BUREAU OF RECLAMATION

Reclamation LTO Climate Change Modeling

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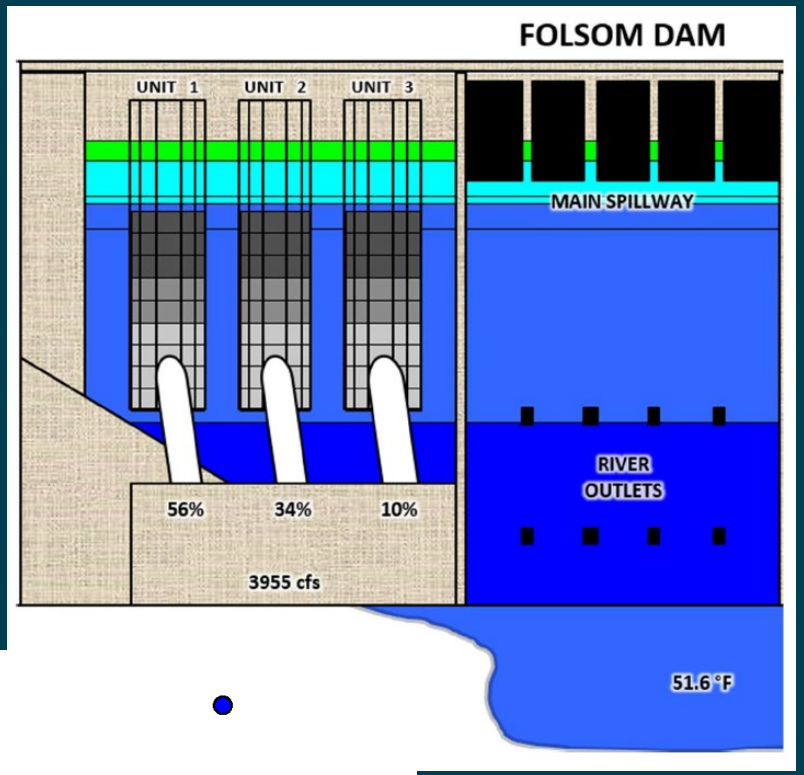
National Academies of Science Panel

August 12th, 2024

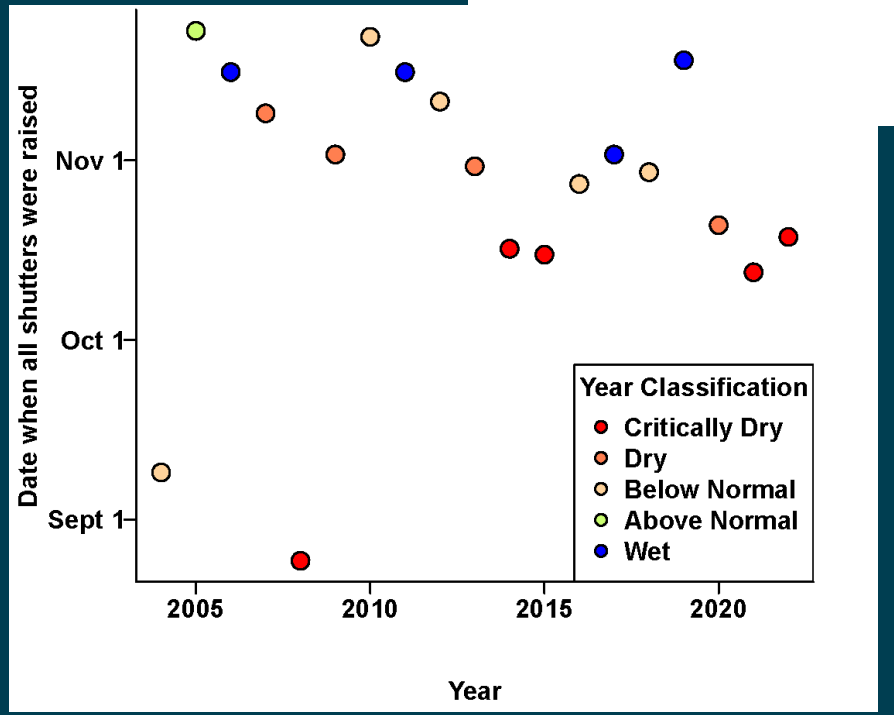
Motivation

- CVP is already experiencing climate change
- Primary versus secondary water management affects
  - California climate is characterized by interannual variability
  - Secondary trends can be more clear
- Potential for fundamental changes to CVP/SWP operations

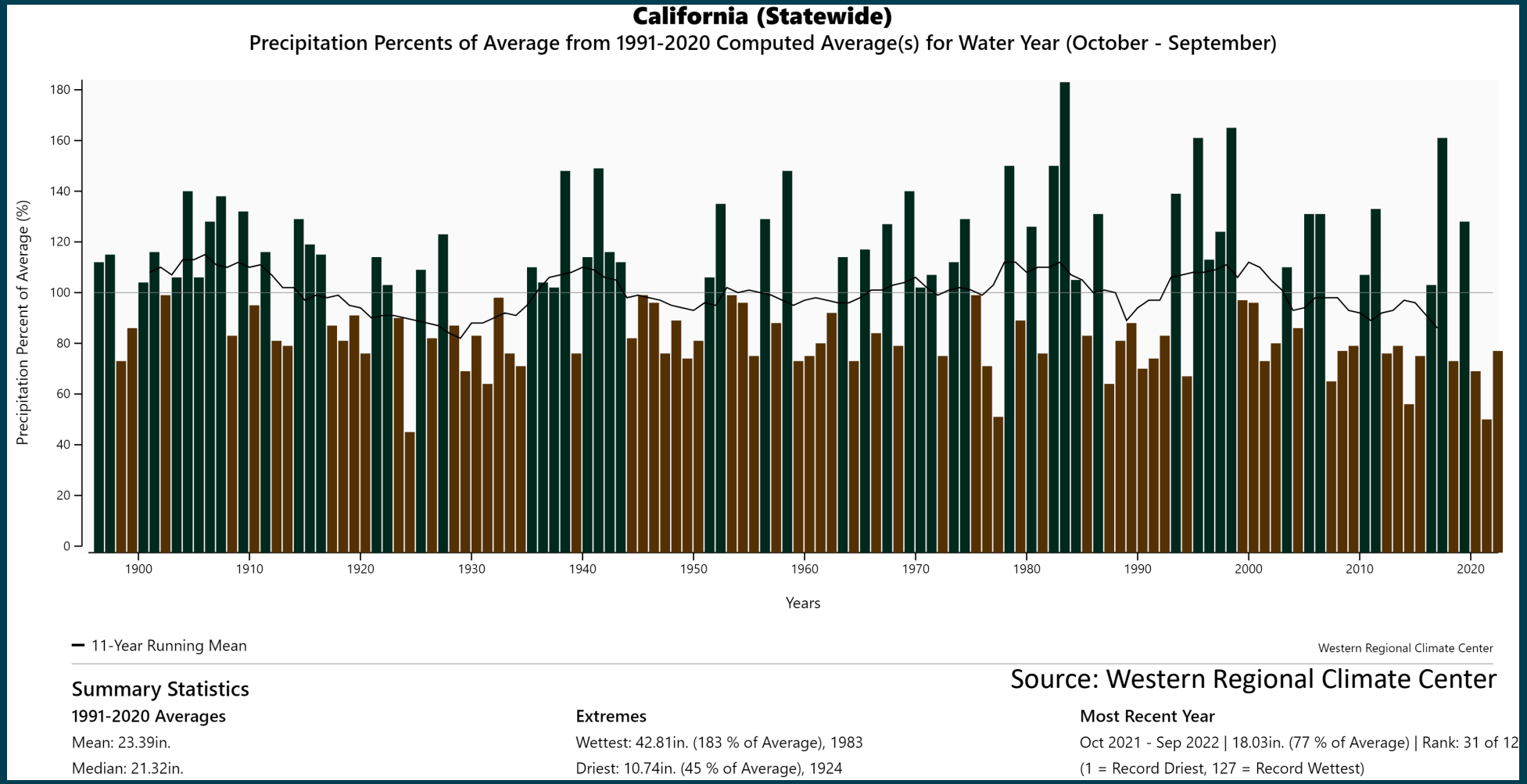
American River Group, April 2024



Reclamation, 2024

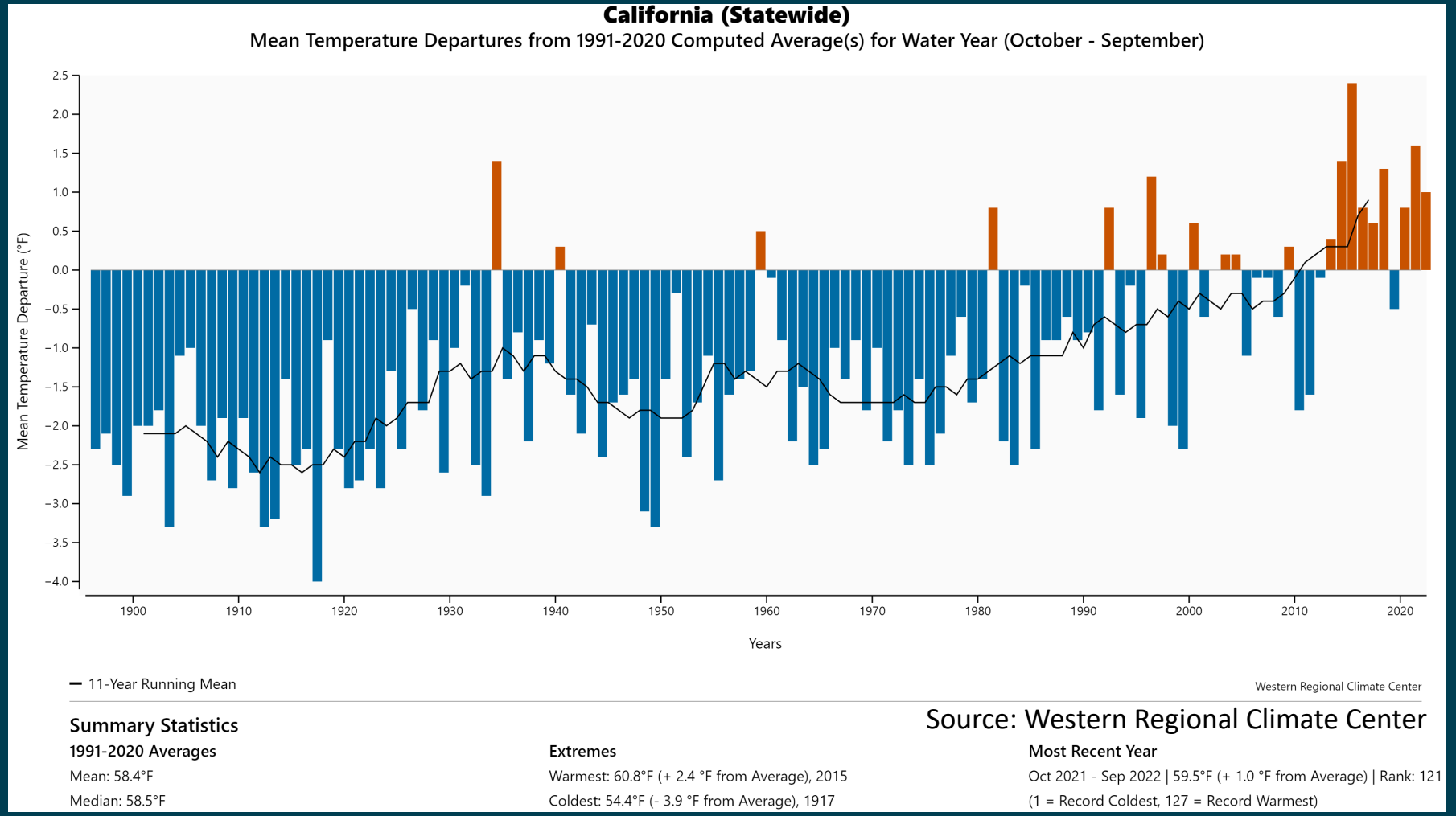


Precipitation - Percent of 1991-2020 Mean



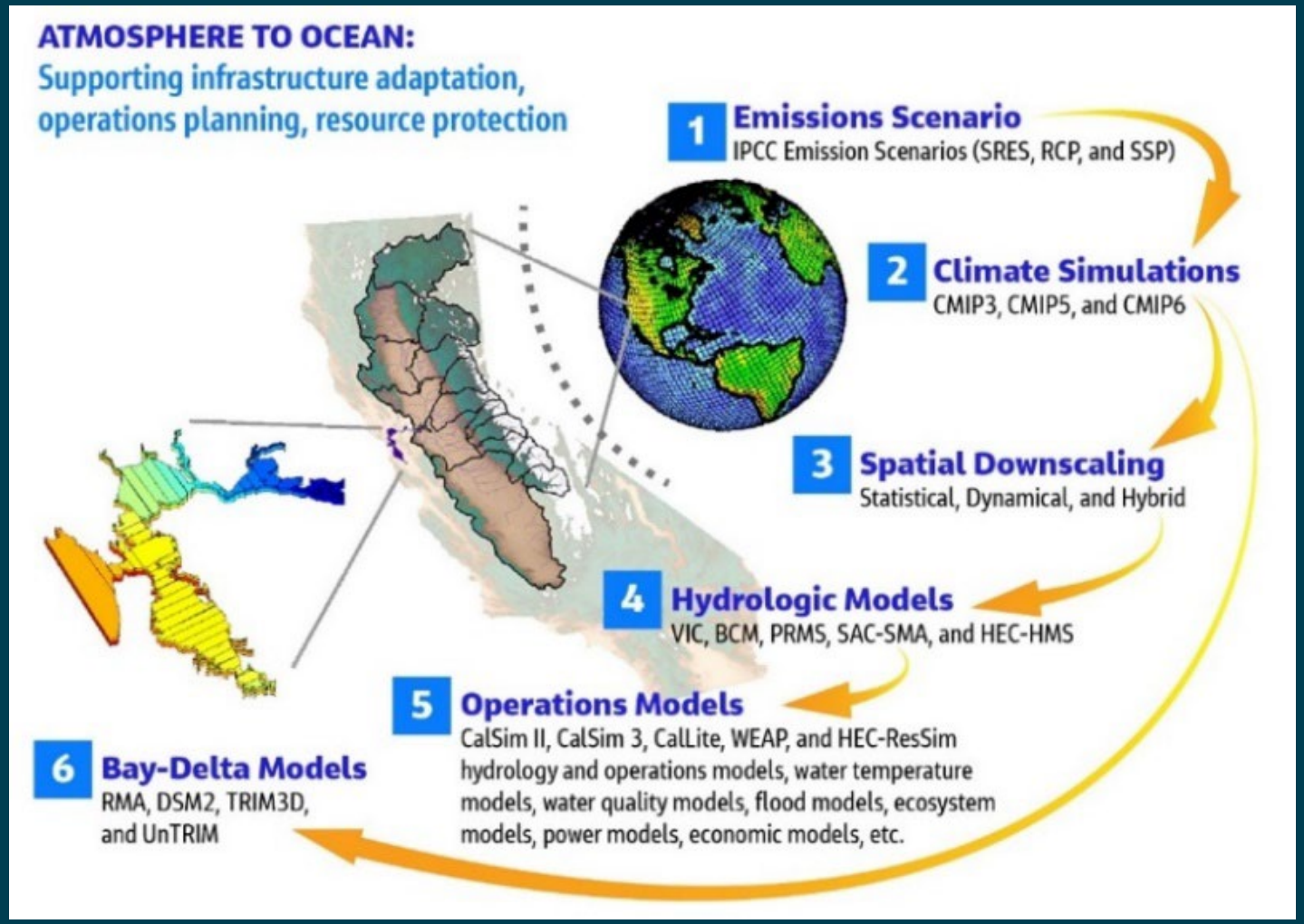
Source: Western Regional Climate Center

Mean Temperature Departures from 1991-2020 Average



Source: Western Regional Climate Center

Modeling Cascade

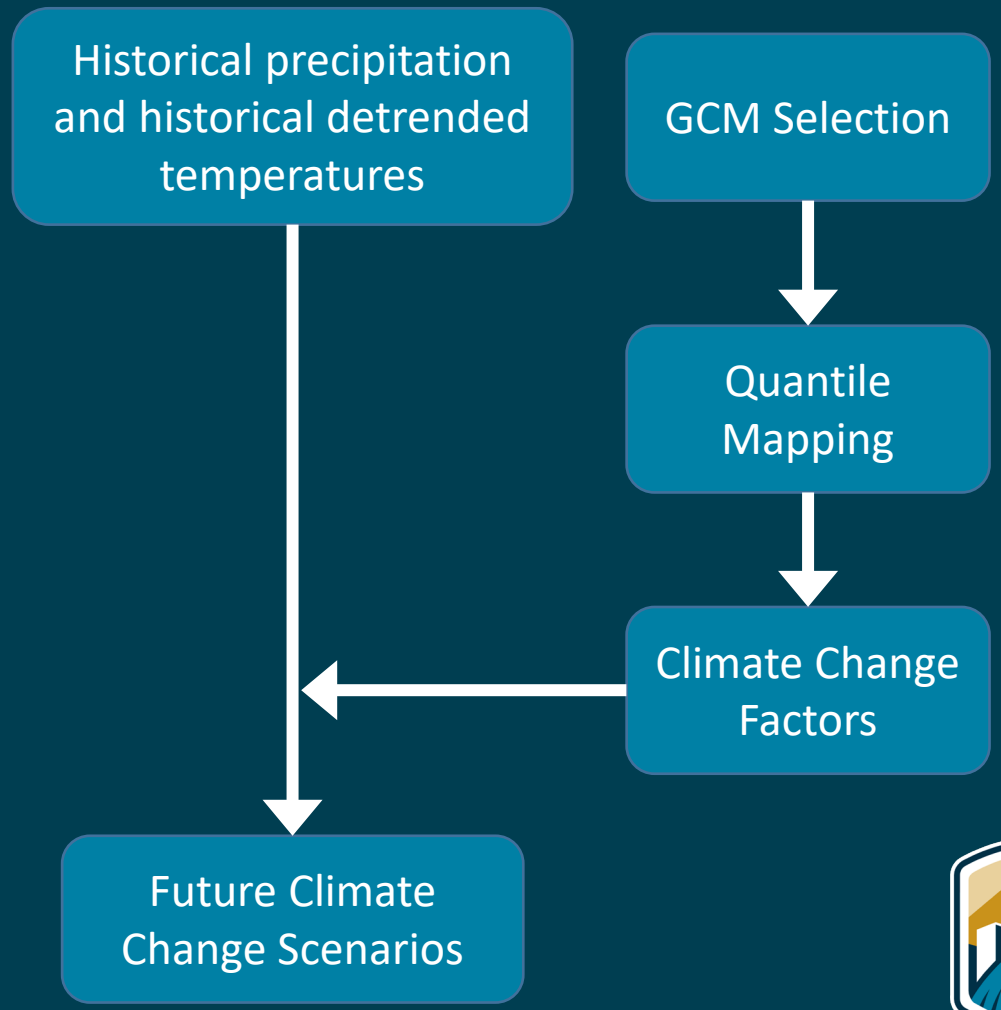


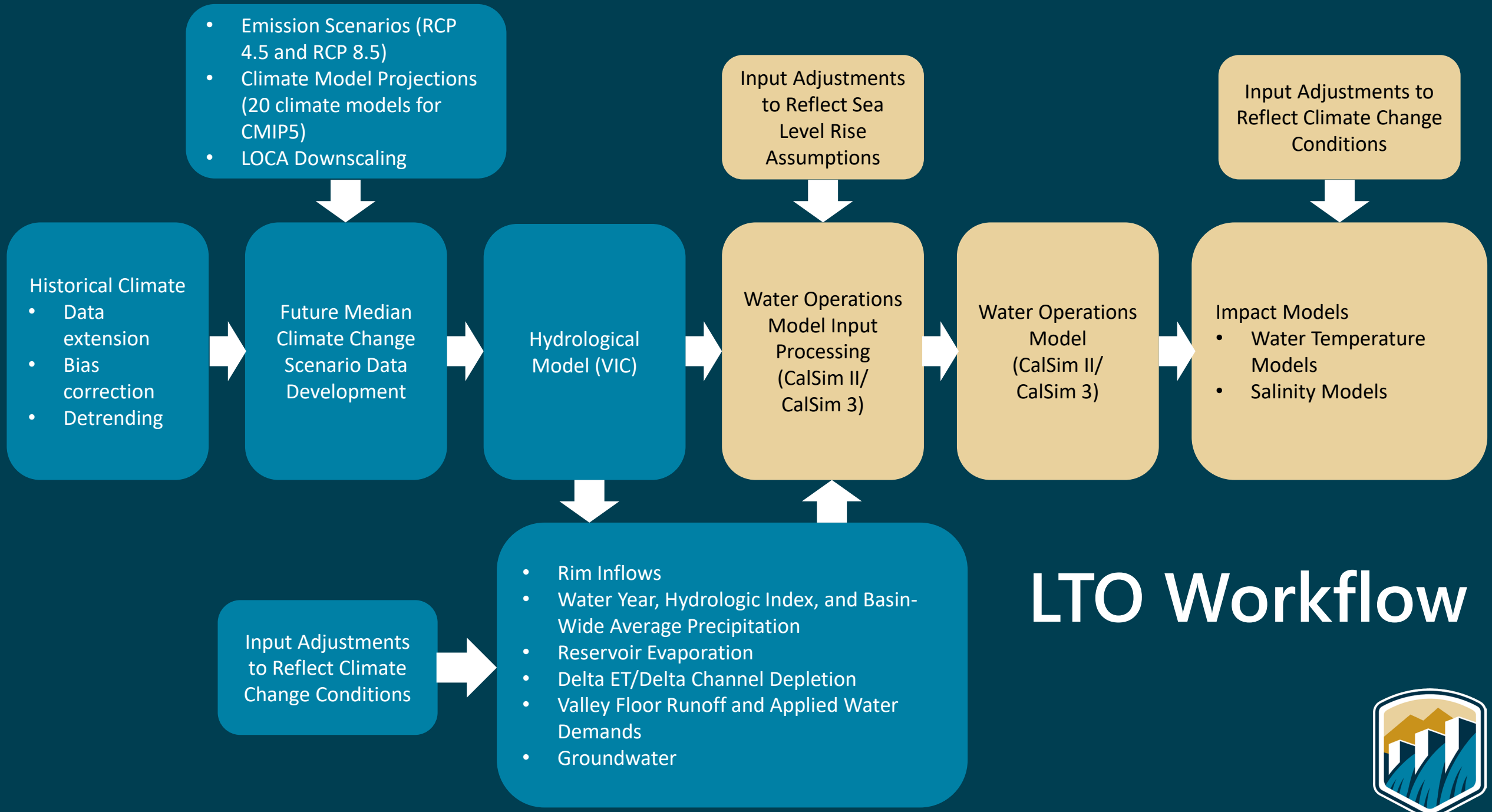
- Carry the best available climate information through the modeling workflow
- Sequential models at differing scales
- Climate and process uncertainty

Reclamation, 2021

Reclamation LTO Workflow

- Centers on the CalSim 3 operations model
  - Models regulatory, environmental, and contractual constraints on the CVP/SWP system
  - Groundwater, sea level, and surface hydrology included
- Assumes fixed constraints under a hydrologic timeseries
- Historic timeseries adjusted to represent future climate



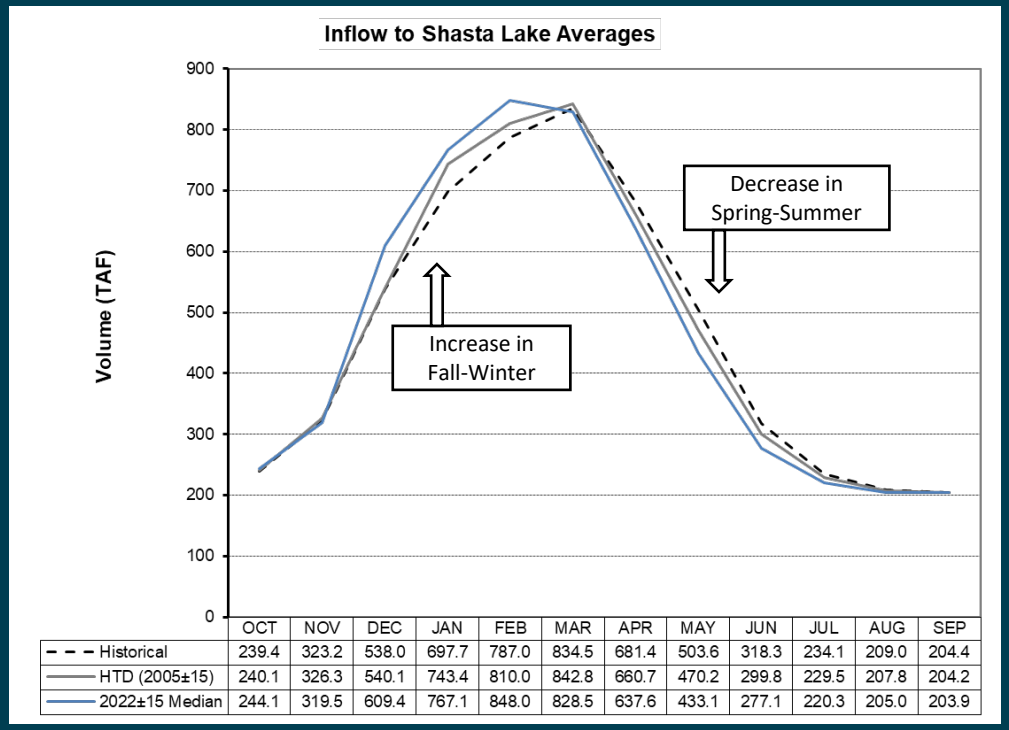


LTO Workflow

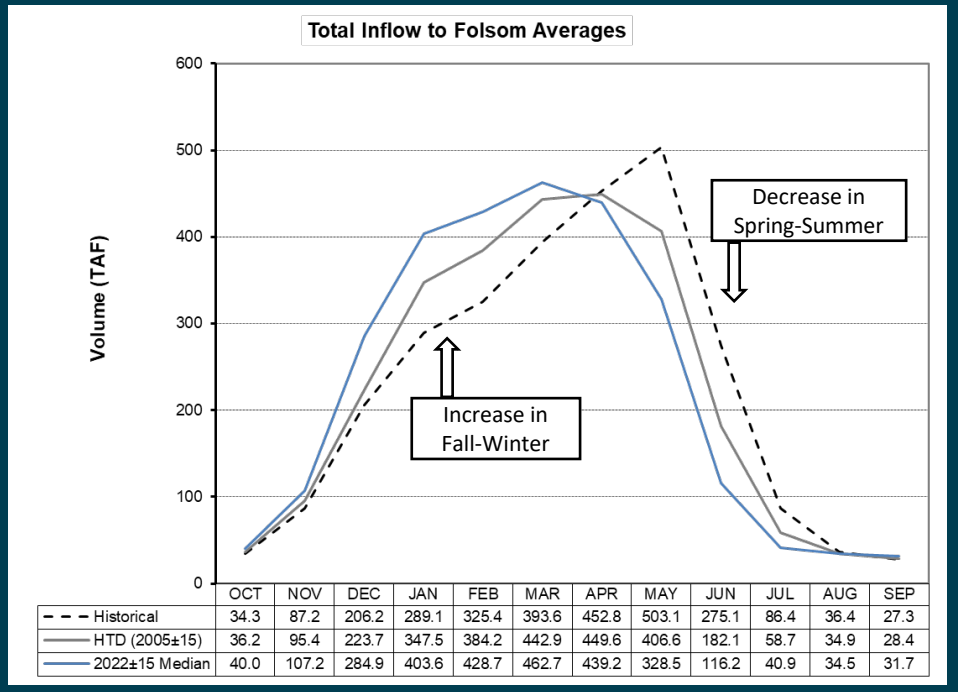
DRAFT: Subject to revisions

Climate Scenarios

- Baseline
  - 2022 Median ± 15 Years
- Climate Effects
  - Limited changes in total volumes
  - Earlier runoff, fill & spill
  - Warmer water temperatures
- Sensitivity Cases
  - Hot/Dry
    - 2022 ± 15 Years at 25th P and 75th T
  - Warm/Wet
    - 2022 ± 15 Years at 75th P and 25th T
  - 2040 Median
    - 2040 ± 15 Years at 50th P and 50th T



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Historical	239.4	323.2	538.0	697.7	787.0	834.5	681.4	503.6	318.3	234.1	209.0	204.4
HTD (2005±15)	240.1	326.3	540.1	743.4	810.0	842.8	660.7	470.2	299.8	229.5	207.8	204.2
2022±15 Median	244.1	319.5	609.4	767.1	848.0	828.5	637.6	433.1	277.1	220.3	205.0	203.9



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Historical	34.3	87.2	206.2	289.1	325.4	393.6	452.8	503.1	275.1	86.4	36.4	27.3
HTD (2005±15)	36.2	95.4	223.7	347.5	384.2	442.9	449.6	406.6	182.1	58.7	34.9	28.4
2022±15 Median	40.0	107.2	284.9	403.6	428.7	462.7	439.2	328.5	116.2	40.9	34.5	31.7

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Climate Storymap

https://storymaps.arcgis.com/stories/e76797f2f7c54fe092f013da41676bdf

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