these locations	Adults, Eggs and Larvae (Juv. Life stage not present at location)	Conservation measures and construction BMPs that will be implemented are expected to minimize the potential for	Negligible	High	Creation of X acres of tidal wetland habitat	

Table 2 v1. Delta Smelt - Bridges from the identified **Potential Effect Mechanisms to the Effects Analysis**, where the impacts to the species are identified and quantified as to magnitude.

Potential Effect Mechanism (changes/actions that could adversely affect individual fish or their habitat)	Components of the Proposed Action contributing to Environ. Effect	Sub-Action(s) (see p. 4-5 of Deconstructed Action Chart)	Location of Sub-action	Timing of the sub-action	Period/ Magnitude of Fish Exposure	Life Stage(s) Affected/ how they are affected	Response/Rationale for Magnitude of Effect	Magnitude of Effect (High, Medium, Low, Negligible, None)	Weight of Evidence for Effect (High, Medium, Low)	Mitigation for Impacts that can't be sufficiently avoided or minimized	Magnitude of combined effect from all components of the Proposed Action (High, Medium, Low, Negligible, None)
from accidental spills and disturbance of contaminated sediment		areas					toxicity to listed fishes from accidental spills and disturbance of contaminated sediments				
“	Barge Landings	“	5 sites	“	??	“	“	Negligible	High	“	
“	HOR Barrier		Head of Old River, at San Joaquin River	“	??	“	“	Negligible	High	“	
“	Clifton Court Forebay										
“	Pre-Construction Actions	Geotechnical activities, site preparation (excluding barge landings), and studies to inform design criteria	Various, but all on land with no in-water work	Year-round	None	None	N/A	None	High	N/A	
“	“	Studies to establish biological baseline	Various, and all involving in-water sampling	??	??	Studies to establish biological baseline will not affect turbidity levels	N/A	None	High	N/A	
	Tunnels	All – See p. 5 of Deconstructed Action Chart	Various, but all on land with no in-water work	Various	None	None/ Not affected by sub-actions	N/A	None	High	N/A	
	Intermediate Forebay	Soil testing; dewatering, excavation, and spoil storage; new intermediate	Adjacent to Snodgrass Slough, north of Delta Cross	Year-round	None	None	N/A	None	High	N/A	

Table 2 v1. Delta Smelt - Bridges from the identified **Potential Effect Mechanisms to the Effects Analysis**, where the impacts to the species are identified and quantified as to magnitude.

Potential Effect Mechanism (changes/actions that could adversely affect individual fish or their habitat)	Components of the Proposed Action contributing to Environ. Effect	Sub-Action(s) (see p. 4-5 of Deconstructed Action Chart)	Location of Sub-action	Timing of the sub-action	Period/ Magnitude of Fish Exposure	Life Stage(s) Affected/ how they are affected	Response/Rationale for Magnitude of Effect	Magnitude of Effect (High, Medium, Low, Negligible, None)	Weight of Evidence for Effect (High, Medium, Low)	Mitigation for Impacts that can't be sufficiently avoided or minimized	Magnitude of combined effect from all components of the Proposed Action (High, Medium, Low, Negligible, None)
		forebay embankment	Channel								
	Connection to Banks/Jones Pumping Plants	Re-routing of Byron Hwy and SPRR; culvert siphon construction; radial gates construction; new canal construction	At Banks/Jones pumping plants								
“	Power Supply & grid connections	Tower and pole construction; line stringing	Various	“							
	Mitigation Sites		TBD								
Underwater Noise Resulting from cofferdam placement and pile installation	“	Cofferdam placement, Foundation Constr. by pile driving	“	“	“	“	The majority of the delta smelt population would not be exposed to construction-related underwater noise	Low – not expected to have adverse population-level effects	High	Mitigation measure AQUA-1a	

This version is organized by the **Environmental Effect Mechanisms**, as is the EIR/EIS. As such, turbidity effects are shown in a single place within the table for all components and sub-components of the proposed action.

The last column of the table attempts to show the overall effect to the species **of creating temporary increases in turbidity** at the identified in-water construction/barge landing locations (i.e., an overall turbidity effect).

In the integration and synthesis section of the BA, one would integrate findings for all the **effects** shown in this table (i.e., integrated overall effects to the species from turbidity, inc. contaminant levels, underwater noise, fish stranding, habitat modifications, etc.).

TABLE 2 V2. DELTA SMELT

Action	Sub-Action(s) (see p. 4-5 of Deconstructed Action Charts)	Location	Timing of the sub-action	Period/ Magnitude of Fish Exposure	Potential Effect Mechanism (changes/actions that could adversely affect individual fish or their habitat)	Life Stage(s) Affected/ How Affected	Response/Rationale for Magnitude of Effect	Magnitude of Effect (High, Medium, Low, Negligible, None)	Weight of Evidence for Effect (High, Medium, Low)	Mitigation for Impacts that can't be sufficiently avoided or minimized	Magnitude of combined effects from all components of the Action (High, Medium, Low, Negligible, None)
North Delta Intakes	Cofferdam placement/removal; Dredging; Bank stabilization/levee grading	Clarksburg/Hood	Jun 1-Oct 31 Constr. window	June-July/ Low exposure due to few delta smelt occurring at these locations	Temporary, localized increase in turbidity	Adults, Eggs and Larvae (Juv. Life stage not present at location)/ Fish gill abrasion; decreased ability to feed; reduced growth rates	Delta smelt are adapted to life in turbid waters, and thus are not expected to experience gill abrasion or reduced feeding success from the anticipated temporary increases in turbidity	Negligible	High	Creation of X acres of tidal wetland habitat	
	Etc.				Temporary, localized increased contaminant levels						
	Etc.				Underwater noise						
HOR Barrier	Cofferdam placement/removal; Dredging; Bank stabilization	Head of Old River, at San Joaquin River	Aug 1-Nov 30 Constr. window		Temporary, localized increase in turbidity						
	Etc.				Temporary, localized increased contaminant levels						

This version is organized by the **components and sub-components of the action**, which is how the current outline for Chapter 5 (BA) is organized, but not how the EIR/EIS impact analysis for construction is organized (which is organized by effect mechanism). As such, turbidity effects will come up numerous times throughout this table (i.e., not all in one place).

The last column of the table attempts to show the overall effect to the species of constructing the North Delta Intakes. A similar “wrap up of overall effect to the spp.” would likewise be done for HOR Barrier, CCF, etc.

In the integration and synthesis section of the BA, one would integrate findings for all the major “actions” of the construction effort (i.e., integrated effects from constructing the North Delta Intakes, plus conveyance facilities, plus HOR Barrier, plus Intermediate forebay, plus CCF, plus connections to pumps, etc.)

Section 7 Consultation for Listed Fishes: Deconstruction of the Action – CA Water Fix (Proposed Action is to improve California's water delivery system)

Future Actions Requiring Separate ESA Consultation	Ongoing Reg. Actions in Env. Baseline (Not Mod. by Prop. Action)	Discretionary Actions with No Effects on Listed Fish Species or Critical Habitat	Construction of Facilities	Operations	Maintenance	Environmental Commitments, A&M Measures, and Monitoring
California Eco Restore	D-1641 Compliance	Governance	North Delta Intakes	North Delta Intakes	North Delta Facilities	Tidal Wetland Restoration
CVP-wide OCAP	Delta Cross-Channel Gates	Facilities Design	Tunnels	HOR Barrier	Tunnels	Channel Margin Enhancement
SWRCB Minimum Instream Flow Requirements	Export:Inflow Ratio	CMs and A&M Measures with No Potential to Impact Listed Fishes	HOR Barrier	South Delta Facilities	HOR Barrier	Localized Reduction in Predatory Fishes
Construction and Operation of New North Bay Aqueduct Intake	Winter & Summer Outflow	Adaptive Management	Intermediate Forebay	Other Flow Criteria	Forebays	Avoidance & Minimization Measures w/ Potential to Affect Listed Fishes
North Bay Aqueduct	USFWS 2008 BiOp in Environmental Baseline	Collaborative Research	Clifton Court Forebay		Connection to Banks/Jones Pumping Plants	Non-tidal Wetland Restoration
Other	Fall Outflow	Sturgeon Year-Class-Index Flow	Connection to Banks/Jones Pumping Plants		South Delta Facilities	Vernal Pool Restoration
	Suisun Marsh Salinity Control Gates Operations		Power Supply and Grid Connections (Potentially No Effect)		Mitigation Sites	Riparian Restoration
	NMFS 2009 BiOp in Env. Baseline		Mitigation Sites			Monitoring
	Non-discretionary Water Deliveries					Collaborative Research
	Existing Flow Requirements					Predation Suppression
	Other Water Quality Objectives					
	Oroville FERC Project					
	Other Existing Regulatory and Contractual Obligations					

Section 7 Consultation: Deconstruction of the Action – CA Water Fix

Future Actions Requiring Separate ESA Consultation

California Eco Restore

CVP-wide OCAP

SWRCB Minimum Instream Flow Requirements

Construction and Operation of New North Bay Aqueduct Intake

North Bay Aqueduct

Other

Ongoing Regulatory Actions in Environmental Baseline (Not Mod. by Proposed Action)

D-1641 Compliance

Delta Cross-Channel Gates Operations

Export: Inflow Ratio

Winter & Summer Outflow

USFWS 2008 BiOp in Env. Baseline

Fall Outflow

NMFS 2009 BiOp in Env. Baseline

Suisun Marsh Salinity Control Gates Operations

Non-Discretionary Water Deliveries

Existing Flow Requirements

Other Water Quality Objectives

Oroville FERC Project

Other Existing Regulatory and Contractual Obligations

Discretionary Actions with No Effects on Listed Fish Species or Critical Habitat

Governance

Facilities Design

CMs and Avoidance & Minimization Measures with No Potential to Impact Listed Fishes (all except #10 and #27)

Adaptive Management

Collaborative Research

Sturgeon Year-Class-Index Flow

Note:

If adaptive management is necessary, it will either result in operational conditions that are currently defined by the Proposed Action's criteria or, if it needs to go beyond the defined criteria due to changed circumstances, it cannot be determined *a priori* what that would be.

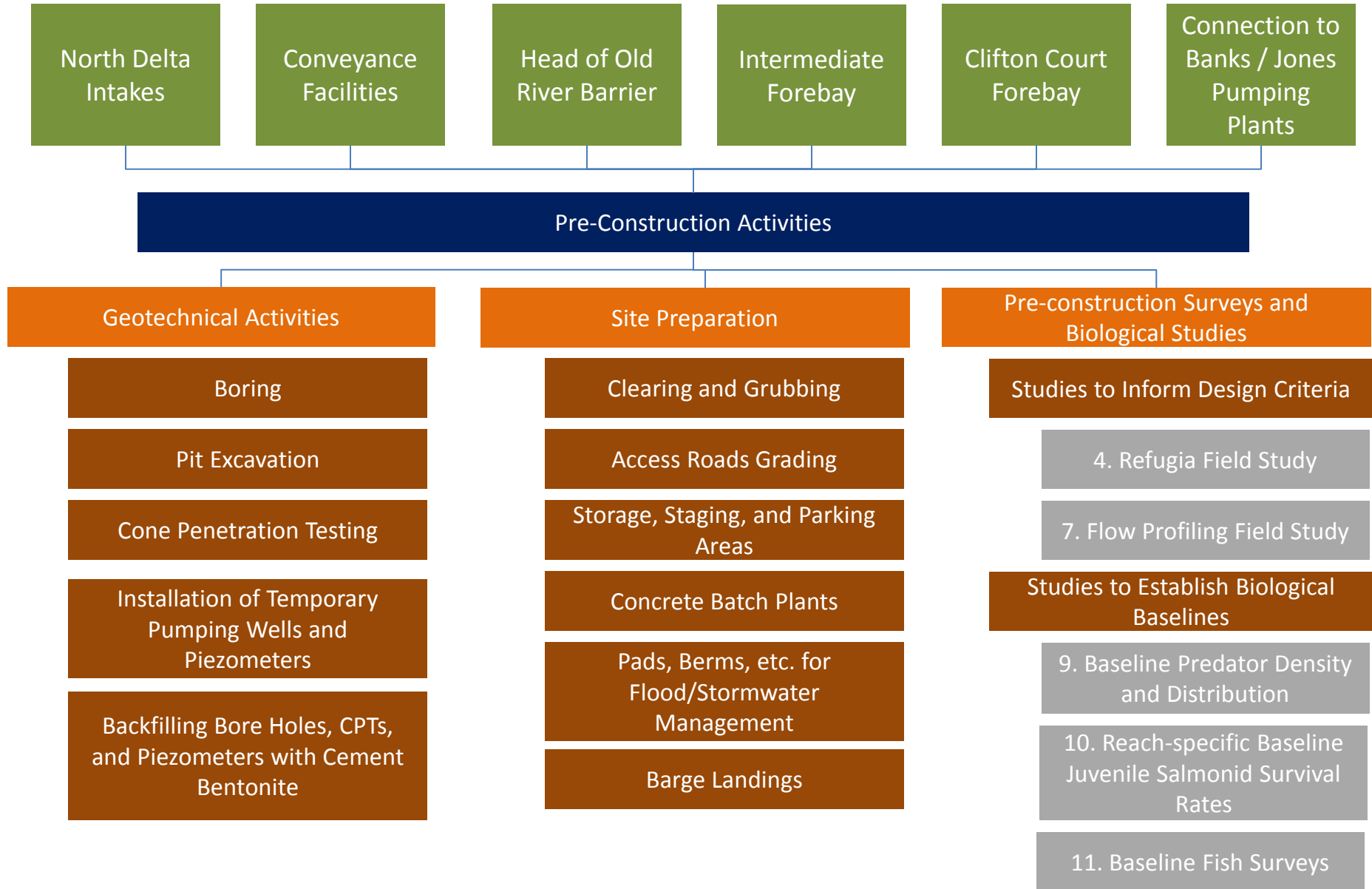
Note:

The USFWS 2008 and NMFS 2009 BiOps are part of the consultation process but are not part of the Proposed Action, per se. The consultation is on delivering water and not just the changes to the infrastructure/operations associated with delivering water.

Section 7 Consultation: Deconstruction of the Action – CA Water Fix (Proposed Action is to improve California's water delivery system)

Construction of Facilities	Operations	Maintenance	Environmental Commitments, A&M Measures, and Monitoring
North Delta Intakes	North Delta Intakes	North Delta Facilities	Tidal Wetlands Restoration
Tunnels	HOR Barrier	Tunnels	Channel Margin Enhancement
HOR Barrier	South Delta Facilities	HOR Barrier	Localized Reduction in Predatory Fishes
Intermediate Forebay	Other Flow Criteria	Forebays	Avoid. / Min. Measures w/ Potential to Affect Listed Fishes
Clifton Court Forebay		Connection to Banks/Jones Pumping Plants	Non-tidal Wetland Restoration
Connection to Banks/Jones Pumping Plants		South Delta Facilities	Vernal Pool Restoration
Power Supply and Grid Connections (Potentially No Effect)		Mitigation Sites	Riparian Restoration
Mitigation Sites			Monitoring/ Collaborative Research

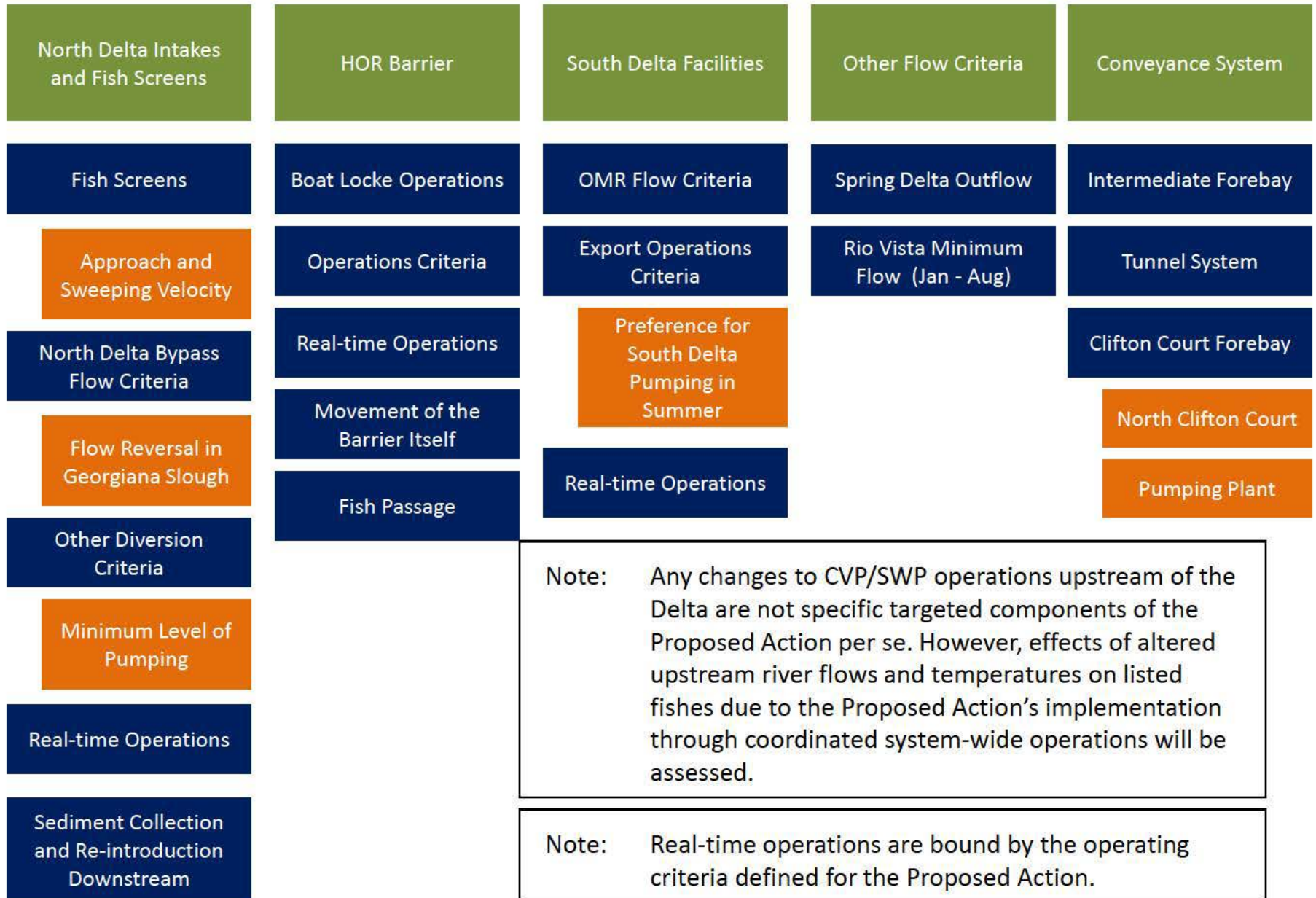
Construction of Facilities – CA Water Fix



Construction of Facilities – CA Water Fix (cont.)

North Delta Intakes	Tunnels	Head of Old River Barrier	Intermediate Forebay (Potentially No Effects to Listed Fishes)	Clifton Court Forebay (NCCF & SCCF)	Connection to Banks / Jones Pumping Plants	Power Supply and Grid Connections (Potentially No Effect to Fishes)	Mitigation Sites
Coffer Dam Placement	Launch Pads and Shafts	Coffer Dam Placement	Soil Testing	Dredging	Temporary Reroute of Byron Highway and SPRR	Tower and Pole Construction	
Coffer Dam Dewatering	Tunnel Excavation and Support	Coffer Dam Dewatering	Dewatering, Excavation, and Spoil Storage	Coffer Dam Placement	Culvert Siphon Construction	Line Stringing	
Dredging	Concrete Batch Plants	Dredging	New Intermediate Forebay Embankment	Dewatering	Radial Gates Construction		
Foundation Construction by Pile Driving / Drill Set	Construction of Shafts for Maintenance	Foundation Construction by Pile Driving / Drill Set		Pile Installation	New Canal Construction		
Intake Facility Construction	Management of Reusable Tunnel Material	In-the-wet Construction		Embankment Construction			
Intakes		Barrier Construction		Pumping Plant Construction			
Fish Screens	Storage	Staging Areas Spill / Runoff Containment		New Spillway and Stilling Basin			
Bank Stabilization levee grading	Dewatering	Bank Stabilization		New Forebay Structures (inlets, outlets, and control structures)			
Sedimentation Facilities	Transport						
Staging Areas Spill / Runoff Containment	Culvert Siphons						

Operations – CA Water Fix



Maintenance – CA Water Fix

North Delta
Facilities

Conveyance
Facilities

Head of Old
River Barrier

Forebays

Connection to
Banks/Jones
PP

South Delta
Facilities

Mitigation
Sites

Intake Facilities

Cleaning,
Painting, and
Mechanical
Equipment
Maintenance
Sediment
Removal

Dewatering for
Inspection and
Repairs

Annual
Maintenance
of Motors,
Compressors,
and Control
Gates

Harvesting of
Weeds,
Primarily in
NCCF & SCCF

Erosion Control

Repairs to
Maintain
Consistency
with Design
Specifications

Vegetation and
Rodent Control

Trash Rack
Cleaning

Embankment
Repairs

Fish Screens

Daily Cleaning
and
Mechanical
Maintenance
Removal of
Sediment,
Debris, and
Biofouling
Material
Impact
Repairs
(as needed)

Maintenance
of Bottom-
hinged Gates
Every 5-10
Years

Sediment
Handling
(Infrequent
Dredging)

Monitoring of
Seepage Flows

Dredging

Dredging Every
3-5 Years
(Aug 1-Nov 30)

Embankment
Vegetation and
Rodent
Control;
Repairs

Erosion Control
and Bank
Stabilization

Structure
Maintenance
(e.g., gates)

Sedimentation
Facilities
Erosion Control
and Bank
Stabilization

Embankment
Vegetation and
Rodent
Control;
Repairs

Fishway
Maintenance

Spillway and
Stilling Basin
Maintenance

Environmental Commitments, A&M, Monitoring

Tidal Wetlands
Restoration

Channel Margin
Enhancement

Localized
Reduction in
Predatory Fishes

Avoidance &
Minimization
Measures
w/Potential to
Impact Aquatic
Species

Adaptive
Management

Monitoring/
Collaborative
Research

Construction

Construction

Removal of
Predatory Fishes

Avoidance &
Minimization
Measure #10
Restoration of
Temporarily
Affected Natural
Communities

Evaluation of
Monitoring and
Research
Information

Fish Screen
Monitoring

Channel
Improvements

Remove Riprap

Centrarchids

Post-Construction
Reach-specific
Juvenile Salmonid
Survival Rates

Levees &
Embankments

Modify or Set
Back Levee

Striped Bass

Existence of New
Habitat

Installation of
LWD

Other Predators

Mandatory
Monitoring of
Incidental Take

Monitoring,
Management, and
Maintenance

Existence of New
Habitat

Monitoring,
Management, and
Maintenance

Avoidance &
Minimization
Measure #27
Construction &
Operation of
Georgiana Slough
Non-physical
Barrier

Construction
Monitoring

Post-
construction
Monitoring

Monitoring to
Support RTOs

Collaborative
Research

Predator
Suppression