System Reoperation Program

October 27, 2011

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Study Authorization / Purpose

- Legislation: Senate Bill X2 1

(Water Quality, Flood Control, Water Storage, and Wildlife Preservation - Perata, 2008)

(i) … planning and feasibility studies to identify potential options for the reoperation of the state's flood protection and water supply systems that will optimize the use of existing facilities and groundwater storage capacity.

(ii) The studies shall incorporate appropriate climate change scenarios and be designed to determine the potential to achieve the following objectives:

- INTEGRATION OF FLOOD PROTECTION AND WATER SUPPLY SYSTEMS TO INCREASE WATER SUPPLY RELIABILITY AND FLOOD PROTECTION, IMPROVE WATER QUALITY, AND PROVIDE FOR ECOSYSTEM PROTECTION AND RESTORATION.
- REOPERATION OF EXISTING RESERVOIRS, FLOOD FACILITIES, AND OTHER WATER FACILITIES IN CONJUNCTION WITH GROUNDWATER STORAGE TO IMPROVE WATER SUPPLY RELIABILITY, FLOOD HAZARD REDUCTION, AND ECOSYSTEM PROTECTION AND TO REDUCE GROUNDWATER OVERDRAFT.
- PROMOTION OF MORE EFFECTIVE GROUNDWATER MANAGEMENT AND PROTECTION AND GREATER INTEGRATION OF GROUNDWATER AND SURFACE WATER RESOURCE USES.
- IMPROVEMENT OF EXISTING WATER CONVEYANCE SYSTEMS TO INCREASE WATER SUPPLY RELIABILITY, IMPROVE WATER QUALITY, EXPAND FLOOD PROTECTION, AND PROTECT AND RESTORE ECOSYSTEMS.

4 Phases System Reoperation Study

Phase 1: Plan of Study
(Preliminary strategies)

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Phase 2: Strategies Formulation and Refinement

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Phase 3: Reconnaissance-level Assessment

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Phase 4: Feasibility-level Assessment

Working Definitions

- Building block – a broad category of system reoperation changes/actions under which a full range of measures can be developed
- Measure – a physical change or management action
- Strategy – an assemblage of interconnected measures that work in concert to meet the three objectives

Phase 1 Building Blocks

- Integrate CVP, SWP, USACE, & other projects
- Re-operate Reservoirs
- Integrate Management of Groundwater and Surface Water
- Facilitate Water Transfers
- Change Flow Regimes
- Expand through-valley Flood Conveyance, Reactivate Floodplains
- Protect and Restore Ecosystem
  Design with ecosystem processes
- Improve Water Supply Reliability
  Drought supplies and groundwater replenishment

Protect and Restore Ecosystem

What are the Ecosystem Benefits of Reoperations?

- Restore riparian, riverine, and floodplain habitat:
  - Reduce stressors on species life history requirements
  - Increase biodiversity and system resiliency
  - Supports species population fitness & expansion, terrestrial & aquatic food web complexes, water quality benefits
  - Improve flood risk through increase floodway capacity/conveyance
- Restore more natural river hydrograph (frequently activated floodplains, attenuated receding flows):
  - Supports development of biodiversity and species life history
  - Supports habitat development, renewal of spawning habitat, riparian/wetlands benefits

Protect and Restore Ecosystem

What are the Ecosystem Benefits of Reoperations?

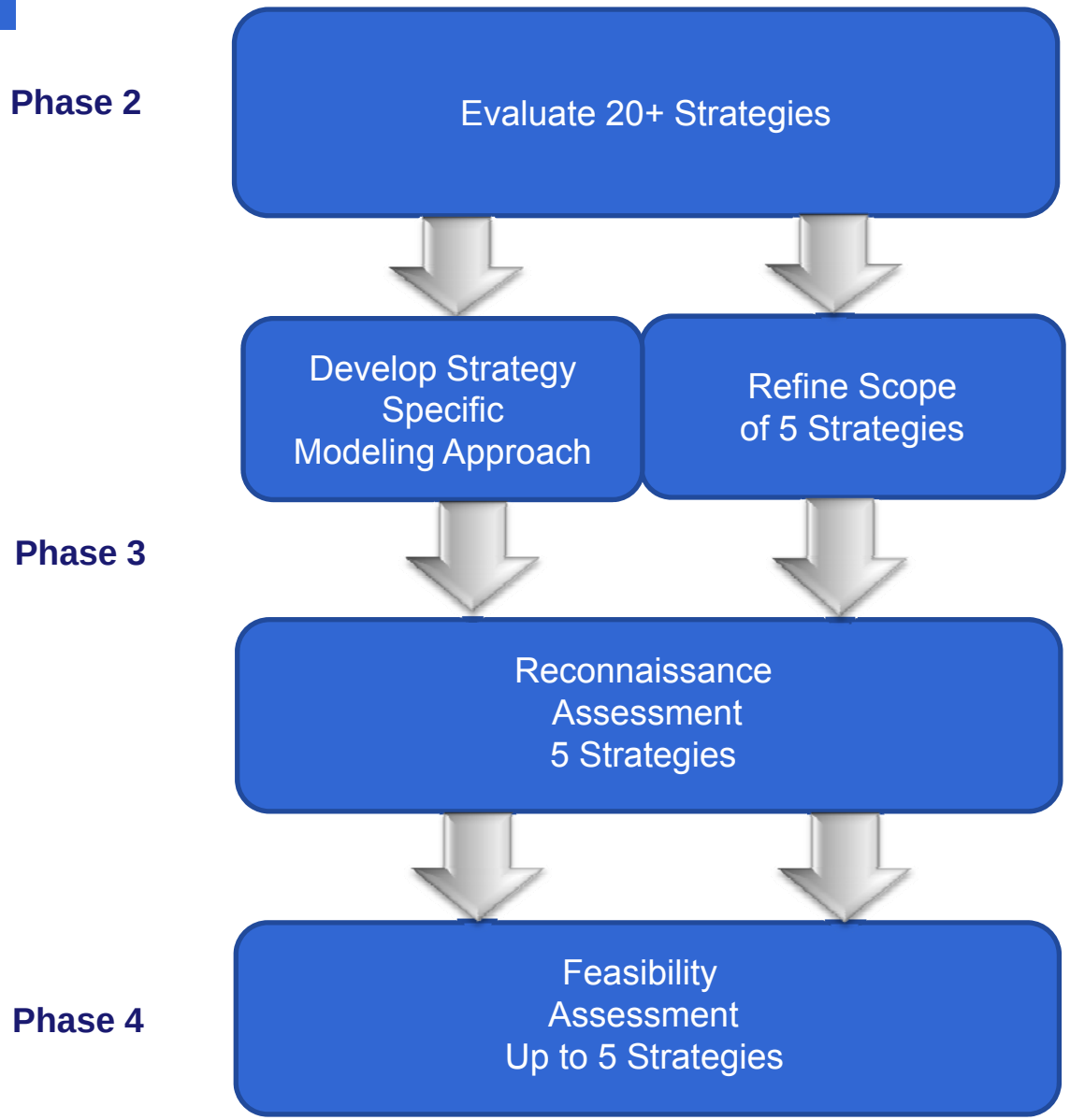
- Improved water temperature management:
  - Reduces a mortality factor for threatened/endangered fish
  - Supports other native aquatic species life cycles
- Restore Geomorphic processes:
  - Restores physical/biological system dynamics
  - Provides for species queues and specialized habitats
- Improve upper watershed infiltration (meadow restoration, forest thinning/restoration):
  - Shifts discharge hydrograph, restores base flow, improves in-stream habitat & water quality

Protect and Restore Ecosystem

What are the Ecosystem Benefits of Reoperations?

- Access historical spawning areas (i.e. fish passage at dams):
  - Direct expansion of habitat for listed fish (80-90% historic loss)
  - Potential for mimicking historic variation in valley floor habitat conditions
  - Climate Change adaptation & habitat refugia
  - Potential for water management flexibility downstream
- Improve drought water management:
  - Reduced potential catastrophic disturbance to aquatic systems
  - Climate change adaptation

Overview of Remaining System Reoperation Study Phases



Phase 2 – Strategy Formulation and Refinement

- Establish ranking & prioritization process
- Evaluate & refine strategies from Phase 1
- Use experts
  - Project Team (DWR and consultants)
  - System Experts (academia, state & federal agencies, facilities owners & operators)
- Select strategies for reconnaissance-level analysis in Phase 3

Phase 3 – Reconnaissance-Level Assessment

- Refine modeling approaches to be strategy specific
- Assess strategy benefits/effects
- Assess strategy vs. climate change conditions
- Assess strategy vs. BDCP conditions
- Evaluate ecosystem restoration/protection potential
- Evaluate water supply reliability potential & WQ improvements
- Evaluate improvements to existing water conveyance system
- Evaluate flood risk reduction potential
- Develop reconnaissance-level costs
- Identify primary constraints affecting implementation
- Rank strategies

Phase 4 – Feasibility-Level Assessment

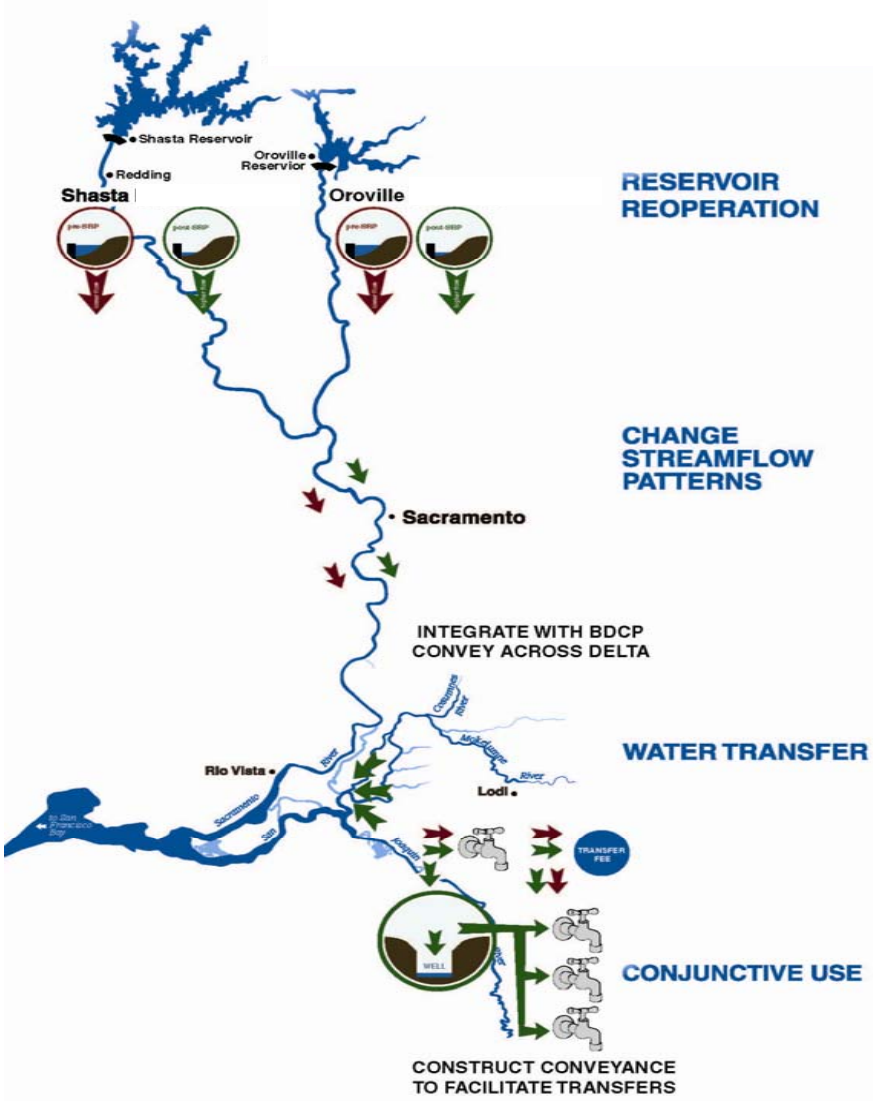
- More detailed assessment
- Demonstrate strategies are economical
- Provide basis for decision-makers to determine if program warrants further study
- Develop an approach/methodology for others to evaluate new strategies

Some Promising Reoperation Concepts

Reoperate Reservoirs with Backstopping by Groundwater Integration

- Capture the fraction of the runoff hydrograph not now controlled for beneficial use by increasing flood control reservation
- Dedicate this “surplus” water to environmental flows and improved water supply
- Payback reservoir in dry years with groundwater substitution
- Incidental flood control benefits
- Incidental climate resilience benefits

Sac. Valley Reservoir Reoperation Concept



Other Reoperation Concepts:

- Folsom Dam
- Reservoirs in the San Joaquin River Basin
- Fish Passage
- Expand & Reactivate Floodplains for Improved Flood Management & Ecosystem Restoration

Full Integration of SWP, CVP, and USACE Operations

Outreach & Coordination

Phase I
Plan of Study

DWR & Consultants

Briefings:
USACE, Reclamation, SWP and CVP Operators, Stakeholders

Phase 2
Strategy Formulation & Refinement

Project Team
Strategy Formulation

Outside Experts
(Stakeholders, academia, agencies)

System Experts
(facilities owners & operators)

Phase 3
Reconnaissance-Level Assessment

DWR & Experts:
Strategy Benefit Metrics
Strategies Selected for Phase 4

Briefings:
facilities owners & operators, agencies, stakeholders

Phase 4
Feasibility-Level Assessment

Framework for Stakeholder Outreach and Coordination

Schedule

Phase	Estimated Completion
Phase 1 – Plan of Study	June 2011
Phase 2 – Strategy Formulation & Refinement	December 2011
Phase 3 – Reconnaissance-Level Assessment	May 2012
Phase 4 – Feasibility-Level Assessment	June 2013

Contact

Sean Sou
Department of Water Resources
(916) 651-9269
sou@water.ca.gov

Website: http://www.water.ca.gov/system_reop/

Questions