



DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT/SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

Sacramento River Deep Water Ship Channel

Binder 1 of 2

**U.S. Army Corps of Engineers
San Francisco District and
Port of West Sacramento**

February 2011

DRAFT

**SUPPLEMENTAL ENVIRONMENTAL
IMPACT STATEMENT/SUBSEQUENT
ENVIRONMENTAL IMPACT REPORT**

**SACRAMENTO RIVER DEEP WATER SHIP
CHANNEL**

U.S. Army Corps of Engineers
San Francisco District

and

Port of West Sacramento

February 2011

Sacramento River Deep Water Ship Channel
Contra Costa, Solano, Sacramento, and Yolo Counties, California

Draft
Supplemental Environmental Impact Statement/
Subsequent Environmental Impact Report

This Draft Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report (SEIS/SEIR) evaluates the impacts of the proposed deepening of the Sacramento River Deep Water Ship Channel (SRDWSC). The federal lead agency is the U.S. Army Corps of Engineers, San Francisco District (USACE). The state lead agency is the Port of West Sacramento (Port). The Channel Deepening to -35 Feet Mean Lower Low Water Alternative (Proposed Project) would deepen, to its Congressionally authorized depth, and selectively widen portions of the SRDWSC. The purpose of the Proposed Project is to realize increased economic benefits associated with a reduced transportation cost of moving goods to the Port and provide safe navigation for commercial vessel traffic. This Draft SEIS/SEIR supplements the *Sacramento River Deep Water Ship Channel, California: Feasibility Report and Environmental Impact Statement for Navigation and Related Purposes* completed in 1980, and the *General Design Memorandum and Final Supplemental Environmental Impact Statement* completed in 1986. This Draft SEIS/SEIR analyzes potential impacts of the Proposed Project and alternatives and will support decision making by USACE, the Port, and other agencies regarding implementation of the Proposed Project and ensure compliance with the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), and other pertinent laws and regulations.

Federal, state, and local agencies and the public will have an opportunity to comment on this document during a 45-day comment period from February 25, 2011, to April 11, 2011. Information on the Draft SEIS/SEIR can be found at:
<http://www.sacramentoshipchannel.org>.

Prepared by:
U.S. Army Corps of Engineers, San Francisco District
Environmental Section A
1455 Market Street, San Francisco, California 94103
Contact: William N. Brostoff at (415) 503-6867 or Fari Tabatabai at (415) 503-6860
e-mail: spnetpa@usace.army.mil

Port of West Sacramento
Port of Sacramento, City of West Sacramento
1110 West Capitol Avenue, First Floor
West Sacramento, California 95691

February 2011

Cite as:

U.S. Army Corps of Engineers and Port of West Sacramento. Sacramento River Deep Water Ship Channel Draft Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report. February 2011.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ES-1
Project Overview.....	ES-1
Location and Scope of Analysis	ES-2
Purpose and Need and Project Objectives	ES-2
Alternatives	ES-3
Major Conclusions and Findings	ES-4
Cumulative Impacts	ES-5
Issues of Concern Raised During Scoping.....	ES-6
Issues Pending Resolution	ES-7
1 INTRODUCTION AND PURPOSE AND NEED FOR THE ACTION.....	1
1.1 Introduction.....	1
1.1.1 Overview of the Proposed Project.....	2
1.2 Purpose and Need/Project Objectives.....	10
1.3 Study Area Description and Scope of Analysis.....	11
1.4 Problems and Opportunities.....	12
1.5 Relevant Prior Studies, Reports, and Plans.....	12
1.6 Relationship of Proposed Project to Environmental Statutes and Requirements	15
1.6.1 Federal.....	16
1.6.2 State	20
1.6.3 Local	22
1.7 Intended Uses	23
1.7.1 USACE Uses	23
1.7.2 Port Uses	23
2 ALTERNATIVES.....	24
2.1 Alternatives Considered but Eliminated from Detailed Study.....	25
2.1.1 Intermodal Transportation Alternative	25
2.1.2 Increased Use of Lighter Aboard Ships Alternative	25
2.1.3 Locks Alternative.....	26
2.1.4 Channel Deepening to Depths Shallower than -33 Feet MLLW or Deeper than -35 Feet MLLW and Selective Widening Alternative.....	26
2.2 Alternatives Evaluated	27
2.2.1 Environmental Baseline	28
2.2.1.1 Future without Project Conditions (NEPA and CEQA Baseline).....	29
2.2.2 Proposed Project: Channel Deepening to -35 Feet MLLW and Selective Widening.....	39
2.2.2.1 Dredging Operations	39
2.2.2.2 Dredged Material Placement Activities	42

2.2.2.3	Wetland Mitigation	42
2.2.2.4	Utility Relocation	44
2.2.2.5	Continuation of Commercial Shipping	45
2.2.2.6	Relationship to the San Francisco Bay to Stockton Deep Water Ship Channel Plan.....	46
2.2.3	Channel Deepening to -33 Feet MLLW and Selective Widening Alternative	47
2.2.3.1	Construction Dredging Operations	47
2.2.3.2	Dredged Material Placement Activities	55
2.2.3.3	Wetland Mitigation	56
2.2.3.4	Utility Relocation	56
2.2.3.5	Continuation of Commercial Shipping	56
2.2.3.6	Relationship to the San Francisco Bay to Stockton Deep Water Ship Channel Plan.....	58
2.3	Dredged Material Placement Alternatives	58
2.3.1	Placement Sites Categories	58
2.3.2	Screening Criteria for Determining Placement Site Practicability	61
2.3.2.1	Tier 1 Criteria and Results	61
2.3.2.2	Tier 2 Criteria and Results	65
2.3.2.3	Tier 3 Criteria and Results	65
2.3.3	Placement Sites Evaluated in this Draft SEIS/SEIR	66
2.3.4	Additional Placement Sites for Future Consideration.....	70
3	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES.....	72
3.1	Physical Characteristics	75
3.1.1	Geology	75
3.1.1.1	Baseline Conditions	75
3.1.1.2	Methodology for Determining Impacts	77
3.1.1.3	Threshold of Significance.....	77
3.1.1.4	Impacts and Mitigation Measures.....	78
3.1.2	Hydrology, Hydraulics, Sedimentation, and Sediment Transport	79
3.1.2.1	Baseline Conditions	79
3.1.2.2	Methodology for Determining Impacts	92
3.1.2.3	Thresholds of Significance	92
3.1.2.4	Impacts and Mitigation Measures.....	92
3.1.3	Sediment Quality.....	103
3.1.3.1	Baseline Conditions	103
3.1.3.2	Methodology for Determining Impacts	111
3.1.3.3	Thresholds of Significance	111
3.1.3.4	Impacts and Mitigation Measures.....	111
3.1.4	Water Quality.....	117

3.1.4.1	Baseline Conditions	117
3.1.4.2	Methodology for Determining Impacts	131
3.1.4.3	Thresholds of Significance	131
3.1.4.4	Impacts and Mitigation Measures.....	132
3.2	Biological Characteristics.....	139
3.2.1	Aquatic Species and Habitat	143
3.2.1.1	Baseline Conditions	143
3.2.1.2	Methodology for Determining Impacts	184
3.2.1.3	Thresholds of Significance	184
3.2.1.4	Impacts and Mitigation Measures.....	187
3.2.2	Terrestrial Species and Habitat.....	213
3.2.2.1	Baseline Conditions	213
3.2.2.2	Methodology for Determining Impacts	261
3.2.2.3	Thresholds of Significance	262
3.2.2.4	Impacts and Mitigation Measures.....	262
3.2.2.5	Summary of Impacts and Mitigation Measures	295
3.3	Human Use Characteristics.....	297
3.3.1	Land Use.....	297
3.3.1.1	Baseline Conditions	297
3.3.1.2	Methodology for Determining Impacts	324
3.3.1.3	Threshold of Significance.....	325
3.3.1.4	Impacts and Mitigation Measures.....	327
3.3.2	Aesthetics.....	330
3.3.2.1	Baseline Conditions	330
3.3.2.2	Methodology for Determining Impacts	334
3.3.2.3	Thresholds of Significance	335
3.3.2.4	Impacts and Mitigation Measures.....	336
3.3.3	Air Quality	342
3.3.3.1	Baseline Conditions	342
3.3.3.2	Methodology for Determining Impacts	352
3.3.3.3	Thresholds of Significance	354
3.3.3.4	Impacts and Mitigation Measures.....	356
3.3.4	Noise.....	370
3.3.4.1	Baseline Conditions	370
3.3.4.2	Methodology for Determining Impacts	381
3.3.4.3	Threshold of Significance.....	382
3.3.4.4	Impacts and Mitigation Measures.....	382
3.3.5	Environmental Justice.....	385
3.3.5.1	Baseline Conditions	385
3.3.5.2	Methodology for Determining Impacts	391

3.3.5.3	Threshold of Significance.....	391
3.3.5.4	Impacts and Mitigation Measures.....	391
3.3.6	Utilities.....	394
3.3.6.1	Baseline Conditions	394
3.3.6.2	Methodology for Determining Impacts	397
3.3.6.3	Thresholds of Significance	397
3.3.6.4	Impacts and Mitigation Measures.....	397
3.3.7	Cultural and Historic Resources	399
3.3.7.1	Baseline Conditions	399
3.3.7.2	Methodology for Determining Impacts	408
3.3.7.3	Threshold of Significance.....	408
3.3.7.4	Impacts and Mitigation Measures.....	409
3.3.8	Recreational Resources	410
3.3.8.1	Baseline Conditions	410
3.3.8.2	Methodology for Determining Impacts	415
3.3.8.3	Thresholds of Significance	415
3.3.8.4	Impacts and Mitigation Measures.....	415
3.3.9	Commercial Fisheries.....	419
3.3.9.1	Baseline Conditions	419
3.3.9.2	Methodology for Determining Impacts	420
3.3.9.3	Thresholds of Significance	421
3.3.9.4	Impacts and Mitigation Measures.....	421
3.3.10	Marine Navigation and Transportation.....	424
3.3.10.1	Baseline Conditions	424
3.3.10.2	Methodology for Determining Impacts	428
3.3.10.3	Thresholds of Significance	429
3.3.10.4	Impacts and Mitigation Measures.....	429
3.3.11	Hazardous, Toxic, and Radioactive Waste	433
3.3.11.1	Baseline Conditions	433
3.3.11.2	Methodology for Determining Impacts	443
3.3.11.3	Threshold of Significance.....	443
3.3.11.4	Impacts and Mitigation Measures.....	443
4	OTHER REQUIRED ANALYSES.....	445
4.1	Unavoidable Adverse Impacts	445
4.2	Relationship of Short-Term Uses and Long-Term Productivity	445
4.3	Irreversible and Irretrievable Commitment of Resources	446
4.4	Growth-Inducing Impacts	447
4.5	Cumulative Impacts	447
4.5.1	Requirements for Cumulative Impact Analysis.....	447

4.5.2	Summary of Cumulative Effects Identified.....	449
4.5.2.1	Future Maintenance Dredging and Bank Stabilization Activities	449
4.5.2.2	Ongoing Commercial Shipping Practices	450
4.5.2.3	Other Potential Cumulative Effects	451
4.6	Indirect Impacts	451
4.7	Mitigation Monitoring and Reporting Program.....	452
5	PUBLIC INVOLVEMENT	460
6	LIST OF PREPARERS AND DISTRIBUTION LIST	462
6.1	List of Preparers in Alphabetical Order by Organization.....	462
6.1.1	U.S. Army Corps of Engineers, San Francisco District.....	462
6.1.2	Port of West Sacramento	462
6.1.3	Anchor QEA, LP.....	462
6.1.4	Ilanco Environmental, LLC	463
6.1.5	Environmental Planning Strategies, Inc.	463
6.2	Distribution List	463
6.2.1	Federal Agencies.....	463
6.2.2	State Agencies.....	463
6.2.3	Local/Regional Agencies	464
6.2.4	Locations where Draft SEIS/SEIR is Available	464
6.2.5	Internet Availability.....	464
7	LIST OF AGENCIES FROM WHICH PERMITS ARE REQUIRED.....	465
8	REFERENCES	468

List of Tables

Table ES-1	Summary of Impacts and Proposed Mitigation Measures	ES-9
Table 1	Study Area Reach Extents	12
Table 2	Forecasted Commodity Imports.....	30
Table 3	Estimated Change in Vessel Numbers under Future without Project Conditions	32
Table 4	Bulk Carriers – Forecasted Fleet Mix under Future without Project Conditions	33
Table 5	General Carriers – Forecasted Fleet Mix under Future without Project Conditions	33
Table 6	Tankers – Forecasted Fleet Mix under Future without Project Conditions....	34
Table 7	Existing and Proposed SRDWSC Dimensions.....	39
Table 8	Dredging Volumes Per Reach Under the Proposed Project.....	40
Table 9	Dredged Material Placement Site Locations and Capacities for the Proposed Project.....	42

Table 10	Estimated Change in Vessel Numbers under the Proposed Project	46
Table 11	Bulk Carriers – Change in Forecasted Fleet Mix from Future without Project Conditions to the Proposed Project	46
Table 12	Liquid Tankers – Change in Forecasted Fleet Mix from Future without Project Conditions to the Proposed Project	46
Table 13	Dredging Volumes Per Reach Under the Channel Deepening to -33 Feet MLLW and Selective Widening Alternative.....	54
Table 14	Dredged Material Placement Site Locations and Capacities for the Channel Deepening to -33 Feet MLLW and Selective Widening Alternative	56
Table 15	Estimated Change in Vessel Numbers under the Channel Deepening to -33 Feet MLLW and Selective Widening Alternative	57
Table 16	Bulk Carriers – Change in Forecasted Fleet Mix from Future without Project Conditions to the Channel Deepening to -33 Feet MLLW and Selective Widening Alternative.....	57
Table 17	Liquid Tankers – Change in Forecasted Fleet Mix from Future without Project Conditions to the Channel Deepening to -33 Feet MLLW and Selective Widening Alternative.....	58
Table 18	Tiers 1 and 2 Criteria Results	62
Table 19	Proposed Dredged Material Placement Site Details	67
Table 20	Summary of Proposed Mitigation Measures	72
Table 21	Summary of Impacts to Levee/Berm Stability and Mitigation Measures	79
Table 22	Tidal Ranges along the SRDWSC	82
Table 23	Maintenance Dredging Record in SRDWSC.....	84
Table 24	Summary of Hydrology, Hydraulics, Sedimentation, and Sediment Transport Impacts and Mitigation Measures	102
Table 25	Heavy Metal Concentrations in Sediments, 1975 and 1984.....	104
Table 26	Sediment Testing Results for Operations and Maintenance Dredging in SRDWSC since 2000	104
Table 27	Chemical Constituents that Exceeded Criteria in Sediment Composite Samples During 2009 Sediment Testing.....	108
Table 28	Chemical Constituents in Discrete Sediment Samples (New Horizons) that Exceeded Criteria During 2009 Baseline Sampling.....	110
Table 29	Metals within Discrete Samples with Concentrations in Exceedance of Corresponding Metal Concentrations within Composite Samples and Sediment Quality Criteria	113
Table 30	Summary of Sediment Quality Impacts and Mitigation Measures	117
Table 31	Average Surface and Subsurface Turbidity	123
Table 32	Average Surface and Subsurface DO	124
Table 33	Average Surface and Subsurface Salinity Levels	124
Table 34	Average Surface and Subsurface Conductivity Levels	125

Table 35	Chemical Constituents that Exceeded Criteria in MET Samples During 2009 Baseline Sampling	129
Table 36	Chemical Constituents that Exceeded Criteria in DI-WET Samples During 2009 Baseline Sampling	131
Table 37	Summary of Water Quality Impacts and Mitigation Measures	138
Table 38	Fish Species with Potential to Occur in the Study Area	153
Table 39	Occurrence, Life Stage, and Residence Time of Special Status Fish Species in the SRDWSC	158
Table 40	Results of Stockton Deep Water Ship Channel and SRDWSC Entrainment Monitoring	189
Table 41	Summary of Aquatic Species and Habitat Impacts and Mitigation Measures.....	211
Table 42	Summary of Habitat Types Mapped in Proposed Dredged Material Placement Sites.....	226
Table 43	Summary of Impacted and Mitigated Habitat Types in Usable Portions of Placement Sites	232
Table 44	Terrestrial Species without Special Status with Potential to Occur in the Study Area.....	237
Table 45	Federal and State Special Status Species with the Potential to Occur within the Study Area	240
Table 46	Summary of Terrestrial Threatened and Endangered Species and Critical Habitat Impacts and Mitigation Measures.....	295
Table 47	Acreage of Farmland Designations for the Proposed Dredged Material Placement Sites	310
Table 48	Proposed Dredged Material Placement Site Land Use Information	325
Table 49	Summary of Land Use Impacts and Mitigation Measures	329
Table 50	Summary of Aesthetic Resources Impacts and Mitigation Measures	342
Table 51	Adverse Effects Associated with Criteria Pollutants	344
Table 52	Construction Source Activities and Characteristics.....	353
Table 53	Thresholds of Significance for Criteria Pollutants.....	355
Table 54	Summary of Construction Emissions without Mitigation	358
Table 55	Summary of Construction Emissions with Mitigation	359
Table 56	Summary of Future without Project Conditions Operational Emissions without Mitigation.....	360
Table 57	Summary of Proposed Project Operational Emissions without Mitigation ...	361
Table 58	Summary of Channel Deepening to -33 Feet MLLW and Selective Widening Alternative Operational Emissions without Mitigation	363
Table 59	Summary of Air Quality Resource Impacts and Mitigation Measures	369
Table 60	Common Terminology Used to Characterize Sound	371
Table 61	Rules for Combining Noise Levels	373

Table 62	Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety	373
Table 63	Summary of Sensitive Receptors in the Study Area Vicinity.....	377
Table 64	Typical Dredging and Construction Noise Attenuation.....	381
Table 65	Summary of Noise Impacts and Mitigation Measures	385
Table 66	Minority and Low-income Populations in the Study Area	389
Table 67	Children and Juvenile Populations in the Study Area.....	390
Table 68	Educational Attainment	391
Table 69	Summary of Environmental Justice Impacts and Mitigation Measures	394
Table 70	Summary of Utilities Impacts and Mitigation Measures	399
Table 71	Summary of Cultural Resources Information at Proposed Dredged Material Placement Sites	407
Table 72	Summary of Cultural and Historic Resources Impacts and Mitigation Measures.....	410
Table 73	Recreational Fisheries in the Study Area	412
Table 74	Marinas Located in the Study Area.....	413
Table 75	Summary of Recreational Resources Impacts and Mitigation Measures	418
Table 76	Summary of Commercial Fisheries Impacts and Mitigation Measures.....	423
Table 77	Draft Constraints for Bulk Cargo Carriers.....	425
Table 78	Draft Constraints for General Cargo Carriers	425
Table 79	Summary of Marine Navigation and Transportation Impacts and Mitigation Measures.....	433
Table 80	Summary of HTRW Impacts and Mitigation Measures	444
Table 81	Forecasted Vessel Numbers Calling on the Port	450
Table 82	Mitigation Monitoring and Reporting Program	453

List of Figures

Figure 1	SRDWSC Vicinity Map	3
Figure 2	Overview of the Proposed Project.....	4
Figure 3	Overview of Future without Project Conditions	36
Figure 4	Overview of the Channel Deepening to -33 Feet MLLW and Selective Widening Alternative.....	48
Figure 5	Inventory of Potential Placement Sites Identified in the Placement Site Report	60
Figure 6	Tidal Gauges and Water Quality Monitoring Stations in the Study Area.....	81
Figure 7	Salt Water Intrusion Shear Stress Mechanism	86
Figure 8	Year 0 X2 distances within the Sacramento River Delta.....	88
Figure 9	Estimated Sea Level Rise Rates	91
Figure 10	Year 50 X2 Distances within the Sacramento River Delta.....	95

Figure 11	Year 0 Cumulative Days Proposed Project X2 Distances Exceed Future without Project Conditions	96
Figure 12	Year 50 Cumulative Days Proposed Project X2 Distances Exceed Future without Project Conditions	97
Figure 13	2009 SRDWSC Sediment Sampling Locations	107
Figure 14	2009 SRDWSC Water Quality Sampling Locations.....	122
Figure 15	Aquatic Habitat Types by Water Depth within the Study Area.....	144
Figure 16	Critical Habitat Designations within the Study Area for Green Sturgeon and Delta Smelt.....	164
Figure 17	Critical Habitat Designations within the Study Area for Central Valley Spring-run Chinook, Central Valley Steelhead, and Sacramento River Winter-run Chinook	167
Figure 18	Essential Fish Habitat within the Study Area	181
Figure 19	Habitat Types Identified at Placement Site S1	214
Figure 20	Habitat Types Identified at Placement Site S4.....	215
Figure 21	Habitat Types Identified at Placement Site S11	216
Figure 22	Habitat Types Identified at Placement Site S14.....	217
Figure 23	Habitat Types Identified at Placement Site S16.....	218
Figure 24	Habitat Types Identified at Placement Site S19	219
Figure 25	Habitat Types Identified at Placement Site S20.....	220
Figure 26	Habitat Types Identified at Placement Site S31	221
Figure 27	Habitat Types Identified at Placement Site S32	223
Figure 28	Habitat Types Identified at Placement Site S35	225
Figure 29	Land Use Overview.....	299
Figure 30	General Plans/Zoning within the Study Area.....	300
Figure 31	Farmlands within the Study Area.....	312
Figure 32	Williamson Act Properties within the Study Area.....	318
Figure 33	Aesthetic Resources	331
Figure 34	Scenic Route 160 within the Study Area.....	332
Figure 35	Marinas and Harbors within the Study Area	414
Figure 36	Known HTRW Sites within 1,000 Feet of the Study Area.....	437

List of Appendices

- Appendix A Covers and Records of Decision from Past EIS and SEIS (1980, 1986)
- Appendix B 404(b)(1) Alternatives Analysis (2011)
- Appendix C Fish and Wildlife HEP Report (2010)
- Appendix D Draft Fish and Wildlife Coordination Report (2011)
- Appendix E Draft Sacramento River Deep Water Ship Channel Limited Reevaluation Report (LRR) With-Project Economic Analysis (2011)

-
- Appendix F Navigation Study for Sacramento Deep Water Ship Channel Improvement Data Report (2010)
 - Appendix G Utility Investigation Report (2010)
 - Appendix H Opportunities for Beneficial Use of Dredged Material Report (2010)
 - Appendix I Placement Site Summary Table (2010)
 - Appendix J Hydraulics and Hydrology Report (2010)
 - Appendix K Sacramento DWSC Modeling Results Summary (2010)
 - Appendix L Summary of the Sacramento DWSC and San Francisco Bay to Stockton Navigation Project Alternatives Modeling Report (2010)
 - Appendix M Sediment Quality Report (2010)
 - Appendix N 2008 and 2009 Water Quality Monitoring Reports (2008, 2009)
 - Appendix O Vegetation Report (2010)
 - Appendix P Air Quality Analysis Report (2010)
 - Appendix Q Hazardous, Toxic, and Radioactive Waste Report (2009)

LIST OF ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
°F	degree Fahrenheit
ABAG	Association of Bay Area Governments
AHPA	Archaeological and Historical Preservation Act
APE	Area of Potential Effects
AQAP	Air Quality Attainment Plan
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BDCP	Bay-Delta Conservation Plan
BMP	best management practice
BNSF	Burlington Northern Santa Fe
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CALFED	CALFED Bay-Delta Program
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDBW	California Department of Boating and Waterways
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act/Superfund Amendments and Reauthorization Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CH ₄	methane
CNEL	community noise equivalent level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	CO ₂ equivalent
CUPA	Certified Uniform Program Agencies
CWA	Clean Water Act
cy	cubic yard
CZMA	Coastal Zone Management Act

CZMP	Coastal Zone Management Plan
DA	Department of the Army
dB	decibel
dBA	A-weighted decibel
DDT	dichloro diphenyl trichloroethane
Delta	Sacramento-San Joaquin River Delta
DHCCP	Delta Habitat Conservation and Conveyance Program
DI-WET	Deionized Water-Waste Extraction Test
DO	dissolved oxygen
dph	days post hatch
DPS	distinct population segment
DWR	California Department of Water Resources
DWT	deadweight tonnage
EFH	essential fish habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ER	Engineer Regulations
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
ESU	evolutionary significant unit
FMC	Fishery Management Council
FMMP	Farmland Mapping and Monitoring Program
FMP	Fishery Management Plan
FPPA	Farmland Protection Policy Act
FR	Federal Regulation
FWPRA	Federal Water Project Recreation Act
GDM	General Design Memorandum
GHG	greenhouse gas
GIS	geographical information system
HCP	Habitat Conservation Plan
HEP	Habitat Evaluation Procedures
HFC	Hydrofluorocarbons
HTRW	hazardous, toxic, and radioactive waste
I	Interstate
IEP	Interagency Ecological Program
km	kilometers
LASH	Lighter Aboard Ship
Ldn	day-night average sound level
LEDPA	Least Environmentally Damaging Practicable Alternative
Leq	equivalent sound level

LESA	Land Evaluation and Site Assessment
LIM	Land Inventory and Monitoring
LRR	Limited Reevaluation Report
LSIWA	Lower Sherman Island Wildlife Area
LTMS	Long Term Management Strategy
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
MET	Modified Elutriate Test
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MHHW	mean higher high water
MHW	mean high water
mph	miles per hour
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
mS/cm	miscoSiemens per centimeters
MSL	mean sea level
MT	metric tons
N ₂ O	nitrous oxide
NAAQS	national ambient air quality standards
NCCPA	Natural Communities Conservation Planning Act
NED	National Economic Development
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO ₂	nitrogen dioxide
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NOP	Notice of Preparation
NOTAM	Notice to All Mariners
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O ₃	ozone
OGV	ocean going vessel
OHW	ordinary high water

PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	primary constituent element
PEM1R	palustrine, emergent, persistent, seasonal-tidal
PEMC	palustrine, emergent, temporarily flooded
Pf	palustrine farmed
PFC	perfluorocarbon
PFMC	Pacific Fishery Management Council
PG&E	Pacific Gas and Electric
PM	particulate matter
POD	Pelagic Organism Decline
Port	Port of West Sacramento
Porter-Cologne	Porter-Cologne Water Quality Control Act
ppt	parts per thousand
ppmv	parts per million on a volume basis
PRC	California Public Resources Code
PRG	Preliminary Remediation Goal
psu	practical salinity units
PUBA	palustrine, unconsolidated bottom, temporarily flooded
Pub. L.	Public Law
RCA	Resource Conservation Area
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act
RM	river mile
ROD	Record of Decision
ROG	reactive organic gas
RPD	relative percent difference
RPM	revolutions per minute
RWQCB	Regional Water Quality Control Board
SEIS/SEIR	Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report
SF ₆	sulfur hexafluoride
SFEI	San Francisco Estuary Institute
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMAQMD	Sacramento Metro Air Quality Management District
SO ₂	sulfur dioxide
SO _x	sulfur oxides
SR	State Route
SRDWSC	Sacramento River Deep Water Ship Channel

SSC	State Species of Concern
STLC	Soluble Threshold Limit Concentration
SVAB	Sacramento Valley Air Basin
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
TOC	total organic carbon
TSCA	Toxic Substances Control Act
TSS	total suspended solids
µg/m ³	micrograms per cubic meter
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
WDR	Waste Discharge Requirement
WQC	Water Quality Certification
X2	distance from the Golden Gate Bridge to the tidally averaged near-bed 2-psu isohaline (constant salinity)
YBWA	Yolo Bypass Wildlife Area
YSAQMD	Yolo Solano Air Quality Management District