

NID-PFW ResSim Model

February 21, 2023

Reservoir Operations Model



Agenda

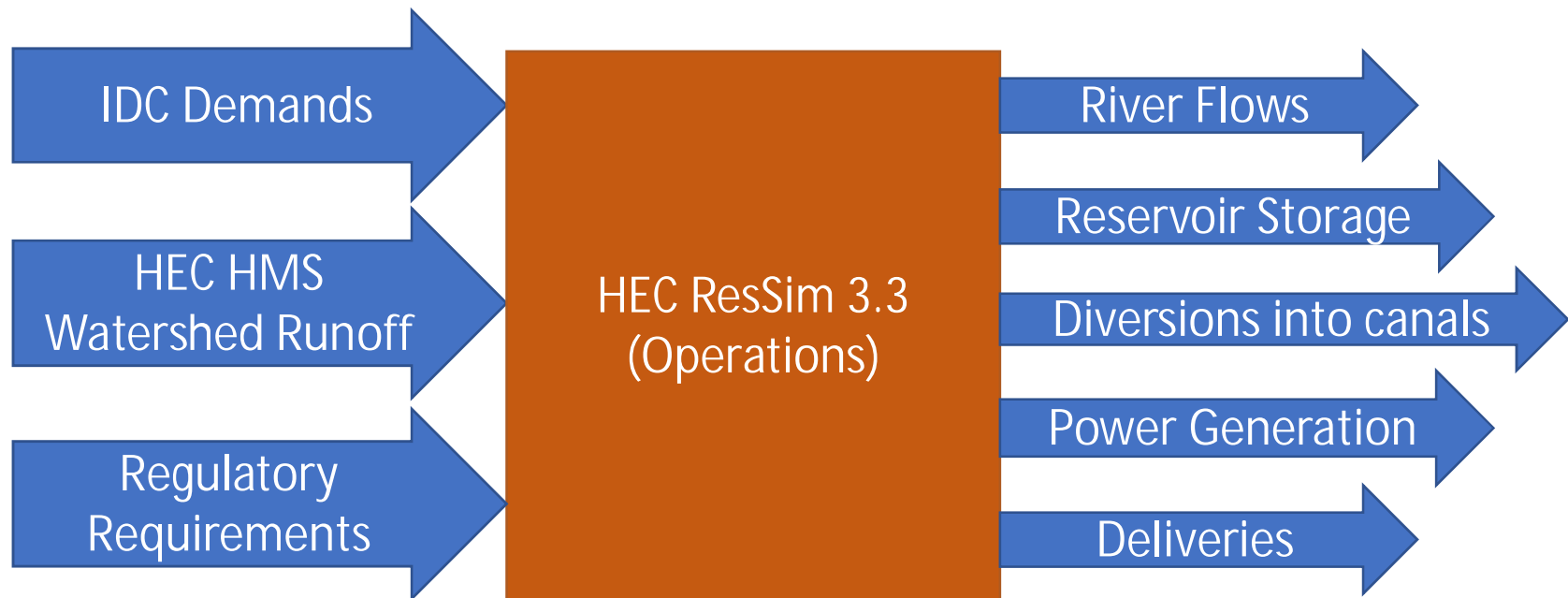
- Model Overview
- Work Performed
- Next Steps
- Discussion and Questions

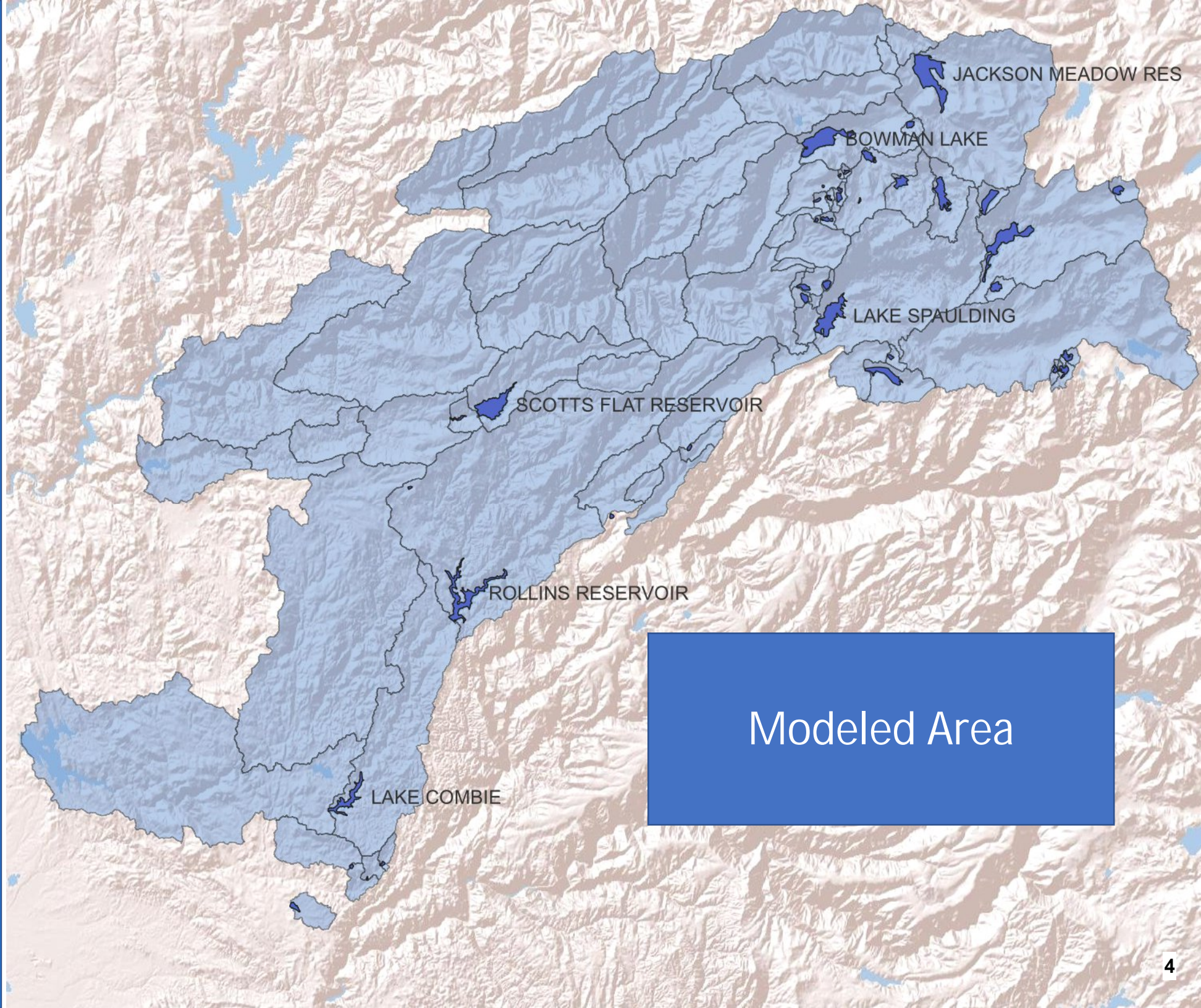
Reservoir Operations Model



US Army Corps
of Engineers
Hydrologic Engineering Center

HEC-ResSim *Reservoir System Simulation*





JACKSON MEADOW RES

BOWMAN LAKE

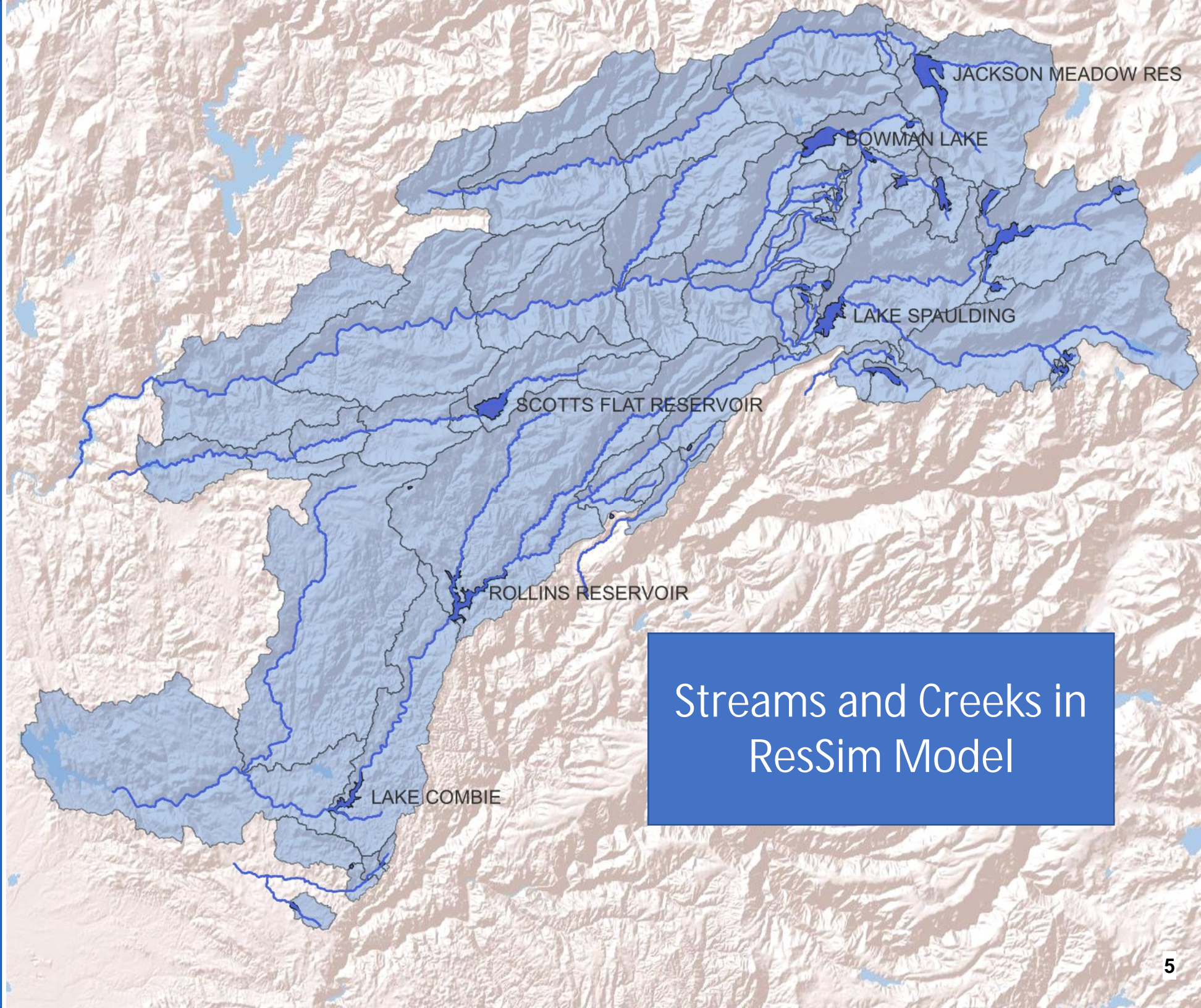
LAKE SPAULDING

SCOTTS FLAT RESERVOIR

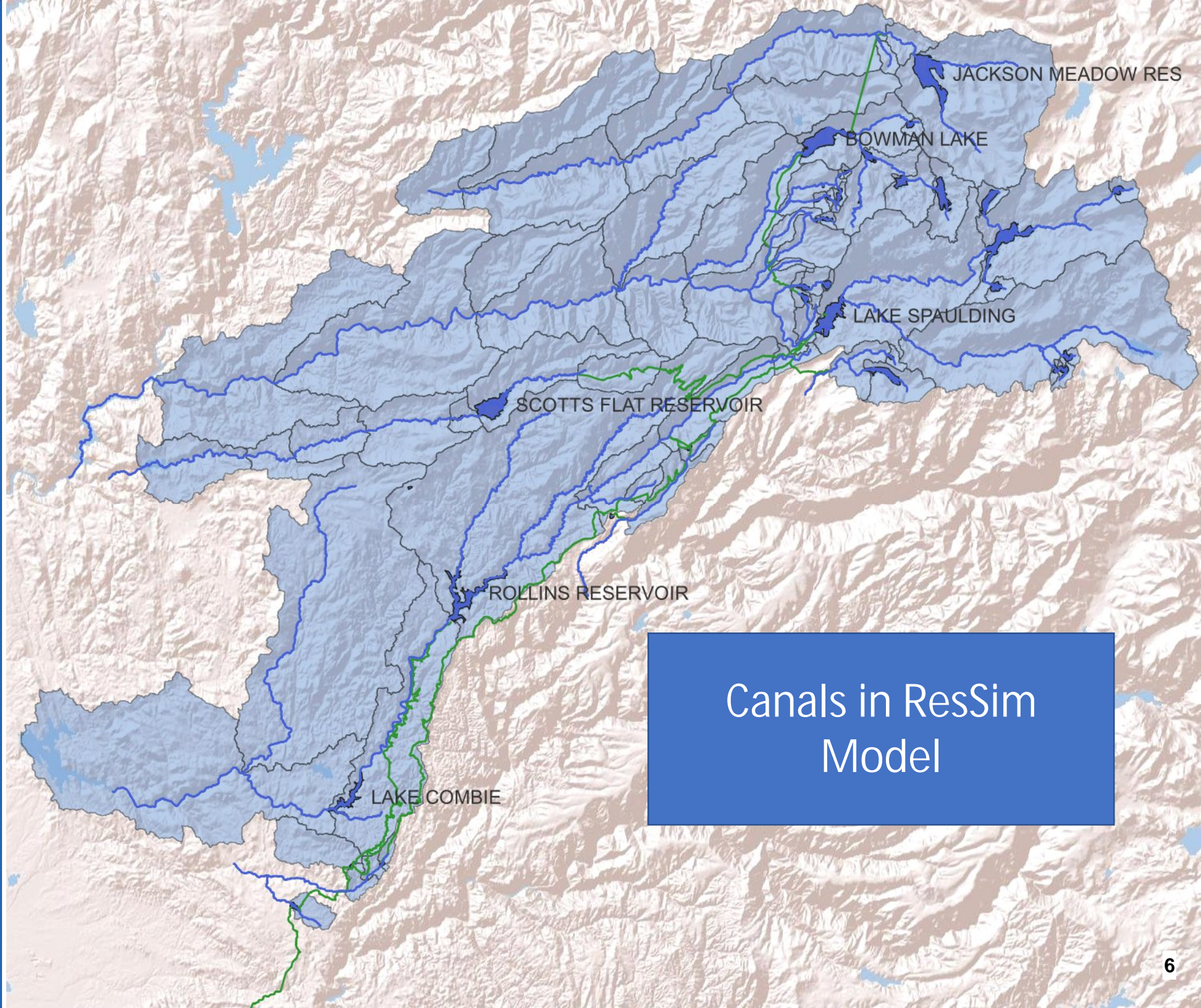
ROLLINS RESERVOIR

LAKE COMBIE

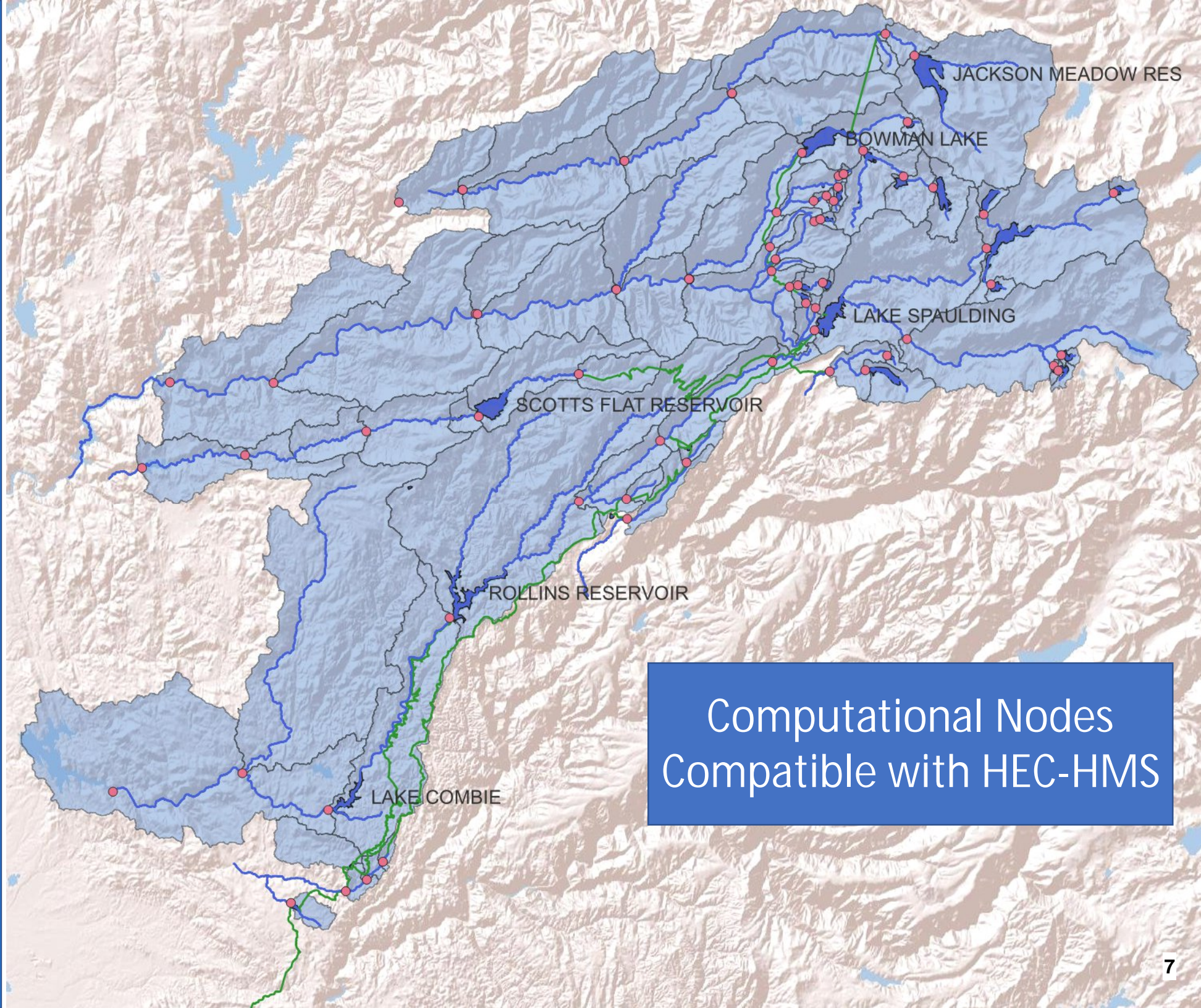
Modeled Area



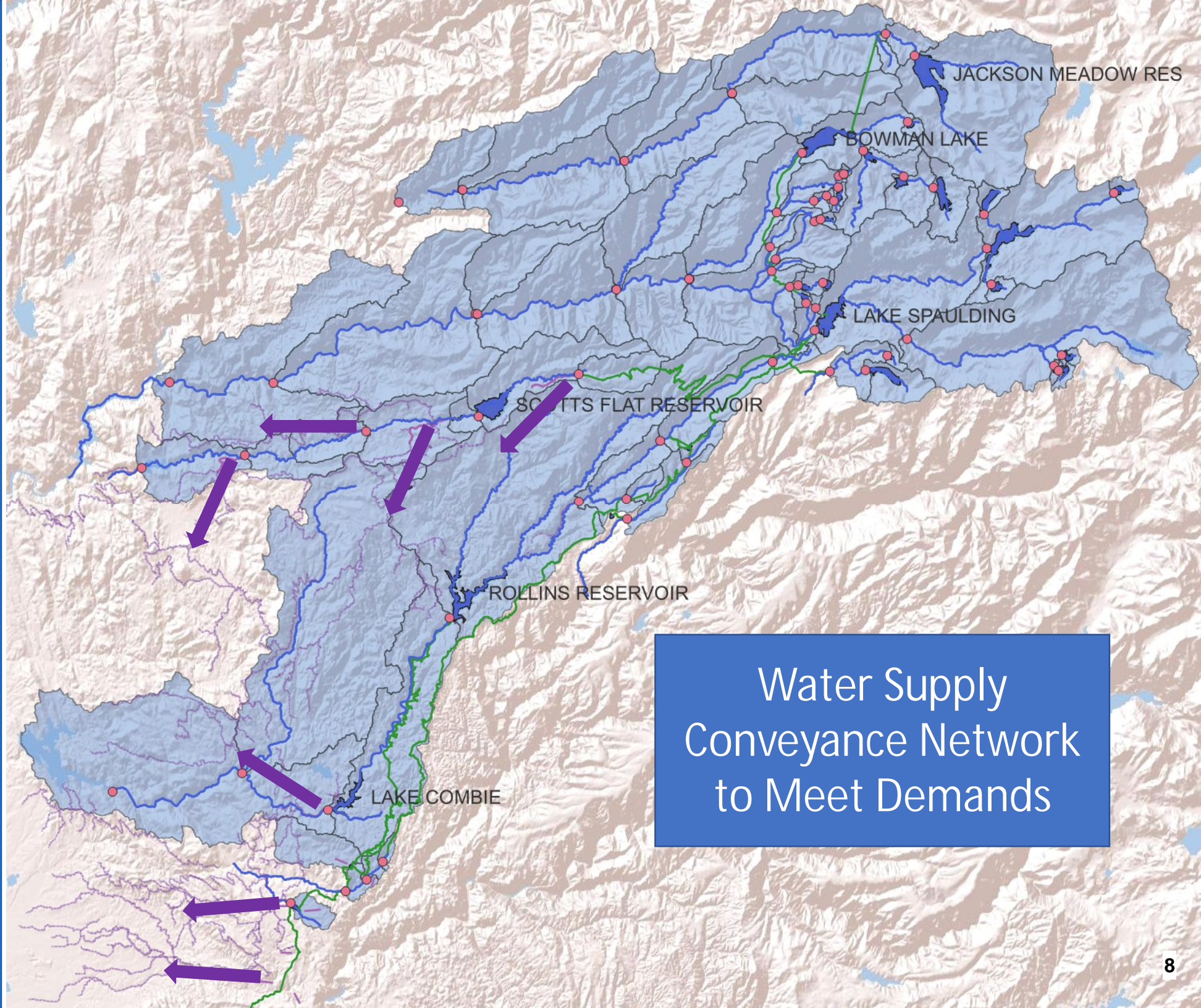
Streams and Creeks in
ResSim Model



Canals in ResSim
Model



Computational Nodes
Compatible with HEC-HMS



Water Supply
Conveyance Network
to Meet Demands

HEC-ResSim Model Build

- HEC-ResSim v3.0a (April 2007)
 - Previous NID Operations Model
- HEC-ResSim v3.3 (February 2021)
 - Updated NID Operations Model

30 Reservoirs Modeled

NID Reservoirs

Jackson Meadows Reservoir

Bowman Lake

French Lake

Faucherie Lake

Sawmill Lake

Jackson Lake

Scotts Flat Reservoir

Rollins Lake

Lake Combie

PG&E Reservoirs

Lake Spaulding

Fordyce Lake

Lake Sterling

White Rock Lake

Meadow Lake

Kidd Lake

Upper Peak Lake

Lower Peak Lake

Lake Valley Reservoir

Kelly Lake

Upper Rock Lake

Lower Rock Lake

Lindsey Lakes

Feely Lake

Carr Lake

Culbertson Lake

Rucker Lake

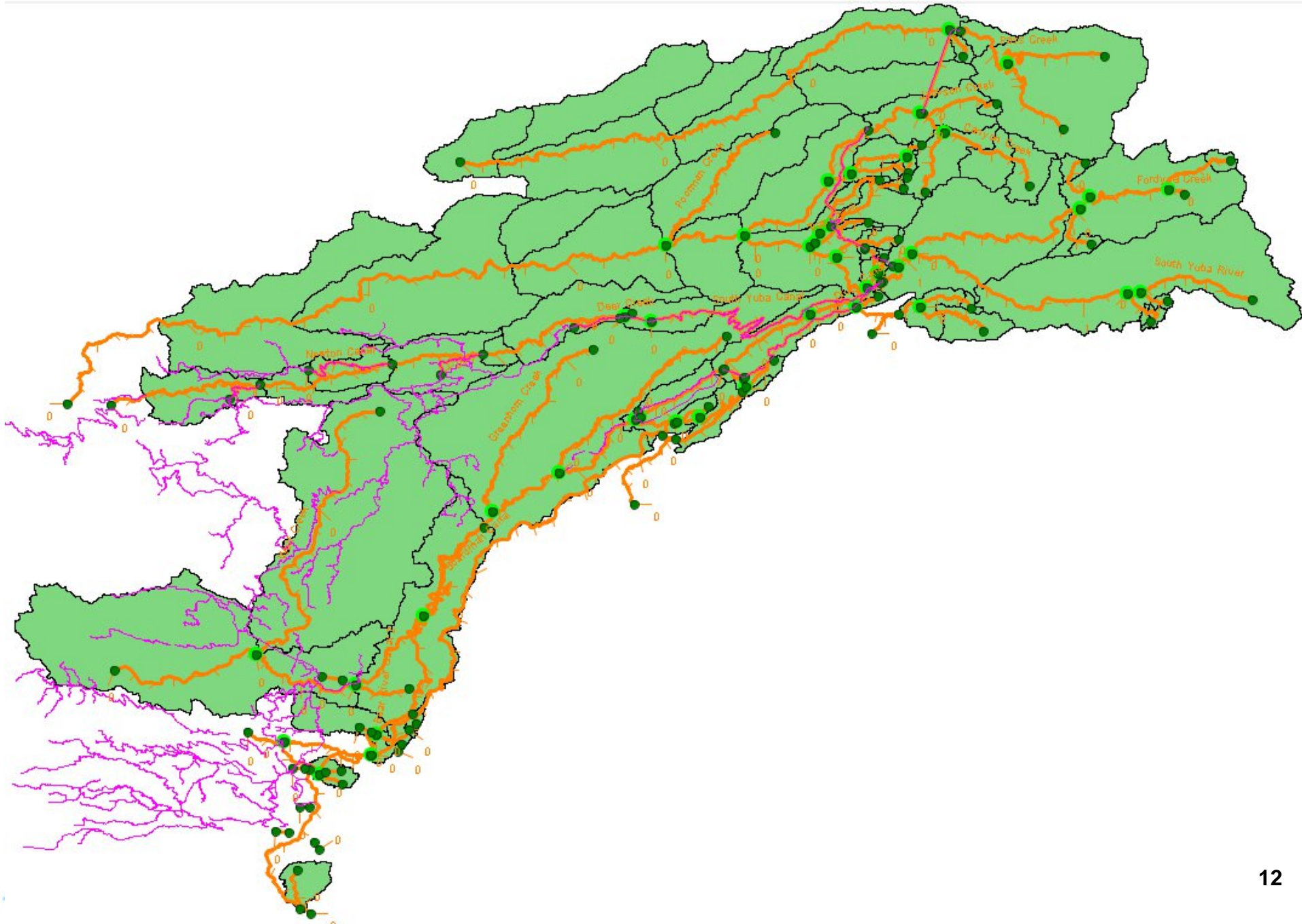
Fuller Lake

Blue Lake

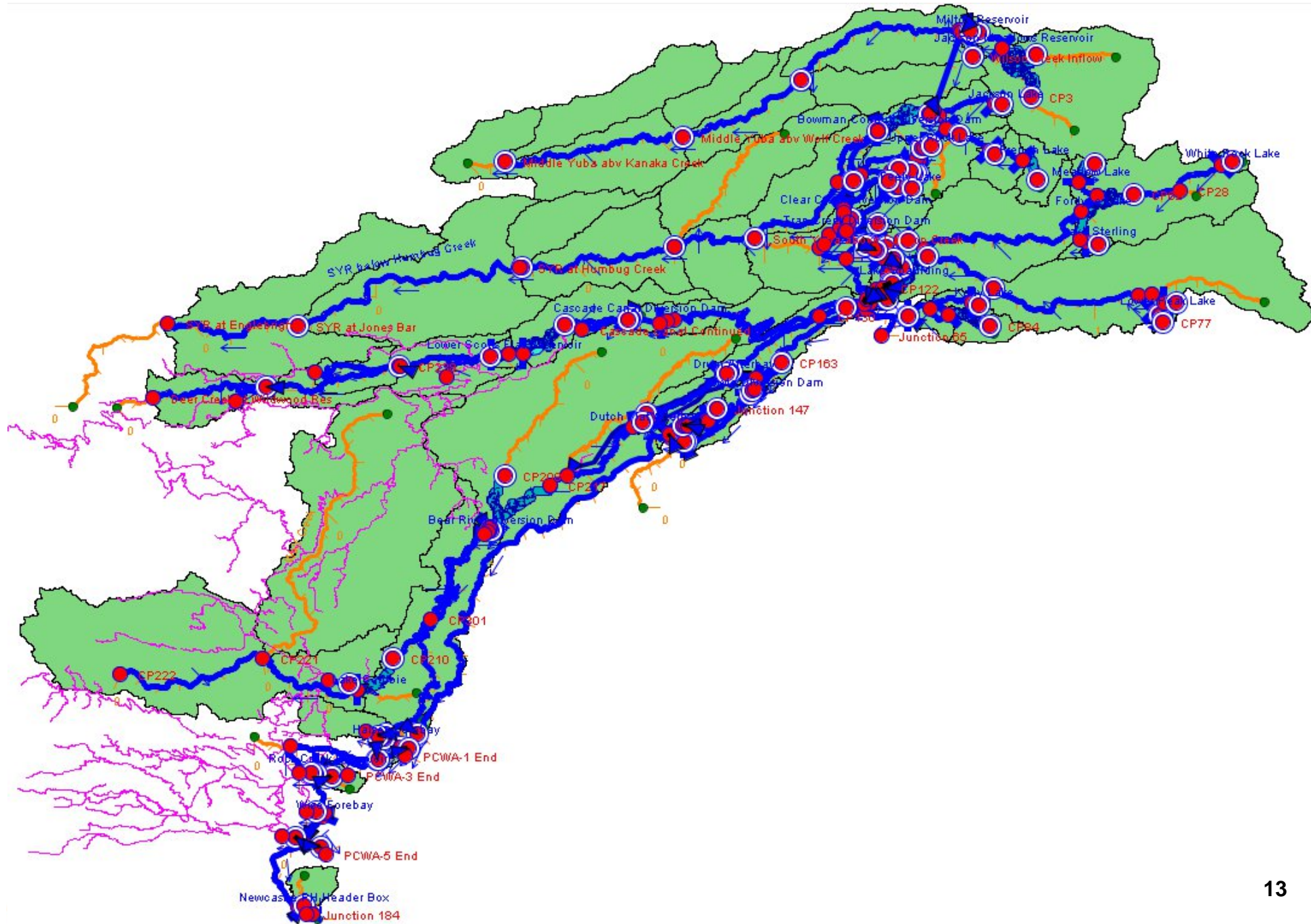
Canals modeled explicitly

- Milton Bowman Conduit
- Bowman Spaulding Conduit
- South Yuba Canal
- Chalk Bluff Canal
- Drum Canal
- Bear River Canal
- Wise Canal
- Boardman Canal

Model Schematic and Framework



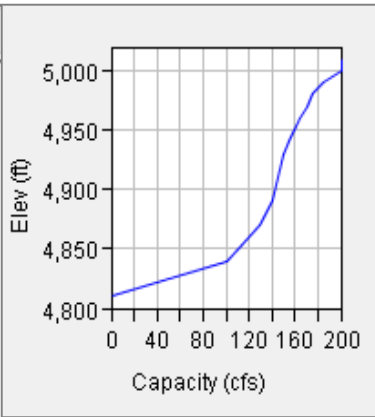
Facilities and Conveyance Structures



Added reservoir and canal capacities, ratings, etc.

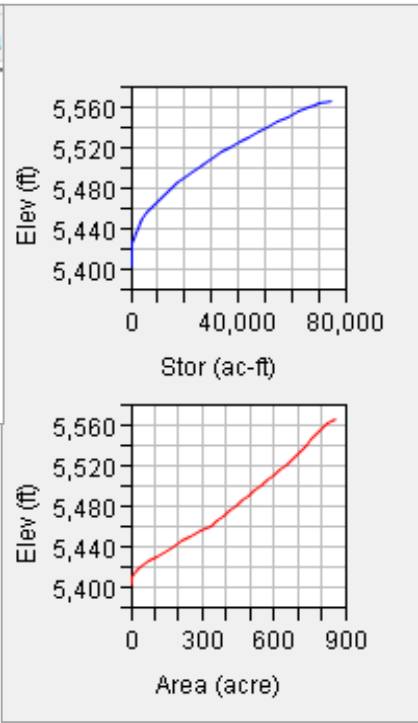
Physical Operations Observed Data

- ▲ Lake Spaulding
 - Pool
 - Evaporation
 - Dam at South Yuba River
 - Low Level Outlet
 - Combined Spillways
 - Spaulding No 1 Powerhouse
 - Spaulding PH No 1
 - Tailwater
 - PH No 1 Bypass
 - Routing
 - Spaulding No 2 Powerhouse
 - Spaulding PH No 2
 - Tailwater
 - Routing



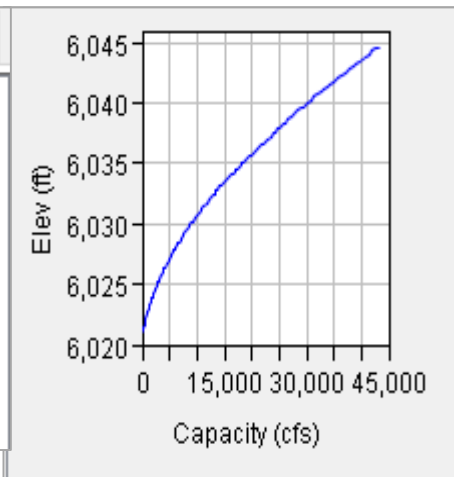
Physical Operations Observed Data

- ▲ Bowman Lake
 - Pool
 - Evaporation
 - Dam at Canyon Creek
 - North Dam Low Level Outlet
 - Power Plant
 - Tailwater
 - Ungated Spillway
 - Gated Spillway

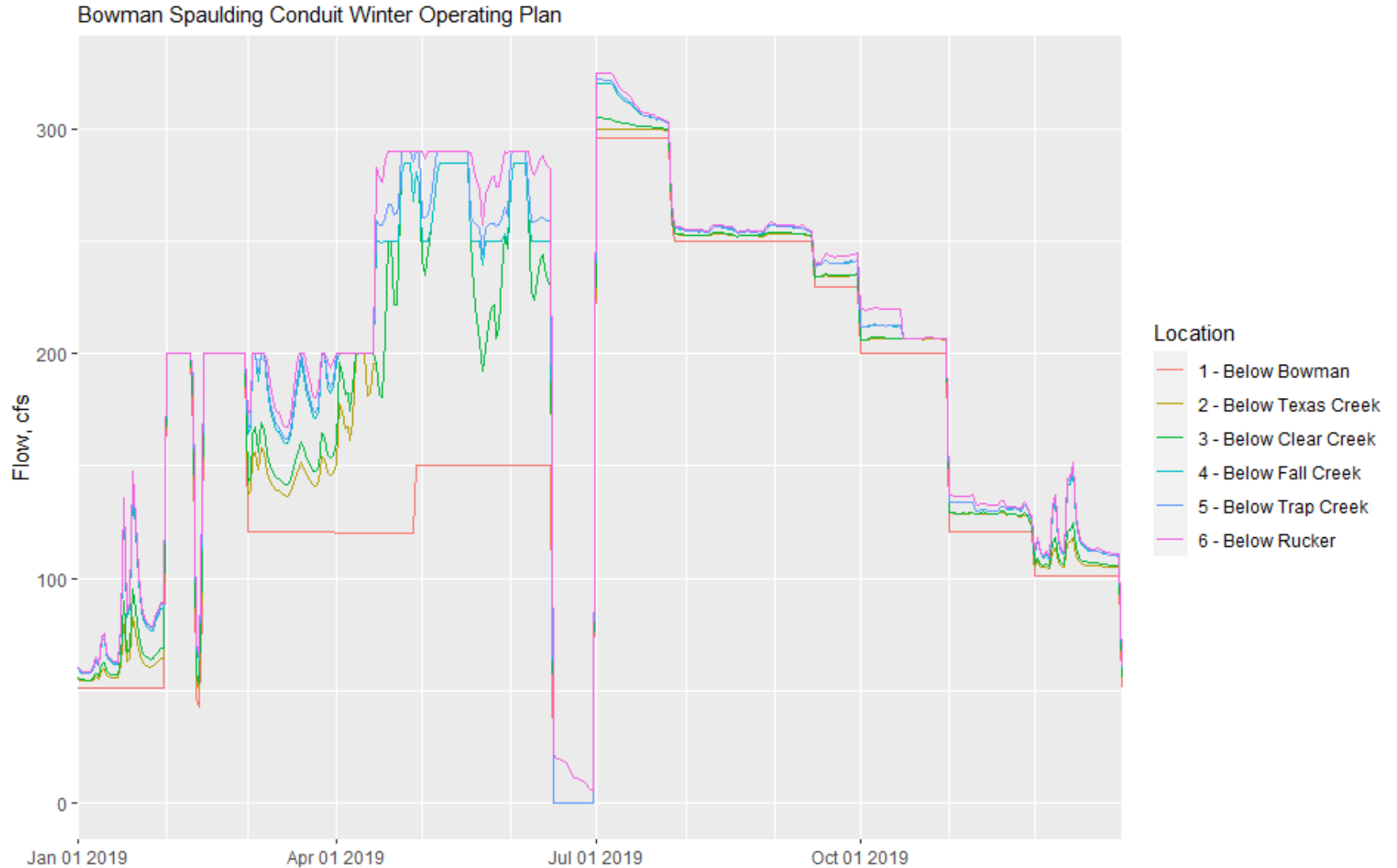


Physical Operations Observed Data

- ▲ Jackson Meadows Reservoir
 - Pool
 - Evaporation
 - Dam at Middle Yuba River
 - Low Level Outlet
 - Gated Spillway



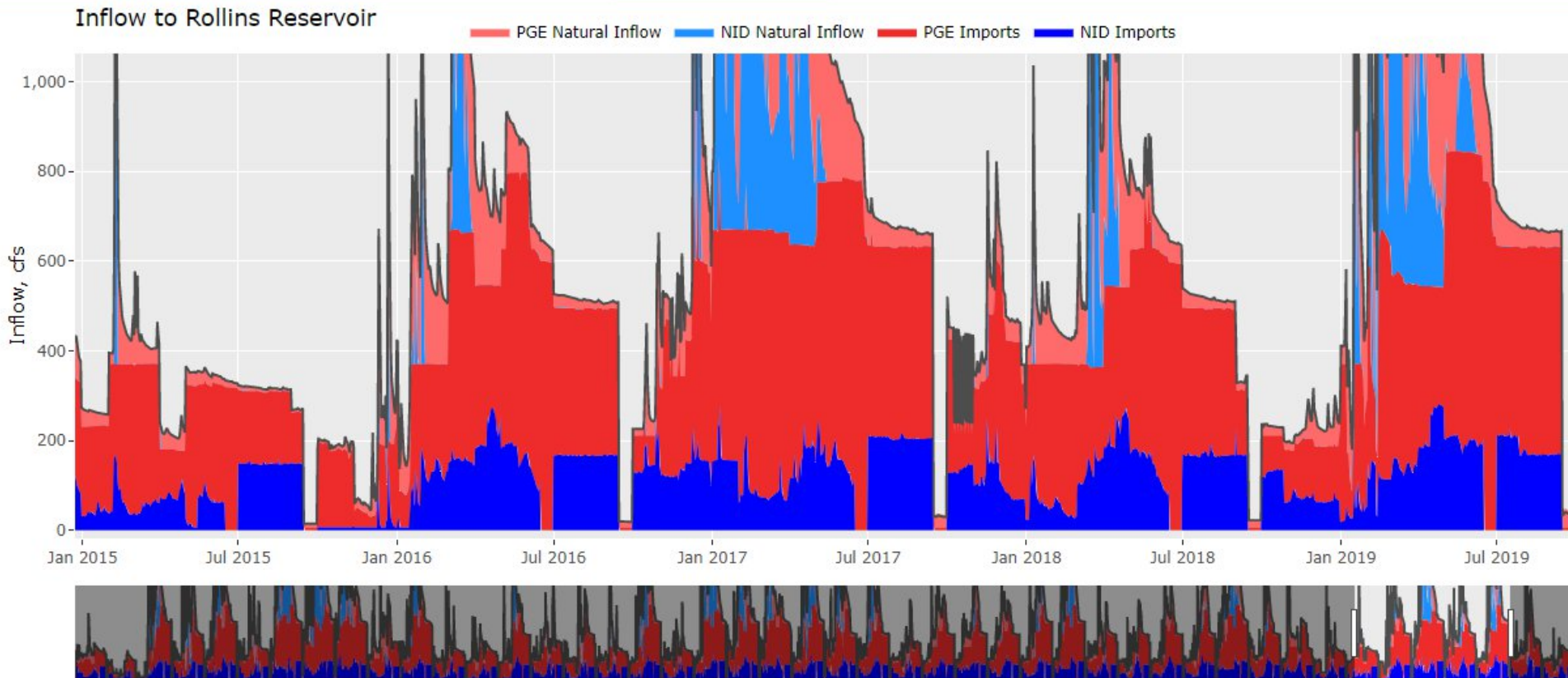
Updated Operations Rules



Track NID & PG&E Supplies

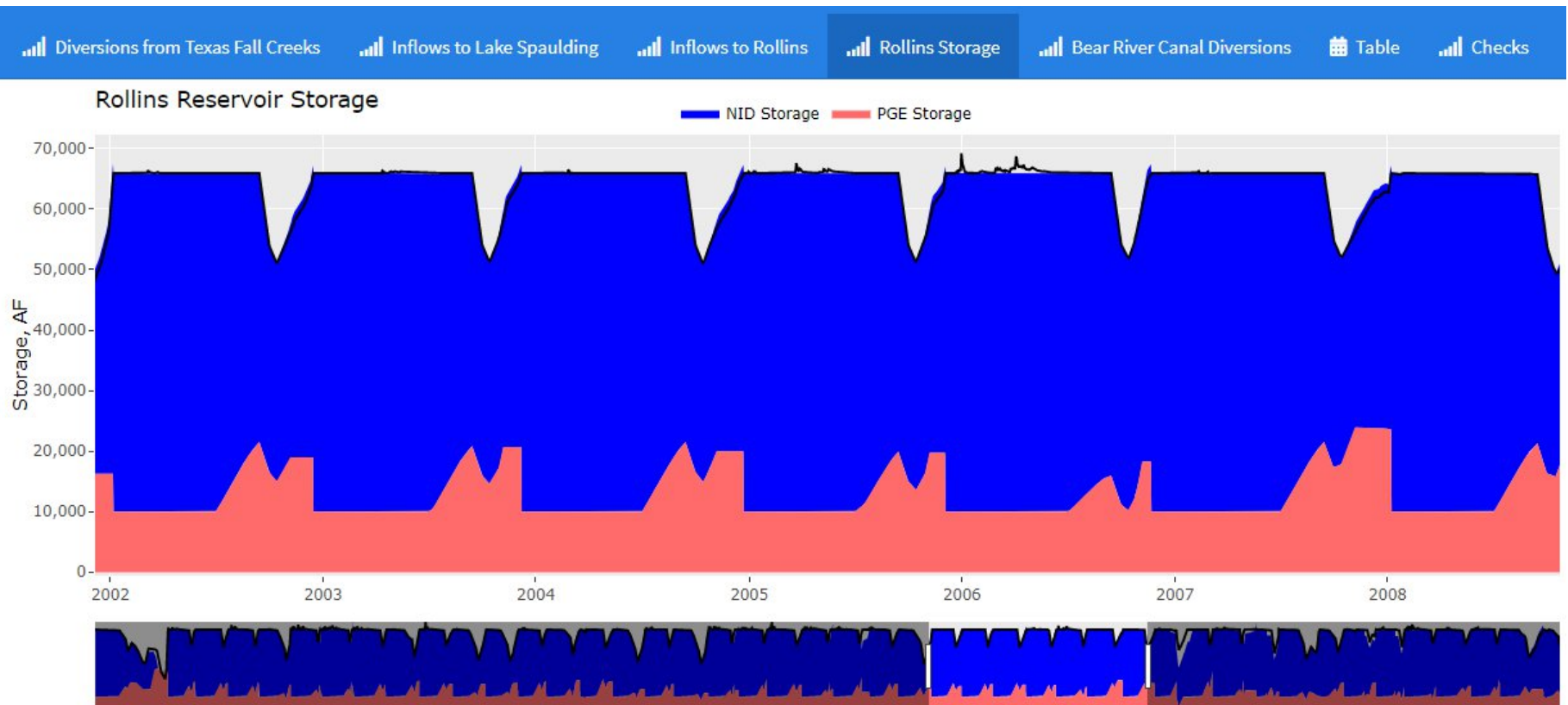
- Inflow to Rollins Reservoir

||| Diversions from Texas Fall Creeks ||| Inflows to Lake Spaulding ||| Inflows to Rollins ||| Rollins Storage ||| Bear River Canal Diversions Table ||| Checks



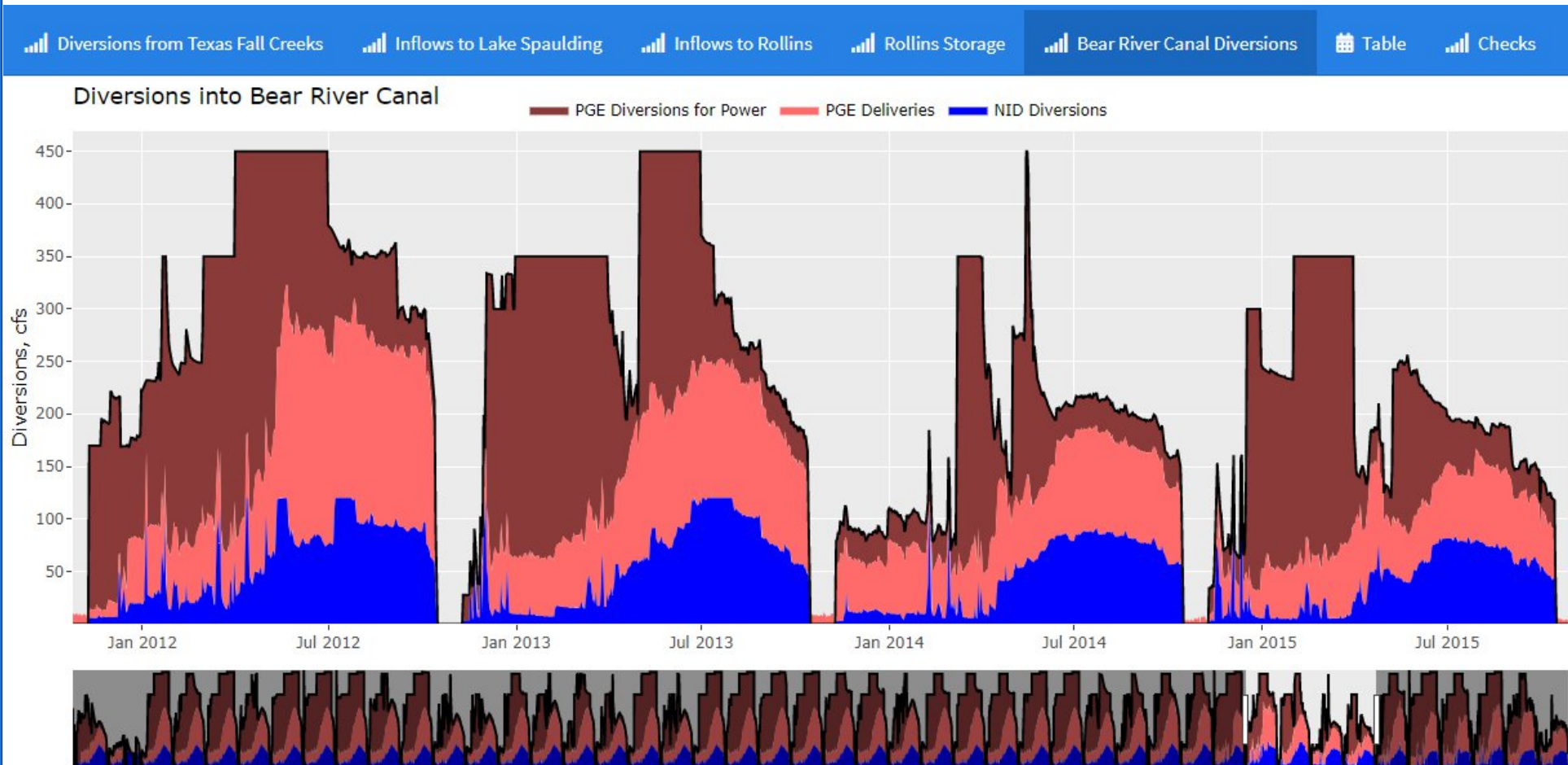
Track NID & PG&E Supplies

- Rollins Reservoir Storage



Track NID & PG&E Supplies

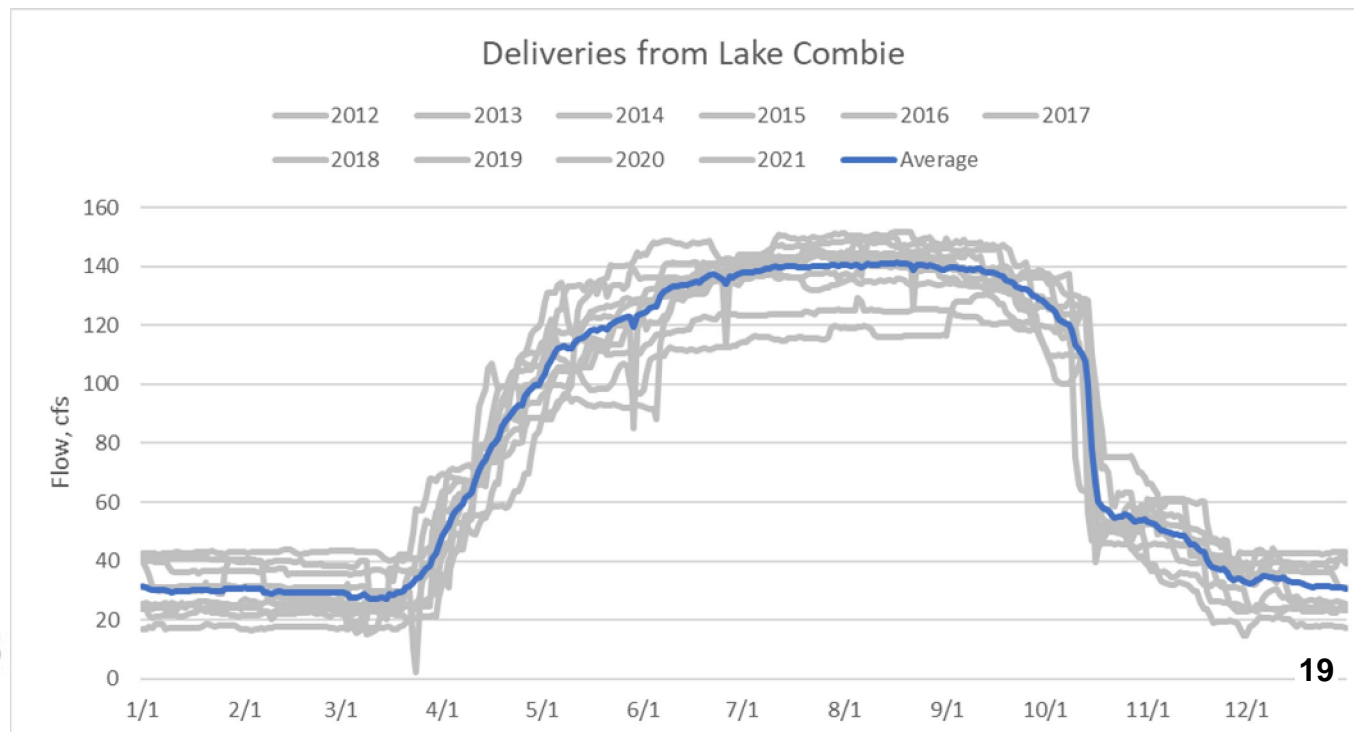
- Diversions into Bear River Canal



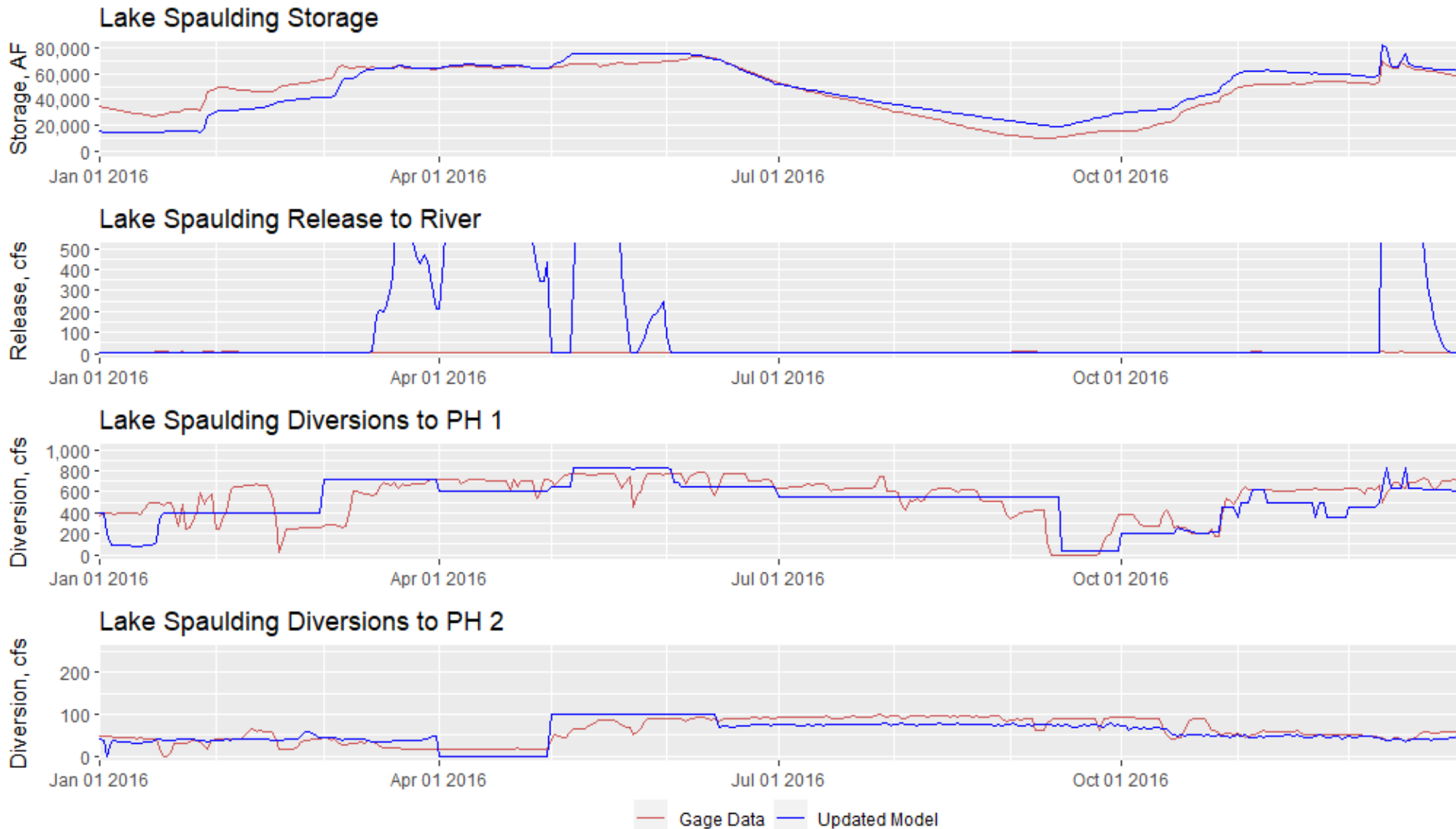
Calibration

- Performing calibration studies

Calibration Study Inputs		
Watershed Runoff	Consumptive Demands	
1976-2021	1976-2011	2012-2021
Historic, extended from previous hydrology work	Daily Average of 2012-2021 Gage Data	Gaged Delivery Data

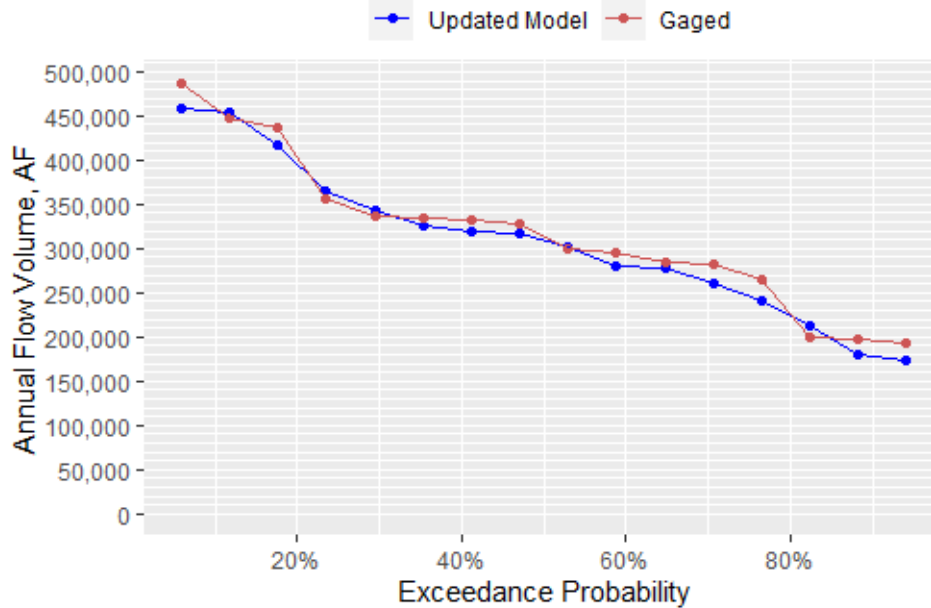


Calibration notebooks



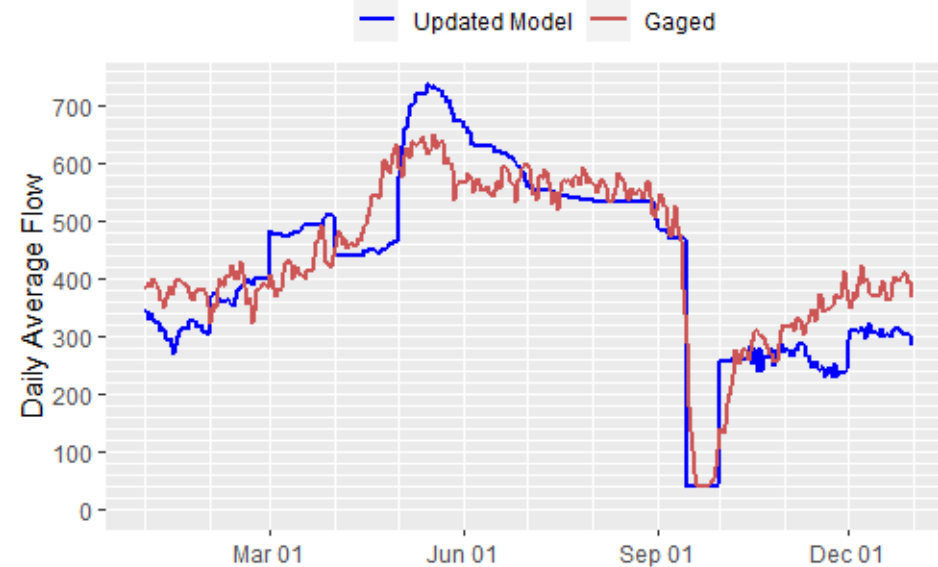
Calibration notebooks

Drum Canal at Spaulding PH No 1

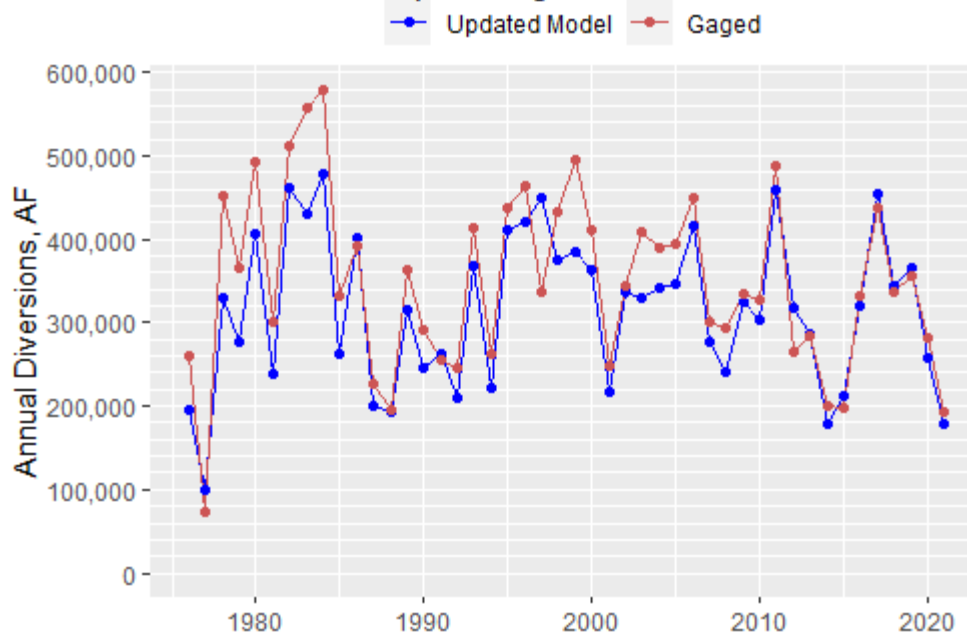


Drum Canal at Spaulding PH No 1

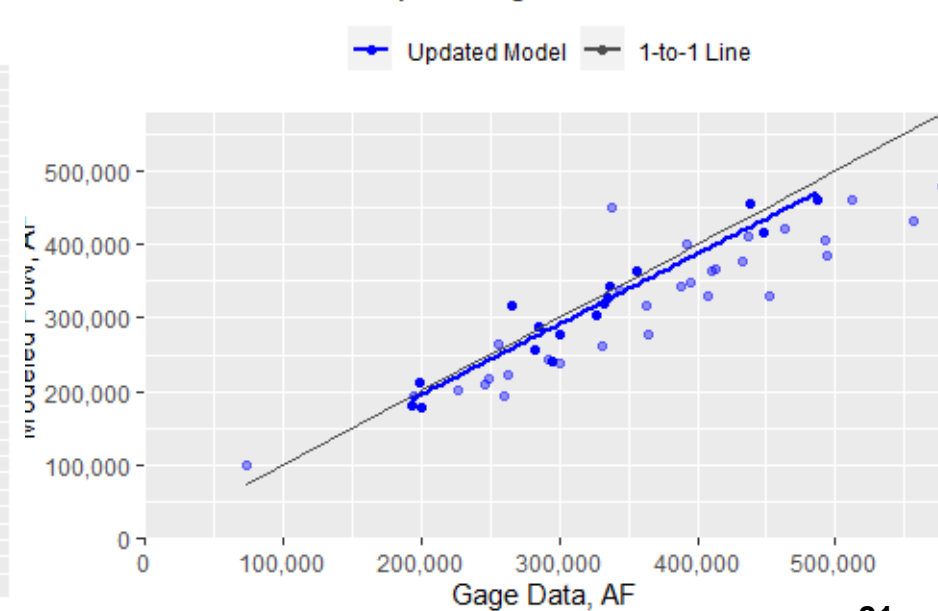
Average Daily Flow, 2006-2021



Drum Canal at Spaulding PH No 1



Drum Canal at Spaulding PH No 1



Next Steps

- Add Drought Contingency Plans
- Continue calibration
- Develop post-processing tools and metrics

- Determine scenarios
 - Vary demand assumptions
 - Vary climate change assumptions
- Perform studies with new input datasets

Questions & Comments