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Salinas Valley Operational Model (SVOM)

Input Operational Data

March 8th 2023

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U.S. Geological Survey

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The Salinas Valley Operational Model (SVOM)

A hypothetical baseline model developed to examine the benefit of different reservoir operations to help make decisions about water resources and habitat conservation

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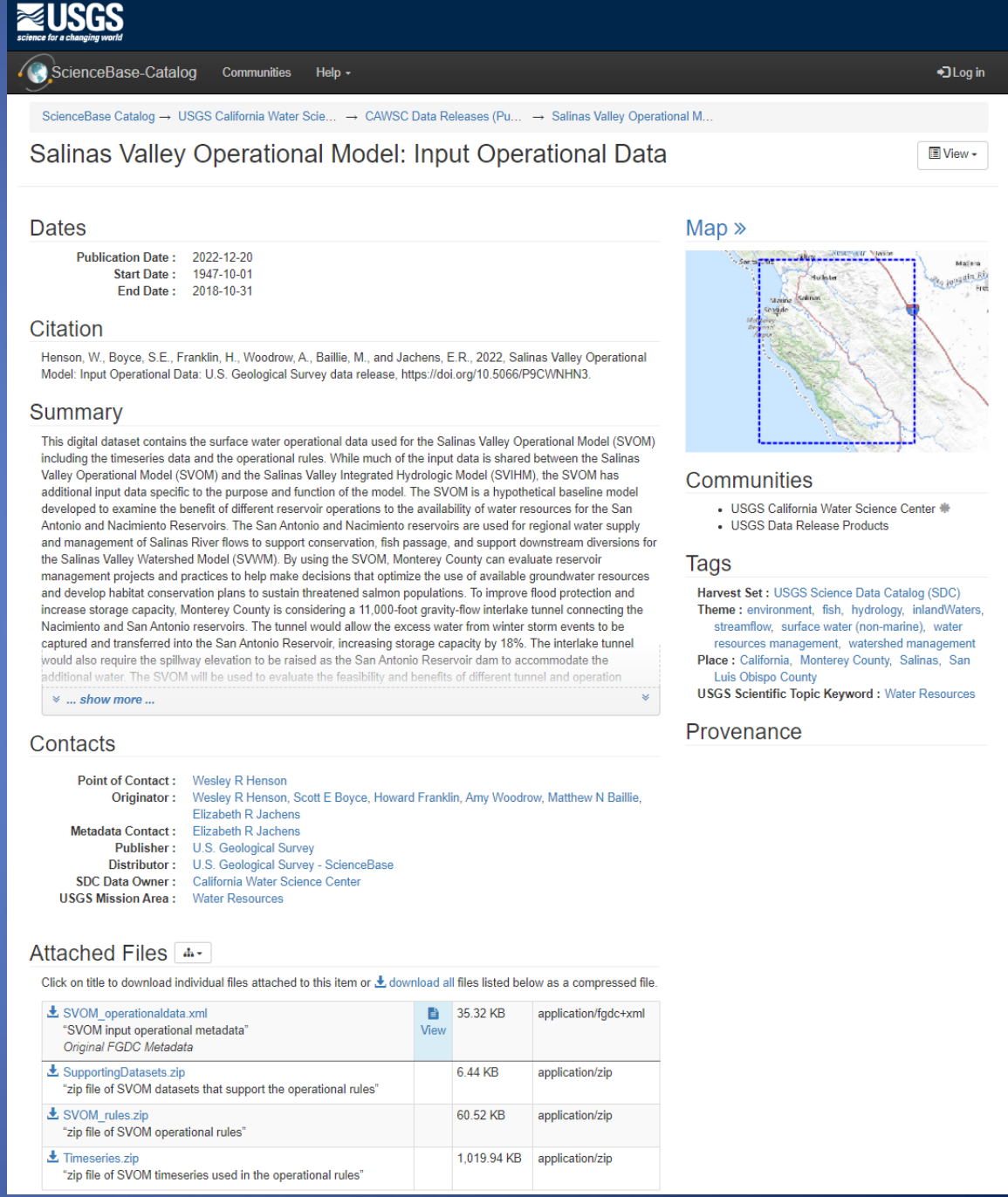
SVOM Data Release

https://www.sciencebase.gov/catalog/item/63601caad34ebe442505e7e9



Reference: https://www.usgs.gov/software/modflow-one-water-hydrologic-flow-model-mf-owhm

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Overview

- How is SVOM different than SVIHM?
- How are Reservoir releases dynamically simulated in SVOM?
- What are the operational rule parameters?
- What are the supporting datasets required?

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Q: How is SVOM different than SVIHM?
A 1: Land Use

SVHIM

- Annually variable land use

SVOM

- 2014 constant land use

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Q: How is SVOM different than SVIHM?
A 2: Timestep

SVHIM

- Bi-monthly timestep

SVOM

- 5-6 day timestep

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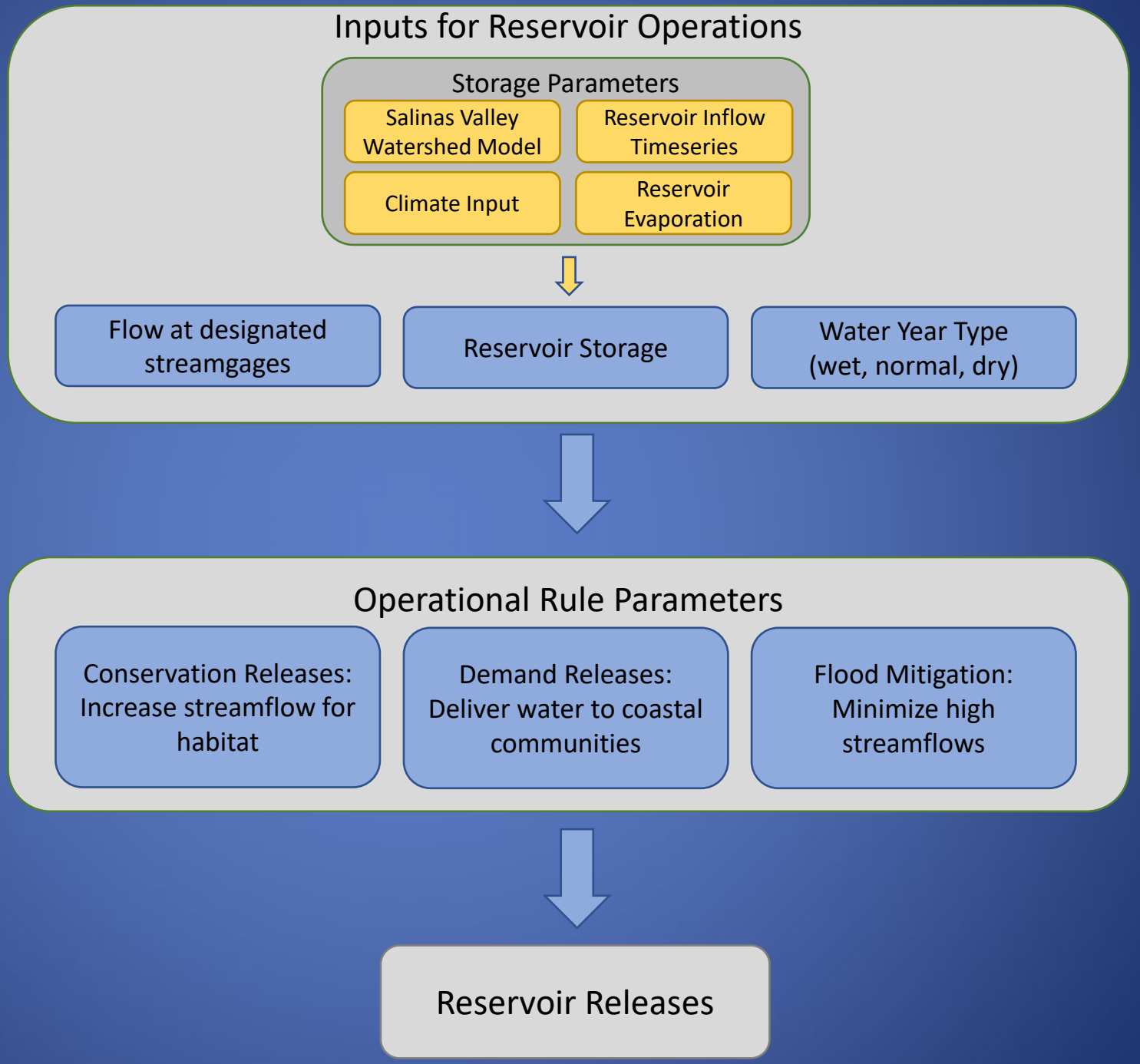
Q: How is SVOM different than SVIHM?
A 3: Reservoir releases

SVHIM

- Reservoirs releases follow a timeseries of historic releases

SVOM

- The reservoir releases are dynamically simulated using
  - defined operational rules
  - MODFLOW-OHWM surface water operations framework (Boyce and others, 2020; Ferguson, I.A., and Llewellyn, 2015; Ferguson and others, 2016)
- Current reservoir operation rules and legal constraints allow internal simulation of reservoir release
  - Account for changes in reservoir storage and releases
  - Inform management for conservation, public consumption/demand, and flood control



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Operational Rule Parameters

Each rule file contains *logic* that determines if reservoir releases should be triggered based on the input conditions.

There are a total of 10 rule files:

- 3 that describe fish passage,
- 2 on water rights,
- 2 on the reservoir fraction,
- 1 of the spillway release thresholds,
- 1 on the Salinas River diversion facility, and
- 1 on the reservoir tunnel operation.

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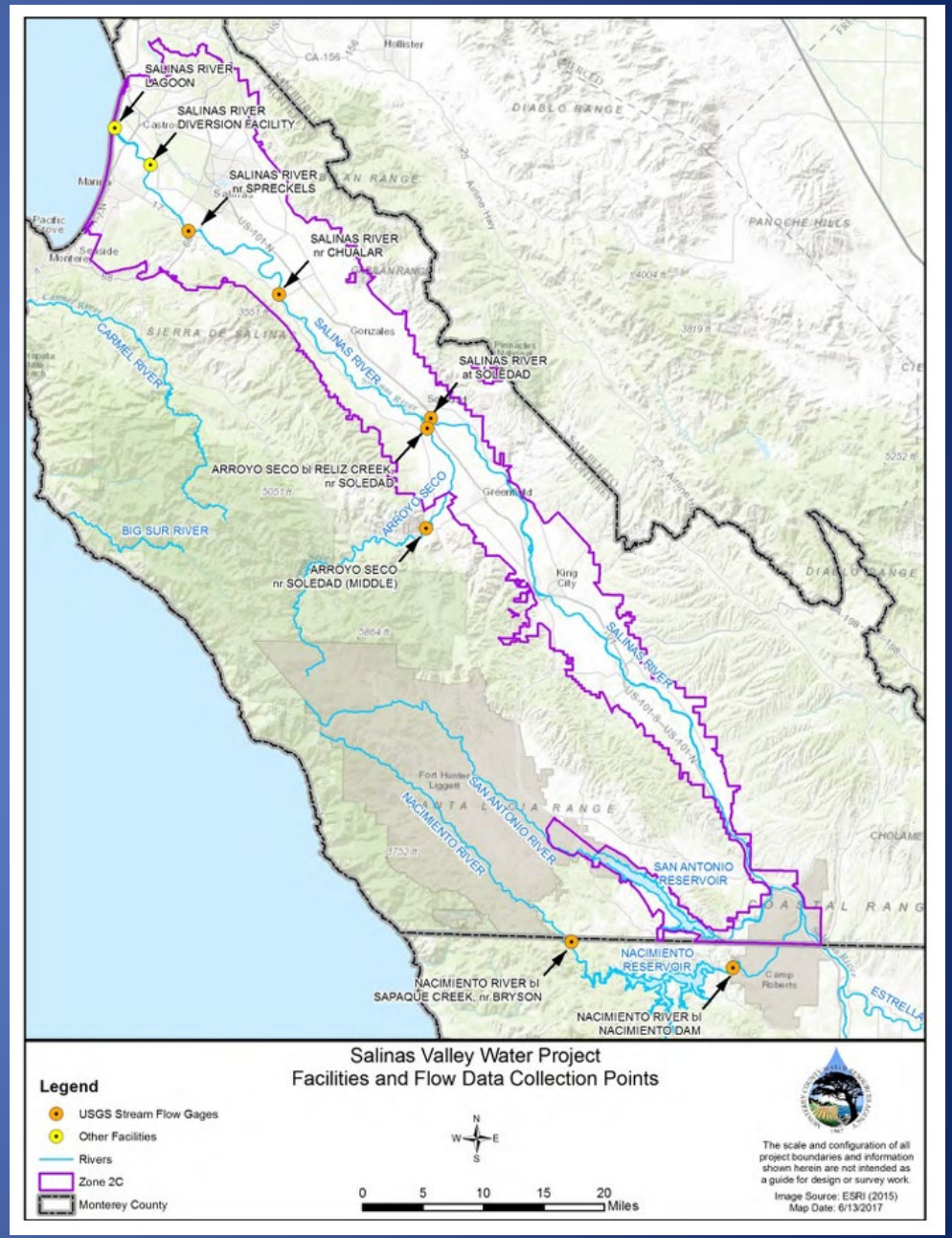
Logic

- Water Year Designation: Dry/Normal/Wet
  - Based on the percentile of annual mean flow at the Arroyo Seco near Soledad station (11152000), where normal water years are defined as having between 25th and 75th percentiles of annual mean flows
  - Evaluated on March 15 and verified on April 1

Streamflow

- 7 USGS streamflow gauges (USGS, 2022)
- 2 diversion points



Source: MCRA, 2018

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Conservation Releases

	Adult	Smolt	Juvenile
Description	Flow release schedule to enhance upstream migration conditions for adult steelhead (Oncorhynchus mykiss)	Flow release schedule to enhance outmigration conditions for smolts	Flow release schedule to enhance downstream migration conditions for juvenile steelhead and kelts
File name	AdultPassage.rul	SmoltPassage.rul	JuvenilePassage.rul
Logic	• Minimum reservoir storage • minimum flow requirements at two specific streamgages	• Water Year Type is not dry • Minimum reservoir storage • Minimum flow requirements at two specific streamgages	• Smolt flows supersede juvenile flows • If smolt flows are not triggered, year type is not dry, minimum reservoir storage
Trigger	• Reservoir releases to maintain minimum flow at specific stream location for minimum of 5 days	• Depending on the date triggered, reservoir releases to meet minimum flow requirements at several streamgages for a designated duration	• Reservoir releases to maintain flow to the Lagoon for specified duration

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Demand Responses and Flood Mitigation

- Water Rights - evaluate the storage and the flood curve for each reservoir for refilling and withdrawal conditions (iterative)
  - Water_Rights_Pre.rul & Water_Rights_Post.rul
- Nacimiento Reservoir fraction - verify the storage in each of the reservoirs and evaluate the release demand to determine which reservoir the water should be released from and if an inter-lake transfer is necessary (iterative).
  - Check_naci_frac_pre.rul & Check_naci_frac_post.rul
- Spillway release - based on the reservoir stage, where reservoir operation thresholds determine the spill calculation and maximum release changes
  - SpillwayMaxRelease.rul
- Salinas River Diversion Facility - handles both channel wetting requirements and the flow requirements for the diversion facility
  - SRDF_Operations.rul
- The reservoir tunnel - calculate the tunnel flow based on current reservoir elevations for the baseline case only and does not apply to the interlake tunnel scenario.
  - ReservoirTunnel.rul

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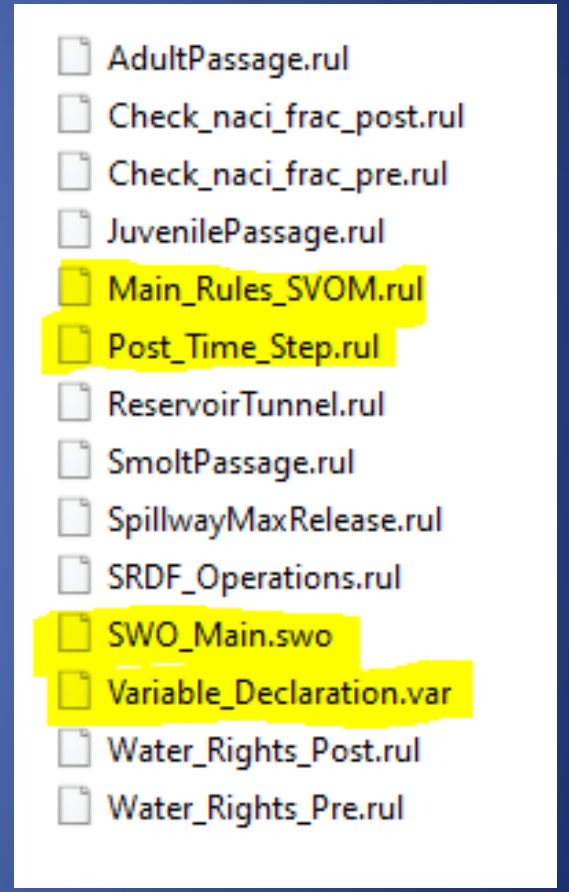
Rule Files

- The main surface water operation inputs are described in the file “SWO_Main.swo”, which references the files:
  - Main_Rules_SVOM.rul
  - Post_Time_Step.rul
  - Variable_Declaration.var

These 4 files point to the individual rules and describe how the rules are dependent on each other.

The time series data and supporting datasets included are required to carry out the logic in each of the rules.



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Time series Files

There are eight different types of time series files:

- Time series at a specific USGS streamgage,
- starting conditions at each reservoir,
- evaporation data,
- inflow data to the reservoir,
- precipitation data for each reservoir,
- San Luis Obispo storage requirements,
- historical reservoir storage, and
- minimum reservoir storage.

These files are directly referenced in the rule files

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Supporting Datasets

There are four other types of supporting data tables:

- reservoir area-capacity tables,
- San Antonio spillway elevation and discharge table,
- stream segment type table, and
- historical reservoir release time series.

These data are not directly referenced or called in the rule files but are used to supporting the reservoir operation logic or as a SVOM performance.

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The data release has all these files + a metadata file

https://www.sciencebase.gov/catalog/item/63601caad34ebe442505e7e9

If you have any questions about the data or something is unclear, please reach out to me and I would be happy to help!

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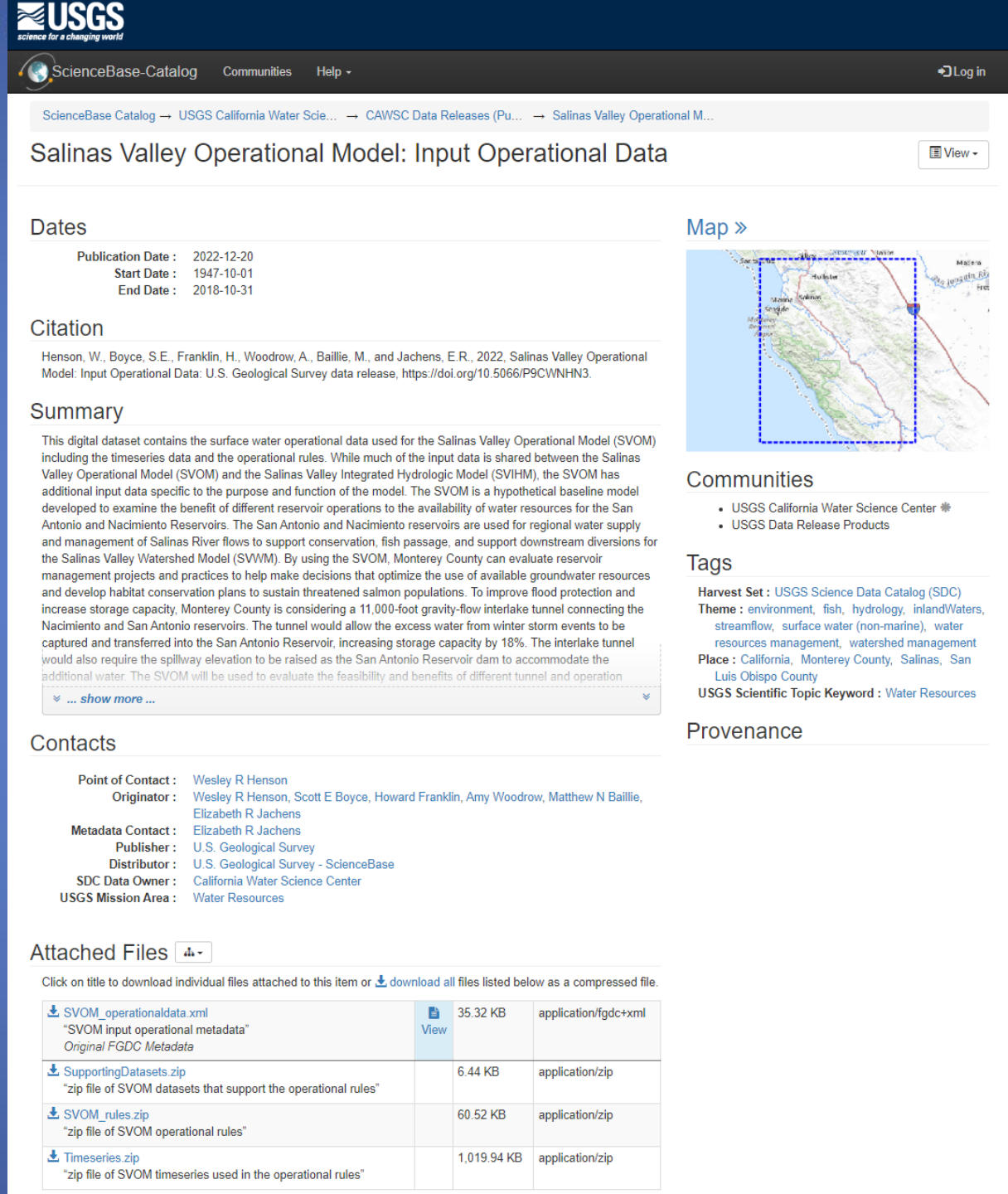

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Salinas Valley Operational Model: Input Operational Data

View

Dates

Publication Date : 2022-12-20
Start Date : 1947-10-01
End Date : 2018-10-31

Citation

Henson, W., Boyce, S.E., Franklin, H., Woodrow, A., Baillie, M., and Jachens, E.R., 2022, Salinas Valley Operational Model: Input Operational Data: U.S. Geological Survey data release, https://doi.org/10.5066/P9CWNHN3.

Summary

This digital dataset contains the surface water operational data used for the Salinas Valley Operational Model (SVOM) including the timeseries data and the operational rules. While much of the input data is shared between the Salinas Valley Operational Model (SVOM) and the Salinas Valley Integrated Hydrologic Model (SVIHM), the SVOM has additional input data specific to the purpose and function of the model. The SVOM is a hypothetical baseline model developed to examine the benefit of different reservoir operations to the availability of water resources for the San Antonio and Nacimiento Reservoirs. The San Antonio and Nacimiento reservoirs are used for regional water supply and management of Salinas River flows to support conservation, fish passage, and support downstream diversions for the Salinas Valley Watershed Model (SVWM). By using the SVOM, Monterey County can evaluate reservoir management projects and practices to help make decisions that optimize the use of available groundwater resources and develop habitat conservation plans to sustain threatened salmon populations. To improve flood protection and increase storage capacity, Monterey County is considering a 11,000-foot gravity-flow interlake tunnel connecting the Nacimiento and San Antonio reservoirs. The tunnel would allow the excess water from winter storm events to be captured and transferred into the San Antonio Reservoir, increasing storage capacity by 18%. The interlake tunnel would also require the spillway elevation to be raised as the San Antonio Reservoir dam to accommodate the additional water. The SVOM will be used to evaluate the feasibility and benefits of different tunnel and operation

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Publisher : U.S. Geological Survey
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SDC Data Owner : California Water Science Center
USGS Mission Area : Water Resources

Attached Files

Click on title to download individual files attached to this item or download all files listed below as a compressed file.

SVOM_operationaldata.xml "SVOM input operational metadata" *Original FGDC Metadata*	View	35.32 KB	application/fgdc+xml
SupportingDatasets.zip "zip file of SVOM datasets that support the operational rules"		6.44 KB	application/zip
SVOM_rules.zip "zip file of SVOM operational rules"		60.52 KB	application/zip
Timeseries.zip "zip file of SVOM timeseries used in the operational rules"		1,019.94 KB	application/zip

Map »

Communities

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- USGS Data Release Products

Tags

Harvest Set : USGS Science Data Catalog (SDC)
Theme : environment, fish, hydrology, inlandWaters, streamflow, surface water (non-marine), water resources management, watershed management
Place : California, Monterey County, Salinas, San Luis Obispo County
USGS Scientific Topic Keyword : Water Resources

Provenance

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Sources

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Questions

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