

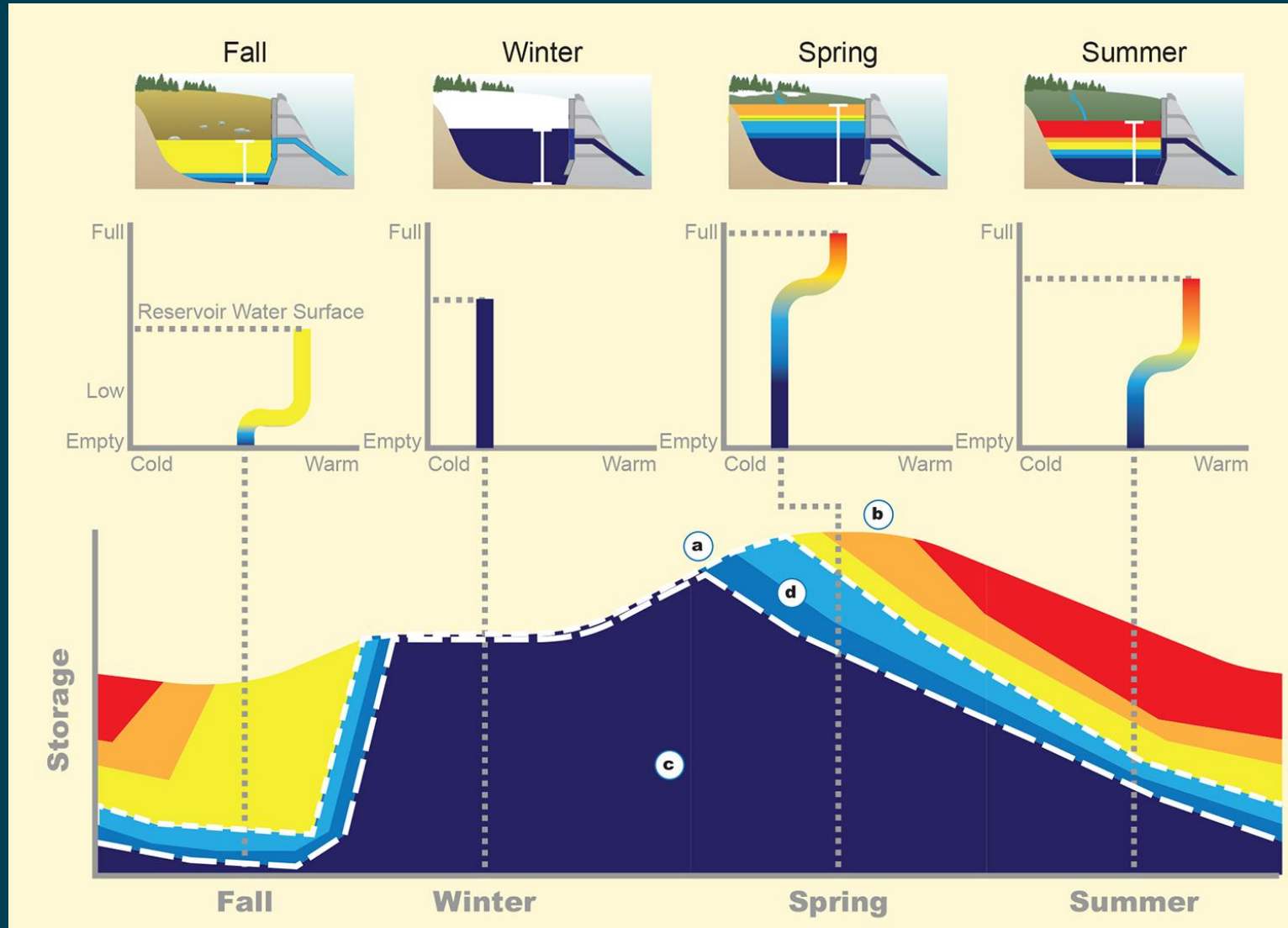


— BUREAU OF —
RECLAMATION

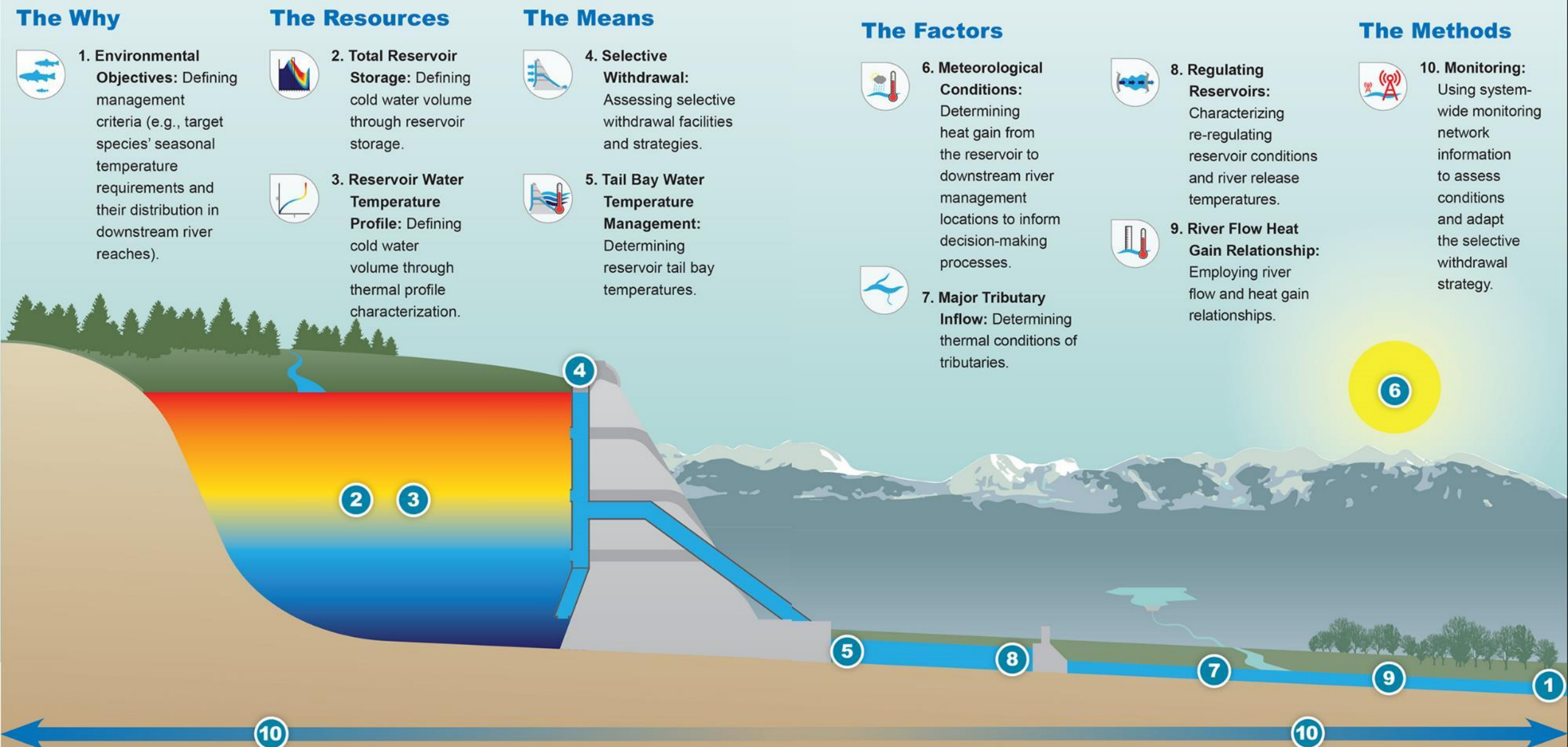
Water Temperature Modeling Platform Planning Model Development

Ryan Lucas, Randi Field, Drew Loney, Mussie
Beyene, Mike Deas, John DeGeorge, Yung-Hsin
Sun

Water Temperature Management

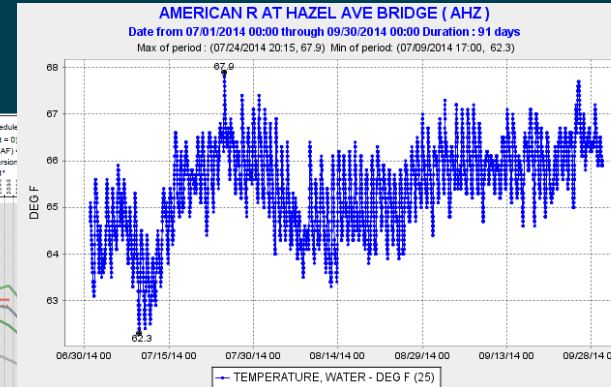
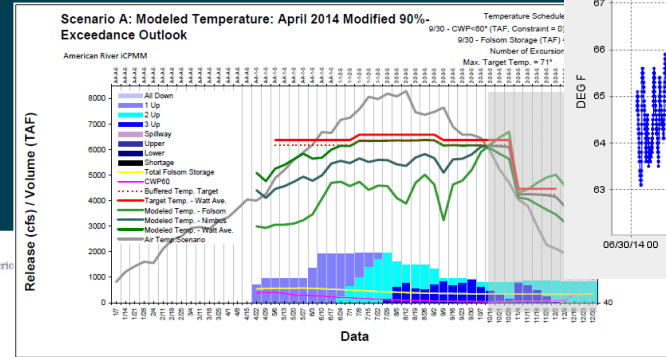
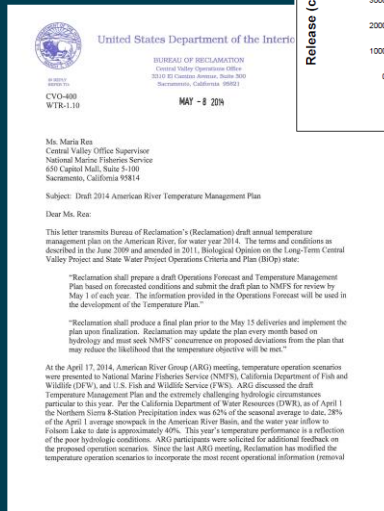


Elements of Temperature Management



Reference: Reclamation, 2017. Water Temperature Management in Reservoir-River Systems through Selective Withdrawal, Reference Technical Memorandum for Central Valley Project Operation, California. September.

Temperature Management Process



1. May:
Temperature
Management
Plan

2. Update
Plan
Monthly

3. November:
Complete
Season



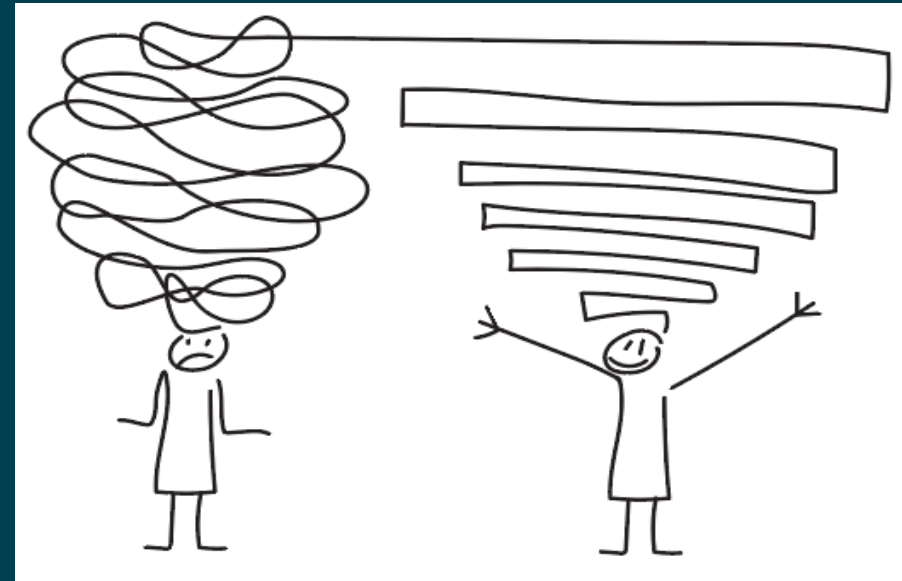
Why WTMP

Goal: Deliver quality products to support Reclamation's mission – predict water temperature to support CVP operations

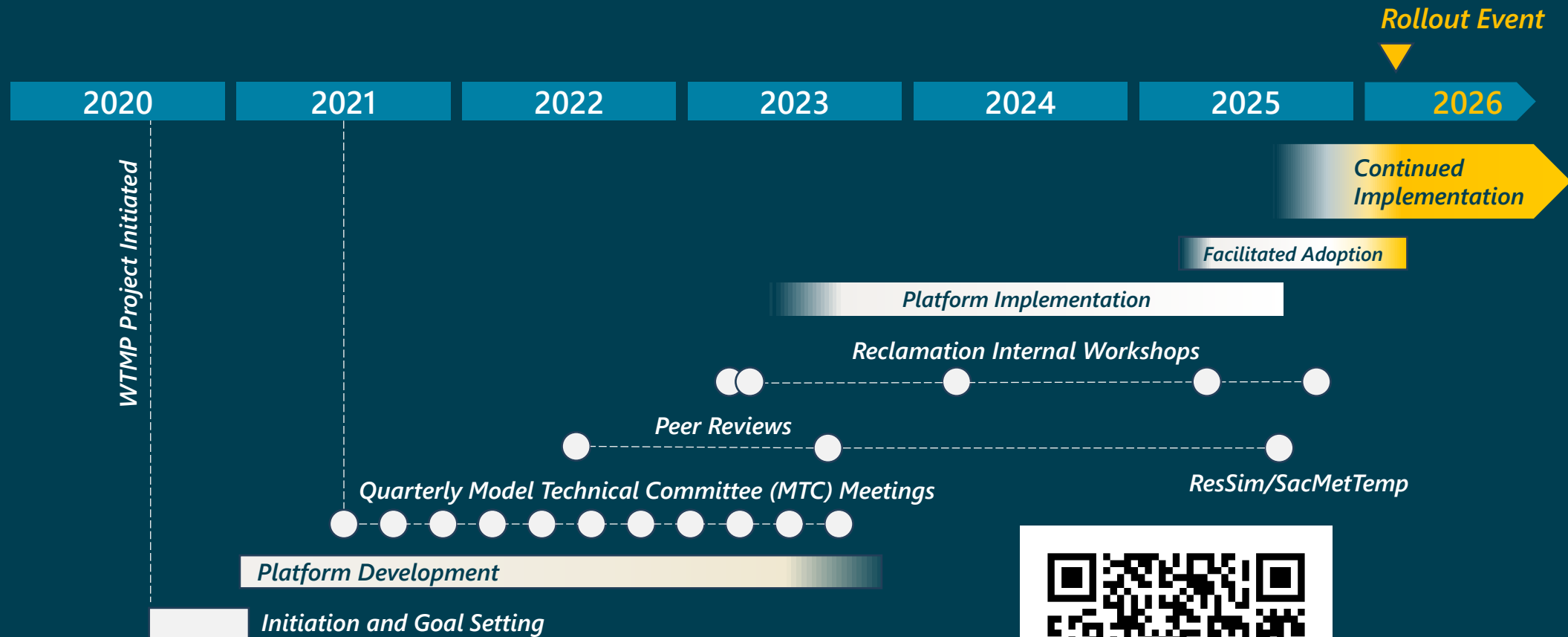
- Modernize CVP systemwide water temperature modeling and analytics
- Develop to current professional standards
- Consistency: Real-time, seasonal, and long-term planning
- Design for flexibility
- Address uncertainty
- Leverage technological advancements
- Build expertise

Typical Simulation Modeling Challenges

- Disparate data sources
 - Data acquisition
 - Data QA and metadata
 - Data storage and access
- Model input development
 - File construction
 - File/study management
 - Consistent boundary conditions
- Model and Model Simulation
 - Model management
 - Multiple model handshake
 - Unique features
 - Calibration/Recalibration
 - Simulation types (e.g., forecast, resimulation)
- Post processing
 - Consistent tools
 - Adaptable repeatable reporting
- Model documentation
- **Transparency**



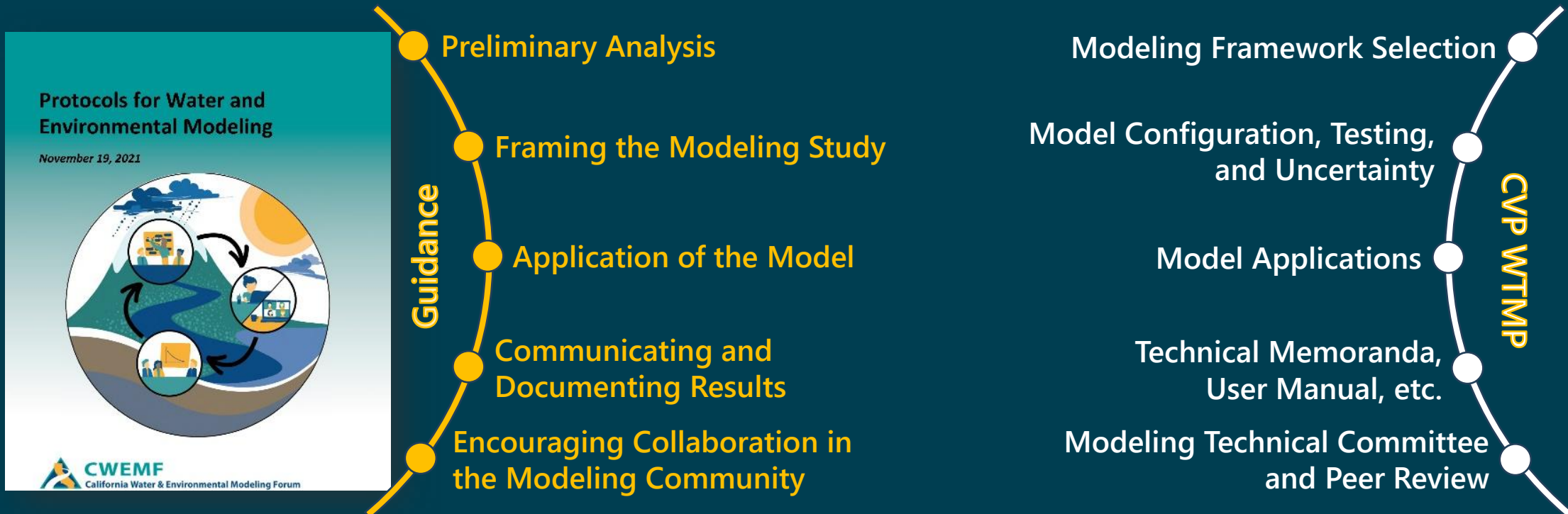
Reflection on WTMP Journey



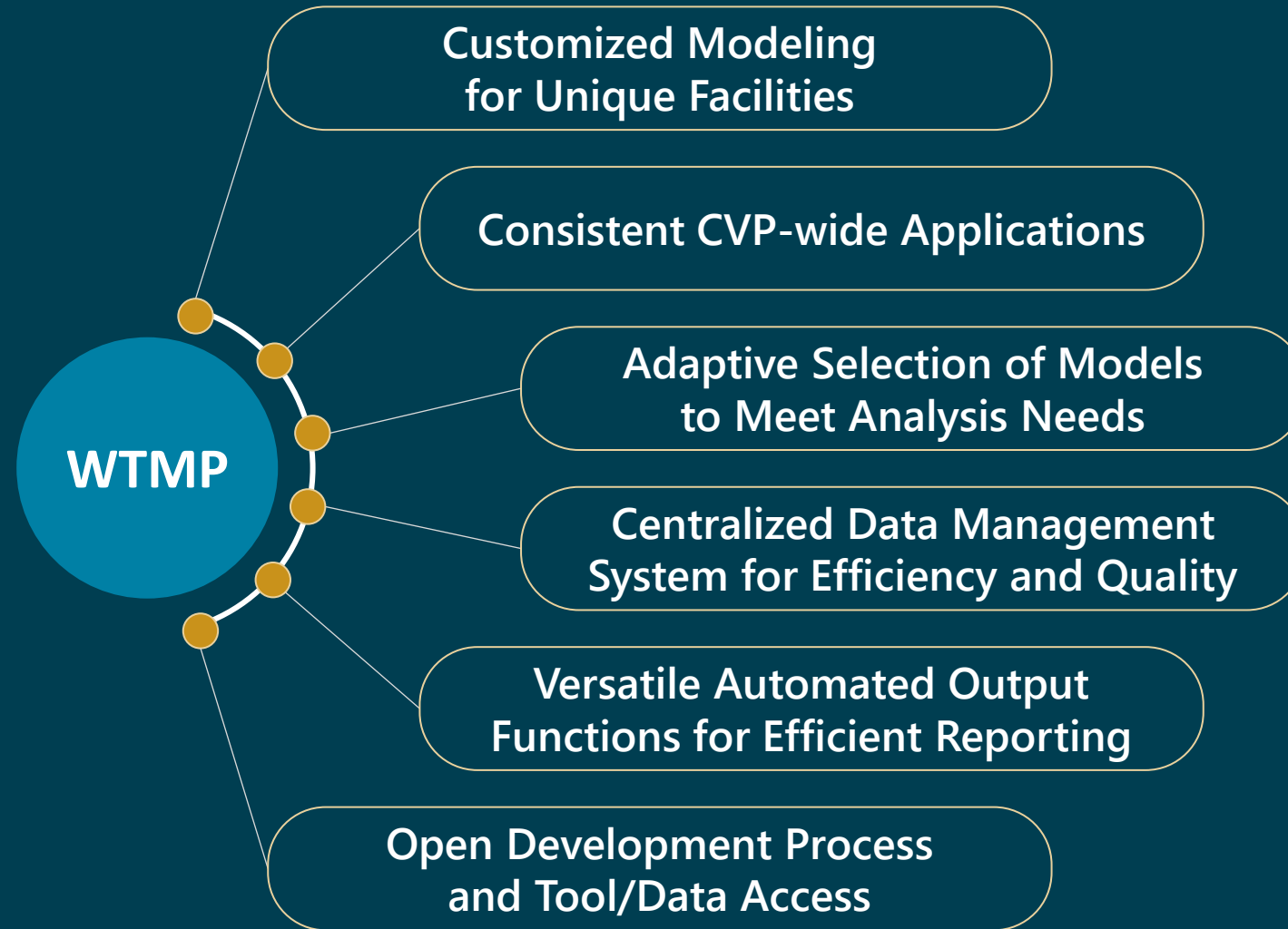
[Project Website with detailed information](https://www.usbr.gov/mp/bdo/cvp-wtmp.html)
<https://www.usbr.gov/mp/bdo/cvp-wtmp.html>



Adoption of Modeling Framework and Guidance from CWEMF



WTMP Unique Features



WTMP Peer Review Resources



DSC WTMP Peer Review



DSC HEC-ResSim Peer Review



Reclamation Peer Review
Home



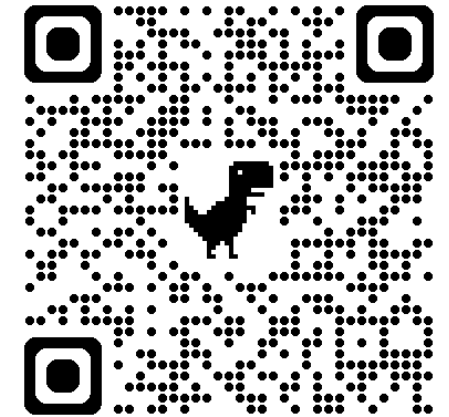
Publication



Article

Development of a Water Temperature Modeling Platform to Support Short- and Long-Term Water Temperature Management in Reservoir–River Systems

Michael Deas ^{1,*} , Yung-Hsin Sun ², John DeGeorge ³, Benjamin T. Saenz ³, Thomas A. Evans ³, Scott Burdick-Yahya ³, Stephen Andrews ³, Jeff Schuyler ⁴, William Candy ⁴, Lin Zheng ⁴, Edwin Hancock ⁴, Craig Addley ⁵, Vanessa Martinez ⁵, Scott Wells ⁶ , Peggy Basdekas ¹, Ibrahim Sogutlugil ¹, Yujia Cai ¹, Jennifer Vaughn ¹, Stacy Tanaka ¹, Drew Loney ⁷, Mechele Pacheco ⁷, Antonia Salas ⁷ , Donna Garcia ⁸, Ryan Lucas ⁹ and Randi Field ⁸

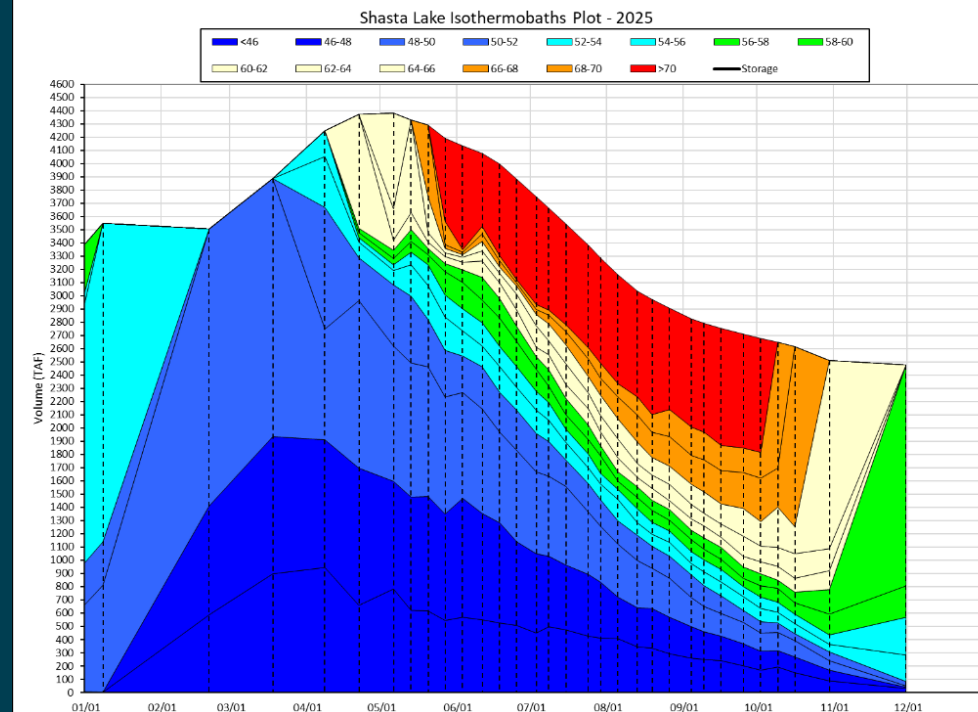
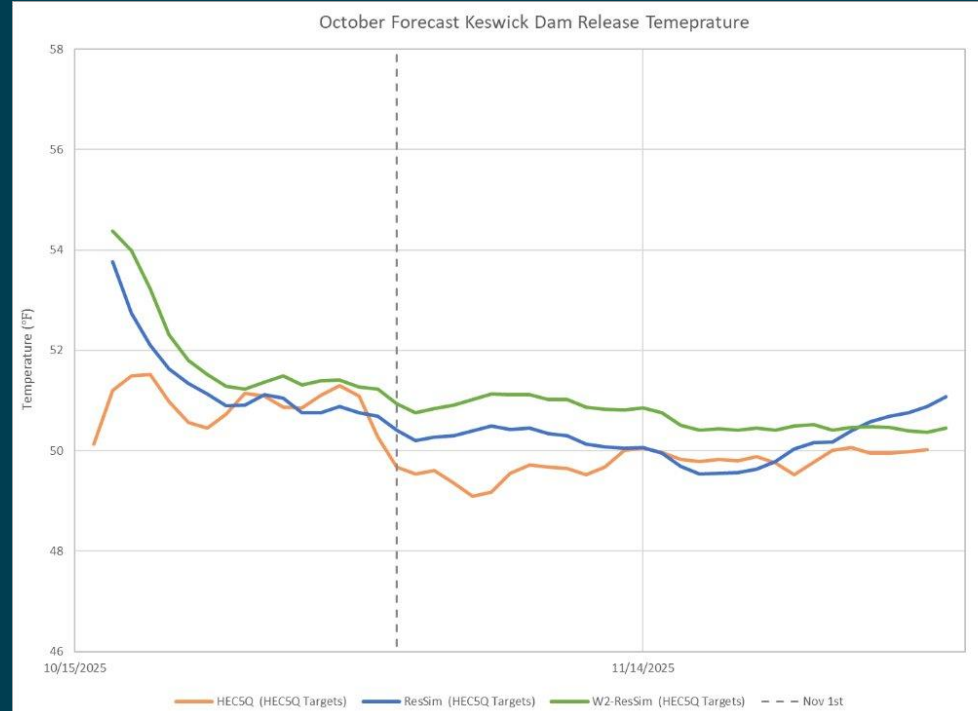


Facilitated Adoption as an Onboarding Process

- WTMP has 2.5 years of open, collaborative development process, and two rounds of peer review led by the Delta Stewardship Counsel.
- Reclamation confirms the value of WTMP and will deploy the platform to support CVP temperature management in the 2026 season.
- Facilitated adoption provides operation groups **an opportunity to concur** with the determination **and support** the anticipated model transition.
- WTMP implementation during the facilitated adoption process is not for Reclamation's water temperature management decision-making.

Facilitated Adoption

- Reclamation provided monthly comparative analysis to the Sacramento and American River Groups
- Present WTMP model results alongside the legacy model
- Highlight advantages of WTMP
 - Multiple models
 - Automated reporting
- Venue for water temperature modeling community to provide feedback

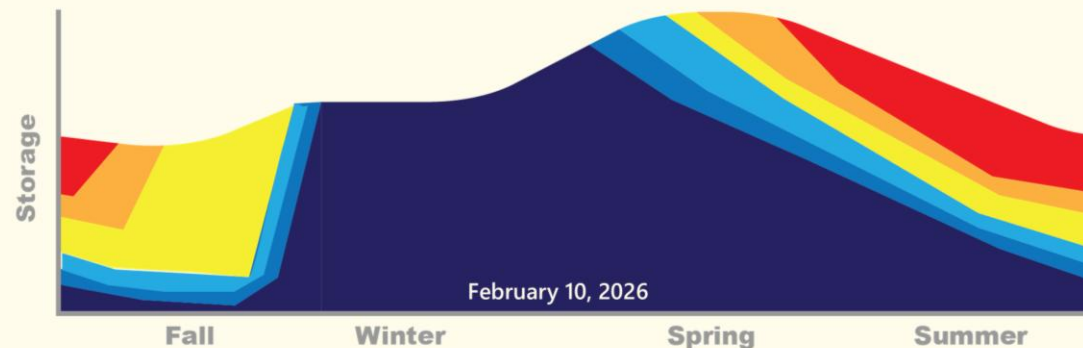


Rollout

- Reclamation rolled out the WTMP Forecast Mode in Feb. 2026
- Launch event with support from multiple agency leadership
- Rollout package now available to the public



Central Valley Project Water Temperature Modeling Platform **ROLLOUT EVENT**



Planning Model Development

CalSim



HEC5Q



Current Planning
Workflow Diagram

Tertiary Models
(e.g. Temperature
Dependent Mortality)



Planning Model Development

CalSim



WTMP



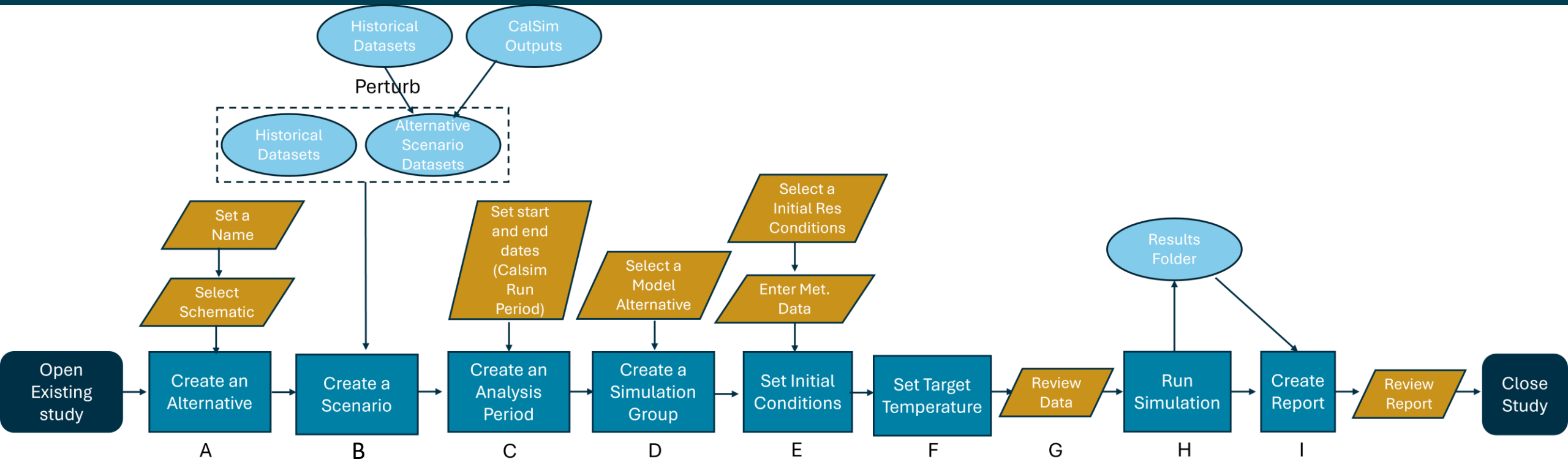
Replacing legacy tool with
WTMP should be
easy...Right?

Tertiary Models
(e.g. Temperature
Dependent Mortality)



Planning Model Development

Implementing modern tool adds some complexity to the workflow



Planning Model Development

- Challenges for Planning Model Development
- Methods for dailifying CalSim 3 output
- Consistent model decision making on gate decisions
- Consistent use of temperature targets
- When to utilize HEC-ResSim vs W2
- What is the best way to report model output
 - Automated reports
 - DSS or other data framework
- QA/QC Best Practices





— BUREAU OF —
RECLAMATION