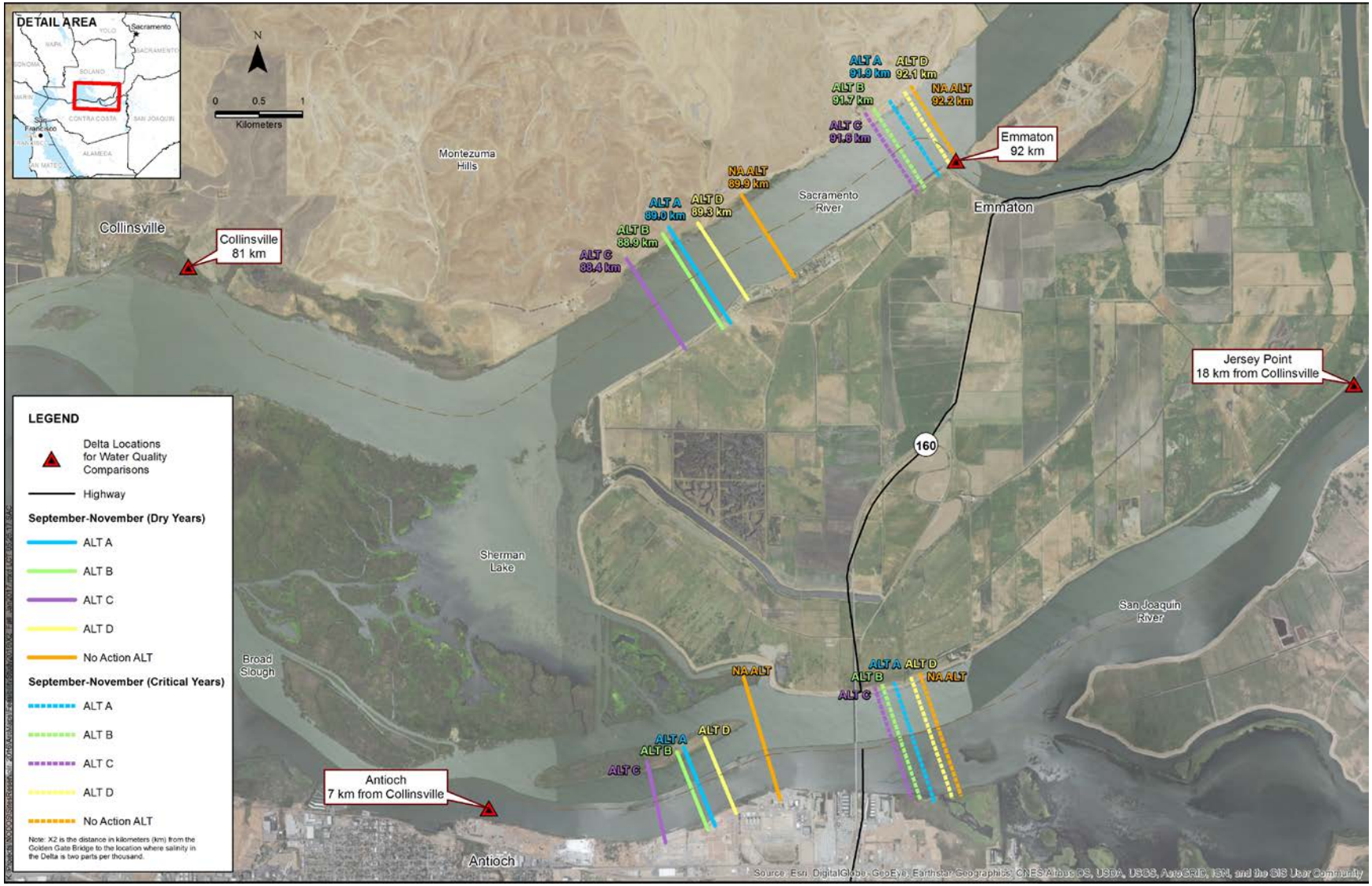

Figure A-26. Position of X2 During September – November in Dry and Critical Years

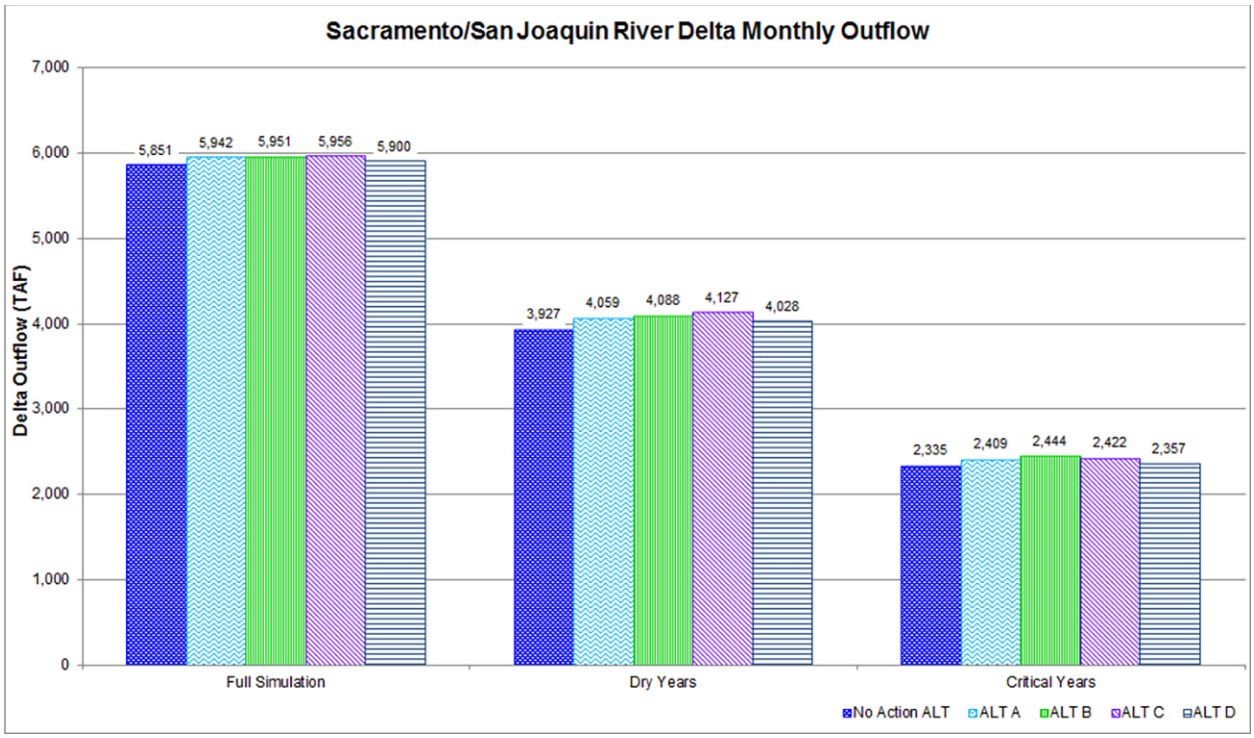

Figure A-27. Delta Outflow (May through December)

Water Quality for Agricultural and M&I Water Uses

Improved water quality in the Delta would benefit Delta export water quality. Exporters using water for M&I purposes would experience a reduction in water treatment costs. Agricultural users, particularly in the San Joaquin River Basin, would benefit from reduced salt loads.

Water quality improvements that would result from the NODOS project alternatives for agricultural and M&I water uses are evaluated by comparing simulated EC, TDS, and chloride concentrations for the four action alternatives (Figure A-28 through Figure A-31). Table A-47 provides the EC, TDS, chloride, and bromide concentrations for the action alternatives.

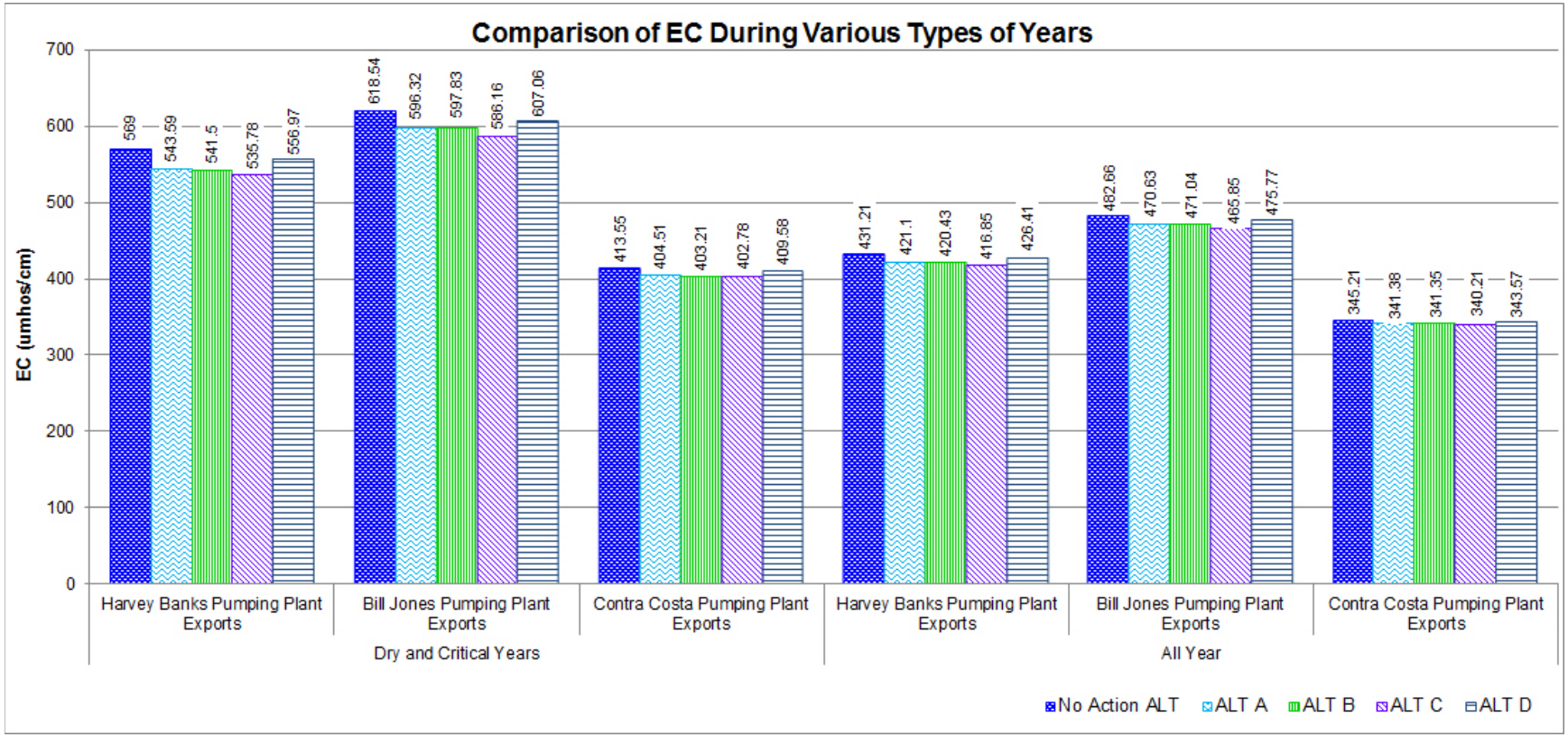

Figure A-28. Improvements in Electrical Conductivity Concentrations

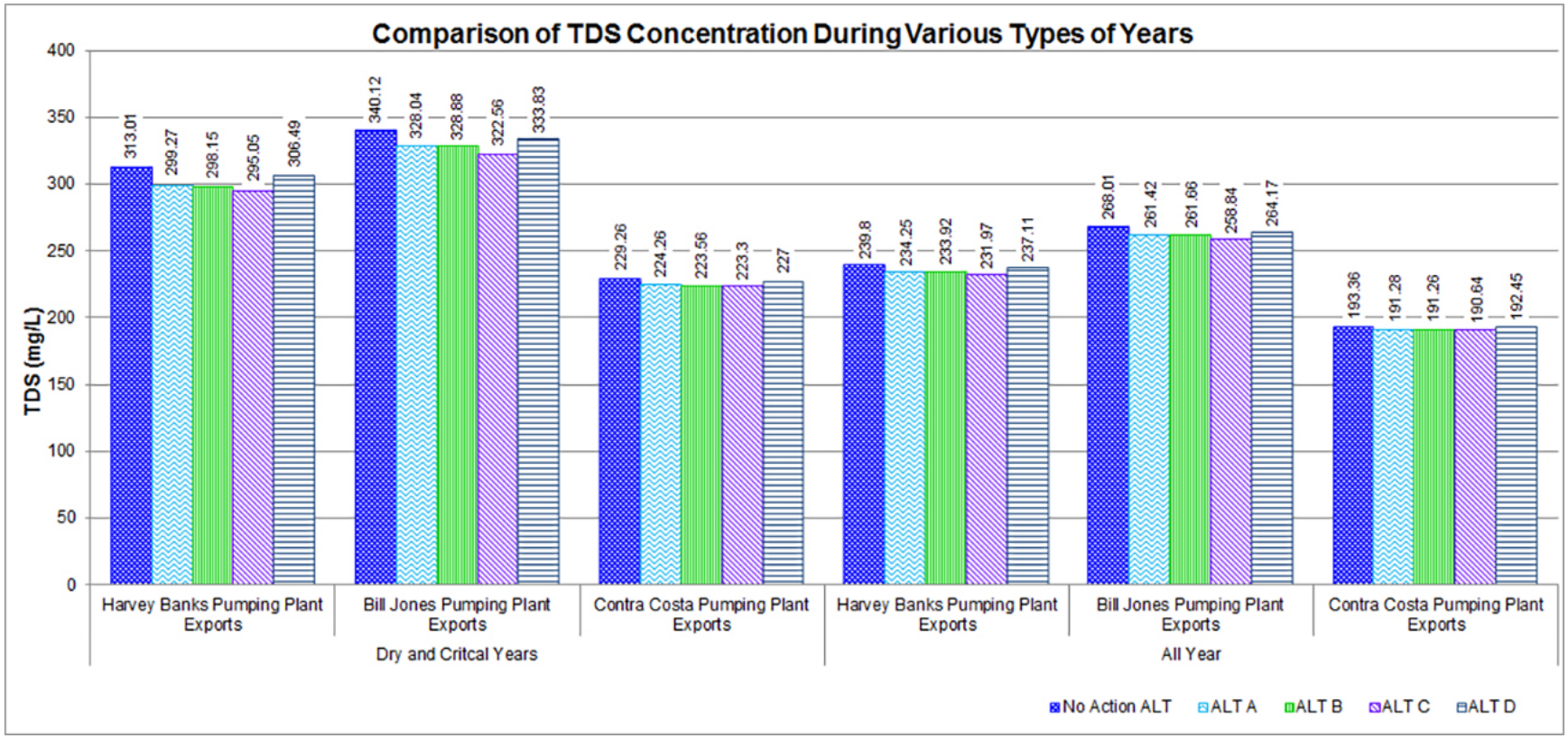

Figure A-29. Improvements in TDS Concentrations

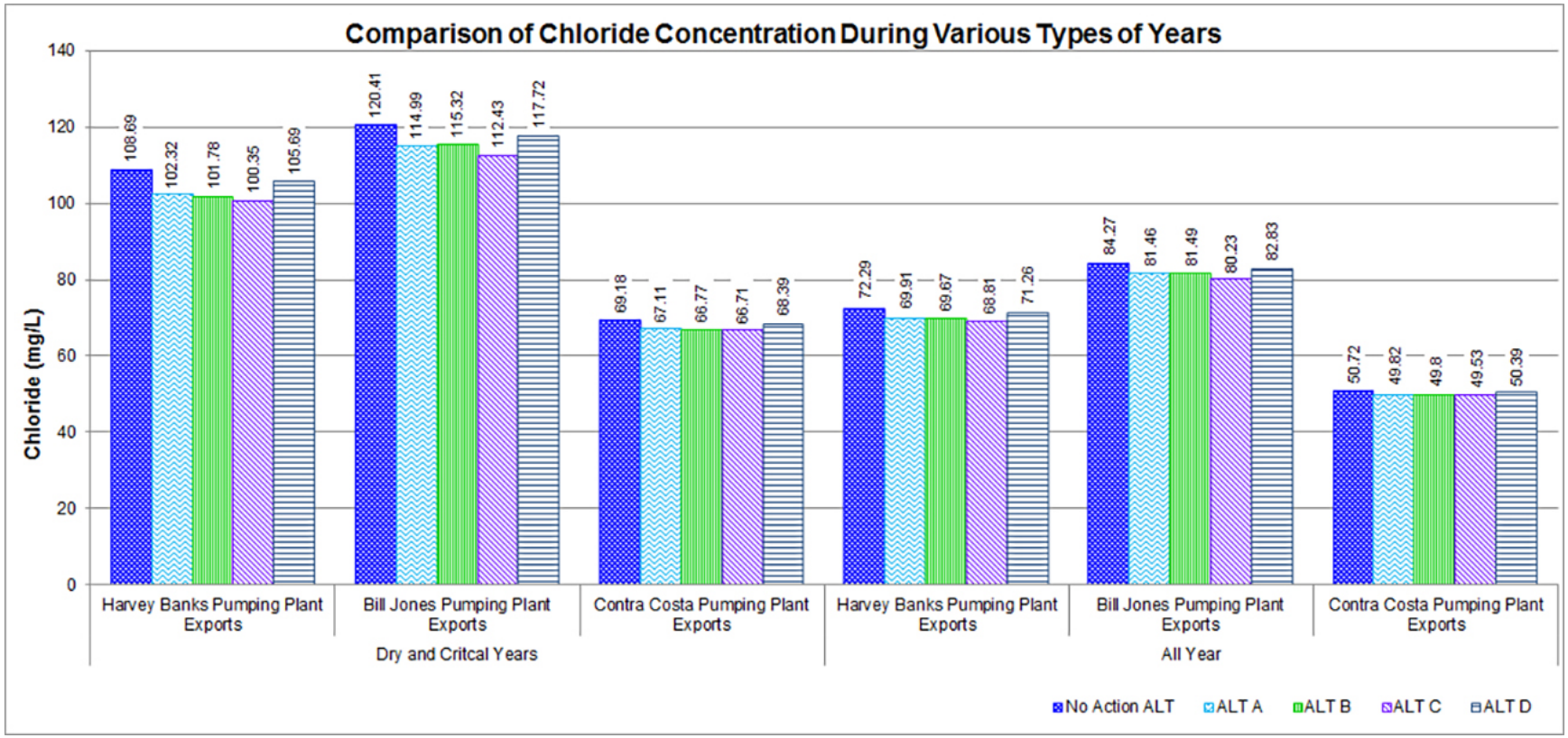

Figure A-30. Improvements in Chloride Concentrations

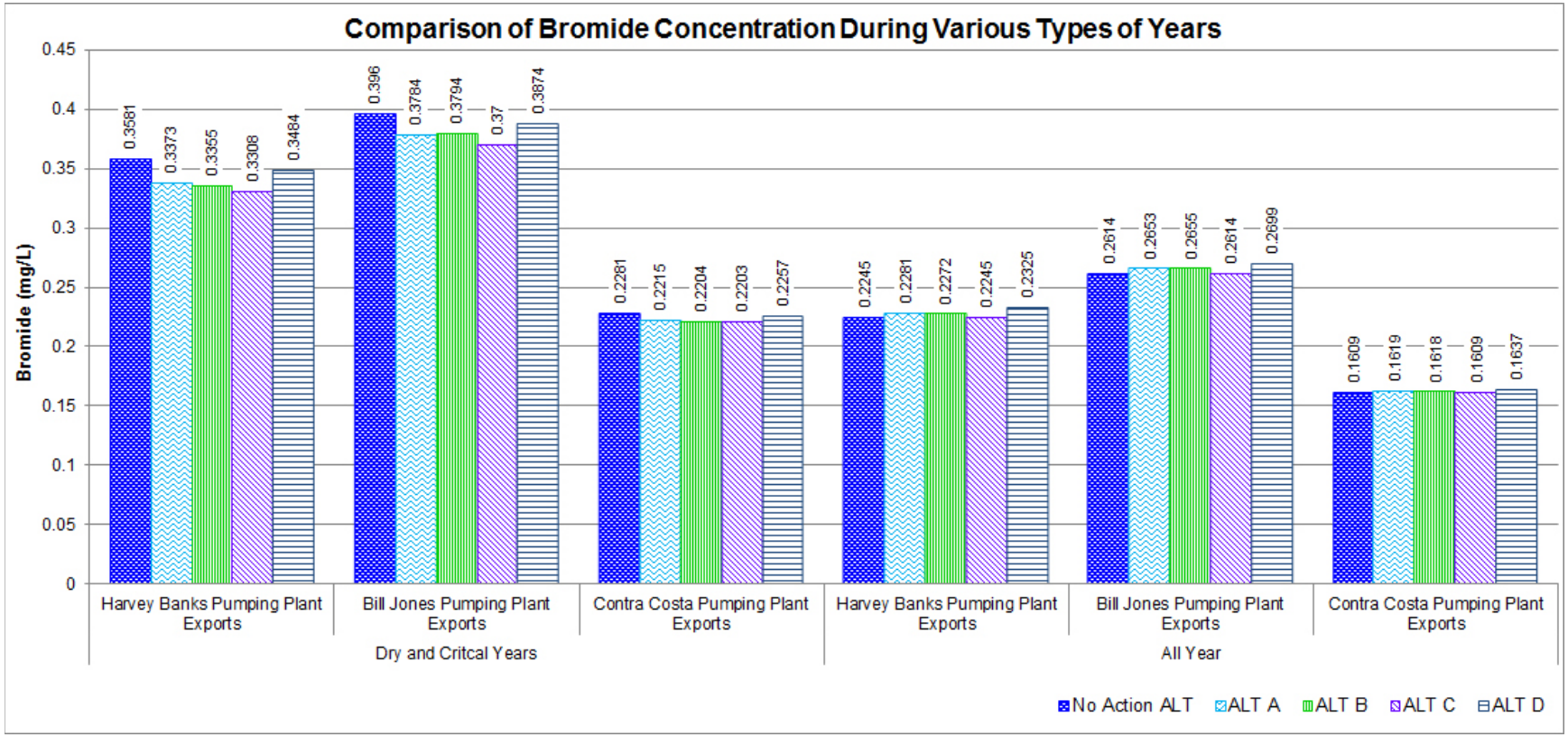

Figure A-31. Improvements in Bromide Concentrations

Table A-47. Quality of Exports

Location	Simulated Using DSM2 Parameter [a, b]	No Project Alternative		Alternative A		Alternative B		Alternative C		Alternative D	
		Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
Banks Pumping Plant	EC (µmhos/cm)	431	569	421	544	420	541	417	536	426	557
	TDS (mg/L)	240	313	234	299	234	298	232	295	237	306
	Chloride (mg/L)	72	109	70	102	70	102	69	100	71	106
	Bromide (mg/L)	0.24	0.36	0.23	0.34	0.23	0.34	0.22	0.33	0.23	0.35
Jones Pumping Plant	EC (µmhos/cm)	483	619	471	596	471	598	466	586	476	607
	TDS (mg/L)	268	340	261	328	262	329	259	323	264	334
	Chloride (mg/L)	84	120	81	115	81	115	80	112	83	118
	Bromide (mg/L)	0.27	0.40	0.27	0.38	0.27	0.38	0.26	0.37	0.27	0.39
Contra Costa Water District	EC (µmhos/cm)	345	414	341	405	341	403	340	403	344	410
	TDS (mg/L)	193	229	191	224	191	224	191	223	192	227
	Chloride (mg/L)	51	69	50	67	50	67	50	67	50	68
	Bromide (mg/L)	0.16	0.23	0.16	0.22	0.16	0.22	0.16	0.22	0.16	0.22

[a] Long term is the average quantity for the period of October 1921 through September 2003.
[b] Dry and Critical Years' Average is the average quantity for the combination of the SWRCB D-1641 40-30-30 Dry and Critical years for the period of October 1921 through September 2003. Average annual increases are based on average quantities for October 1921 through September 2003.

EC = electrical conductivity
DSM2 = Delta Simulation Model II
mg/L = milligrams per liter
SWRCB = State Water Resources Control Board
TDS = total dissolved solids
µmhos/cm = micromhos per centimeter

Sustainable Hydropower Generation (Secondary Objective)

Table A-48 presents the rated generating capacity for each of the facilities under each alternative and the range of hydropower generation (not accounting for the energy consumed in the system by pumping) over the 30-year analysis period in the NODOS Power Optimization Scheme.

Alternative A has a lower maximum water surface elevation (WSE) and, as a result, the Sites Pumping/Generating Plant has a lower capacity. Alternatives B, C, and D have equivalent dam heights. Alternatives C and D have increased pumping capacity due to the inclusion of the Delevan Intake Pumping/Generating Plant. The TRR Pumping/Generating Plant is identical for all three alternatives.

Table A-48. Hydropower Generation

Generation Capacity and Power Generated	Alternative A	Alternative B	Alternative C	Alternative D
Sites-Rated Generation Capacity (MW)	96.3	109.7	109.7	109.7
TRR-Rated Generation Capacity (MW)	4.9	4.9	4.9	4.9
Sacramento River-Rated Generation Capacity (MW)	12	N/A	12	12
Annual Power Generated (GWh)	184–301	143–336	169–353	154–323

GWh = gigawatt-hours
MW = megawatt
N/A = not applicable
TRR = Terminal Regulating Reservoir

The annual power generated is presented as a range of values that occurs in the simulation over the 30-year analysis period for the NODOS Power Optimization Scheme. Power generation is typically highest in the spring and early summer. Under all alternatives, the reservoir is maintained at a higher level throughout all seasons in wet and average years. Under these conditions, power generation at the Sites Pumping/Generating Plant can occur deeper into the summer. Releases occur in summer and fall that result in power generation at the TRR and Sacramento River facilities as well. Under drought conditions, there may not be sufficient water in the reservoir for pump-back operation, and releases, which contribute to power generation, would be diminished. As a result, there is a notable range of power generation over the 30-year analysis period corresponding to year-type.

Recreation (Secondary Objective)

As discussed previously, the Sites Reservoir alternatives would provide important benefits to anadromous fish, including important game fish. The action alternatives would also provide new opportunities for surface-water recreation, such as boating and fishing, at Sites Reservoir. New facilities would be developed on the shore of the reservoir to support other recreation activities, such as camping, hiking, picnicking, and sightseeing.

Alternatives A, B, and C would develop three new recreation areas in a phased approach to meet the local demand for recreation. It is assumed that each project alternative would provide recreational development and types of recreational opportunities comparable to those available at Black Butte Reservoir. The three new recreation areas would be at Stone Corral, Lurline

Headwaters, and Antelope Island. Future facilities would include boat launch sites, picnic areas and tables, developed campsites, restrooms, trails, and parking. Up to 112 overnight campsites would be added at each recreation area if it were fully developed.

Alternative D includes two recreation areas (Stone Corral and Peninsula Hills). The design for these areas was developed with input from Colusa County. Although this alternative has fewer recreation areas, the sites selected provide superior public access from the east and west ends of the new bridge. The facilities in these areas may also be phased in over time.

Reservoir operations would appreciably impact the accomplishments of the action alternatives to provide these recreation opportunities. For some alternatives, WSEs are considerably below maximum levels during summer months in many years, which represents the peak recreation season. In these conditions, facility use would be limited and the overall recreation experience would be impaired. Alternative D provides the highest WSEs on a regular basis, followed by Alternative C, Alternative A, and then Alternative B.

Each of the action alternatives also would change the flows and temperature in the Sacramento River system and connected Sacramento–San Joaquin Delta. These effects could alter the suitability of these waterways for river-based recreation, such as boating (including kayaking and canoeing). However, the benefits to fisheries, including salmonids, may result in higher catch rates and greater fish sizes. Due to the inherent difficulty in translating flow and fishery effects into related recreation accomplishments, these accomplishments are acknowledged here, but not quantified.

Flood-Damage Reduction (Secondary Objective)

A portion of the area along Funks Creek downstream of Funks Reservoir is in the 100-year floodplain. Under current No Project conditions, Funks Reservoir is not a flood control reservoir. As such, it can be overwhelmed with runoff and still send peak flows downstream on Funks Creek. The construction of Golden Gate and Sites Dams would appreciably reduce the potential for flooding for Funks Creek, Stone Coral Creek, and various other unnamed streams. All alternatives would result in a similar reduction in flood damages. Of the 22,200 acres of land prone to flooding in these watersheds, approximately 21 percent (4,660 acres) would experience a reduction in flood-related damages. This area includes the northern portion of the town of Maxwell. In addition to increasing the level of protection in the Funks Creek and Stone Corral Creek watersheds, a 100-year level of protection would also be achieved for approximately 4,025 acres in the Colusa Basin.

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Acronyms

AF	acre-feet
AFRP	Anadromous Fish Restoration Program
Authority	Sites Project Authority
Bay-Delta	San Francisco Bay–Sacramento River and San Joaquin River Delta
CALFED	CALFED Bay-Delta Program
CALFED ROD	CALFED Bay-Delta Programmatic Environmental Impact Statement/Report Record of Decision
CALSIM	California Statewide Integrated System Model
CBD	Colusa Basin Drain
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
cfs	cubic foot/feet per second
CNDDB	California Natural Diversity Database
COA	Coordinated Operations Agreement (for CVP and SWP)
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWC	California Water Code
Delta	Sacramento–San Joaquin River Delta
DPM	Delta Passage Model
DWR	California Department of Water Resources
EC	electrical conductivity
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EQ	Environmental Quality
ERA	Ecosystem Restoration Account
ERP	Ecosystem Restoration Program
ESA	Endangered Species Act (Federal)
EWA	Environmental Water Account
GCID	Glenn-Colusa Irrigation District
IAIR	North-of-the-Delta Offstream Storage Investigation Final Initial Alternatives Information Report (Reclamation and DWR 2006)
IOS	interactive object-oriented simulation
km	kilometer(s)
kV	kilovolt(s)
M&I	municipal and industrial
MAF	million acre-feet

msl	mean sea level
MVA	megavolt-ampere(s)
MW	megawatt(s)
NBA	North Bay Aqueduct
NED	National Economic Development
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NODOS	north-of-the-Delta offstream storage
NOI	Notice of Intent (Federal; published November 9, 2001)
NOP	Notice of Preparation (State; filed November 5, 2001)
OM&R	operation, maintenance, and replacement
OSE	Other Social Effects
P&Gs	Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies; also "principles and guidelines"
PFR	North-of-the-Delta Offstream Storage Investigation Plan Formulation Report (Reclamation and DWR 2008)
PG&E	Pacific Gas and Electric Company
ppt	part(s) per thousand
RBDD	Red Bluff Diversion Dam
Reclamation	United States Department of Interior, Bureau of Reclamation, Mid-Pacific Region
RED	Regional Economic Development
ROD	Record of Decision
ROW	right-of-way
SIS	System Impact Study
State	State of California
SWP	State Water Project
T-C	Tehama-Colusa
TAF	thousand acre-feet
TCCA	Tehama-Colusa Canal Authority
TDS	total dissolved solids
TRR	Terminal Regulating Reservoir
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
VELB	valley elderberry longhorn beetle
WAPA	Western Area Power Administration

WSE	water surface elevation
WUE	Water-Use Efficiency
X2	A Delta management tool, defined as the distance in kilometers from the Golden Gate Bridge to the location where the tidally averaged near-bottom salinity in the Delta measures 2 parts per thousand.

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