Model Selection

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Model Selection Documentation

- Document Link:
  - Model Selection

- Technical Memorandum Status:
  - Final Draft
  - Enhancements since Mid-Term Peer Review:
    - Minor modifications based on MTC feedback
    - Minor modifications based on Panel Comments

Model Selection Philosophy

- Methodically identify and document:
    1. Model requirements
    2. Selection criteria
    3. Candidate models
    4. Model evaluation and comparison

- Solicit feedback from the MTC

Role of Models in WTMP

- Models represent reservoir and rivers
  - <u>System models</u>
    - Represent networks of reservoir and river reaches
    - Can be used alone or in concert with discrete component models

  - <u>Element models</u>
    - Represent discrete reservoir or river reaches (more or less complex)
    - Can be used alone or in concert with a system model

- These models reside in a modeling framework

Model Selection Criteria

Support

I/O

Numerical Model

Qualitative

CVP Features

Linkage

System and Reservoir Models Reviewed

- Technical Memorandum documenting process

Criteria	Comments	Need	CE-QUAL-W2	DYRESM	HEC-5Q	HEC-ResSim	Riverware
Model type (Discrete/ System)	Is the model a discrete model or a system model?	NA	Discrete	Discrete	System	System	System
Model type (River/ Reservoir)	Is the model designed for predicting vertical distributions and release-water temperatures in a reservoir reach?	Require	Yes	Yes	Yes	Yes	Yes
Short-term forecasting	Within season (days, weeks, months)	Require	Yes	Yes	Yes	Yes	Yes
Long-term planning	Extended simulations (years, decades)	Require	Yes	Yes	Yes	Yes	Yes
Number of dimensions (1, 2)		NA	2	1	1	1	1
System geometric representation	Principal dimension(s): longitudinal/ vertical	NA	Longitudinal/ vertical	Vertical	Longitudinal	Longitudinal	Vertical
System geometric representation	Detailed vertical resolution? (Yes/ No)	Require	Yes	Yes	Yes	Yes	No
Dynamic flow model	Yes/ No	Prefer	Yes	No	Yes	Yes	No
Water temperature representation	Full heat budget: Yes/ No	Require	Yes	Yes	No	Yes	Yes
Time step (capable of sub-daily)	Yes/ No	Require	Yes	Yes	Yes	Yes	Yes
Computational performance consideration	Faster/ Slower	NA	Slower	Faster	Faster	Faster	Unknown

Model Recommendation and Decision

- System model
  - HEC-ResSim
- Component models
  - Reservoir Model
    - HEC-ResSim
    - CE-QUAL-W2
  - River Model
    - HEC-ResSim
- Federal water management community
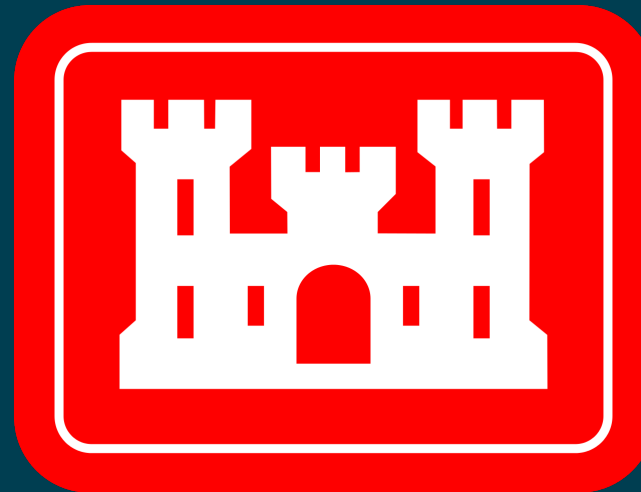
Framework and Model Selection Summary

- Accomplishment:
  - Selection approach resulted in a robust and flexible model and modeling platform to meet the range of Reclamation's production modeling needs.

- Assessment:
  - Comprehensive modeling products are externally maintained by USACE HEC, they offer stability, and can be improved and extended over time.