Salinas River Operations
Habitat Conservation Plan

salinasrivermanagementprogram.org

Reservoir Reoperation Protocols

Technical Advisory Committee Process to Develop Reoperation Protocols

Technical Advisory Committee Background

- The TAC's purpose is to assist in the development and evaluation of water management scenarios considered for the Salinas River Operations HCP by providing a forum for soliciting feedback and recommendations from interested stakeholders through representation by relevant technical experts during the water management evaluation process.
- The HCP-TAC includes individuals with expertise in the following fields:
  - Hydrology
  - Hydrogeology
  - Hydrologic modeling
  - Civil engineering
  - Ecology
  - Fish and wildlife biology
  - Geomorphology
- Convened Fall 2023 and met 5 times between Dec 2023 and Apr 2025

Purpose of HCP Modeling

- Develop new dam operations protocol to meet agency mission and obligations while minimizing effects to species covered under the HCP.
- Guiding Principles:
  - Stop seawater intrusion
  - Improve long-term hydrologic balance between recharge and withdrawal
  - Provide a sufficient water supply to meet existing needs and to serve as the foundation to meet future water needs

Components of the HCP Reoperation Protocols

- Flood control and prevention
- Groundwater recharge
- Comply with existing water rights
- Minimize effects to covered species through targeted dam releases

HCP Comparison Point Scenarios

These scenarios can be compared to each other to show the effect of the current operational approach on the system, and were used to determine the effect of operational changes included in the proposed Reoperation Scenarios

- Current Operations Scenario
  - Matches, as closely as possible, the operational approach currently employed by MCWRA for the reservoirs and related projects and programs
- No Flow Prescription Scenario
  - Identical to Current Operations Scenario, with rules of Flow Prescription removed
- No Operations Scenario
  - Identical to Current Operations Scenario with all reservoir operations removed
  - Reservoirs release as much water as possible at all times, subject to physical limitations

Reservoir Reoperation Protocols

Using studies and surveys performed in support of the HCP, along with input from the TAC, the HCP team developed three reoperation scenarios for consideration

- The Technical Advisory Committee used their wide range of technical expertise to evaluate:
  - Hydrologic model configuration and results
  - Biological needs of covered species
  - Other priority water uses
    - ✓ Groundwater recharge
    - ✓ SRDF operations
    - ✓ Agency water rights
- The TAC and HCP team worked to refine the scenarios and ultimately reach consensus on a recommendation

Reservoir Reoperation Protocols Recommended Alternative

Recommended Reoperation Protocols

The recommended reoperation protocols represent a refinement of the existing flow prescription to make it more biologically relevant, more operationally feasible, and use water more efficiently

- Incorporated modified passage flow targets
  - Critical riffle analysis established 80 cfs at the Salinas River near Chualar as an acceptable passage threshold for all steelhead life stages
  - Incorporated the concept of holding flows for periods when river flows temporarily drop below passage thresholds but allow enough flow for fish to hold in the system without being stranded

Recommended Reoperation Protocols con’t

- Extended upstream migration window and passage actions to allow steelhead more time to move into the upper Salinas watershed
  - Improved migration opportunities
  - Improved operational feasibility - 5-day targets are very difficult to meet
  - Holding flows also help operational success

- Revised the strategy for smolt outmigration
  - Target flows based on pre-dam flows during the outmigration season
  - Incorporated water year types to make outmigration flows better align with current conditions
  - Phased outmigration approach to mimic a natural hydrograph recession limb
  - SRDF compatible late season migration flows

Operational Phases

Operations are broken into four distinct phases that account for the needs of steelhead in the Salinas watershed as well as the operational priorities of the Water Resources Agency

- Adult steelhead upstream migration
  - January 1 – March 31
  - Provides opportunities for steelhead to enter the Salinas River from the ocean and migrate to upstream spawning grounds in the Arroyo Seco, Nacimiento, San Antonio, or upper Salinas
- Smolt Outmigration Period 1
  - Pre-SRDF period March 15 – March 31
  - Provides opportunities for smolts and kelts to move downstream toward the ocean before the SRDF begins operating

Operational Phases con't

- Smolt Outmigration Period 2
  - SRDF operational period April 1 – June 15
  - Provides opportunities for smolts and kelts to move downstream toward the ocean
  - Passage flows compatible with SRDF operations

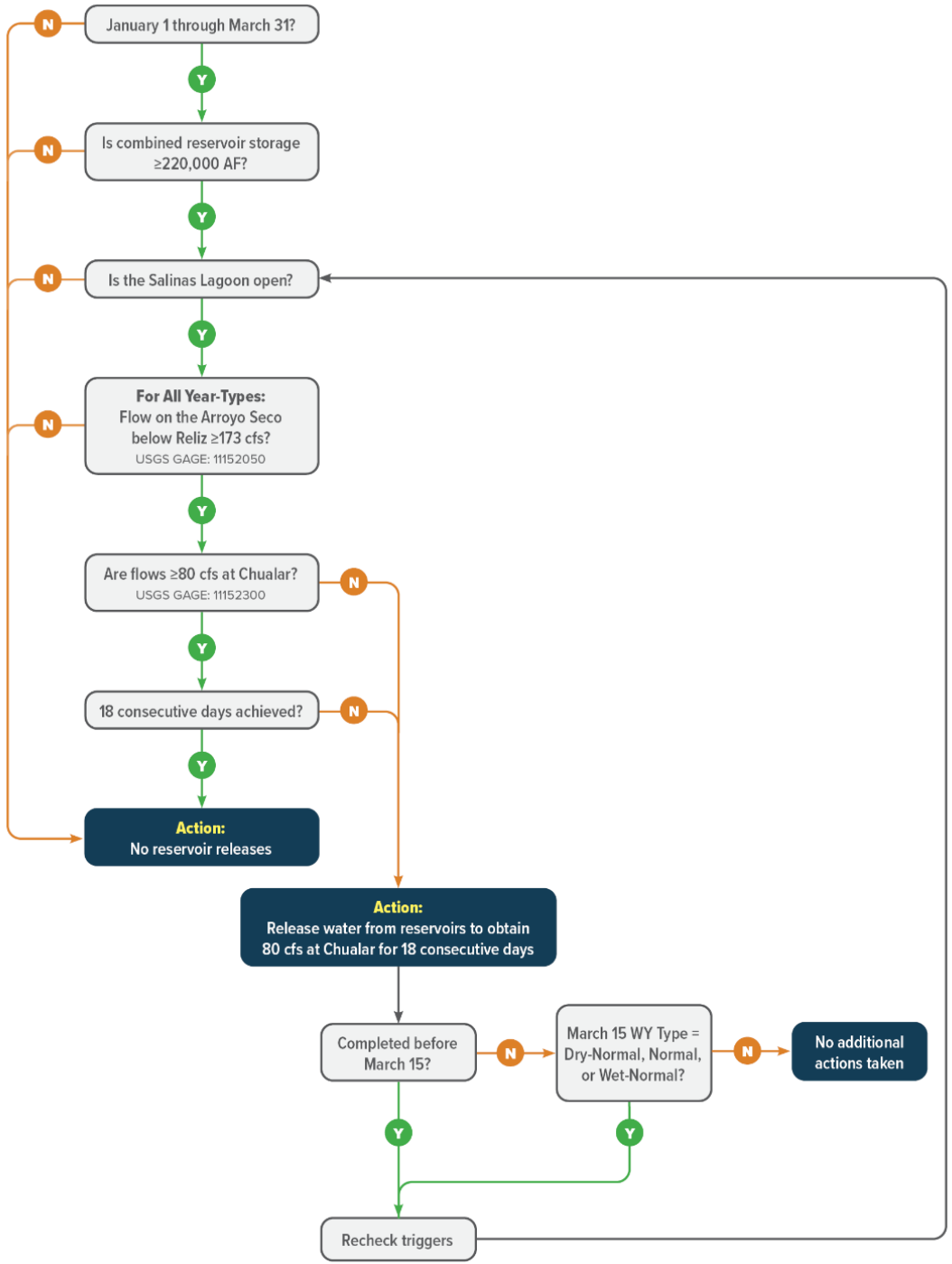
- Opportunistic Releases
  - December 1 – April 30
  - Provides Agency with the opportunity to supplement passage opportunities when conditions are favorable
  - Helps meet fish passage goals when other actions are not triggered

Adult Steelhead Upstream Migration

- January 1 – March 31
- Adult steelhead enter the Salinas River system to move upstream to freshwater spawning and rearing habitat
- Release action is based on watershed conditions that would provide fish with natural indicators for migration
  - Salinas Lagoon open to the ocean
  - Flow from the Arroyo Seco sufficient for upstream migration
- Release action designed supplement natural flows to extend the migration opportunity if needed
- Refined counting of passage days to include a 5-year rolling average to better account for the steelhead life cycle and weather cycles

Adult Steelhead Upstream Migration

Target ≥ 1 action per year



Adult Steelhead Upstream Passage Targets

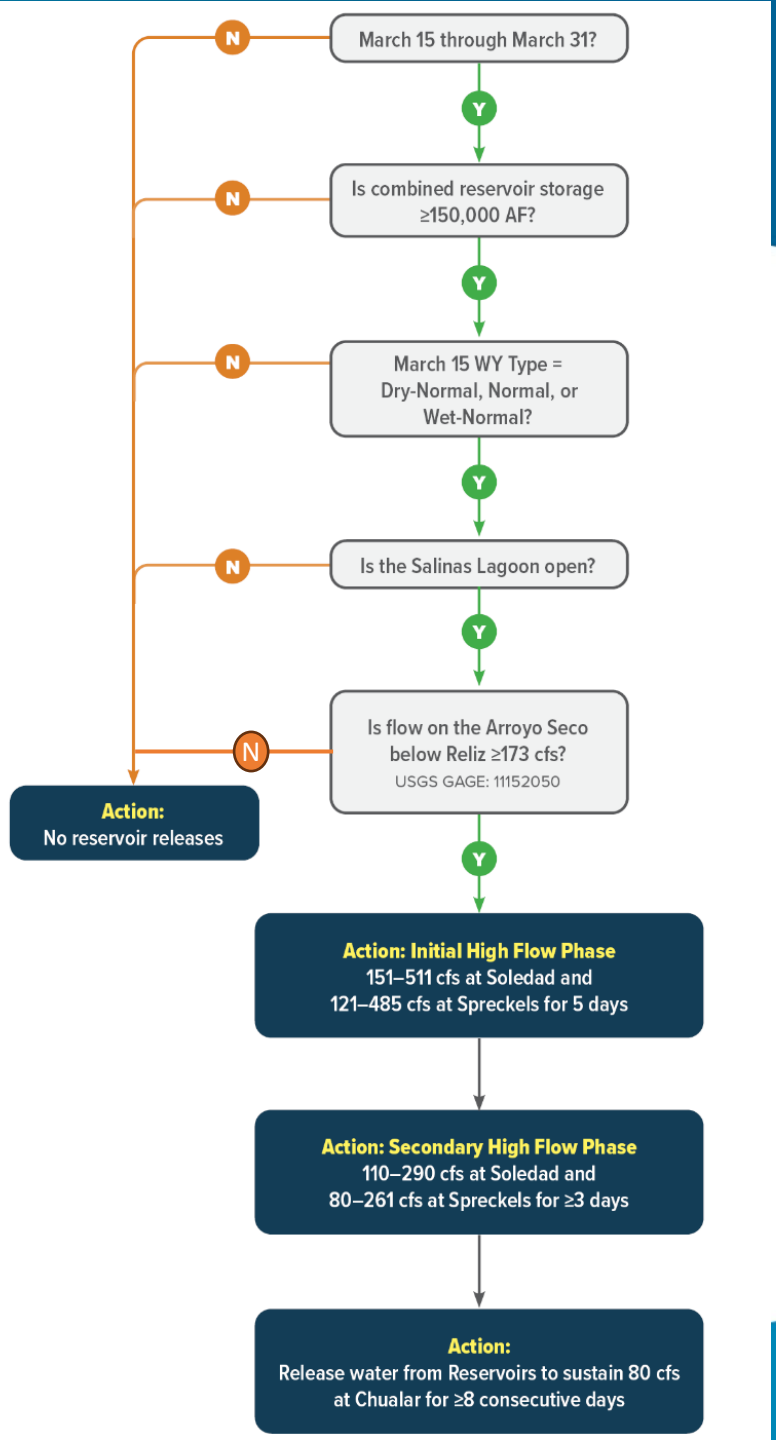
Water Year Types	Upstream Passage Day Targets (Jan 1 to Mar 31)
Dry	11
Dry-Normal	35
Normal	48
Wet-Normal	70
Wet	86
5-year Rolling Average Target	48 (±32.4)

Smolt Outmigration

- March 15 – March 31 and April 1 – June 15
- Steelhead smolts or post spawn adults (kelts) travel downstream from freshwater spawning and rearing habitat to the ocean
- Refined "block flow" releases to be more biologically relevant, more operationally feasible, and more compatible with SRDF operations
  - Established new target flow ranges based on year type
  - Reduced pulse flows in drier year types to be more consistent with natural year type flows
    - ✓ Increases the chance of operational success
    - ✓ Uses water more efficiently to provide migration opportunities
  - Reduced outmigration flows after April 1 to be more consistent with natural spring conditions and allow simultaneous migration flows and SRDF operations
    - ✓ Same as adult upstream target flow of 80 cfs at Chualar

Smolt Outmigration Period 1 (Pre-SRDF Operations)

Target = 1 action per year



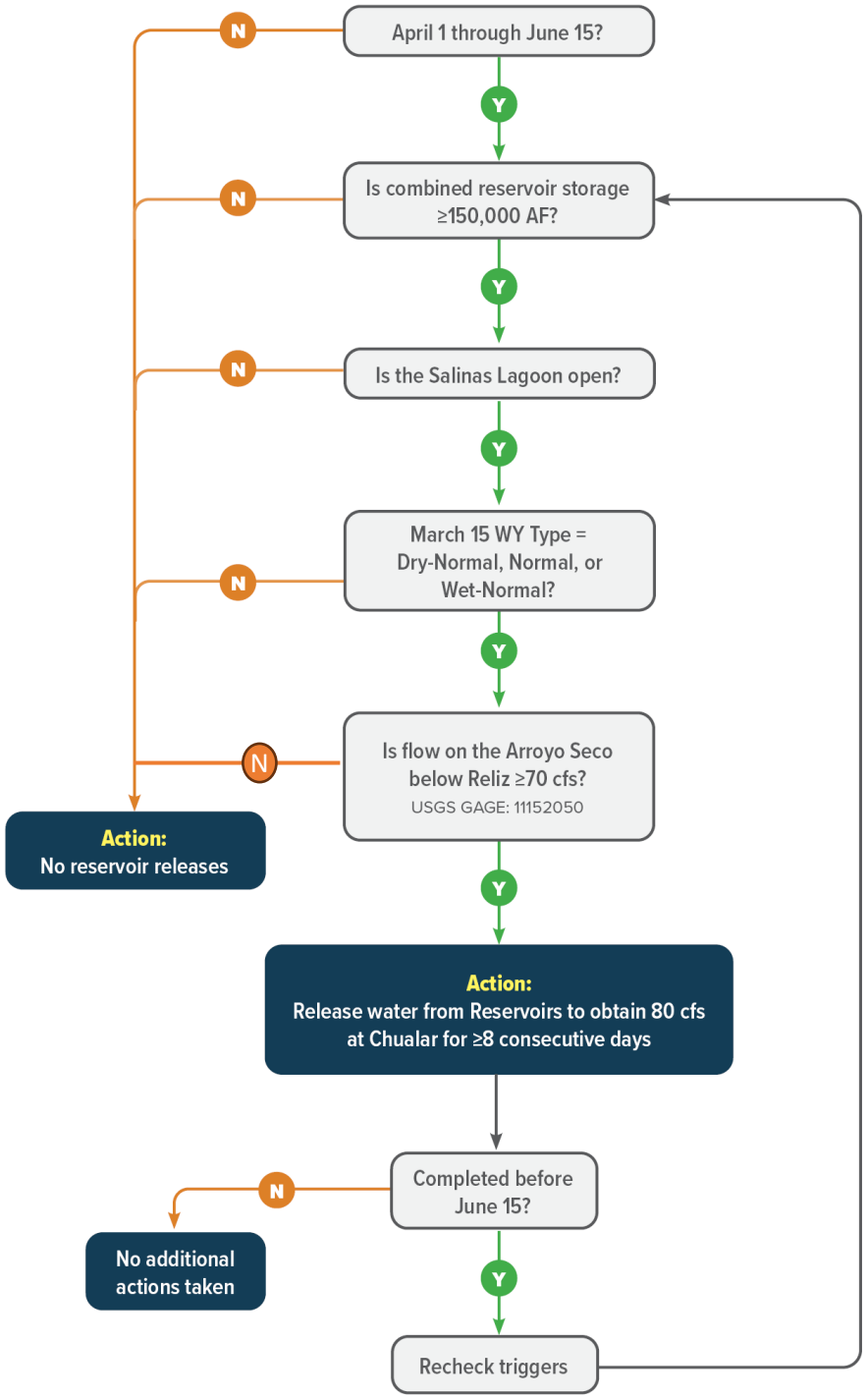
Smolt Outmigration Passage Targets

Water Year Type	Minimum Flows for Initial High Flow Phase 1 (Day 1 – 5)[1]			Minimum Flows Following Initial High Flow Phase 2 (Day 6 – 8)[1]			Maintenance Flows (Day 8+)[1]
	Exceedance	Spreckels	Soledad	Exceedance	Spreckels	Soledad	Chualar
Dry	No Action			No Action			
Dry-Normal	85% of pre-dam 25% exceedance	121	151	2x minimum passage flows	80	110	80
Normal	85% of pre-dam 45% exceedance	214	243	85% of pre-dam 55% exceedance	130	160	80
Wet-Normal	80% of pre-dam 55% exceedance	485	511	85% of pre-dam 5% exceedance	261	290	80
Wet	No Action			No Action			

[1] The target flows would be +/- 10% of real time USGS data (provisional).

Smolt Outmigration Period 2 (During SRDF Operations)

Target ≥ 1 action per year



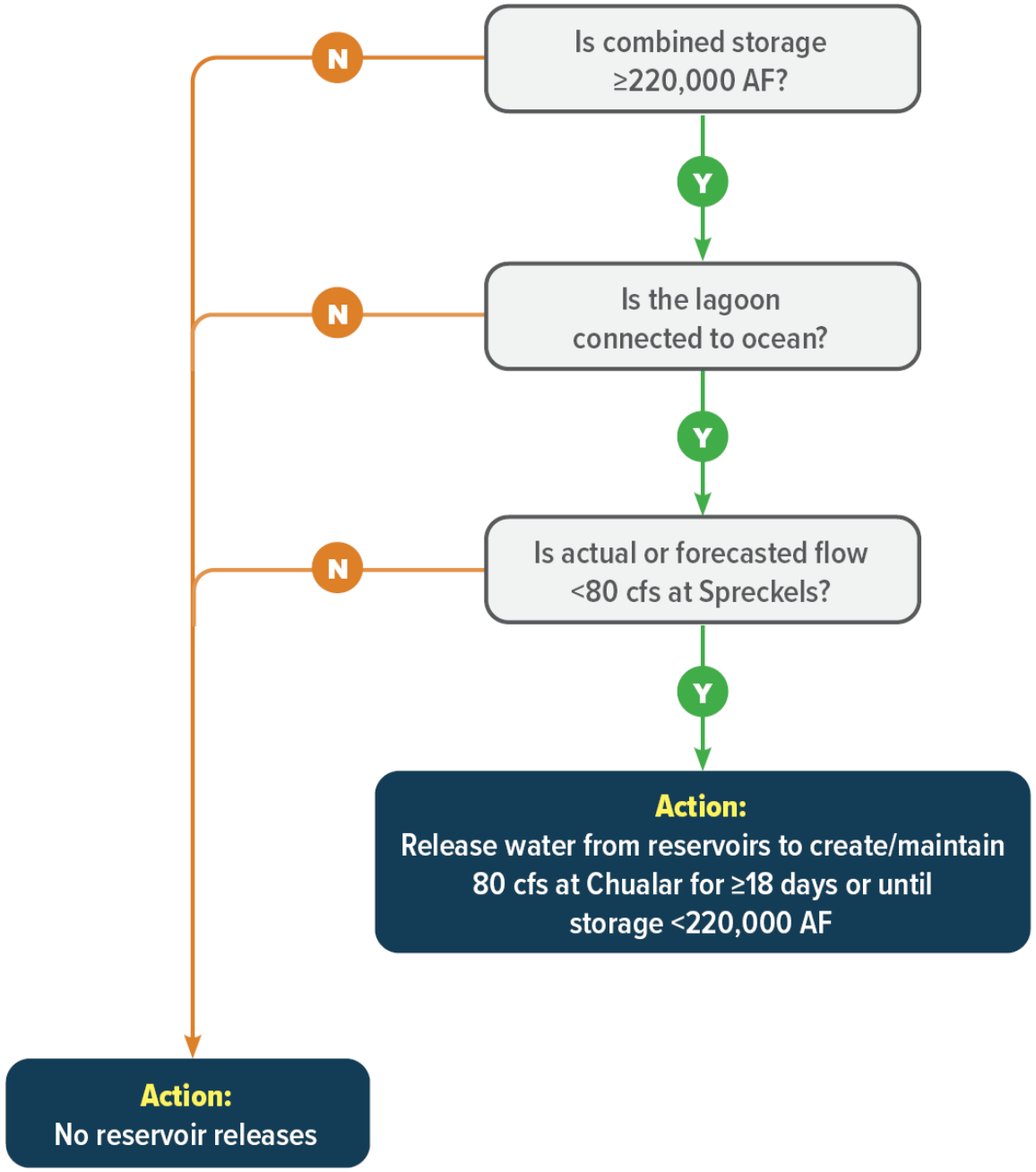
Opportunistic Releases

Provides a fish migration release when the Salinas River opens to the ocean regardless of other streamflow triggers

- December 1 – April 30
- Adaptive management action to help meet 5 year rolling average passage day targets
- Extends the adult upstream passage period
- Follow any lagoon opening event with a release to create 18 days of fish passage
- Goal to facilitate a passage opportunity to the Nacimiento and San Antonio Rivers in years when the lagoon opens to the ocean
- Arroyo Seco passage not guaranteed due to lack of flow triggers but likely in most situations

Opportunistic Releases
December 1 – April 30

Purpose: Opportunistically release water to supplement passage conditions when water is available, and lagoon is open



Overview of Modeling Results for Recommended Reoperation Scenario

Adult Passage Days at Chualar

Days per year, 1/1 to 3/31, with at least 80 cfs (less 10%) in Salinas River at Chualar, and Salinas River Lagoon open to ocean (max possible = 90 days, 91 in leap years)

	Reoperation Criteria (80 cfs)		Flow Prescription Criteria (260 cfs)	
Water Year Type	Observed (Timestep-Averaged)	Reoperation Scenario 1	Observed (Timestep-Averaged)	Current Operations Scenario
All	41	41	37	36
Wet	78	82	76	78
Wet-Normal	60	67	60	56
Normal	53	44	46	32
Dry-Normal	21	22	10	16
Dry	5	3	3	3
Dry to Normal	19	16	13	12

Adult Passage Days at Chualar

Percentage of years with at least 5 consecutive Adult Passage Days (max possible = 100%)

Water Year Type	Observed (Timestep-Averaged)	Reoperation Scenario 1
All	81%	75%
Wet	100%	100%
Wet-Normal	100%	100%
Normal	100%	100%
Dry-Normal	86%	88%
Dry	46%	25%
Dry to Normal	68%	57%

Adult Passage Days at Soledad

Days per year, 1/1 to 3/31, with at least 152 cfs (less 10%) in Salinas River at Soledad, and Salinas River Lagoon open to ocean (max possible = 90 days, 91 in leap years)

Water Year Type	Observed (Timestep-Averaged)	Reoperation Scenario 1
All	33	36
Wet	74	77
Wet-Normal	57	57
Normal	43	28
Dry-Normal	15	12
Dry	3	3
Dry to Normal	13	11

Adult Passage Days at Soledad

Percentage of years with at least 18 consecutive passage days to Nacimiento per year (max possible = 100%)

Water Year Type	Observed (Timestep-Averaged)	Reoperation Scenario 1
All	46%	55%
Wet	100%	100%
Wet-Normal	100%	100%
Normal	75%	67%
Dry-Normal	14%	25%
Dry	0%	6%
Dry to Normal	17%	23%

Adult Passage Summary

- Little difference from the observed record, although the model simulates fewer Passage Days for Normal-Normal Years (this may be affected by the small number of each type of Normal Year in the record)
- All Wet, Wet-Normal, and Normal Years (and most Dry-Normal Years) had at least 5 consecutive Adult Passage Days at Chualar, indicating passage opportunities to Arroyo Seco
- All Wet and Wet-Normal Years (and most Normal Years) had at least 18 consecutive Adult Passage Days at Soledad, indicating passage opportunities to the Nacimiento River

Smolt & Smolt/Kelt Outmigration Passage Days

Days per year, 3/15 to 6/30, with at least 80 cfs (less 10%) in Salinas River at Chualar

Water Year Type	Observed (Timestep-Averaged)	Reoperation Scenario 1
All	46	50
Wet	89	86
Wet-Normal	55	59
Normal	36	22
Dry-Normal	26	44
Dry	17	26
Dry to Normal	23	30

Initial High Flow Actions for Smolt

Percentage of years with initial high flow action taken

Water Year Type	Reoperation Scenario 1
Wet-Normal	83%
Normal	50%
Dry-Normal	25%

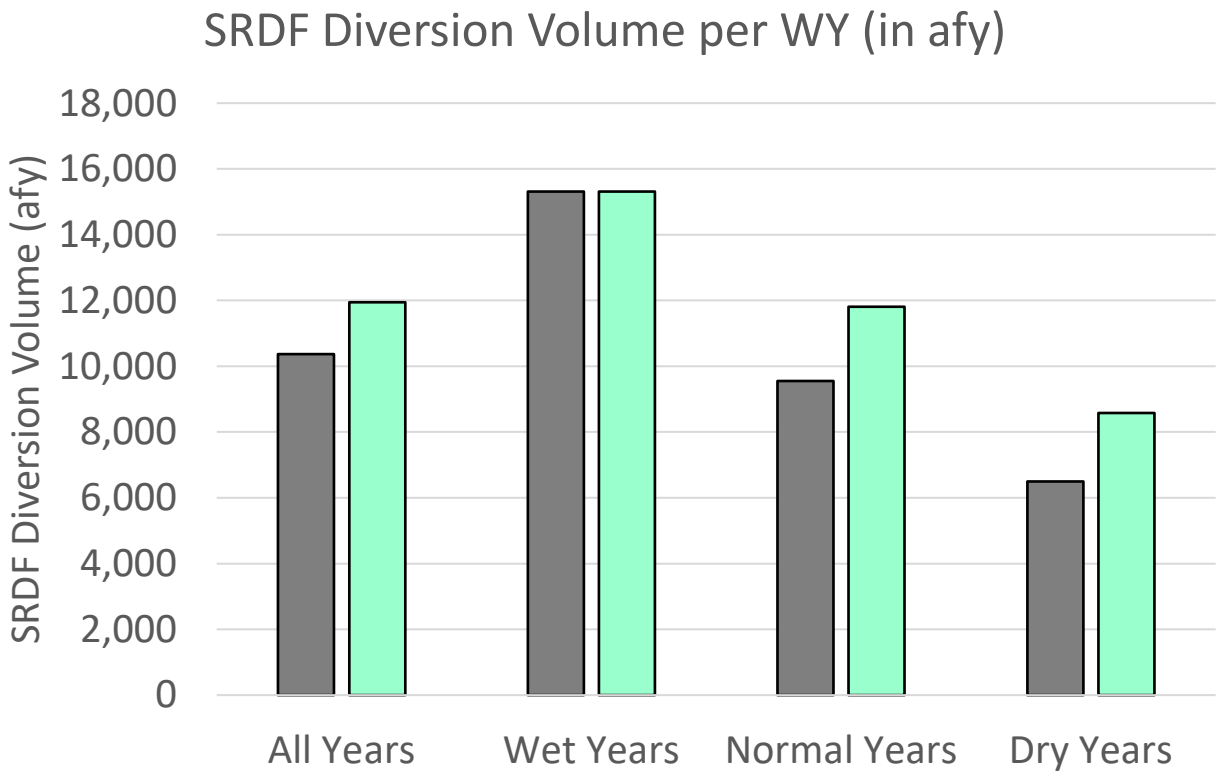
Smolt/Kelt Outmigration Summary

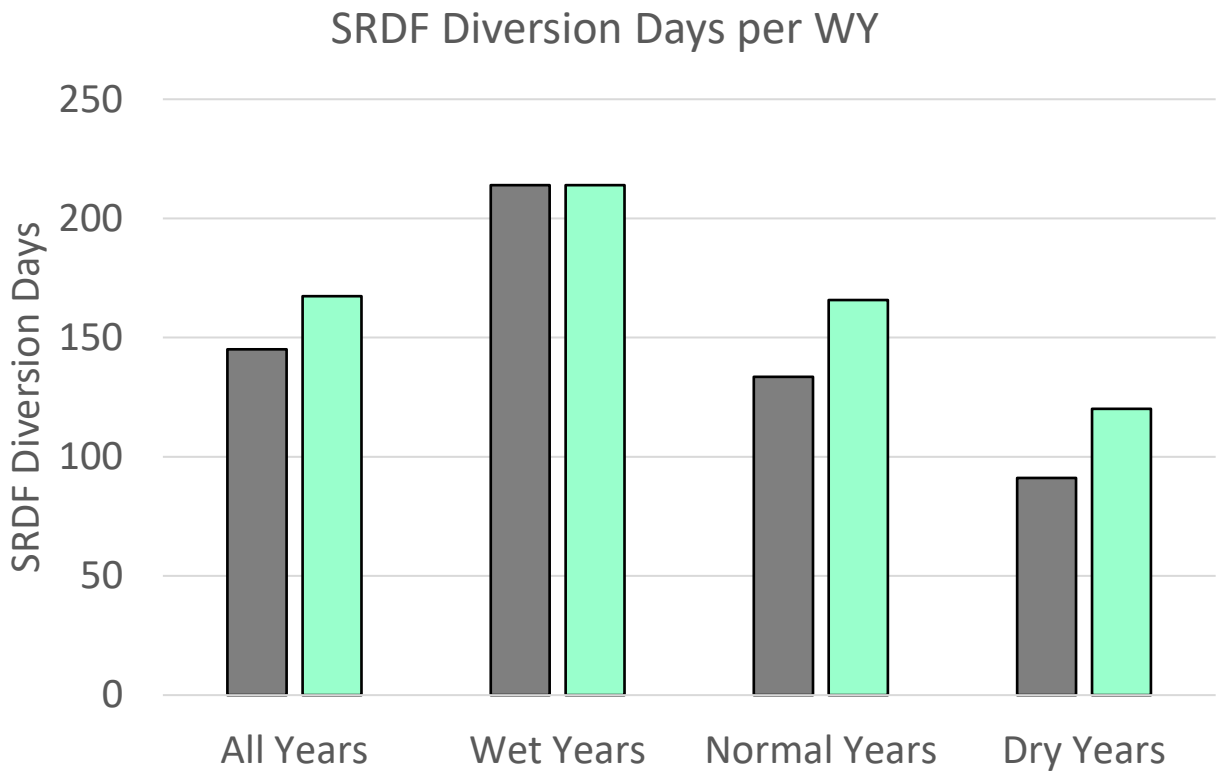
- Reoperation Scenario 1 results in more Outmigration Passage Days, especially in Dry to Normal Years
- Little difference between Reoperation Scenario 1 and observed conditions in terms of Outmigration Passage Days from April to June
- Simulated conditions in the few Normal Years have outsized impact on averages

SRDF Operations

Legend
- Current Operations Scenario
- Reoperation Scenario 1

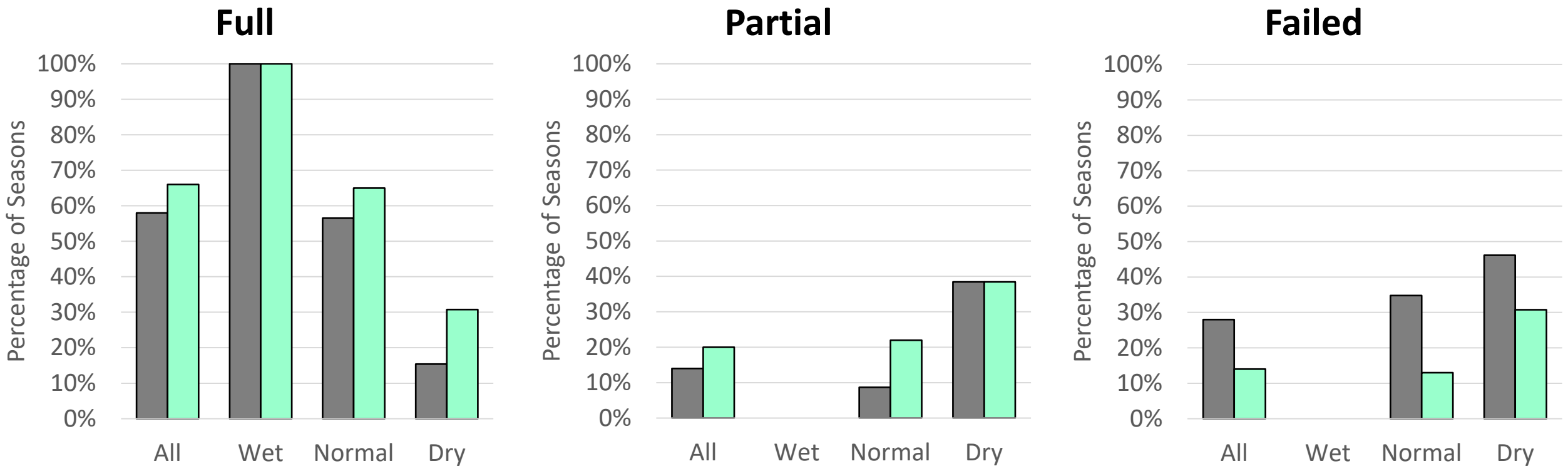
Increased operation of the SRDF, with more diversion volume and diversion days





SRDF Operations

Increased operation of the SRDF, with fewer “Failed” years, more “Partial” and “Full” years



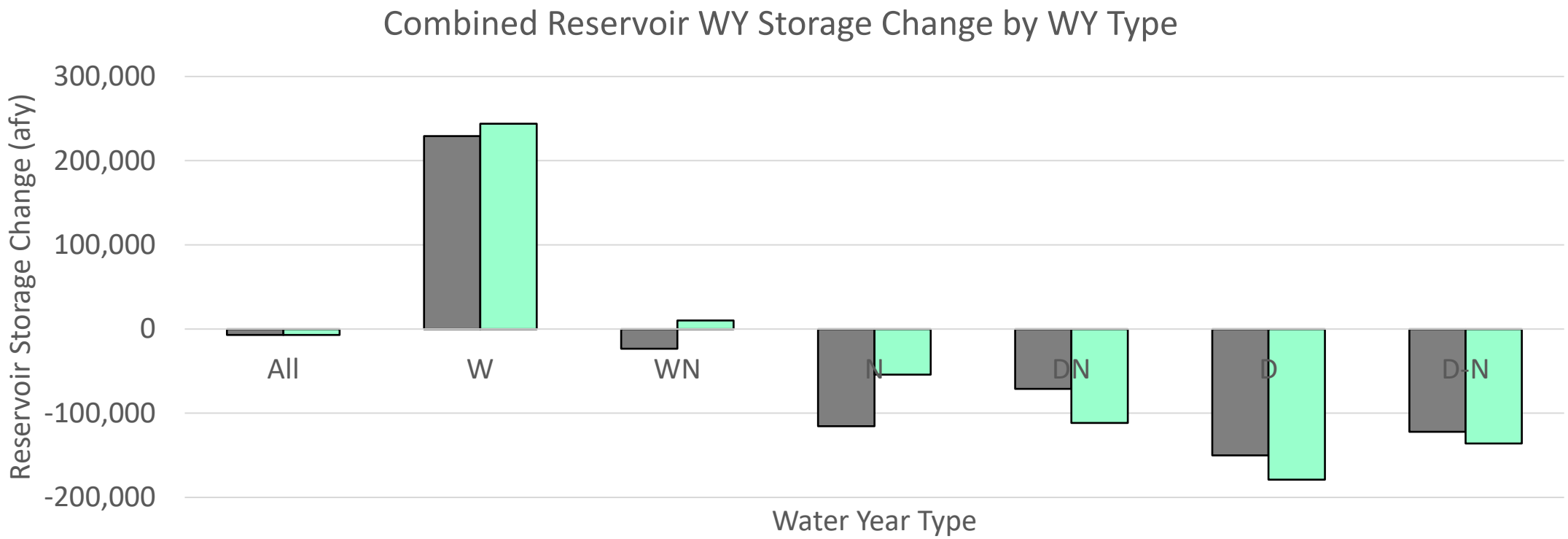
SRDF Operations Summary

- Increased operation of the SRDF, with more diversion volume and diversion days compared to Current Operations
- More Full SRDF seasons and fewer Failed SRDF seasons
- Wet Years continue to be uniformly Full seasons, so the difference is manifested in Normal and Dry Years

Reservoir Storage

Legend
- Current Operations Scenario
- Reoperation Scenario 1

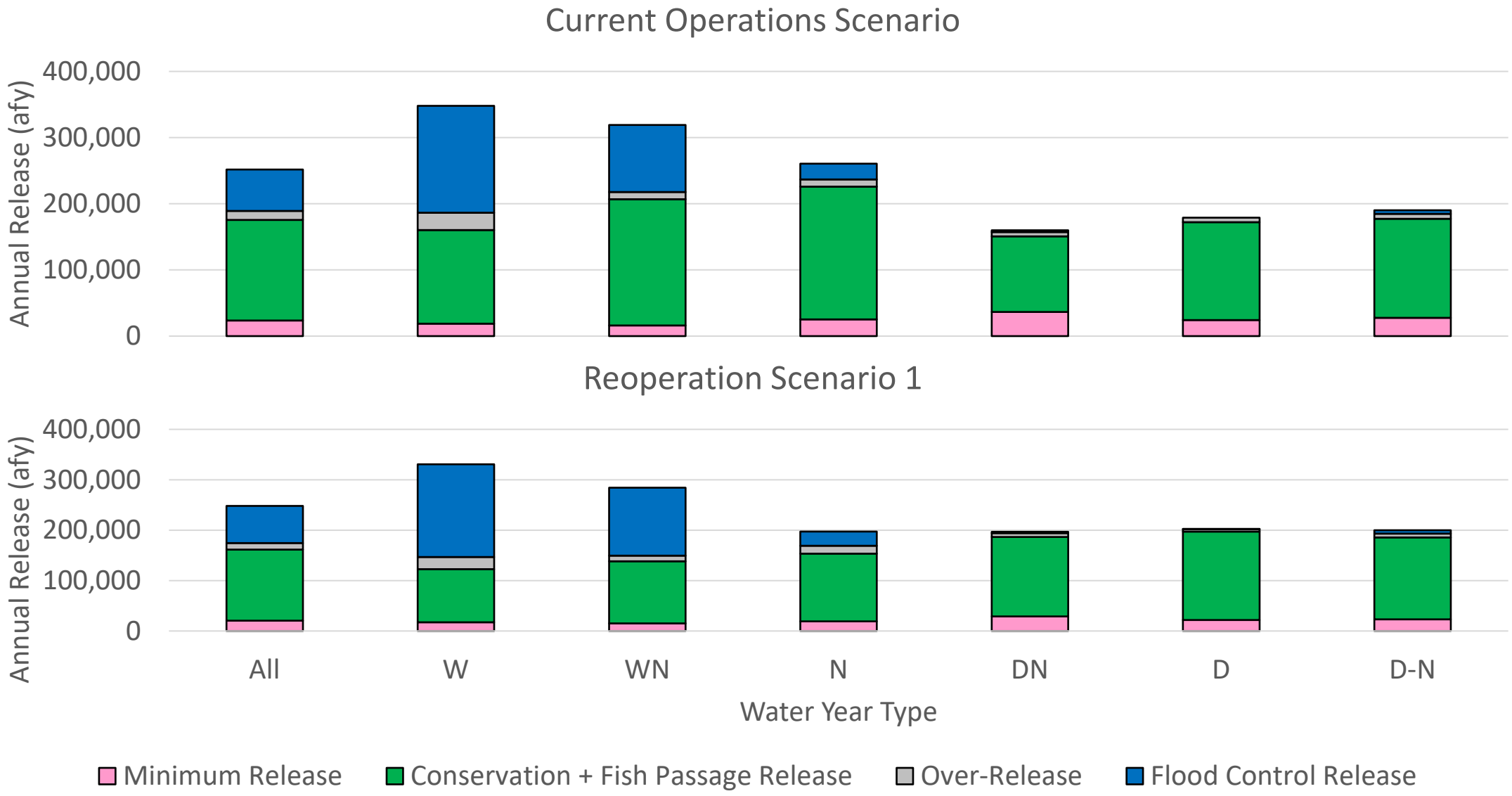
Combined Reservoirs Average Annual Storage Change (in acre-feet per year)



Reservoir Release Categorization

- Minimum Release: each reservoir's target minimum release (60 cfs at Nacimiento Reservoir, 10 cfs at San Antonio Reservoir)
- Flood Control Release: releases to remain at or below the Flood Rule Curve for each reservoir
- Conservation Release: releases to provide groundwater recharge and supply diversion at the SRDF
- Fish Passage Release: releases to meet active fish passage requirements
- Over-Release: additional releases made due to recognized bug in MODFLOW-OWHM

Combined Reservoir Release Categorization



Combined Reservoir Releases: Flood Control

Combined Reservoirs Average Annual Flood Control Release (in acre-feet per year)

Water Year Type	Current Operations	Reoperation Scenario 1	Difference
All	63,000	74,000	11,000
Wet	161,000	184,000	23,000
Wet-Normal	101,000	135,000	34,000
Normal	24,000	28,000	4,000
Dry-Normal	3,000	3,000	0
Dry	0	< 1,000	< 1,000
Dry to Normal	5,000	7,000	2,000

Totals may not sum due to rounding

Combined Reservoir Releases: Non-Flood Control

Combined Reservoirs Average Annual Non-Flood Control Release (in acre-feet per year)

Water Year Type	Current Operations	Reoperation Scenario 1	Difference
All	189,000	175,000	-14,000
Wet	187,000	147,000	-40,000
Wet-Normal	218,000	150,000	-68,000
Normal	237,000	169,000	-68,000
Dry-Normal	157,000	194,000	37,000
Dry	179,000	202,000	23,000
Dry to Normal	185,000	193,000	8,000

Totals may not sum due to rounding

Reservoir Storage and Release Summary

- Little overall difference in combined reservoir storage, since the inputs (reservoir inflow, precipitation rate, and evaporation rate) are fixed
- Reoperation Scenario 1 results in more Flood Control Release and less Non-Flood Control Release because the reservoirs can achieve the similar passage conditions with less release

Groundwater Recharge

Net Flux (Stream Leakage minus Groundwater ET) measured in acre feet

Positive = Net Flux into Groundwater; Positive Difference = More Flux into Groundwater

Water Year Type	No Flow Prescription			Reoperation Scenario 1		
	Average	Diff from Current Ops	Diff from No Ops	Average	Diff from Current Ops	Diff from No Ops
All	405,298	-10,190	43,017	408,521	308	46,239
Wet	662,351	-18,823	-81,294	657,997	-200	-85,648
Wet-Normal	445,280	-53,700	4,518	453,667	3,344	12,905
Normal	357,543	-41,296	71,275	338,654	-32,206	52,386
Dry-Normal	269,900	8,972	75,449	296,105	16,777	101,654
Dry	234,924	16,304	147,182	240,115	3,604	152,373
Dry to Normal	268,775	2,829	112,872	274,754	-45	118,850

HCP Covered Activities

HCP Plan Area

- Comprised of all areas that will be used for any activities described in the HCP, including covered activities and the conservation program.
- Includes all lands necessary for the HCP to be fully implemented.
- Must at a minimum include the permit area, but often includes lands outside of the permit area.

HCP Permit Area

- Geographic area where the impacts of the covered activities occur for which incidental take permit coverage is requested.
- No minimum permit area size.
- Must be within the plan area and under control of the permittee or holder of a certificate of inclusion.
- Must be clearly delineated with a map and written description in the HCP and the incidental take permit.

Developing a Covered Activities List

Step 1: Compile all potential activities

- All actions that could result in take of listed species for which permit will be applicable
  - Specific projects
  - On-going operations or maintenance
  - Include restoration, habitat enhancement, monitoring

Step 2: Apply screening criteria

- Defensible and consistent method of determining covered activities

Step 3: Draft, review, and finalize covered activities

Covered Activity Screening Criteria

- **Control or Authority.** The covered activity **must be under the direct control** of the permittee, or the permittee has the authority for direct control through their jurisdiction or regulation (e.g., a permit or authorization).
- **Location.** The covered activity will occur within the permit area.
- **Timing.** The covered activity will occur during the permit term. For now, we assume that the permit term may be 15-30 years.
- **Impact.** The covered activity has a reasonable likelihood of resulting in take as defined by the ESA of one or more covered species.
- **Project Definition. The location, footprint, and type of impacts** resulting from the activity **are well understood and can be evaluated** in the Plan to the satisfaction of USFWS, NMFS, and CDFW. Specifically, the impacts resulting from the activity and associated mitigation must be technically and economically feasible and can be reasonably evaluated in the plan.
- **Practicability**. The activity can be included in the Plan **without substantially increasing** the scope and cost of Plan development or implementation (e.g., adding new covered species, adding significant complexity to the analysis, or adding significant new controversy).

SROHCP Categories of Covered Activities

- Water Supply and Flood Management Facilities
- Water Supply and Flood Management Operations
- Maintenance Activities
- Other Agency Activities
- Conservation Strategy

Water Supply and Flood Management Facilities

The facilities used by the Agency to manage water supply and mitigate flood risk

- Nacimiento Dam and associated facilities
- San Antonio Dams and associated facilities
- SRDF
- CSIP distribution system
- Flood conveyance pump stations
- OSR slide gate
- Potrero tide gates

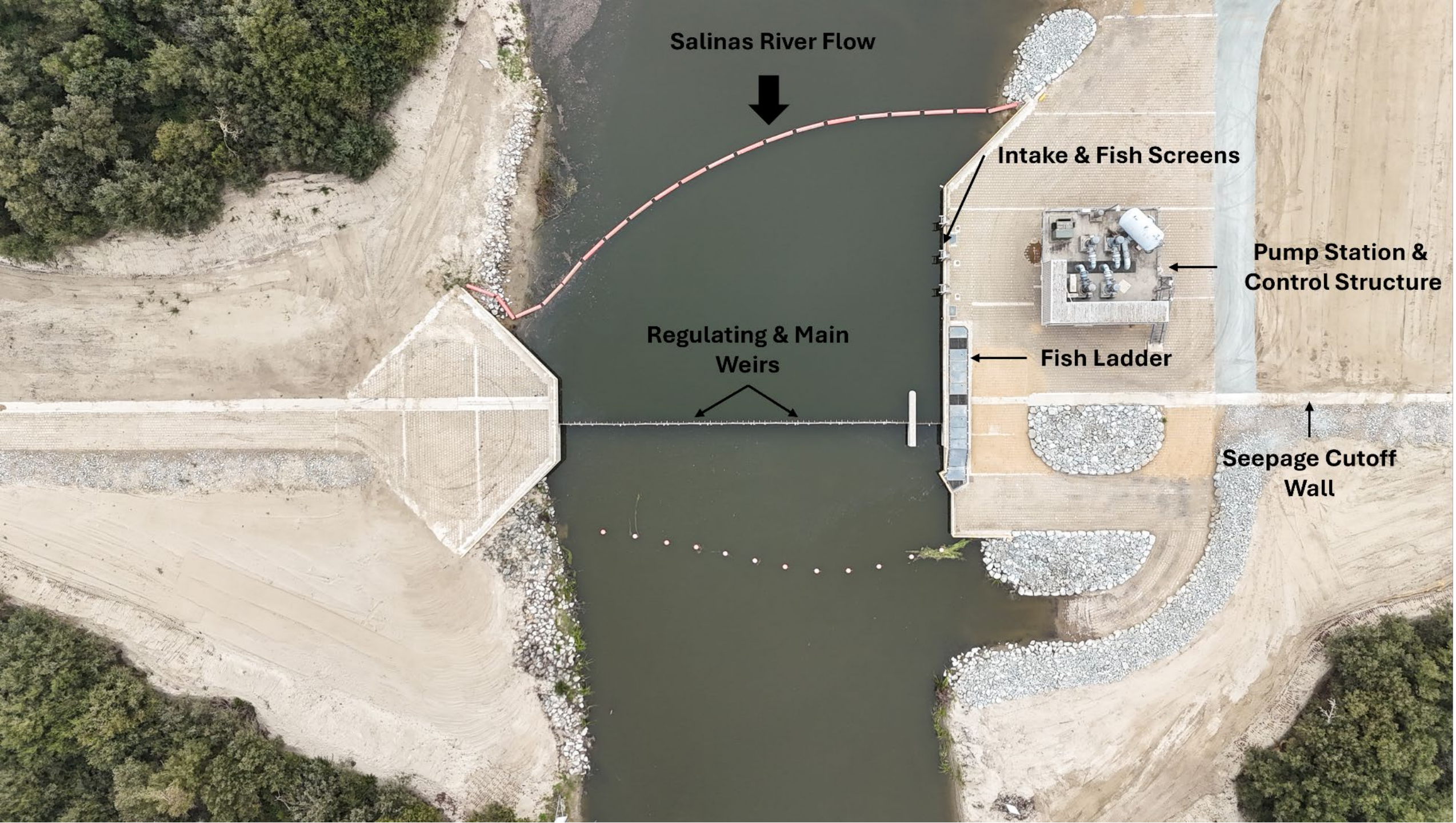

Nacimiento North Shore Boat Ramp
Nacimiento Tanks
Nacimiento Tanks
Spillway Approach Channel
High Level Gate Outlet To Spillway
High Level Outlet Channel
Plunge Pool
Main Channel
Hydroelectric Plant / Low Level Outlet Channel
ALERT Gage/USGS Reservoir Gage
Nacimiento Dam Maintenance Area
Nacimiento Dam Road Maintenance
Log Boom
Parks Lease
0 250 500
Feet
1:8,600
N

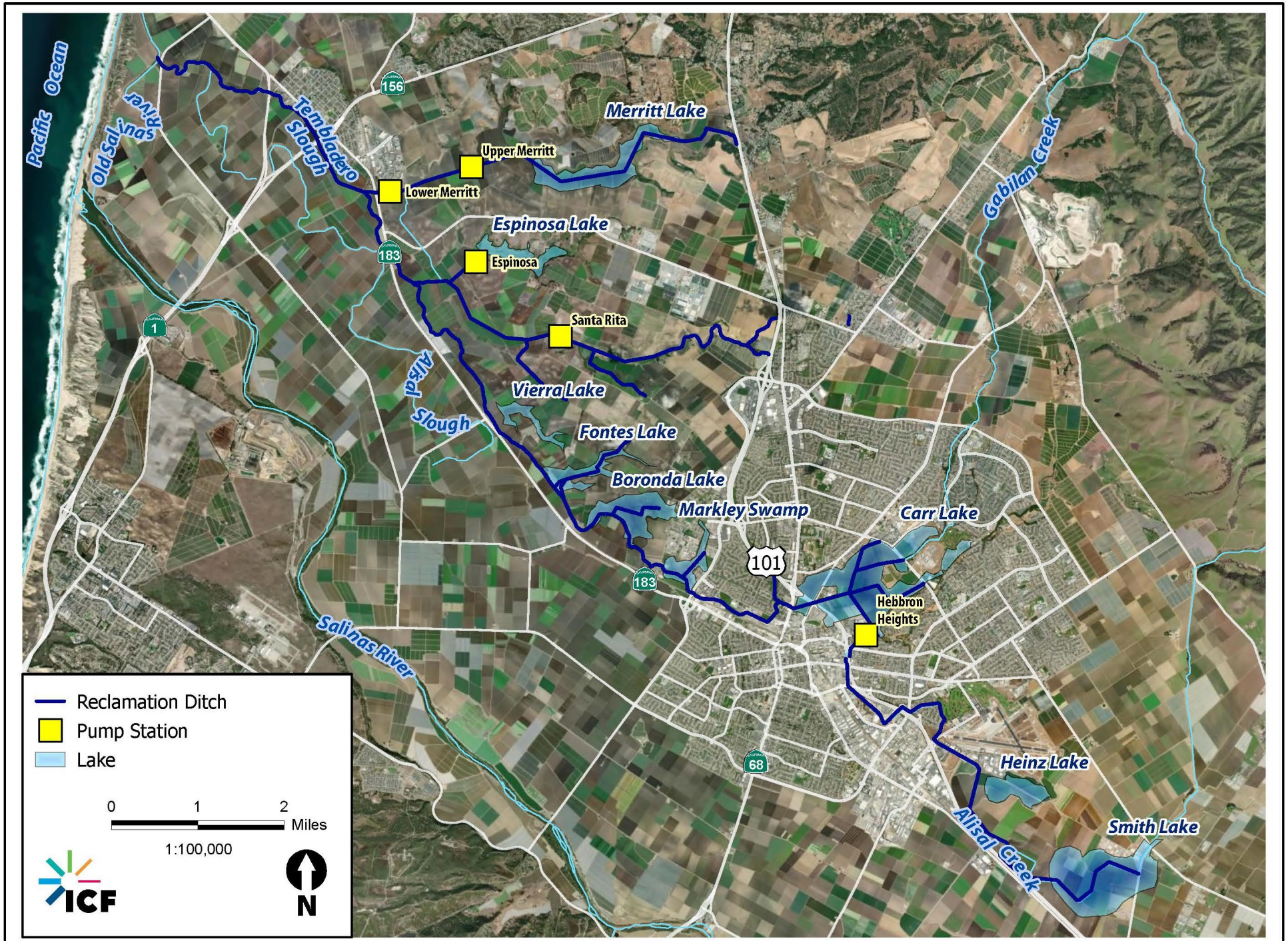

San Antonio Reservoir
Outlet Channel
Outlet Works
San Antonio River
Spillway Approach Channel
Spillway
ALERT/USGS Gage
Start of Maintained Dam Roads
San Antonio Dam Maintenance Area
0 395 790
Feet
1:10,915
N

Water Supply and Flood Management Operations

The way the Agency operates facilities to manage water supply and mitigate flood risk

- Storage and release of water from Nacimiento and San Antonio Reservoirs
  - Flood control
  - Conservation operations
  - Fish migration and habitat releases
- SRDF impoundment and withdrawal
- Distribution of water through CSIP system
- Salinas Lagoon management
  - Slide gate operations
  - Sandbar management
- Low flow and flood conveyance through the Reclamation Ditch and other waterways


Salinas River Flow
Intake & Fish Screens
Pump Station &
Control Structure
Regulating & Main
Weirs
Fish Ladder
Seepage Cutoff
Wall



Maintenance Activities

Inspection, maintenance, repair, and replacement of Agency owned and operated Facilities

- *Within the existing areas of Agency ownership or responsibility:*
  - Maintenance of roads, culverts, and levees
  - Sediment and vegetation management
  - Trash and debris removal
- Water supply and flood management facilities
  - Dams
    - ✓ Spillways structures and gates
    - ✓ Plunge pool
    - ✓ Low and high level outlets
    - ✓ Hydroelectric plant
  - OSR slide gate
  - Potrero tide gates

Other Agency Activities

Single points, less programmatic activities that involve passive operation and less frequent maintenance

- Gonzales Slough Pump Station
- Bryant Canyon Channel
- San Lorenzo Creek Floodwall
- Moss Landing Tide Gates
- Groundwater Monitoring Program
- ALERT Flood Warning System
- Grazing Leases

Conservation Strategy

Activities related to the conservation strategy that could result in incidental take of a covered species

- Conservation strategy is under development but could include:
  - Mitigation projects
    - ✓ Habitat restoration or improvement
    - ✓ Invasive plant removal
    - ✓ Fish passage barrier removal
  - Monitoring activities
    - ✓ Fish and wildlife surveys
    - ✓ Fish capture and tagging

Activities Not Included

Undefined future projects and activities

- SVBGSA, Agency, and stakeholder project concepts
  - Interlake Tunnel
  - Eastside Canal
  - New or expanded Seawater Intrusion Projects
  - Flow regulating dam
  - In and off channel groundwater recharge projects
- Projects still in the conceptual phase
- Not enough information at present to evaluate the type of permit coverage needed, species that could be impacted, location and timing of those impacts
- HCP can be amended in the future to cover if needed

Addressing Future Projects with Operational Impacts

Adding Future Projects

Tiered Plan

- Build the project in with a trigger for future implementation
- Utilized in development plans with uncertainty around intensity of future development
- Project must be well enough understood to meet covered activity criteria

Plan Amendment

Plan Amendment Process

Minor Amendment

- No increase to incidental take limits
- Covered activities do not change beyond what was originally analyzed

Major Amendment

- Change to the Plan that may affect impact analysis or conservation strategy
- Requires same formal review process as original Plan and permit (NEPA, Federal Register notice, internal Section 7)

Plan Amendment Process con't

USFWS and NMFS Responsibility

- Determine level of review needed for amendment under ESA, NEPA, and other related regulations
- Review of No Surprises assurances to confirm they remain sufficient
- Compliance review - permit cannot be renewed, amended or transferred if there are compliance deficiencies with original permit

Major Considerations

- Unauthorized take of an ESA-listed species is a violation of the ESA
- There is no take authorization during the plan development process
- Existing permit remains in place during amendment process, thereby providing take coverage throughout the process and limiting liability
- Implementation and monitoring of the HCP will inform any new negotiation with Services

Questions and Comments?

Project Information:

salinasrivermanagementprogram.org

Project Team Contact:

SalinasRiverHCP@icf.com