Reinitiation of Consultation on the Coordinated Long-Term Operation of the CVP and SWP

June 7, 2018

RECLAMATION

Topics

- Approach
- Overview of Actions
- Water Supply
- Power
- Adaptive Management and Other Stressors

APPROACH

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Goals

- **Near-term Actions: Improve water supply in a way that does not cause additional adverse effects to listed species (is equally or more protective of the species)**
- **Long-term: Improve water supply, power, and re-operate for listed species due to:**
  - **Low populations**
  - **New information as a result of drought**
  - **New information due to collaborative science**

Approach

- Near-term Actions: Near-term actions for water supply
  - Completion within a year
  - Prior work and limited controversy support the schedule
- Programmatic Consultation: ~18 month programmatic analysis to maximize water deliveries and marketable power
  - New storage facilities,
  - New conveyance facilities,
  - Modifications to existing facilities,
  - Changes to regulations, and/or
  - Addressing other stressors.
- Site-specific Consultation: Complete the ROC on LTO with one or more site-specific efforts

Approach

Near-Term	Long-Term	
	Programmatic	*Re-Operation*
• Incorporate updated science for day-to-day decisions on water ops • Incorporate WIIN Act provisions	• Overall system analysis • Adaptive management	• Sustainable water ops in the context of species management
<u>Actions:</u> ➢ San Joaquin I:E ➢ OMR Flexibility ➢ Salinity Management ➢ Non-Physical Barriers ➢ Salvage Efficiency	<u>Actions:</u> ➢ New Storage, New Conveyance, and Power Marketability ➢ Other Stressors ➢ Structured Decision Making	<u>Actions:</u> ➢ Sustainable Regulatory Requirements ➢ Temperature Management ➢ Integrated Operations ➢ Implement Non-Flow Actions

Long-Term Programmatic Approach

- Sets the direction for overall system analysis
  - New storage, conveyance, and power marketability
  - Other stressors
  - Regulatory performance and costs
- Establishes a framework for water operations in the context of species management
  - Structured Decision Making
- Maximizes water supply through improving science around the necessary protections for species
  - Adaptive management strategy

OVERVIEW OF ACTIONS

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Storage, Conveyance, and Power Actions

Upstream of Delta Storage

- Existing Upstream of Delta Storage
- Increase Folsom storage
- Increase Shasta storage
- Sites Reservoir

Conveyance

- California WaterFix
- Change Delta regulations

South of Delta Export Storage

- Existing South of Delta Storage
- Increase San Luis Reservoir Storage
- San Joaquin Groundwater Storage

Power

- Increase CVP Power Value
- Decrease CVP Power Cost
- Even Out Power Customer Payments
- Improve Marketable Power Generation

Other Stressors Actions

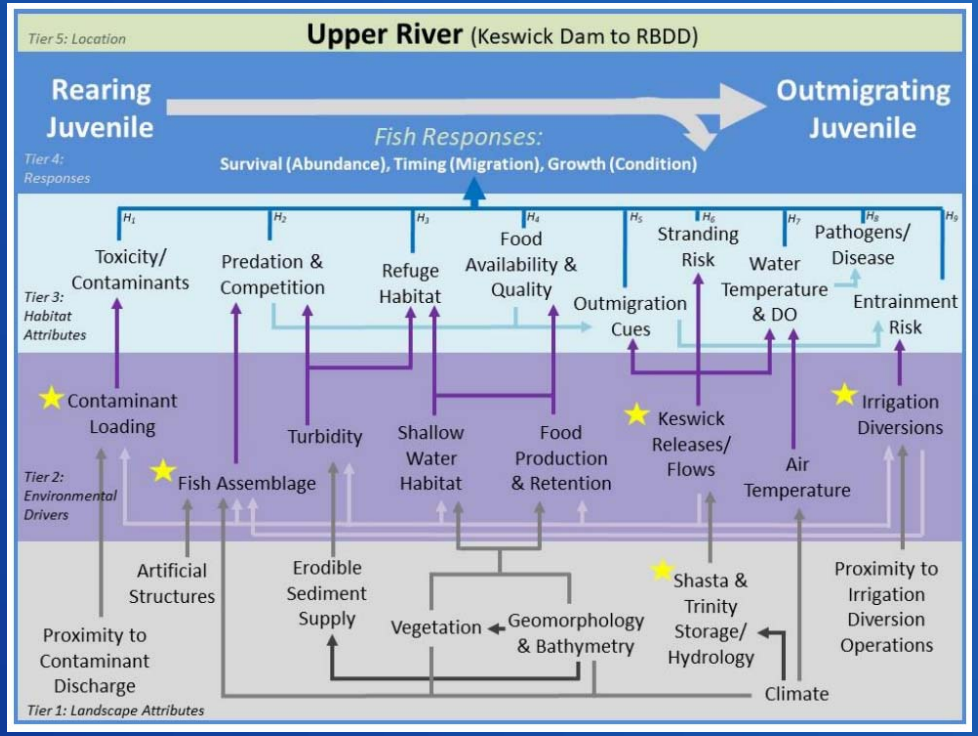
Invasive Aquatic Weeds
(e.g. Hyacinth near Stockton)

Non-Native Predators
(e.g. Striped Bass)

Habitat Loss and Contaminants
(e.g. Levees and Wastewater)

Structured Decision Making Framework for Adaptive Management - Actions

- Sustainable water operations in the context of species management
- Formalized institutional processes for transparency and accountability
- Supports strong voluntary collaborative partnerships



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WATER SUPPLY

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Water Supply Approach

- **If we had a large amount of funding to invest in water supply, how would we invest it?**
  - **Upstream of Delta storage**
  - **South of Delta storage**
  - **Conveyance**



Upstream of Delta Storage	Conveyance	South of Delta Export Storage
•Existing •Increase Folsom storage •Increase Shasta storage	•California WaterFix •Change Delta regulations	•Existing •Increase San Luis Reservoir Storage •San Joaquin Groundwater Storage

Draft Initial Scenarios

- Scenarios are theoretical
- Scenarios may not be realistic
- Initial Options and Scenarios bookend possible futures
- Evaluated changes to Delta regulations to increase export ability in addition to physical conveyance
- Scenarios are very rough, draft, and subject to revision
- No or limited review and refinement was done

Draft Initial Scenarios

- All studies are Draft, Intended for Discussion, and Not for Distribution.
- Baseline – Reclamation's "Full Obligation" CalSim Study – based on 2015 LTO and 2017 DRR CalSim
- Scenario concepts were intended to identify CVP water supply reliability under a range of combinations of regulatory and physical options.
- All scenarios are rough – subjected only to cursory review and refinement.
- No refinements were made to State Water Project allocation or storage operations for any Scenario

Draft Initial Options

Storage

- **San Luis Reservoir increased by 120 TAF**
- **Shasta increased by 634 TAF**
- **Temperance Flat**
- **Folsom increased by 1500 TAF**
- **Folsom increased by 500 TAF**

Draft Initial Options

Conveyance

- **North Delta Conveyance**

Delta Regulations Changes

- **OMR 2/3 on with -2000 cfs background**
- **OMR 1/3 on with -2000 cfs background**
- **No SJR I:E Ratio**
- **Suisun Marsh operation instead of Fall X2**

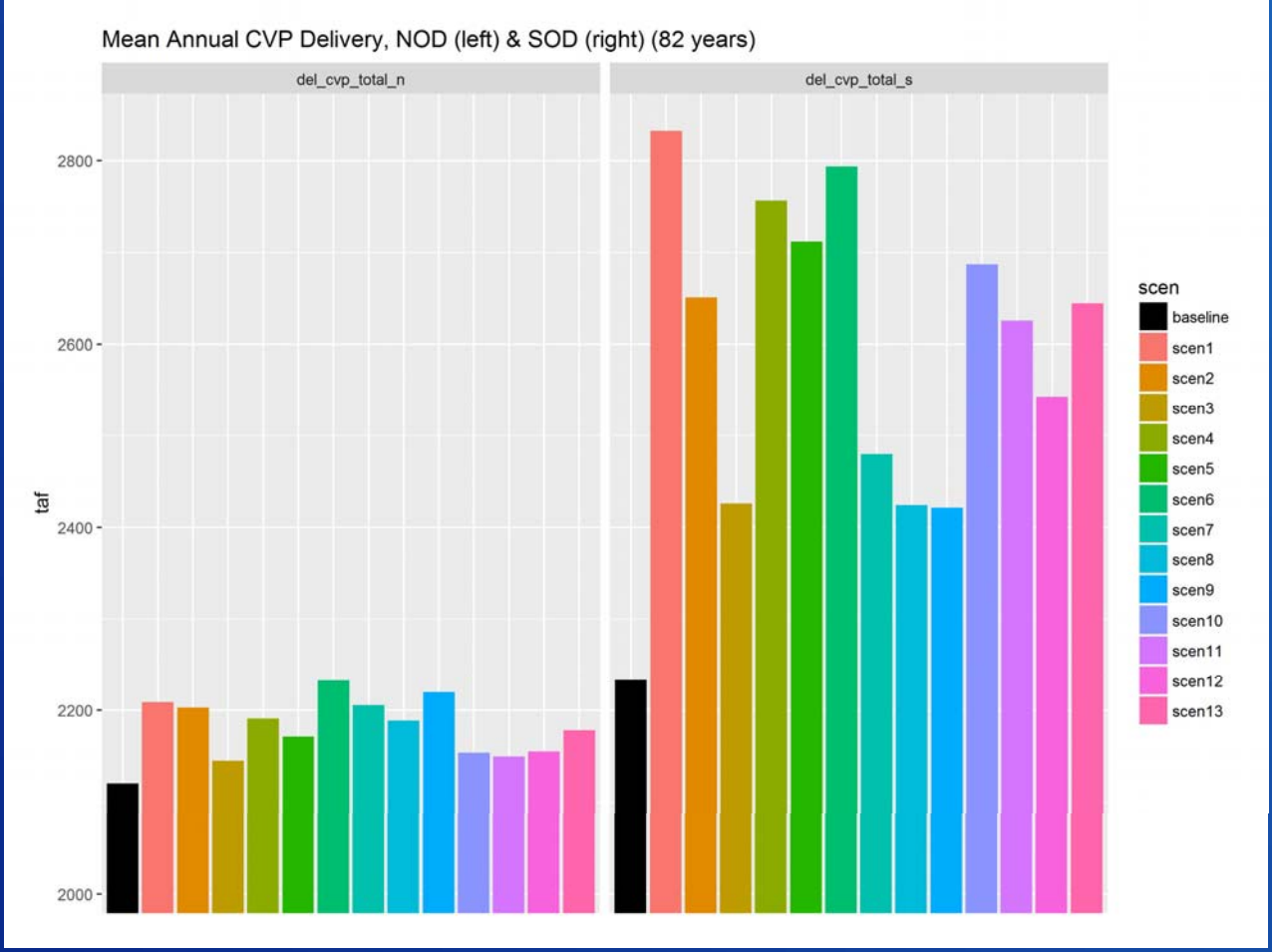
Draft Initial Scenarios

Scenario #	Storage Elements	Export (Conveyance) Elements	Concept
1	San Luis +120 taf; Shasta +634 taf; Temperance Flat; Folsom +1500 taf	No SJR IE Ratio; OMR 1/3 on with -2000 cfs background; Suisun Marsh operation in lieu of Fall X2	Maximum Storage; Delta Regulations Changes
2	San Luis +120 taf; Shasta +634 taf; Temperance Flat; Folsom +1500 taf	North Delta Conveyance	Maximum Storage; Physical Conveyance
3	San Luis +120 taf; Temperance Flat	North Delta Conveyance	SOD Storage; Physical Conveyance
4	San Luis +120 taf; Shasta +634 taf; Temperance Flat; Folsom +500 taf	No SJR IE Ratio; OMR 1/3 on with -2000 cfs background; Suisun Marsh operation in lieu of Fall X2	Smaller Folsom; Delta Regulations Changes
5	San Luis +120 taf; Shasta +634 taf; Temperance Flat; Folsom +500 taf	North Delta Conveyance	Smaller Folsom; Physical Conveyance
6	San Luis +120 taf; Folsom +1500 taf	No SJR IE Ratio; OMR 1/3 on with -2000 cfs background; Suisun Marsh operation in lieu of Fall X2	NOD/SOD Storage Mix; Delta Regulations Changes

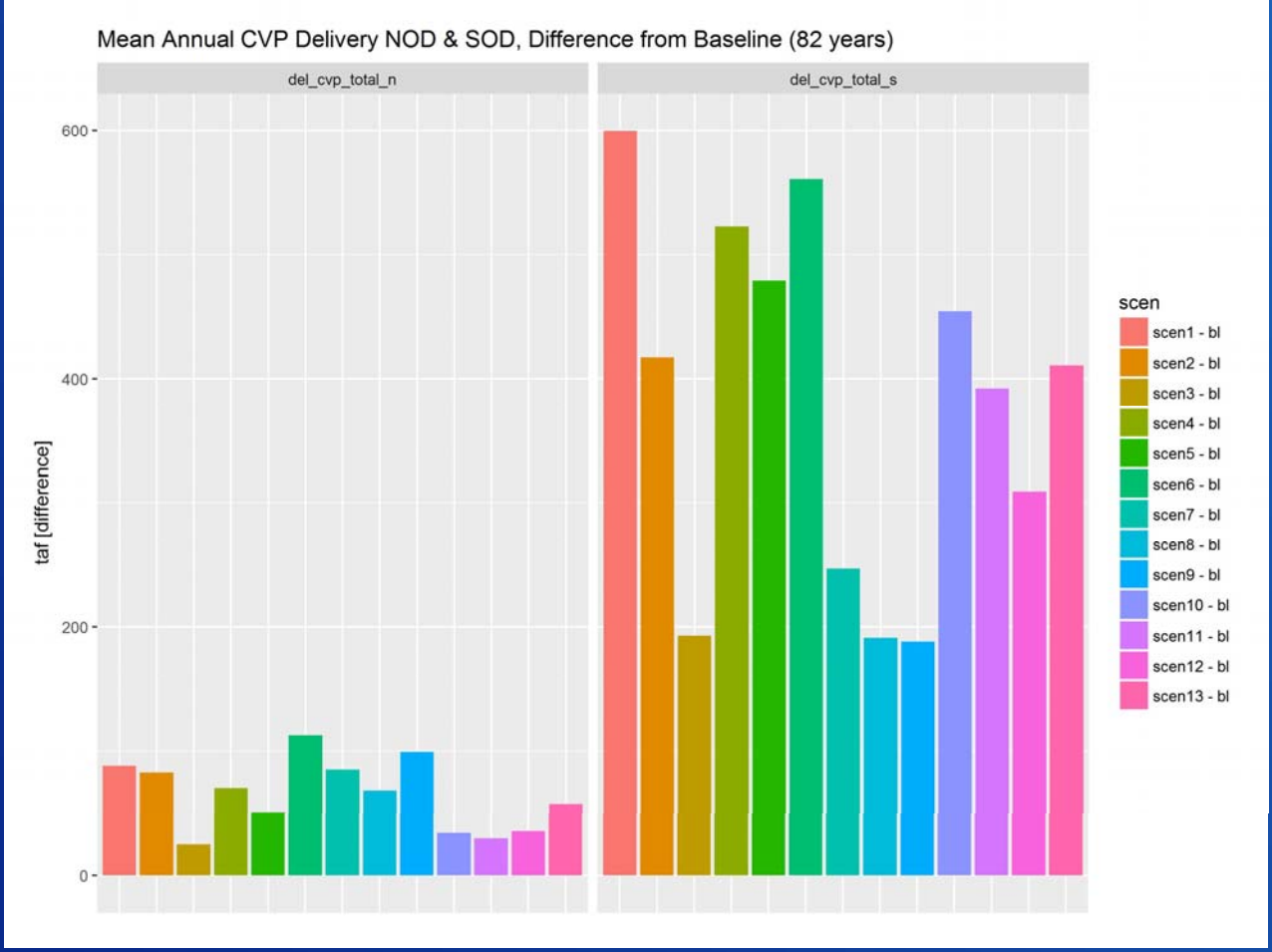
Draft Initial Scenarios

Scenario #	Storage Elements	Export (Conveyance) Elements	Concept
7	San Luis +120 taf; Folsom +1500 taf	North Delta Conveyance	NOD/SOD Storage Mix; Physical Conveyance
8	Shasta +634 taf; Folsom +500 taf	OMR 2/3 on with -2000 cfs background; North Delta Conveyance	Shasta/SmallFolsom; Physical/Regulatory Mix
9	Shasta +634 taf; Folsom +1500 taf	North Delta Conveyance	Shasta/LargeFolsom; Physical Conveyance
10	San Luis +120 taf; Temperance Flat	No SJR IE Ratio; OMR 1/3 on with -2000 cfs background; Suisun Marsh operation in lieu of Fall X2	SOD Storage; Delta Regulations Changes
11	None	No SJR IE Ratio; OMR 1/3 on with -2000 cfs background; Suisun Marsh operation in lieu of Fall X2	No Storage; Delta Regulations Changes
12	None	No SJR IE Ratio; OMR 1/3 on with -2000 cfs background; Suisun Marsh operation in lieu of Fall X2; Dedicated Capacity for CVP at Banks	No Storage; Delta Regulations Changes; Dedicated Banks for CVP
13	Shasta +634 taf	No SJR IE Ratio; OMR 1/3 on with -2000 cfs background; Suisun Marsh operation in lieu of Fall X2	Shasta; Delta Regulations Changes

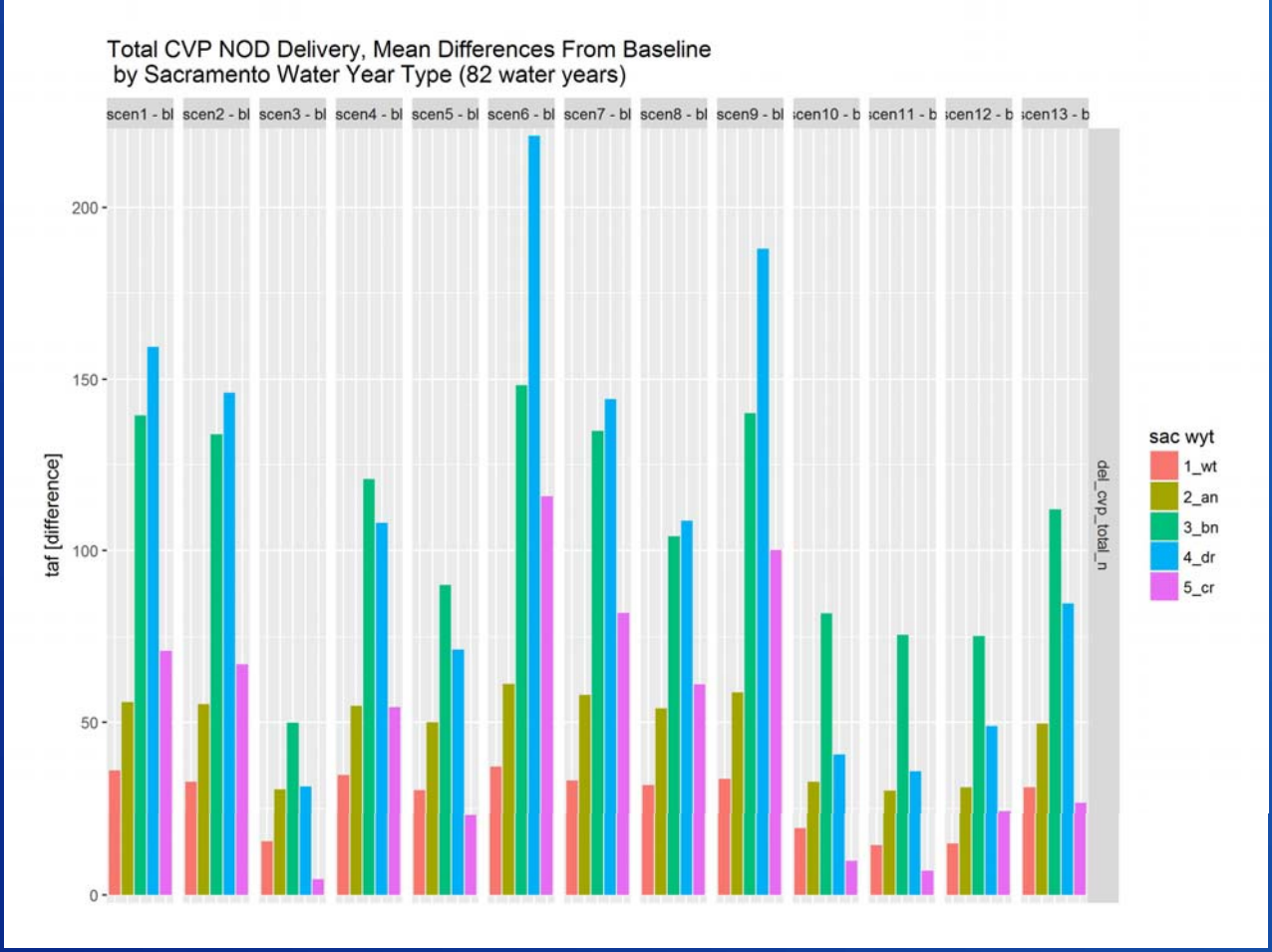
Draft Results – Average Annual CVP Delivery



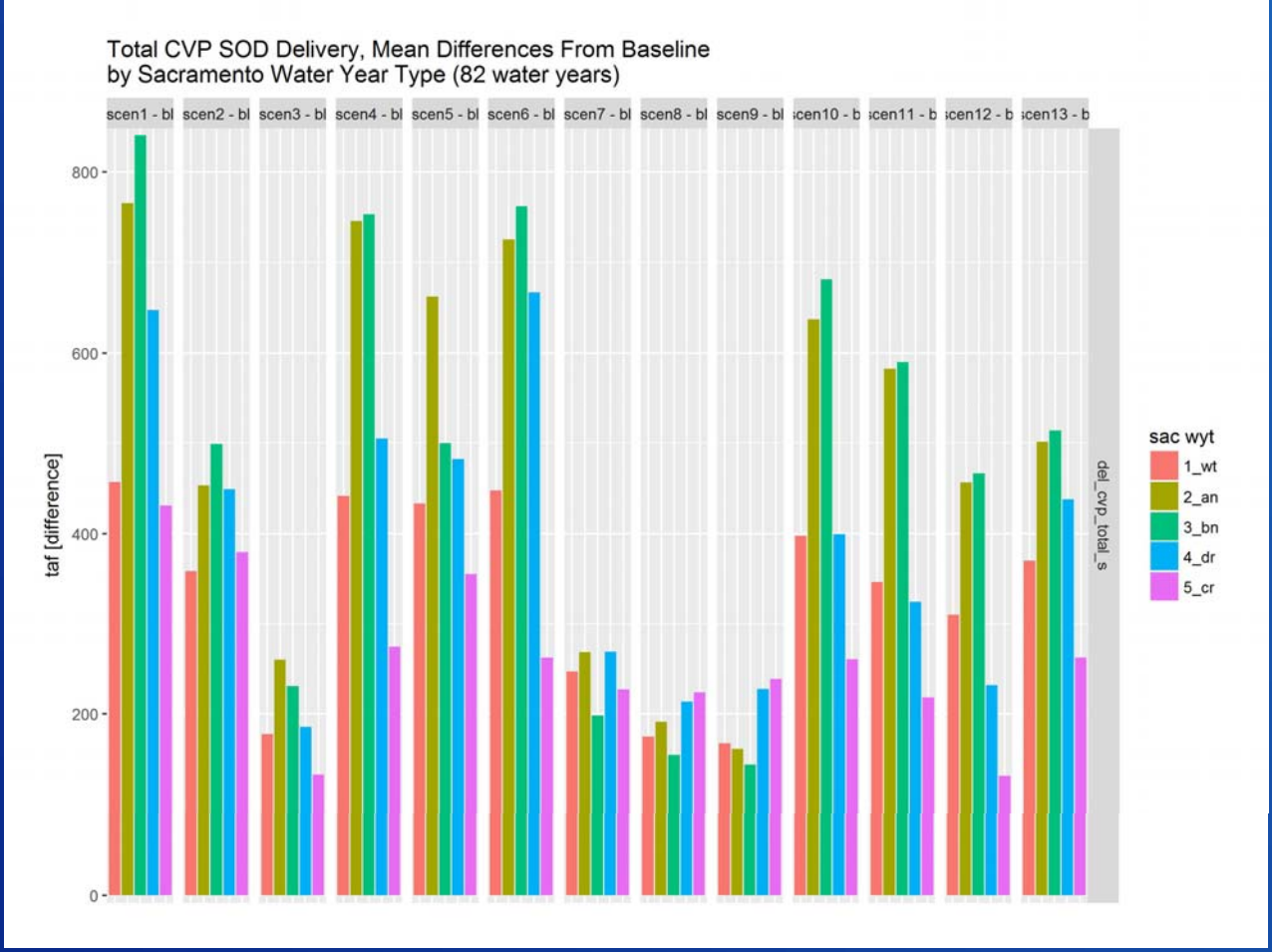
Draft Results – Change in Average Annual CVP Delivery



Draft Results – Change in CVP NOD Delivery



Draft Results – Change in CVP SOD Delivery



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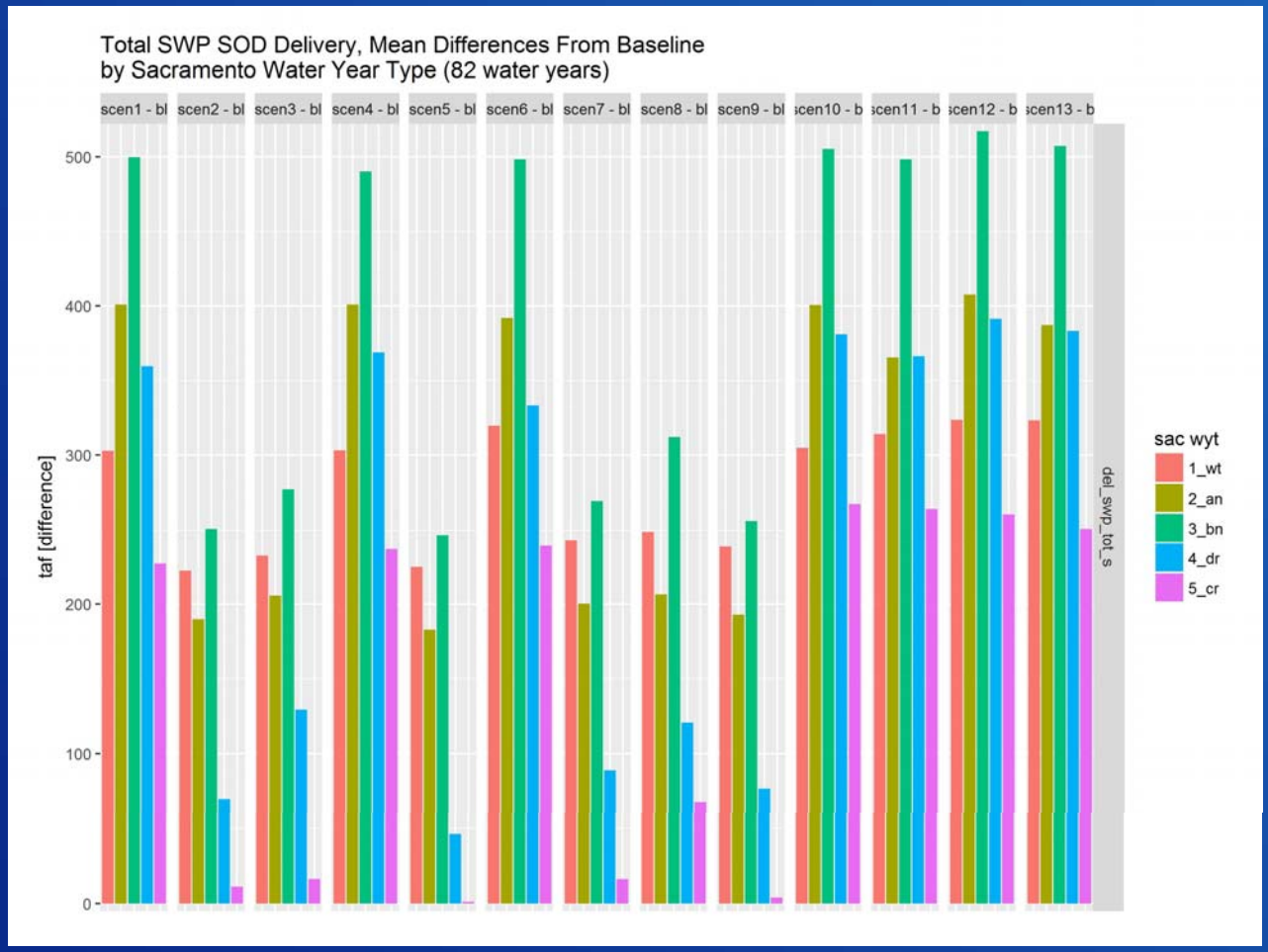
Draft Results – Change in SWP SOD Delivery



POWER

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Power Approach

- CVP Power has increasing costs
  - Operations and Maintenance
  - CVPIA Restoration Fund
- CVP power has decreasing value
  - California Renewable Portfolio Standard

- What can Reclamation do to sustain the economic viability of the CVP?

Power Cost Options

- Existing CVPIA Finance Plan actions
- Longer average instead of 3 year average for CVPIA Restoration Fund calculation
- Evaluate power customer participation in COA, storage projects, CWF, and Voluntary Settlement Agreements
- Evaluate a cap on Aid to Irrigation
- Directly connect Banks to the CVP, reduce transmission charges
- DWR to enter into an exchange agreement with WAPA to provide cost savings
- Include Aid to Irrigation costs in appropriations requests
- Have annual water customers deficits addressed within a shorter time
- Look into other funding sources
- Have DWR net the San Luis generation when scheduling Dos Amigos load
- Establish a common environmental baseline

Power Value Options

- Change California law to get the Renewable Portfolio Standard to include existing large hydropower
- Increase pump storage as generation flexibility
- Time releases to high power values
- Upgrade Jones / Tracy Pumping Plant to variable speed pump system
- Better manage pumping operations, so that Project Use and water customers can take advantage of negative pricing during the peak hours, when applicable. This would allow customers to be able to capture opportunity costs in the negative pricing market
- Formalize the timing of releases through an agreement between the State and Federal agencies

ADAPTIVE MANAGEMENT

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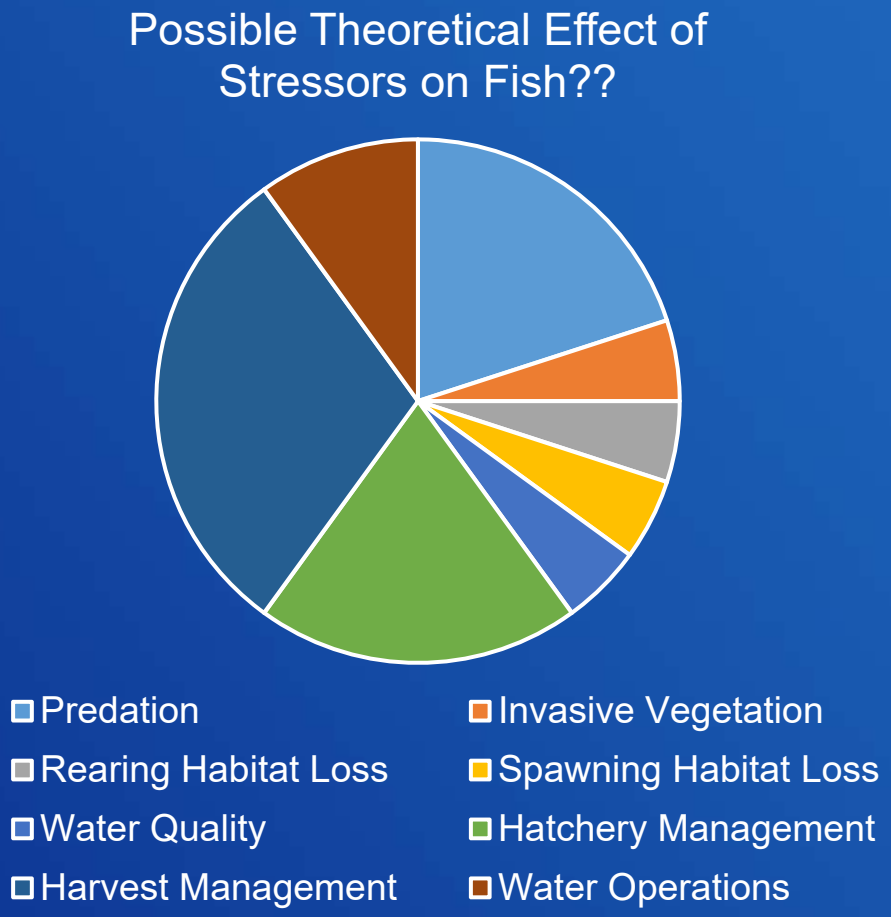
Adaptive Management Approach

- Sustainable water operations in the context of species management
- Formalized institutional processes for transparency and accountability
- Supports strong voluntary collaborative partnerships

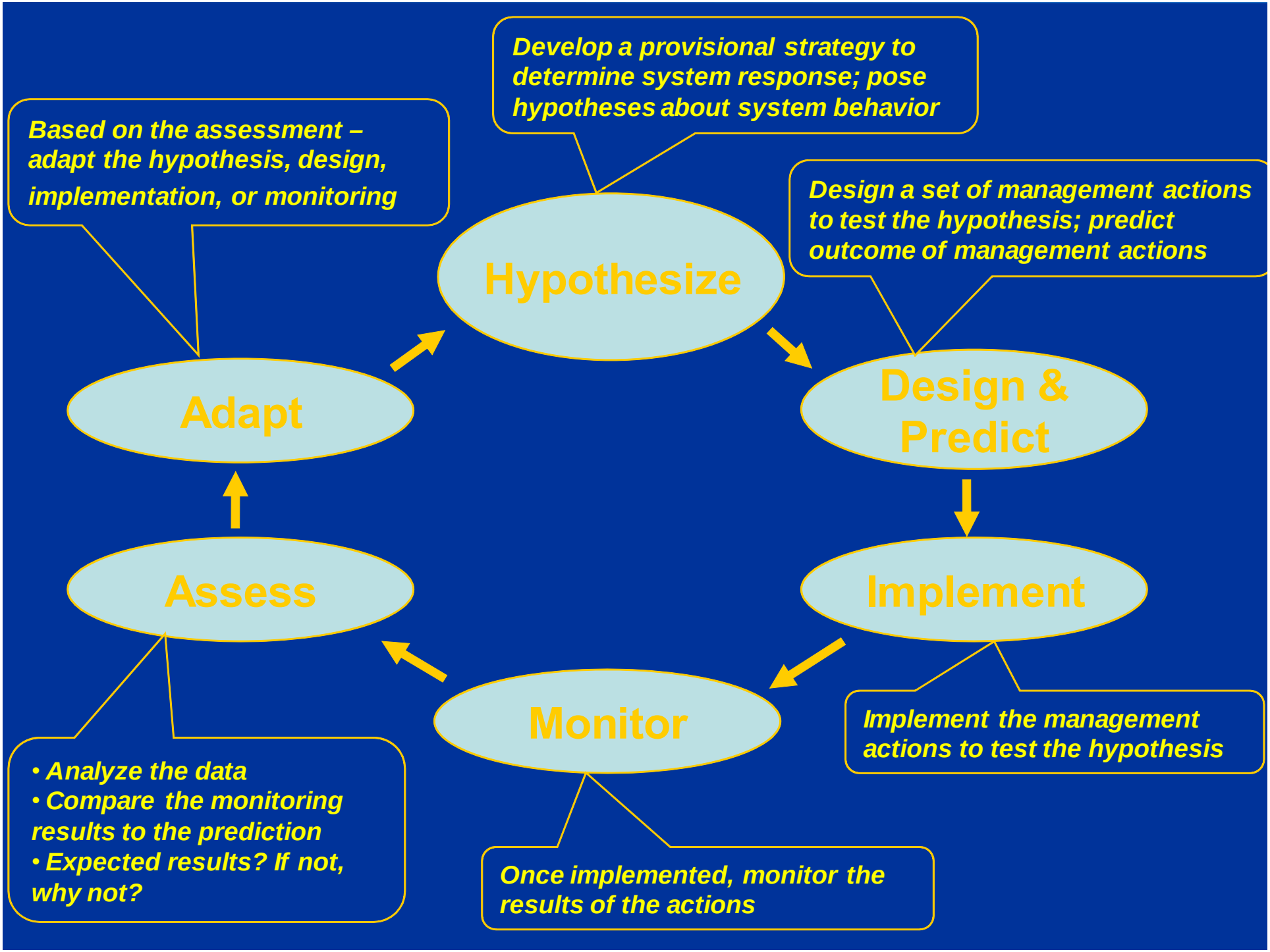


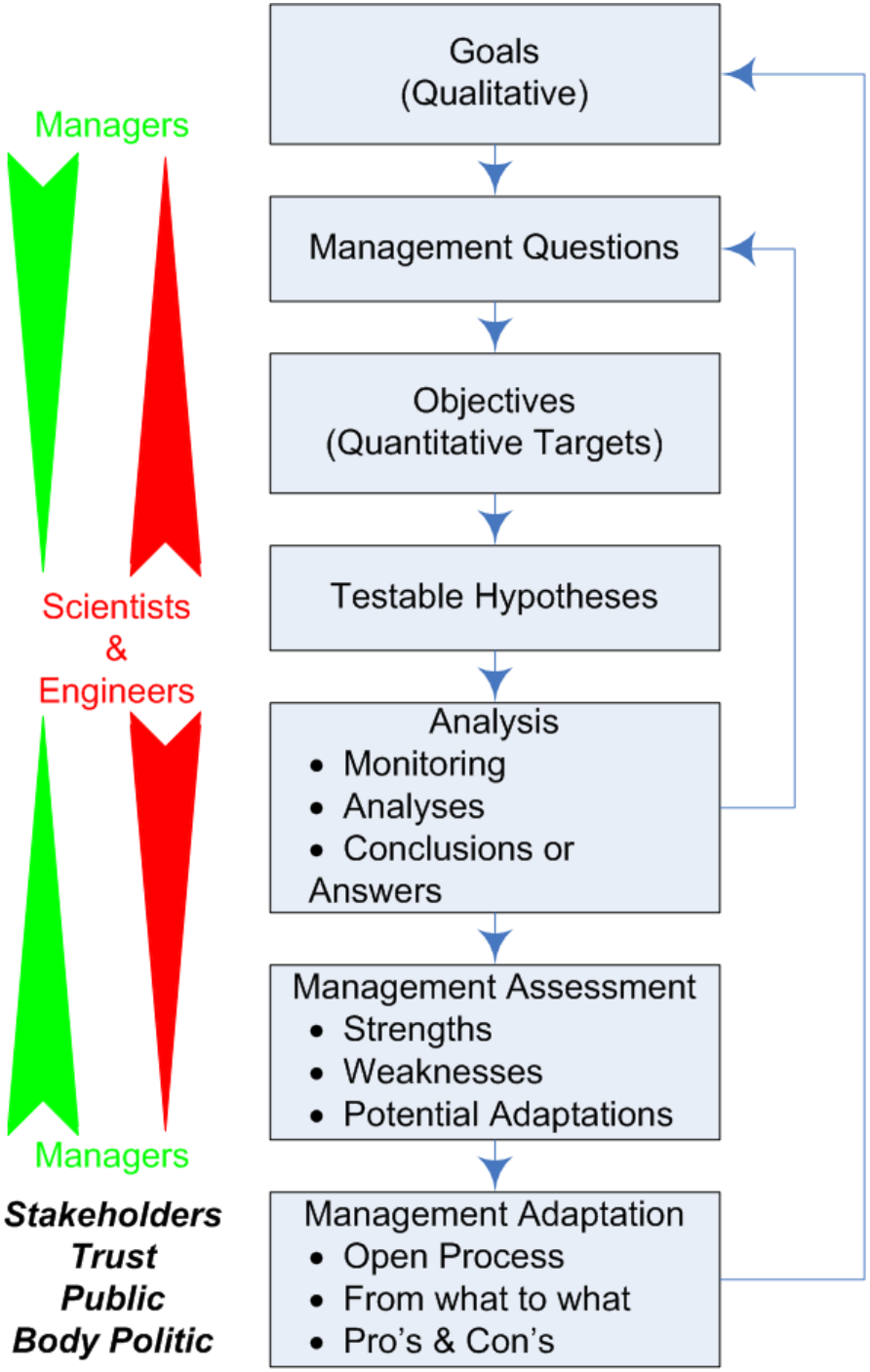
Environmental Watering

Source: Mount et. al., 2016 from the Murray-Darling Basin in Australia

Environmental Watering for California

- **Protect: Predict adverse conditions and implement standard contingency plans to address potential extinction risks to fish populations.**
- **Restore: Promote production of sufficient numbers of juveniles per adult to enable the rebuilding of fish populations.**
- **Maintain: Operate water projects to support adult returns.**


Develop a provisional strategy to determine system response; pose hypotheses about system behavior
Hypothesize
Design a set of management actions to test the hypothesis; predict outcome of management actions
Design & Predict
Implement the management actions to test the hypothesis
Implement
Once implemented, monitor the results of the actions
Monitor
• Analyze the data
• Compare the monitoring results to the prediction
• Expected results? If not, why not?
Assess
Based on the assessment – adapt the hypothesis, design, implementation, or monitoring
Adapt



Adaptive Management

- **Scientific Method**
- **Managers interacting with scientists**

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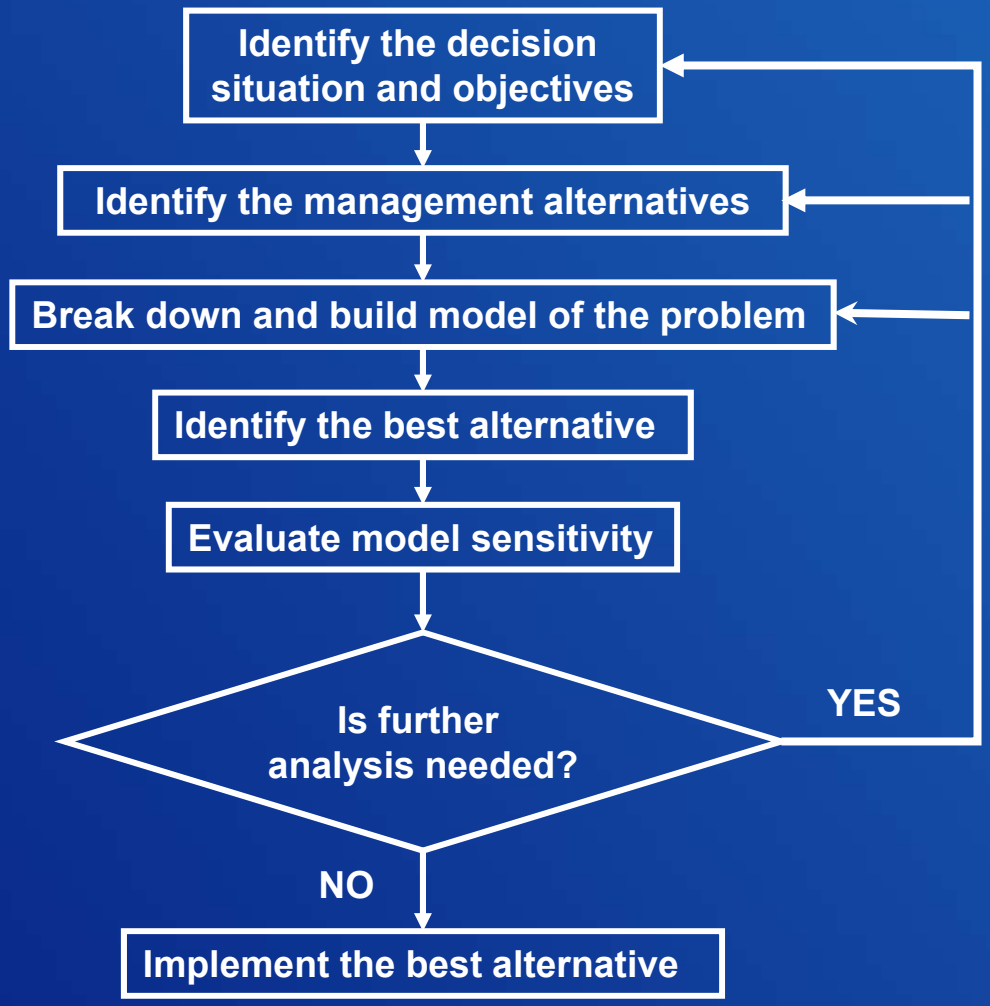
Structured Decision-Making Process – "Hypothesize" and "Design & Predict"



Reclamation CVP Goals

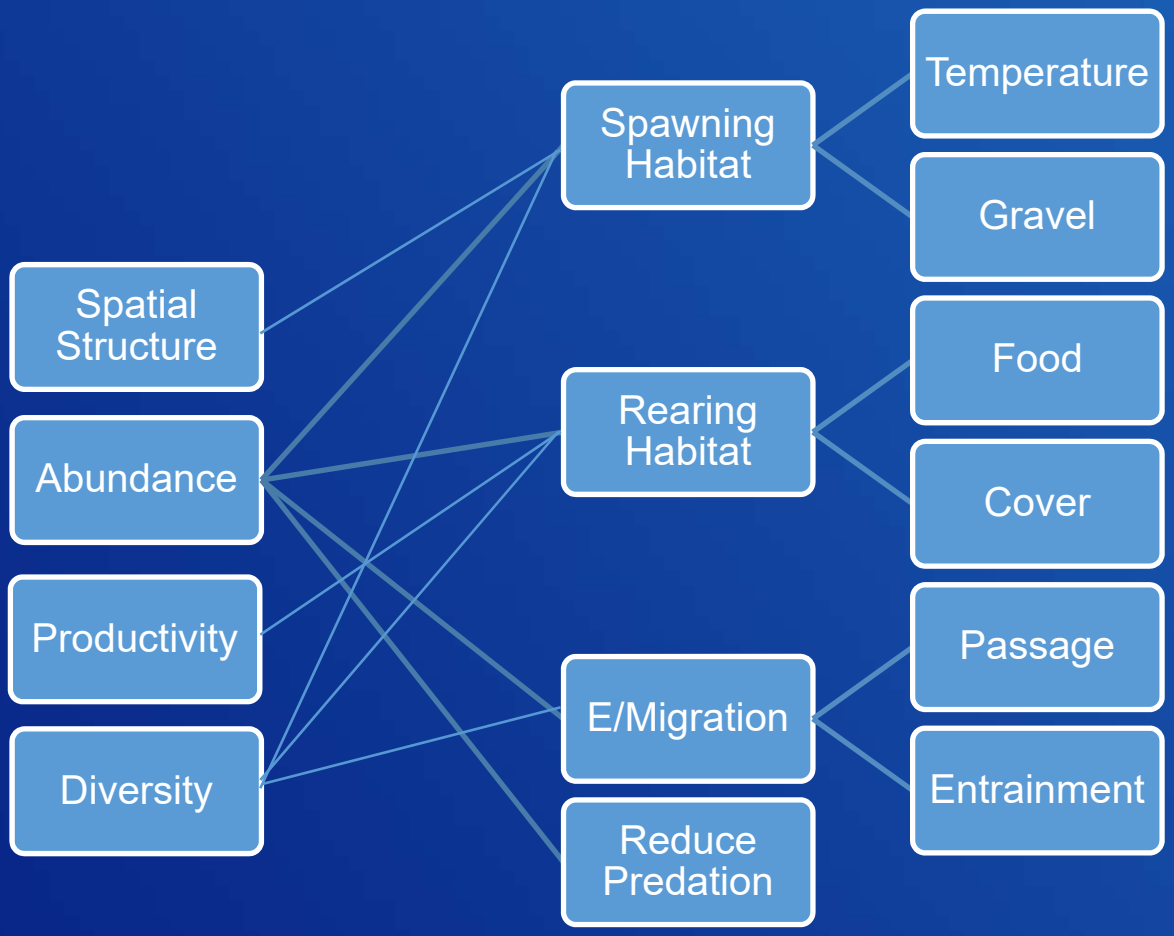
- Maximize average annual water supply deliveries
- Maximize marketable power
- Maximize in-river fish production (until recovery)

- Drought water supply
- Achieve minimum fish population in all years

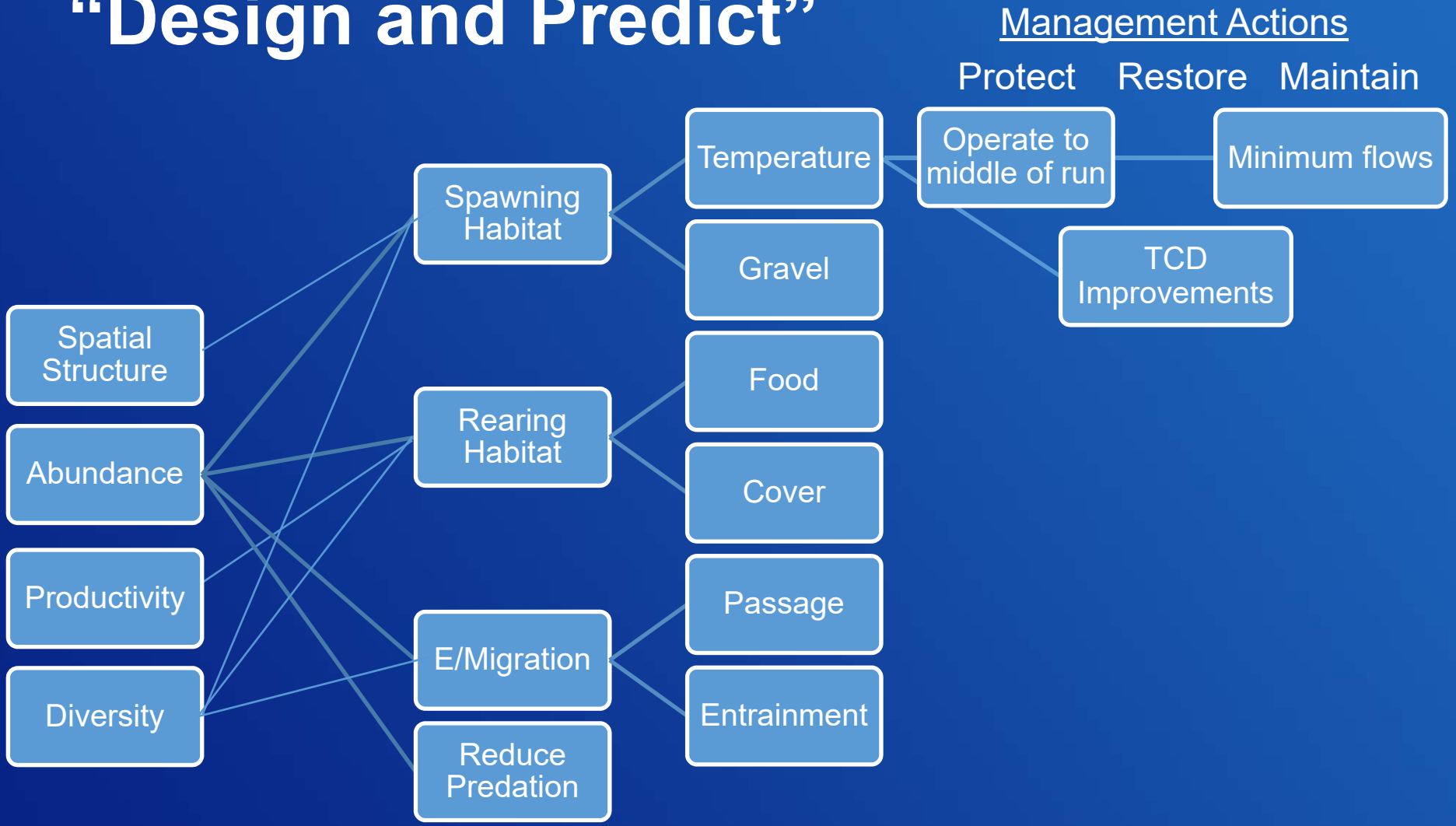
Biological Goals

Viability Parameter	Description
Abundance / Resilience	Avoid rapid decreases in cohort replacement rate, and increase in 3-year running average cohort replacement rate, controlled for hydrology
Productivity / Resilience	Increase number of juveniles exiting the Delta per adult spawner, controlled for hydrology
Spatial Structure / Redundancy	Increased number of river systems in which the species is observed;
Diversity / Redundancy & Representation	Increase number of rearing / spawning / holding locations, controlled for hydrology

Biological Goals to Conceptual Model – "Hypothesize"



Conceptual Model to Actions – "Design and Predict"



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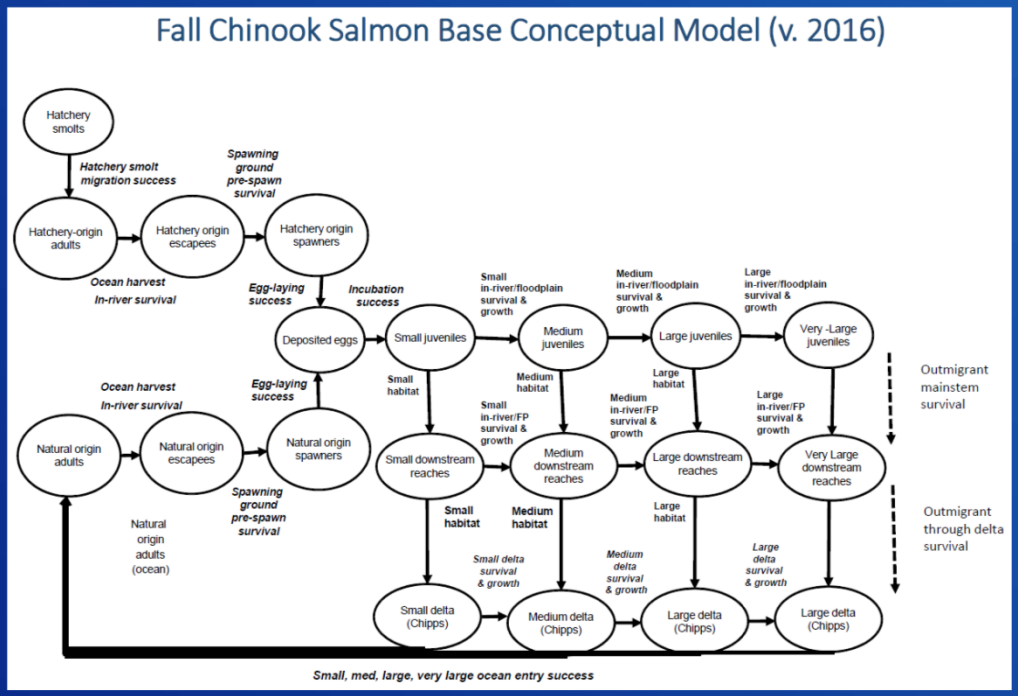
Decision Support Models – "Design and Predict"

- A DSM is a fish population spawning, growing, killing, routing, killing, growing, harvesting, routing, killing, spawning, accounting computational tool



"Adapt"

- How can we become comfortable with learning from our mistakes?
- What can we do to minimize defensiveness?
- Can we set up institutions to avoid individual personalities taking the process and decisions hostage?
- What tools do we have in our regulatory and legal framework to handle adaptation?
- Can we identify the current management strategy – the set of management actions and timing that we currently operate to?
- Can we assess the certainty/uncertainty of each of those management actions?
- Can we consolidate monitoring to best reduce uncertainty and target the most important performance measures?
- Can we adapt our management strategy?

GOALS FOR TODAY

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Today's Goals

- Discuss initial water supply scenarios, initial thoughts on good scenarios to include in alternatives
- Discuss power ideas, initial thoughts on good ideas to include in alternatives
- Brainstorm adaptive management – discuss how to institutionalize a process of adaptation
- Add any other stressors, data to define other stressors, and analytical tools to help analyze other stressors

Questions

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