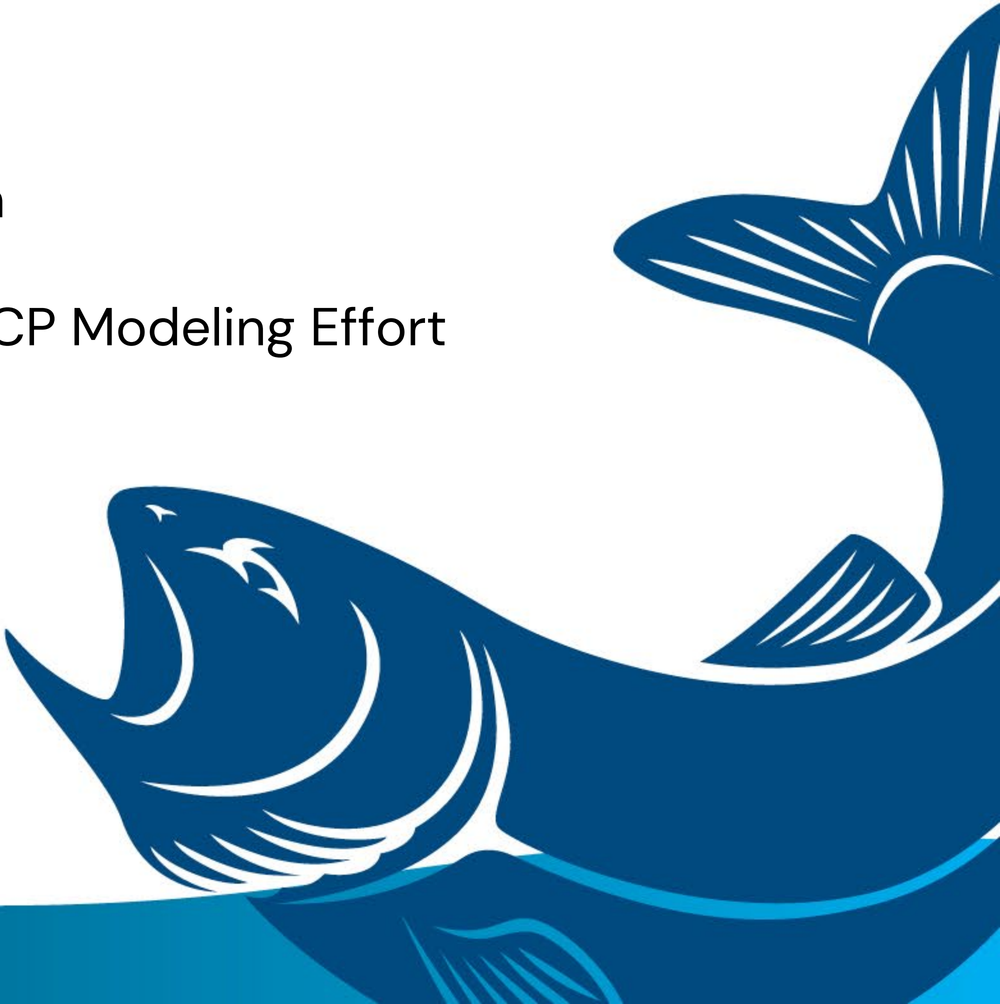
Salinas River Operations
Habitat Conservation Plan

salinasrivermanagementprogram.org

Agenda

- SVOM Progress Update
- Update on Critical Riffle Analysis for Steelhead Migration
- Outline and Discuss New Release Plan and Purpose of HCP Modeling Effort
- Addressing Future Projects with Operational Impacts
- Closing and Next Steps



Salinas Valley Operational Model Progress Update

Matt Baillie – West Yost

Groundwater-Surface Water Modeling Update

Matt Baillie

West Yost

23 Jan 2024

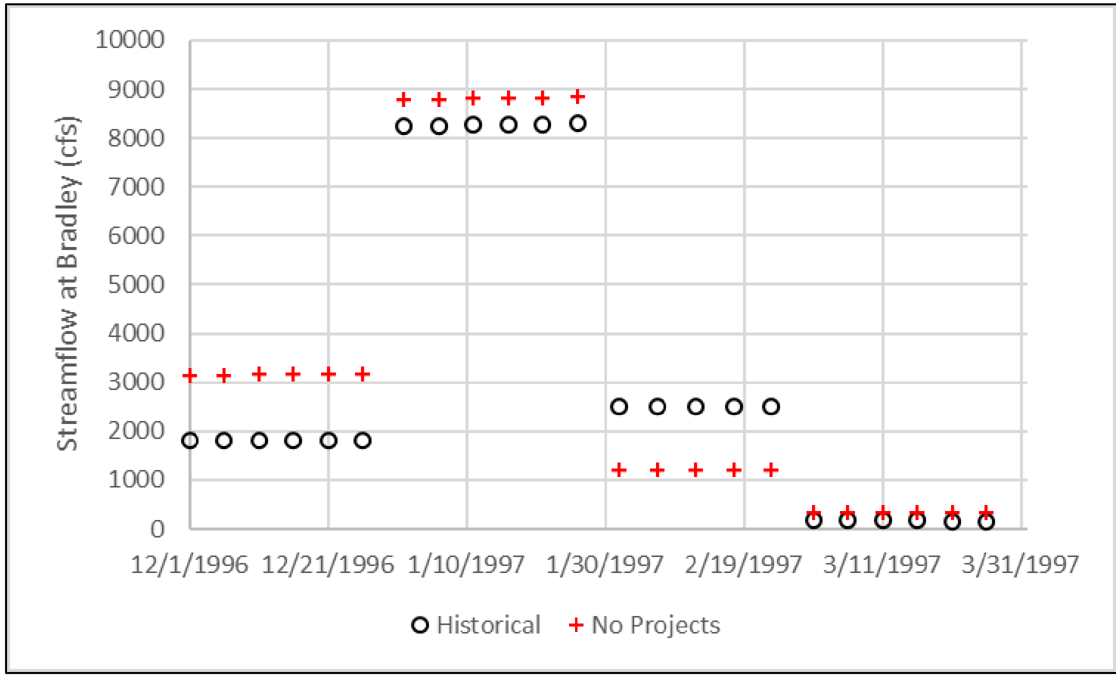
Terminology

- Salinas Valley Integrated Hydrologic Model (SVIHM): Calibrated historical MODFLOW-OWHM model of integrated groundwater-surface water system covering period from WY1968 to 2018
- Salinas Valley Operational Model (SVOM): Operational model of integrated groundwater-surface water-reservoir system simulating 51 water years forced by the same hydrology as the SVIHM
- Stress Period: basic temporal discretization of model, with “stresses” (e.g., well pumping) uniform over each stress period
- Timestep: subdivision of stress period, with model computations performed once per timestep

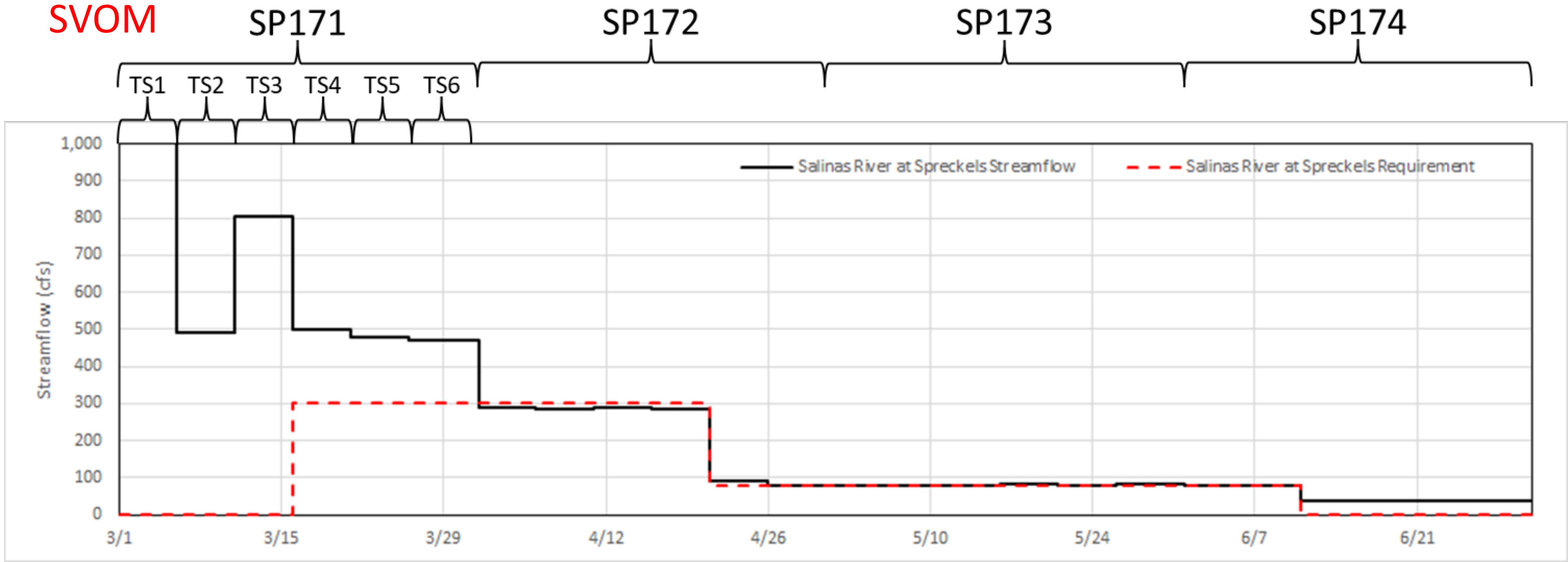
Time Discretization in SVIHM and SVOM

- Monthly stress periods with 5 of 6 timesteps per stress period of 5 to 6 days length (depending on length of month)
- Flattens out peak streamflows and other short-term variations

SVIHM



SVOM



Note on Availability of SVIHM and SVOM

- These USGS-designed models are still under development
- Publication targeted for Spring 2024
- Until published model is used, all model results are considered preliminary
- Changes may occur between the model version used to prepare the HCP and the final published model version

Notes on Observed Streamflows

- Unless stated otherwise, observed streamflows discussed in this presentation represent mean daily streamflows averaged across the length of each model timestep (5 to 6 days)
- This allows direct comparison to model results, since the model simulates average conditions over the timestep length

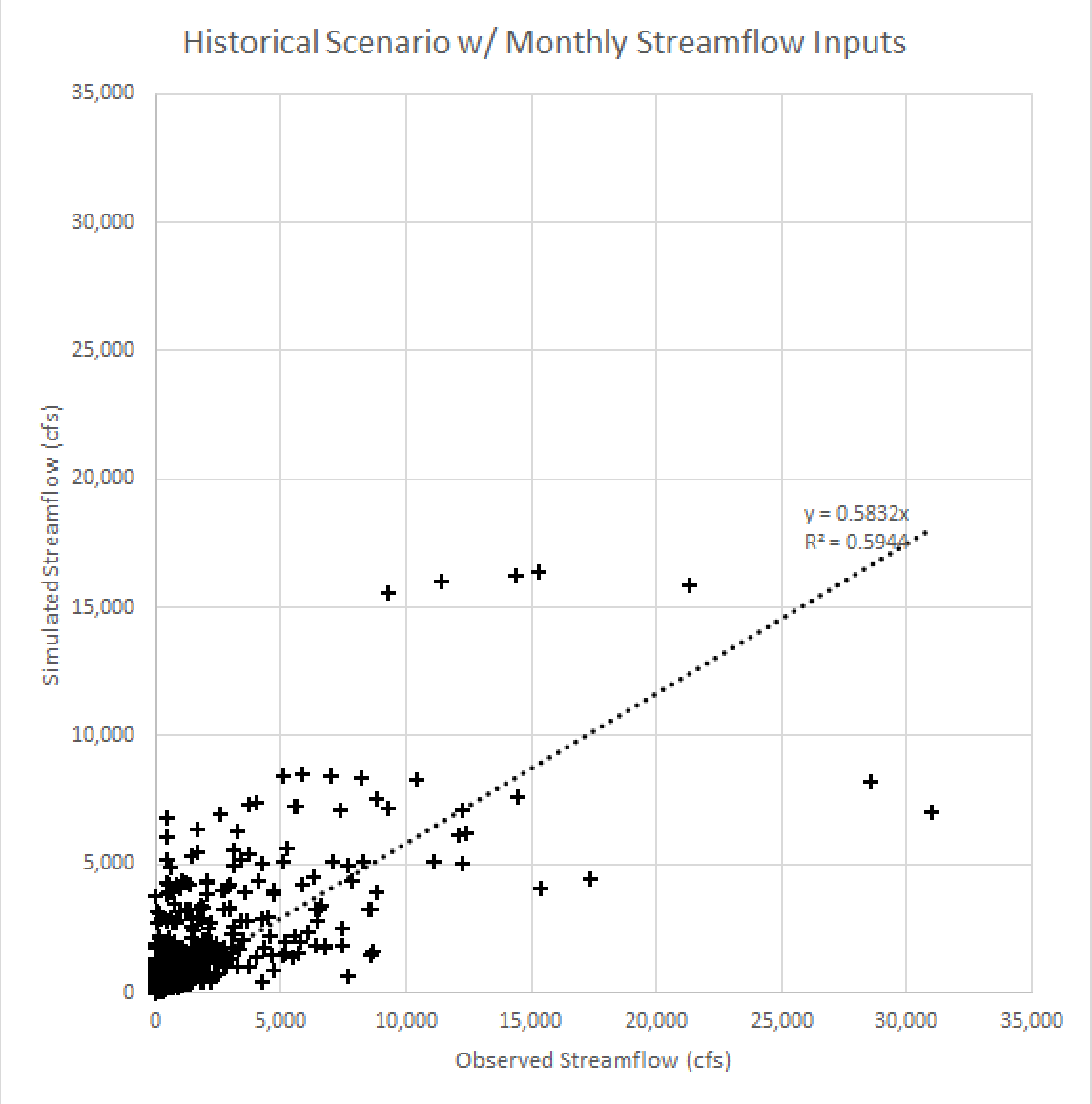
Note on SVIHM Calibration

- The SVIHM as delivered by the USGS includes 2 timesteps per stress period (i.e., 2 calculations per month), and was calibrated to average monthly streamflows

- All results presented here use a slightly modified SVIHM with the same timestep lengths (5 to 6 days) as the SVOM; this only impacts the number of calculations per month

SVIHM Simulation of Streamflow

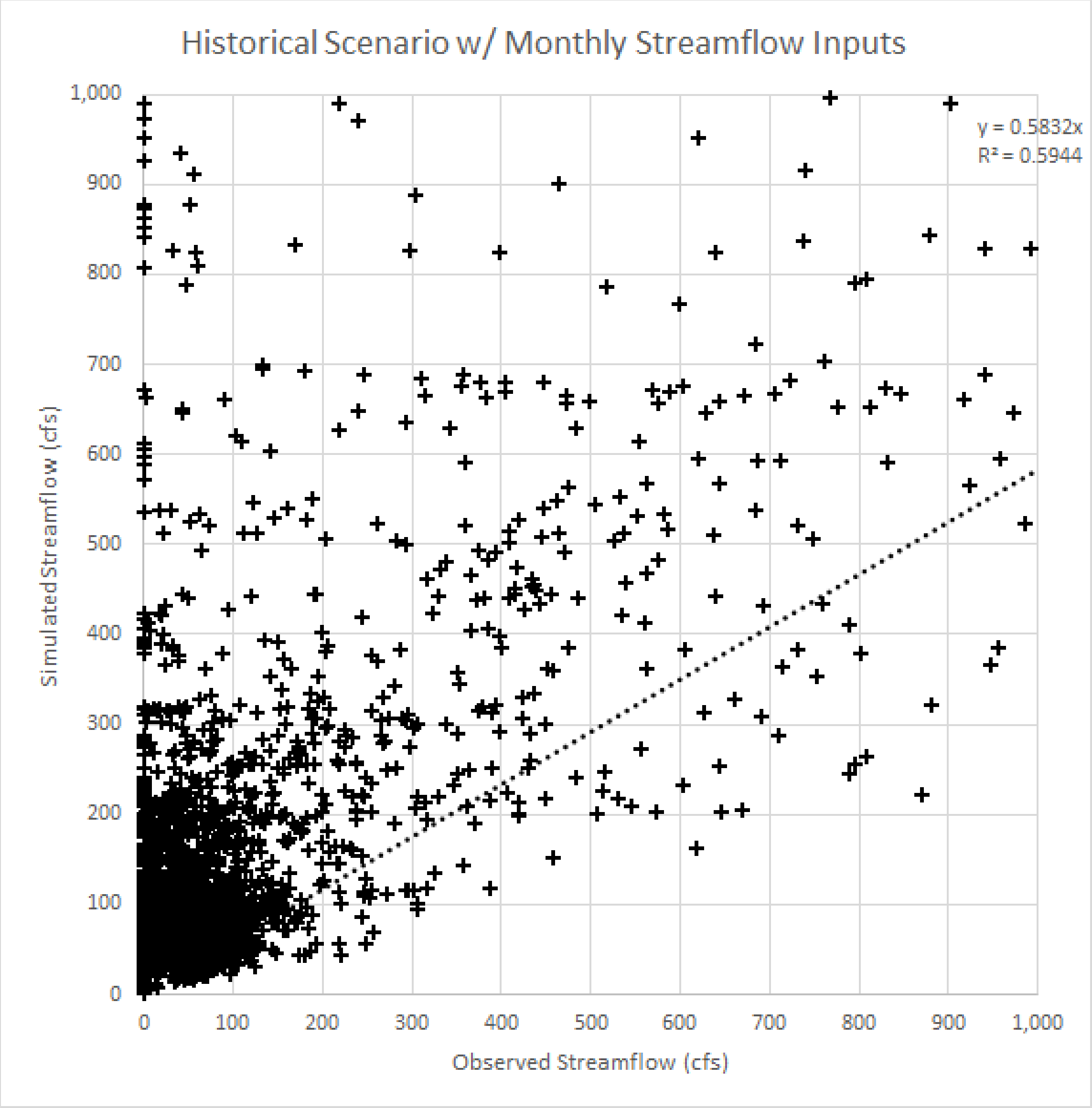
- Chart shows simulated streamflow in the Salinas River at Chualar versus timestep-averaged observed streamflow at the same location
- Large amount of scatter and overall poor match to observed conditions
- Linear regression shows a general under-prediction of streamflow at this location, but this is due to under-prediction of the highest flows



SVIHM Simulation of Streamflow

- Focus on lower streamflows (<1,000 cfs) shows general over-prediction of these streamflows

- Other USGS gauge locations show similar scatter



SVIHM Simulation of Passage Days

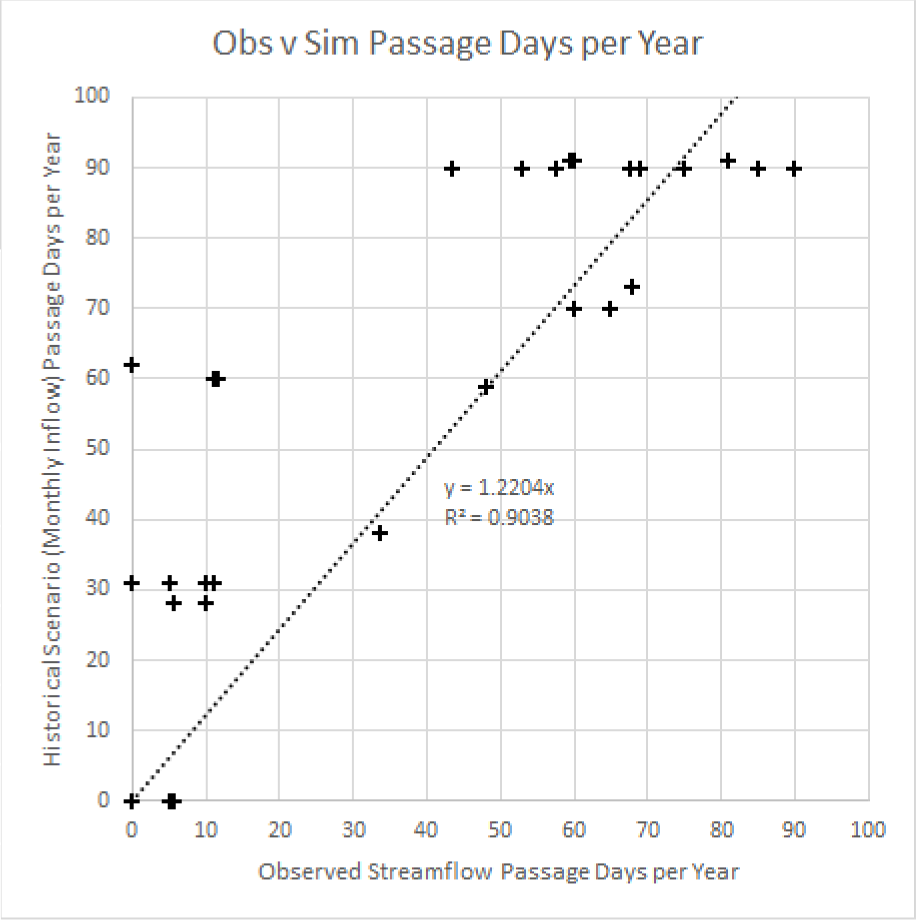
- Passage Days at Chualar as defined as:
  - 5 or more consecutive days of at least 260 cfs flow in the Salinas River at Chualar
  - from the January through March
  - while the Lagoon is open
- For our modeling efforts, MCWRA considers the Lagoon to be open if streamflow in the Salinas River at Spreckels is at least 80 cfs

SVIHM Simulation of Passage Days

- Model over-estimates the number of Passage Days at Chualar
- Note that the Passage Days based on the observed record is higher than the actual Passage Days because most periods of 1 to 4 days of >260 cfs at Chualar result in a timestep-average flow above 260 cfs

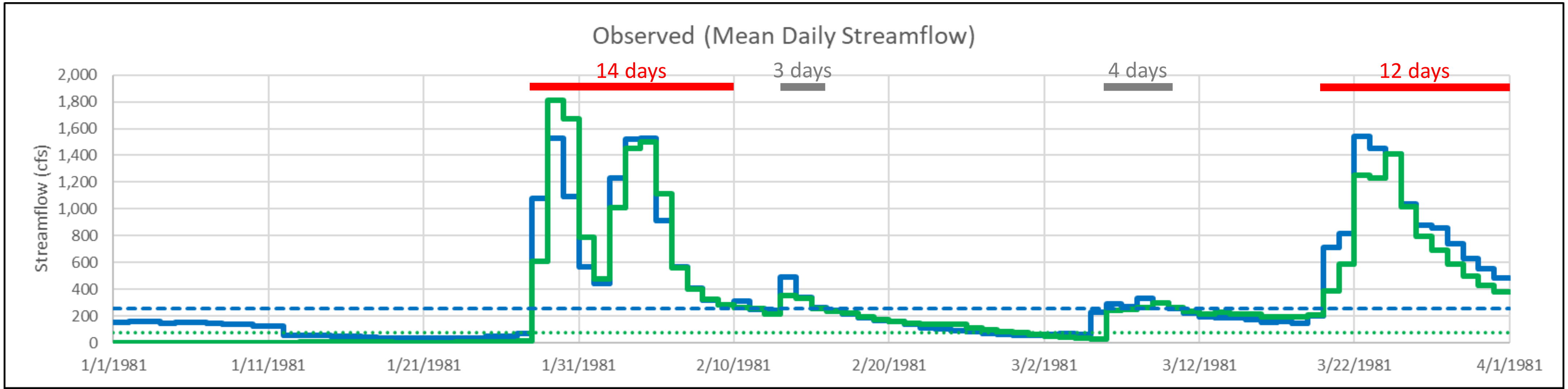
25% of 1-day periods
50% of 2-day periods
100% of 3-day periods
100% of 4-day periods

Water Year Type	Observed (Timestep Avg)*	SVIHM (Monthly Inflow)
All Years	37.2	51.7
Wet Years	75.9	86.9
Wet-Normal Years	60.4	82.3
Normal Years	46.3	73.5
Dry-Normal Years	10.1	38.8
Dry Years	2.5	5.6

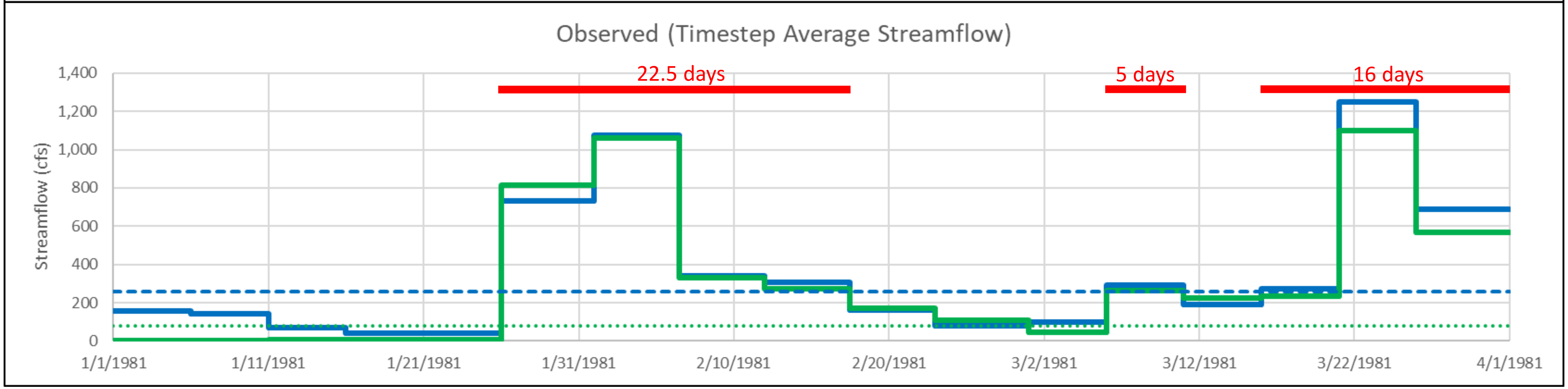


*The Chualar gauge started operating in October 1976, so Observed averages only cover WY1977-2018

Effect of Timestep Averaging on Observed Passage Days


Observed (Mean Daily Streamflow)

26 Passage Days


Observed (Timestep Average Streamflow)

43.5 Passage Days

SVIHM Simulation of Lagoon Open Days

- Model over-estimates the number of days each year the Lagoon is open (based on the 80 cfs threshold at Spreckels)*

Water Year Type	Observed (Timestep Avg)	SVIHM (Monthly Inflow)	Residual
All Years	43.9	68.1	+24.2
Wet Years	81.8	90.1	+8.3
Wet-Normal Years	63.1	90.5	+27.4
Normal Years	56.8	87.2	+30.4
Dry-Normal Years	22.6	68.7	+46.1
Dry Years	6.5	37.2	+30.7

*Only counting days during the January to March period; SVIHM averages cover the entire model period (WY1968-2018)

Assessment of SVIHM (and SVOM)

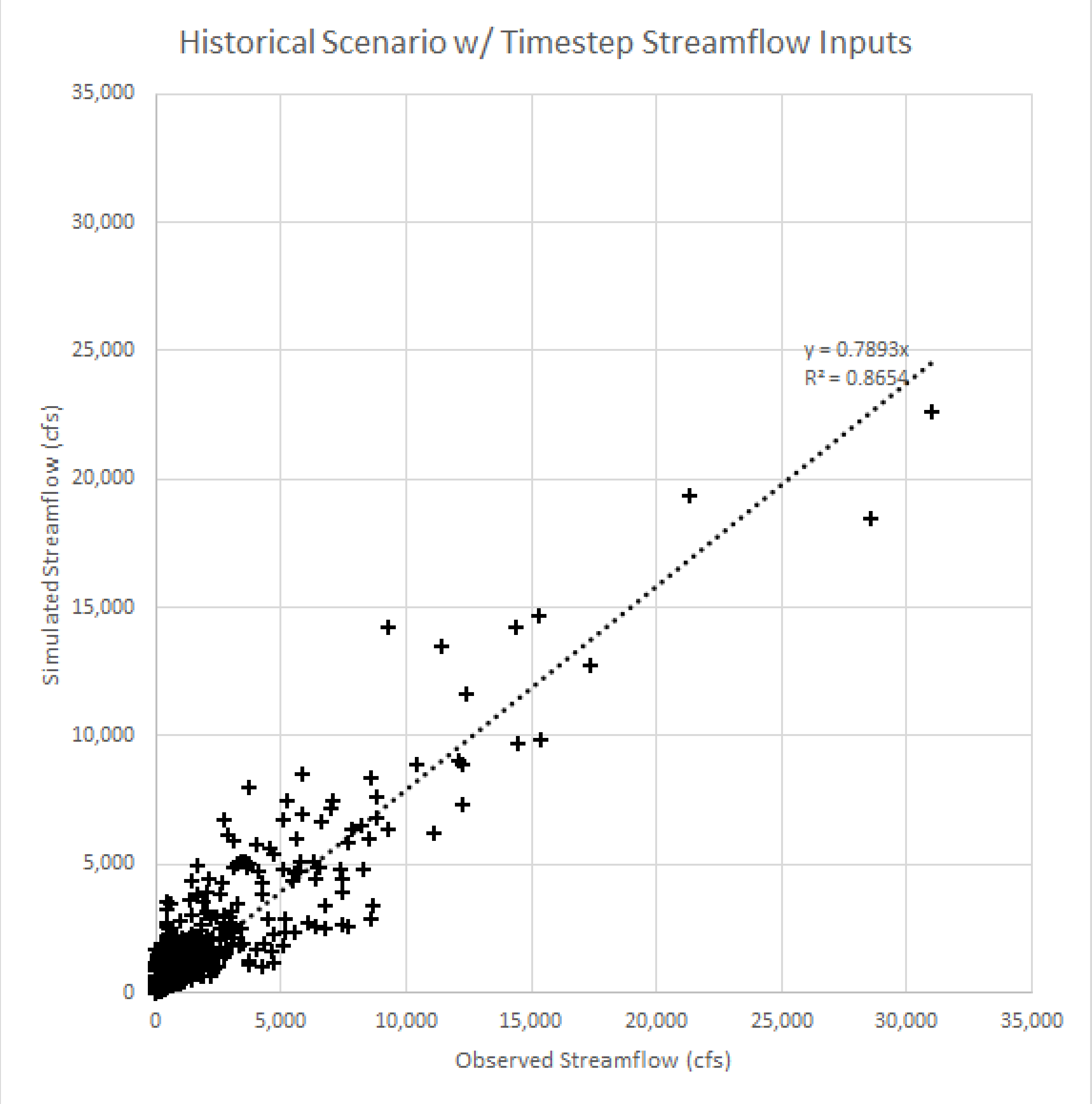
- SVIHM simulates too much water in the Salinas River at lower streamflows, including the range of flows where the reservoirs would need to supplement natural flows to aid fish migration
- This limits the (delivered) model’s ability to accurately simulate conditions relevant to Steelhead migration

Modifications to the SVIHM

- We modified the SVIHM to align it more with the natural system
- Changed the stream inflow time series for the Salinas River (above the Nacimiento River confluence) and Arroyo Seco to use timestep-average streamflows instead of monthly average streamflows

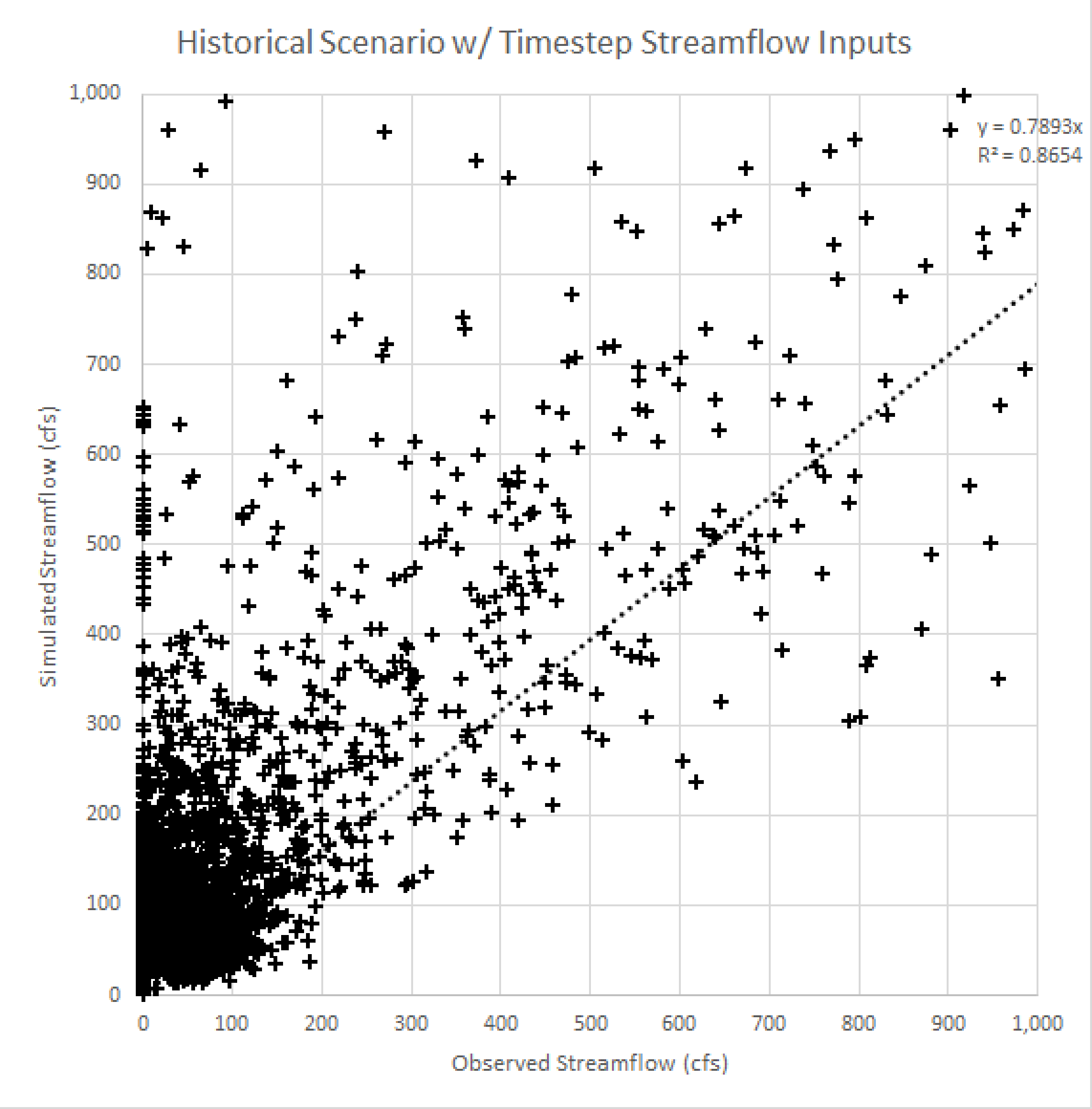
SVIHM Simulation of Streamflow

- Switching to timestep-average stream inflows greatly reduced the scatter in observed versus simulated streamflow
- But high streamflows still under-estimated and low streamflows are still over-estimated



SVIHM Simulation of Streamflow

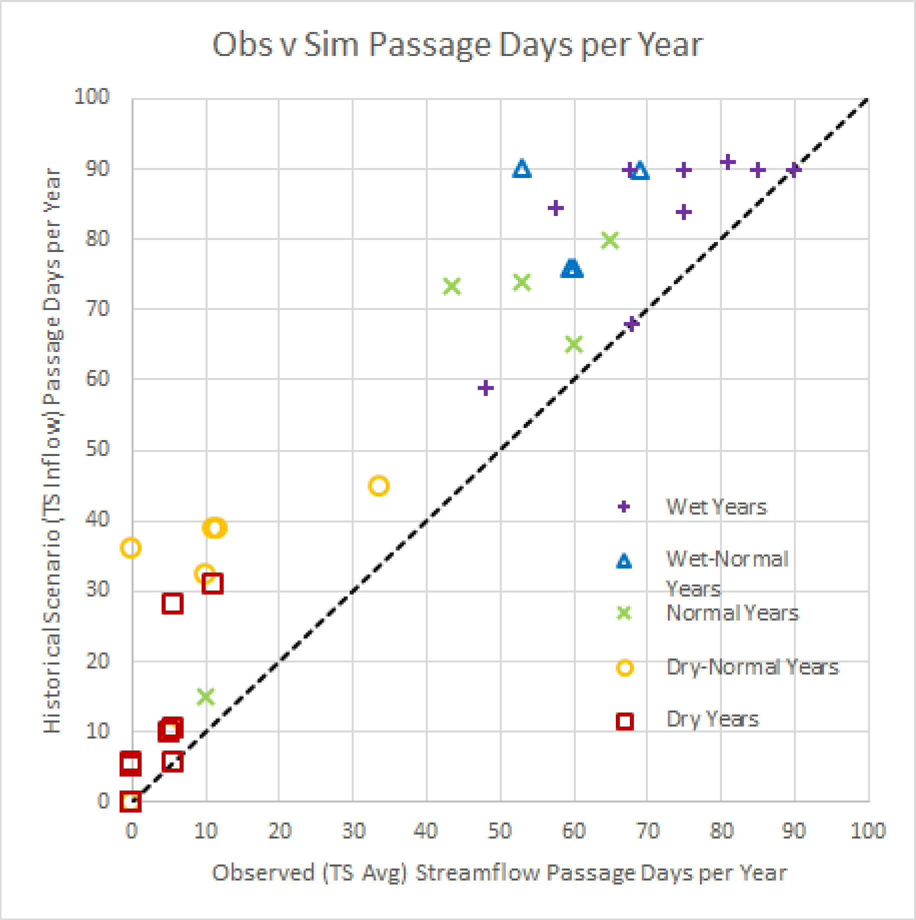
- Still lots of scatter for streamflows below 1,000 cfs, but improved from model with monthly average streamflows



SVIHM Simulation of Passage Days

- Small improvement in model simulation of Passage Days, especially during dry-normal and normal years

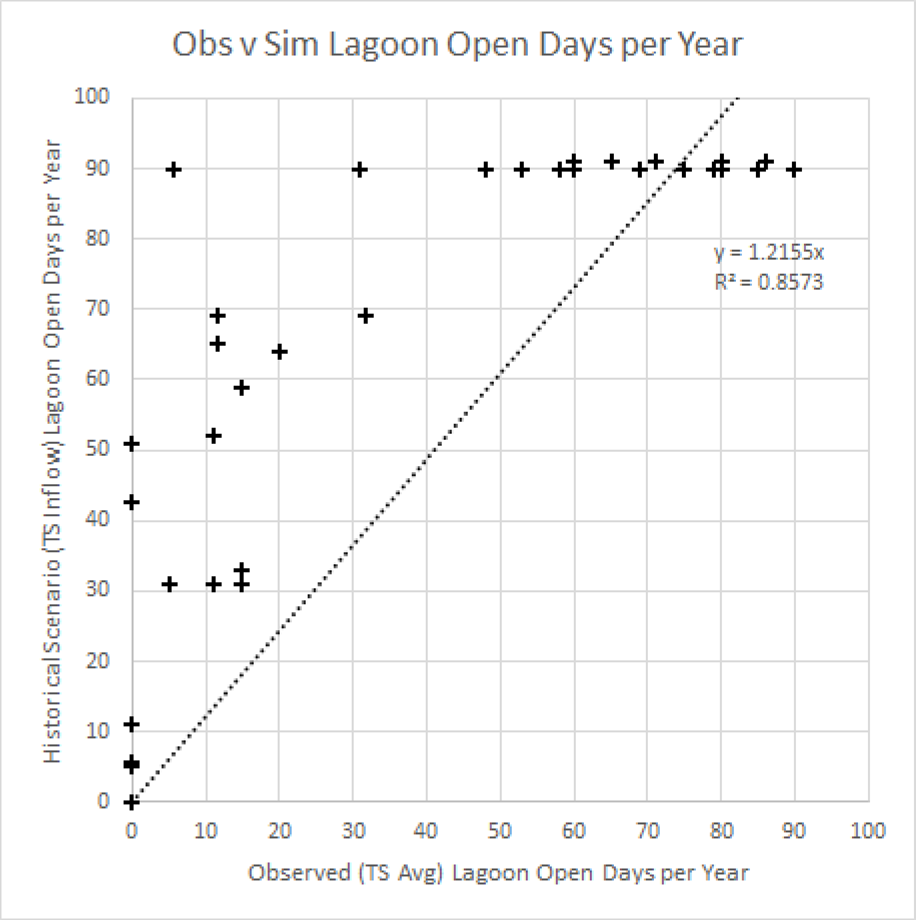
Water Year Type	Observed (Timestep Avg)*	SVIHM (Monthly Inflow)	SVIHM (Timestep Inflow)
All Years	37.2	51.7	47.9
Wet Years	75.9	86.9	85.8
Wet-Normal Years	60.4	82.3	76.4
Normal Years	46.3	73.5	62.4
Dry-Normal Years	10.1	38.8	27.1
Dry Years	2.5	5.6	6.6



SVIHM Simulation of Lagoon Open Days

- Model still over-estimates Lagoon Open days with most improvement during dry and dry-normal years

Water Year Type	Observed (Timestep Avg)	SVIHM (Monthly Inflow)	SVIHM (Timestep Inflow)
All Years	43.9	68.1	64.5
Wet Years	81.8	90.1	90.1
Wet-Normal Years	63.0	90.5	90.5
Normal Years	56.8	87.2	85.2
Dry-Normal Years	22.6	68.7	56.6
Dry Years	6.5	37.2	34.7



Assessment of SVIHM

- Switching to timestep-average inflows in the Salinas River and Arroyo Seco improved the match to observed conditions somewhat, but issues remain

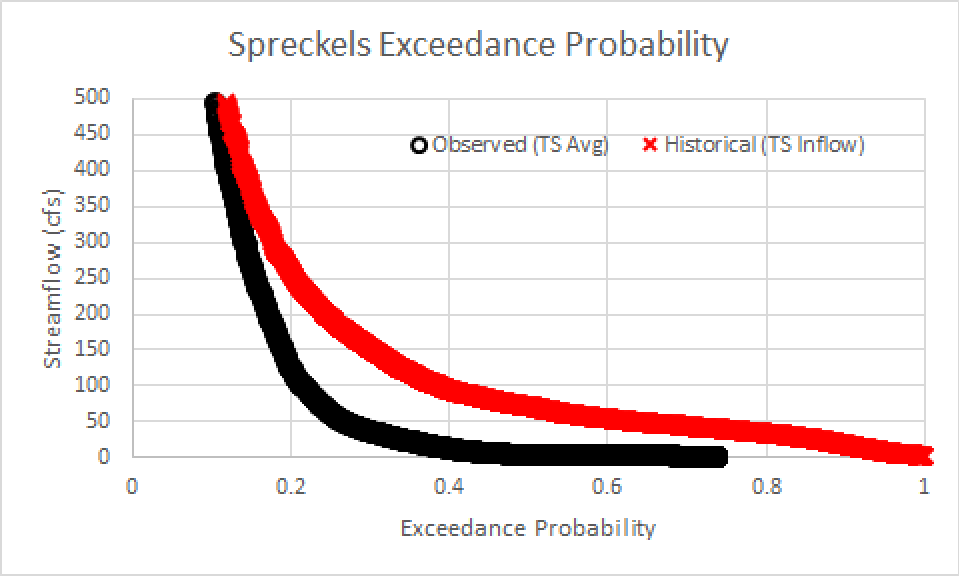
- Further improvement of the SVIHM would require modification of model parameters (e.g., streambed conductance) and re-calibration of the model

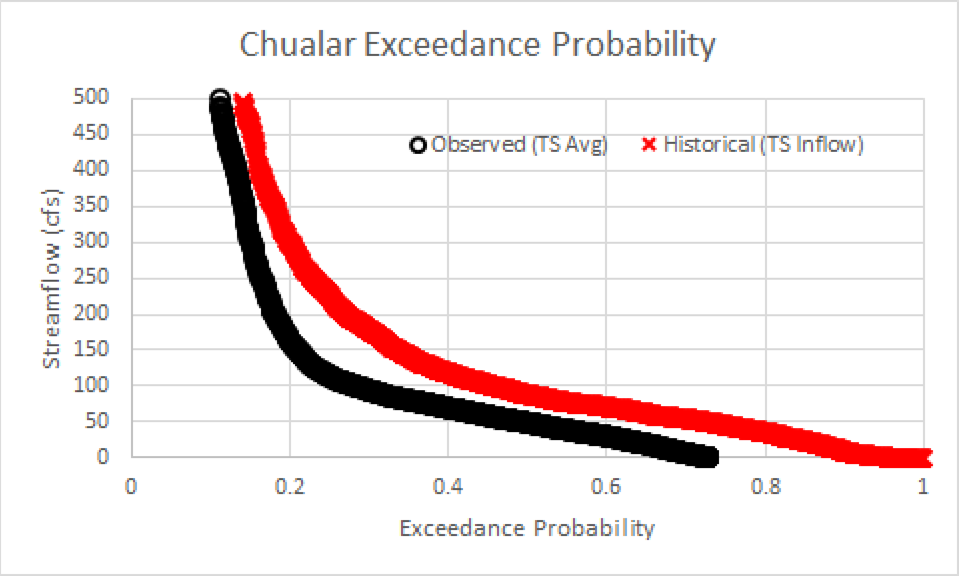
Scaling of Requirements

- Next we looked at whether we can use the relationship between observed and simulated streamflow to improve the estimation of Passage Days

Streamflow Exceedance Probabilities

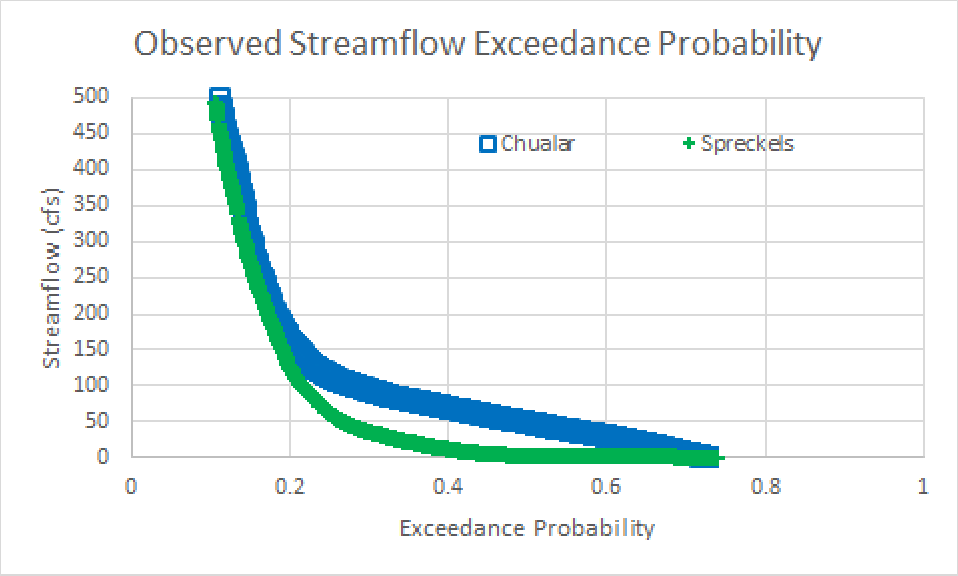
- Simulated streamflow at both Chualar and Spreckels is too high at lower flows

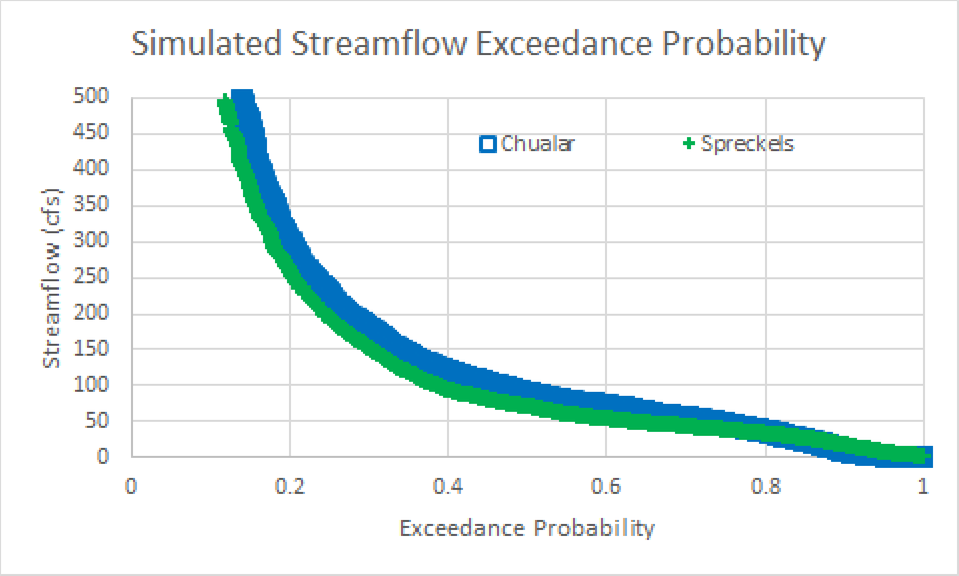

Spreckels Exceedance Probability


Chualar Exceedance Probability

Streamflow Exceedance Probabilities

- Streamflow between Chualar and Spreckels does not fall as much in the model as observed (i.e., streamflow losses are under-estimated)





Streamflow Exceedance Probabilities

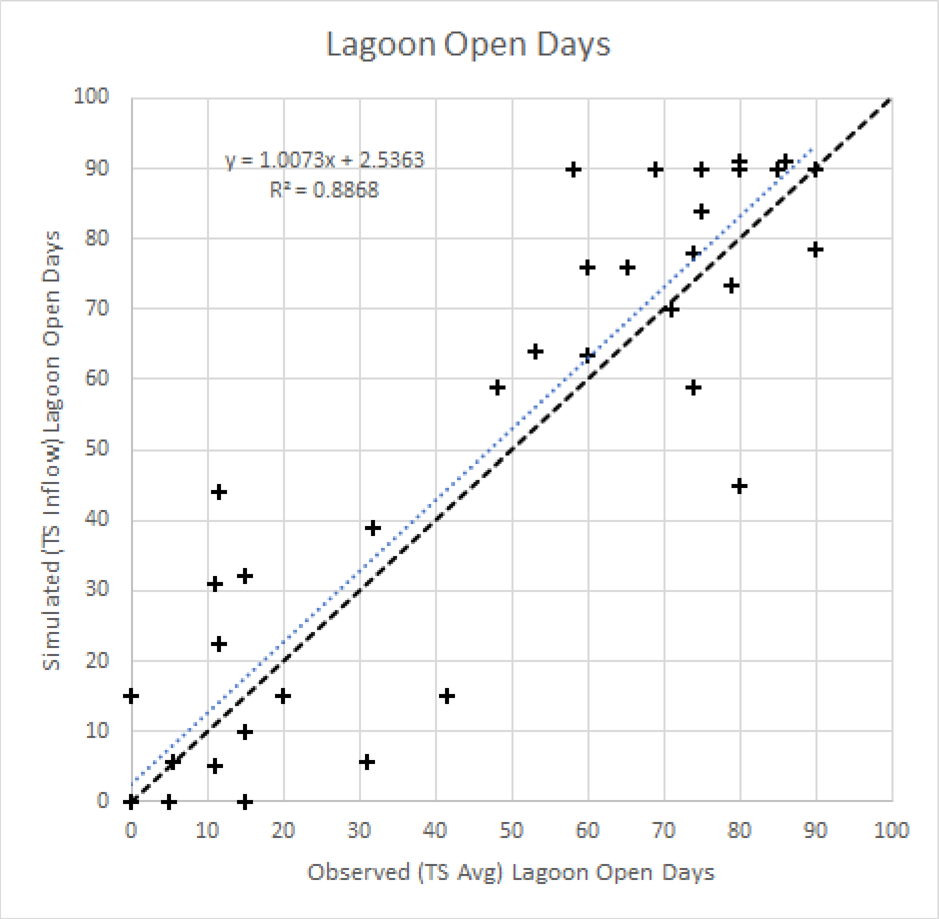
- At Spreckels, an observed streamflow of 80 cfs has the same exceedance probability (23%) as a simulated streamflow of 213 cfs.
- In theory, setting the Lagoon opening threshold at 213 cfs would result in a number of open days in line with reality
- Tested setting a higher threshold* during the migration season (January to March)

*Note that this is external to the model

Modified Lagoon Opening Threshold

- The 240 cfs threshold resulted in an improved match between simulated and observed average annual Lagoon open days for dry to normal years

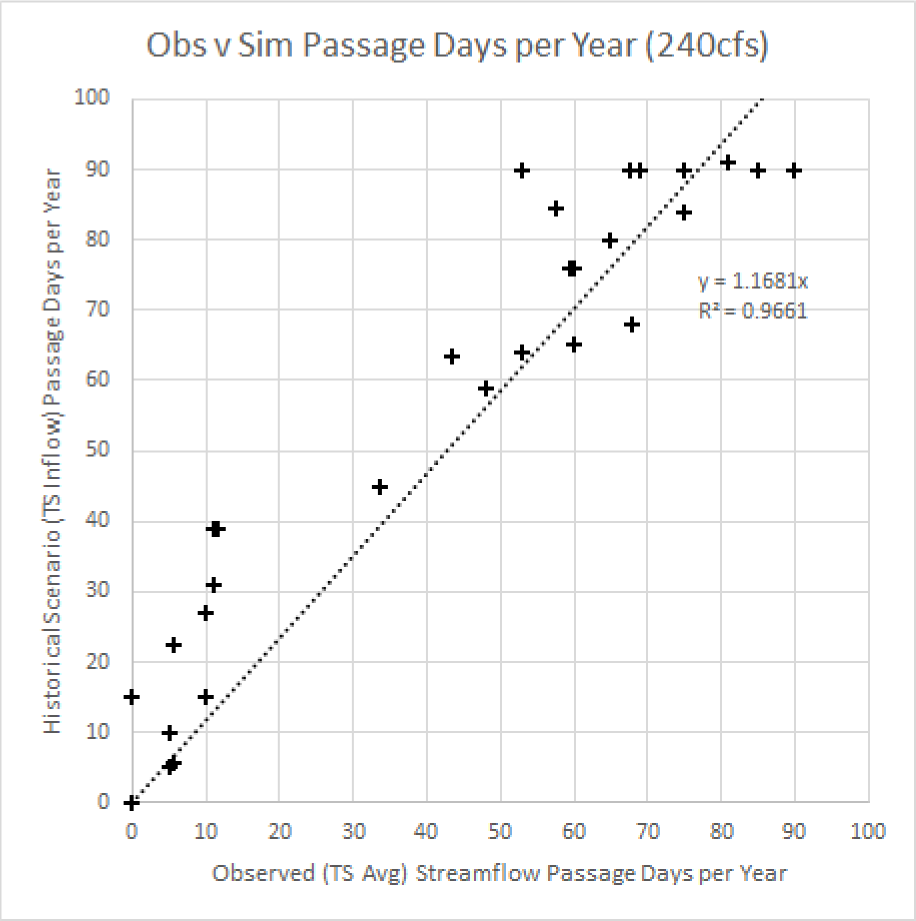
Water Year Type	Observed (Timestep Avg)	Simulated (Timestep Inflow)	Residual	Simulated (240 cfs Spreckels Threshold)	Residual
Wet	43.9	64.5	+20.6	47.4	+3.5
Wet-Normal	80.9	90.1	+9.2	86.0	+5.1
Normal	69.4	86.0	+16.6	78.3	+8.9
Dry-Normal	59.7	86.0	+26.3	63.6	+3.9
Dry	25.0	54.8	+29.8	25.0	+0.0
Dry to Normal	5.3	28.8	+23.5	4.3	-1.0



SVIHM Simulation of Passage Days

- Quantifying Passage Days at Chualar with the modified Lagoon opening threshold at Spreckels
- Slightly better match to observed conditions, but model still over-estimates Passage Days

Water Year Type	Observed (Timestep Avg)	SVIHM (Monthly Inflow)	SVIHM (Timestep Inflow)	SVIHM (240 cfs Threshold)
All Years	37.2	51.7	47.9	47.4
Wet Years	75.9	86.9	85.8	86.5
Wet-Normal Years	60.4	82.3	76.4	78.3
Normal Years	46.3	73.5	62.4	63.6
Dry-Normal Years	10.1	38.8	27.1	25.0
Dry Years	2.5	5.6	6.6	4.3



SVOM Simulation of Passage Days

- Useful to look at Passage Days in the Operational Model as well
  - Note that we do not expect the Operational Model results to look like the observed data because the current reservoir operations approach was not in place throughout the historical period
  - Only Current Operations Scenario results shown here (not other Comparison Point scenarios)

Water Year Type	Observed (Timestep Avg)	SVOM (Monthly Inflow)	SVOM (Timestep Inflow)	SVOM (240 cfs Threshold)
All Years	37.2	49.6	47.7	45.6
Wet Years	75.9	86.5	85.0	84.6
Wet-Normal Years	60.4	72.8	72.0	69.5
Normal Years	46.3	61.6	59.0	56.5
Dry-Normal Years	10.1	42.1	33.4	28.1
Dry Years	2.5	5.4	6.6	4.6

Path Forward

- The model over-estimates Passage Days and Lagoon opening days, but modifications have improved the model performance, and the changed Lagoon opening threshold shows promise

Path Forward

- We propose to use exceedance probability curves to relate observed streamflows to equivalent simulated streamflows
- The equivalent flows will be used to set streamflow requirements and thresholds in the SVOM
- For example:
  - The Current Operations scenario calls for a 260 cfs flow requirement at Chualar when releases are being made to support adult Steelhead migration
  - A 260 cfs streamflow at Chualar has a 16% exceedance probability in the observed record
  - The model simulated streamflow with the same exceedance probability is 400 cfs
  - We would set the Chualar streamflow requirement to 400 cfs in the SVOM

Path Forward

- All modified requirements would be reversed in model post-processing
- Metrics such as simulated Passage Days and Lagoon opening days will be calculated from the model results based on the modified requirements (e.g., simulated streamflow at Spreckels would need to be at least 240 cfs for the Lagoon to be considered open)
- Simulated streamflows would be reported with the modifications reversed

Path Forward

- Before proceeding:
  - Need to show that relationships between observed and simulated streamflow are stable from month to month
  - Need to show that reservoir operations are realistic with the modified streamflow requirements (e.g., that increasing the in-model streamflow requirements does not result in too much reservoir release)
  - Need to be cognizant of effects on groundwater system (e.g., increasing streamflow requirements does not lead to unrealistically high streamflow losses and groundwater levels)

Path Forward

- Note that the changes we will be making will require that we only report average simulated conditions (e.g., by month or water year type), not model results for any specific time, or time series of model results
- The SVIHM and SVOM remain the best available tool for simulating conditions in the integrated groundwater-surface water system

Questions?

Critical Riffle Analysis for Steelhead Migration

Dana Lee – FISHBIO

Salinas River Critical Riffle Analysis

Salinas HCP TAC Meeting

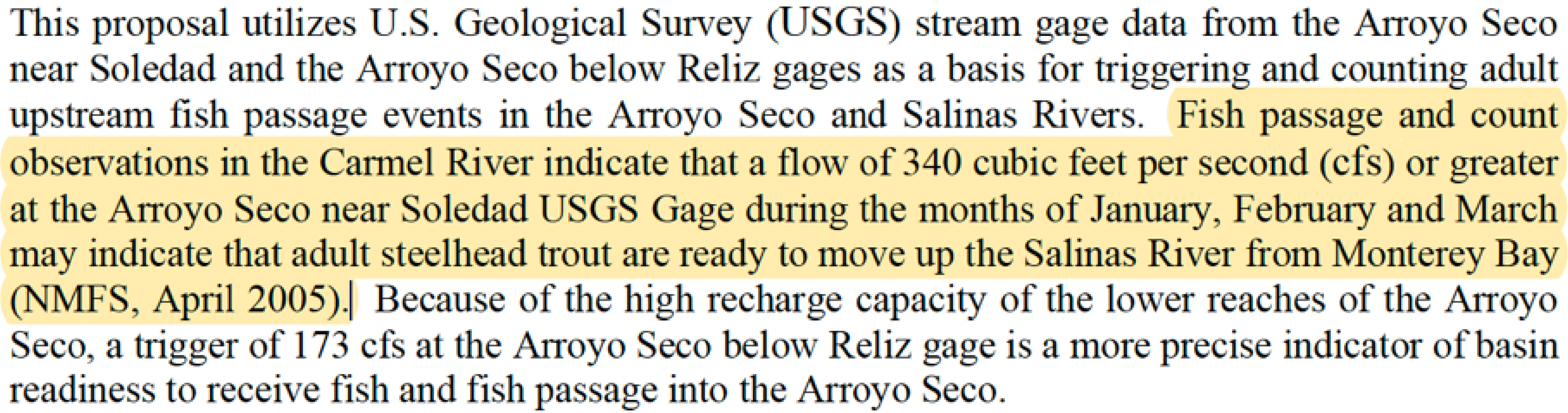
March,7 2024

CRA Overview

- Drone photogrammetry to to establish field-validated thresholds for passage
- Methodology chosen due to limitations of CDFW SOP in sandy channels
  - Minimize field effort
  - Expand spatial coverage
  - Improve modeling flexibility

Previous Thresholds

- Past thresholds based on the Carmel River
- From the Salinas Valley Water Project Flow Prescription for Steelhead Trout (2005):



This proposal utilizes U.S. Geological Survey (USGS) stream gage data from the Arroyo Seco near Soledad and the Arroyo Seco below Reliz gages as a basis for triggering and counting adult upstream fish passage events in the Arroyo Seco and Salinas Rivers. Fish passage and count observations in the Carmel River indicate that a flow of 340 cubic feet per second (cfs) or greater at the Arroyo Seco near Soledad USGS Gage during the months of January, February and March may indicate that adult steelhead trout are ready to move up the Salinas River from Monterey Bay (NMFS, April 2005). Because of the high recharge capacity of the lower reaches of the Arroyo Seco, a trigger of 173 cfs at the Arroyo Seco below Reliz gage is a more precise indicator of basin readiness to receive fish and fish passage into the Arroyo Seco.

Pilot Studies

- Initial pilot surveys in June 2022
- Drone-derived DEMs used to develop an exploratory model
- Several lessons learned
- Model improvements based on initial results

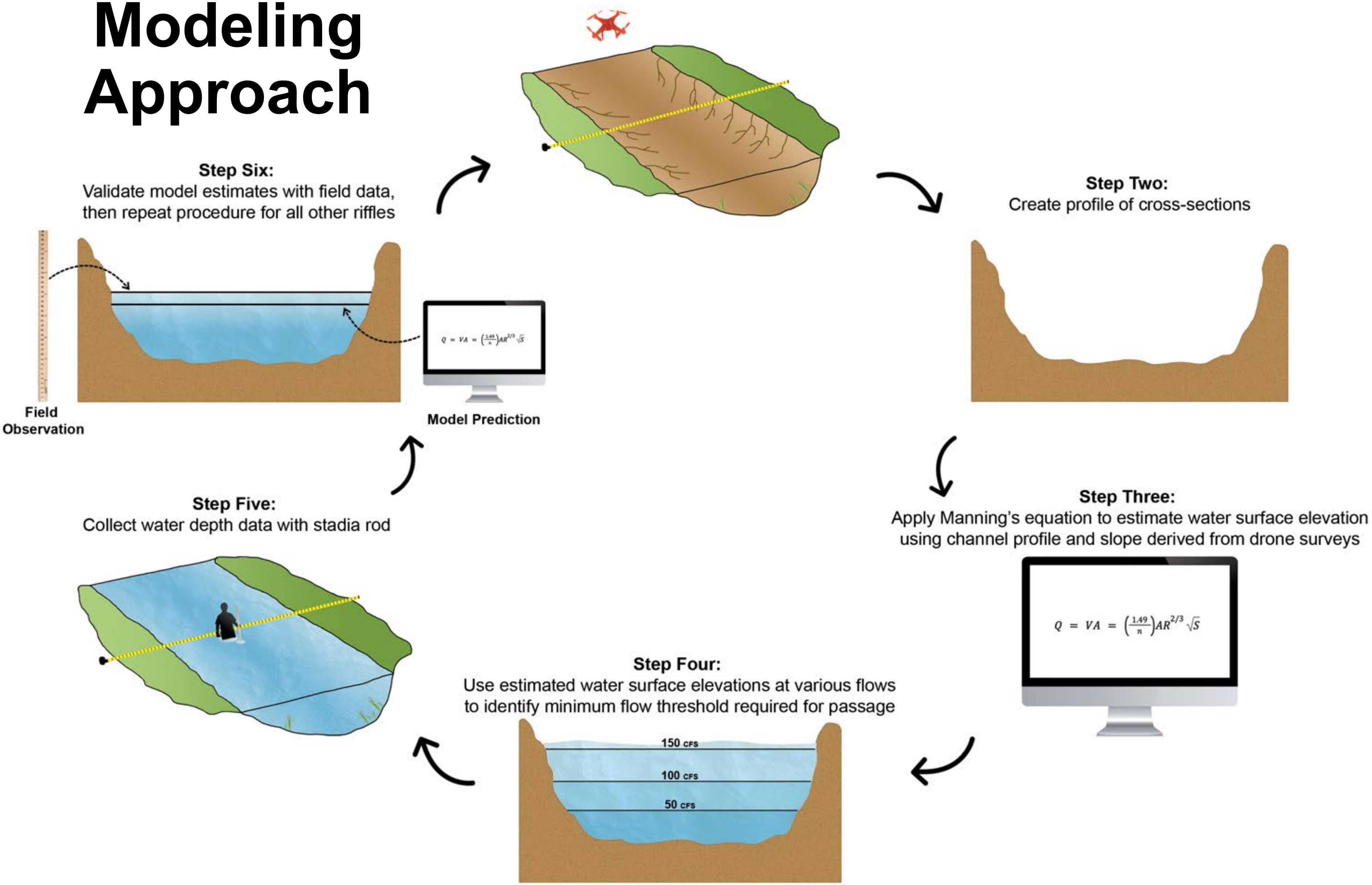
Literature Review on Steelhead Passage Criteria

Most commonly used depth threshold	**0.7 feet**	**Total range of adult depth thresholds used across all studies**	**0.6 feet – 1 foot (values as low as 0.35 feet used for non-anadromous trout)**
Literature referenced in setting thresholds		Bell 1986 Bjornn and Resier 1991 CDFW 2012 Dane 1978 Dryden and Stein 1975 Evans and Johnston 1980 Powers and Orsborn 1985 SWRCB 2014 Thompson 1970 Thompson 1972 – most commonly cited Webb 1975	

Selecting A Target Threshold

- Most commonly used criteria (Thompson 1972) are a useful guideline for understanding passage ability
- Thompson: "*I might caution that the relationship between flow conditions on the transect and the relative ability of fish to pass has not been evaluated.*"
- Lit review failed to find sufficient evidence to recommend alternative passage thresholds
- Model "A" – 25% of wetted width ≥0.7 feet in depth, and ≥10% of this depth is contiguous

Modeling Approach



Step One:
Develop DEM's from drone surveys

Step Two:
Create profile of cross-sections

Step Three:
Apply Manning's equation to estimate water surface elevation using channel profile and slope derived from drone surveys

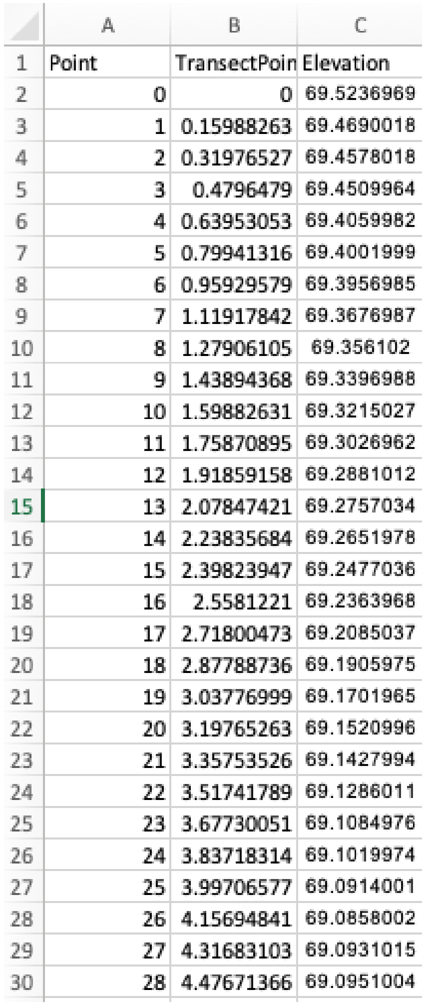
Step Four:
Use estimated water surface elevations at various flows to identify minimum flow threshold required for passage

Step Five:
Collect water depth data with stadia rod

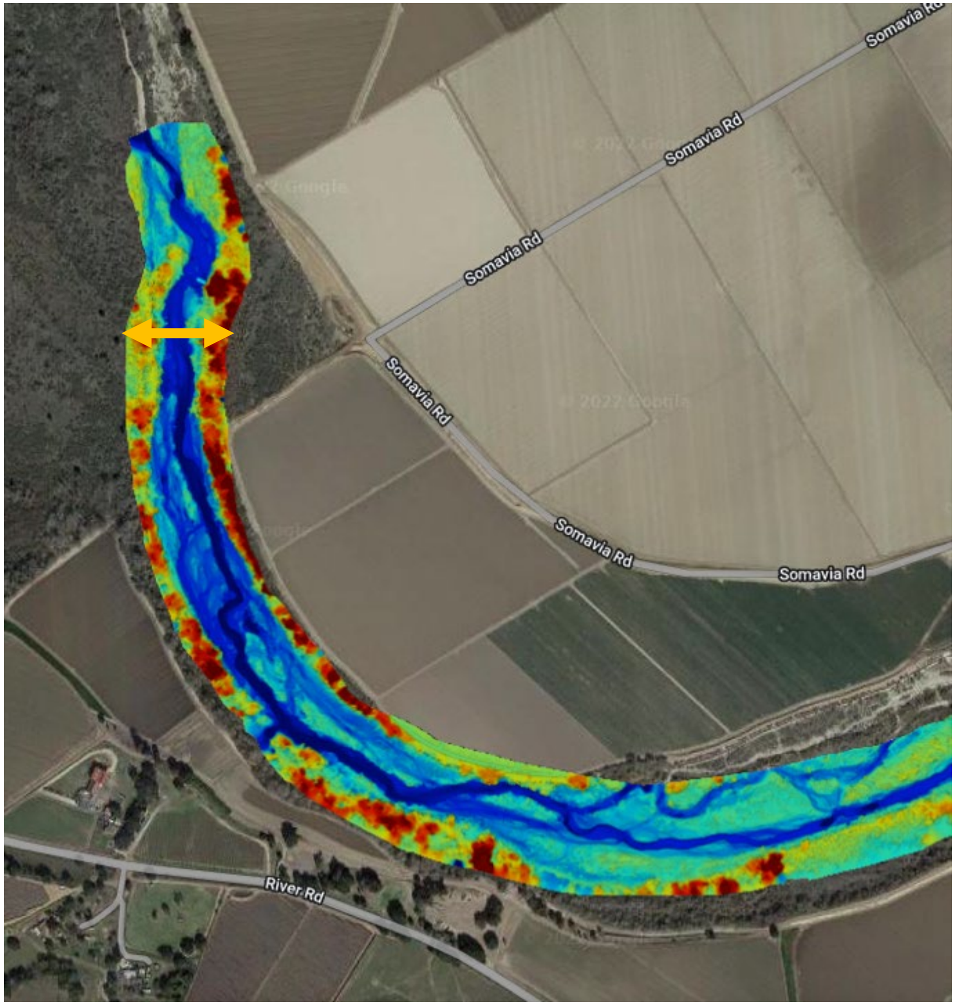
Step Six:
Validate model estimates with field data, then repeat procedure for all other riffles

Step 1

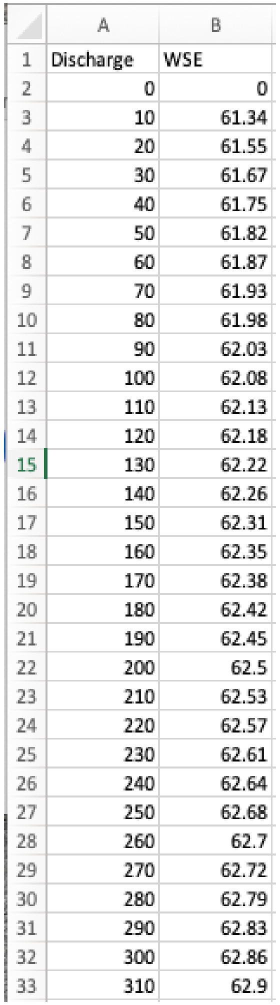
Step 2



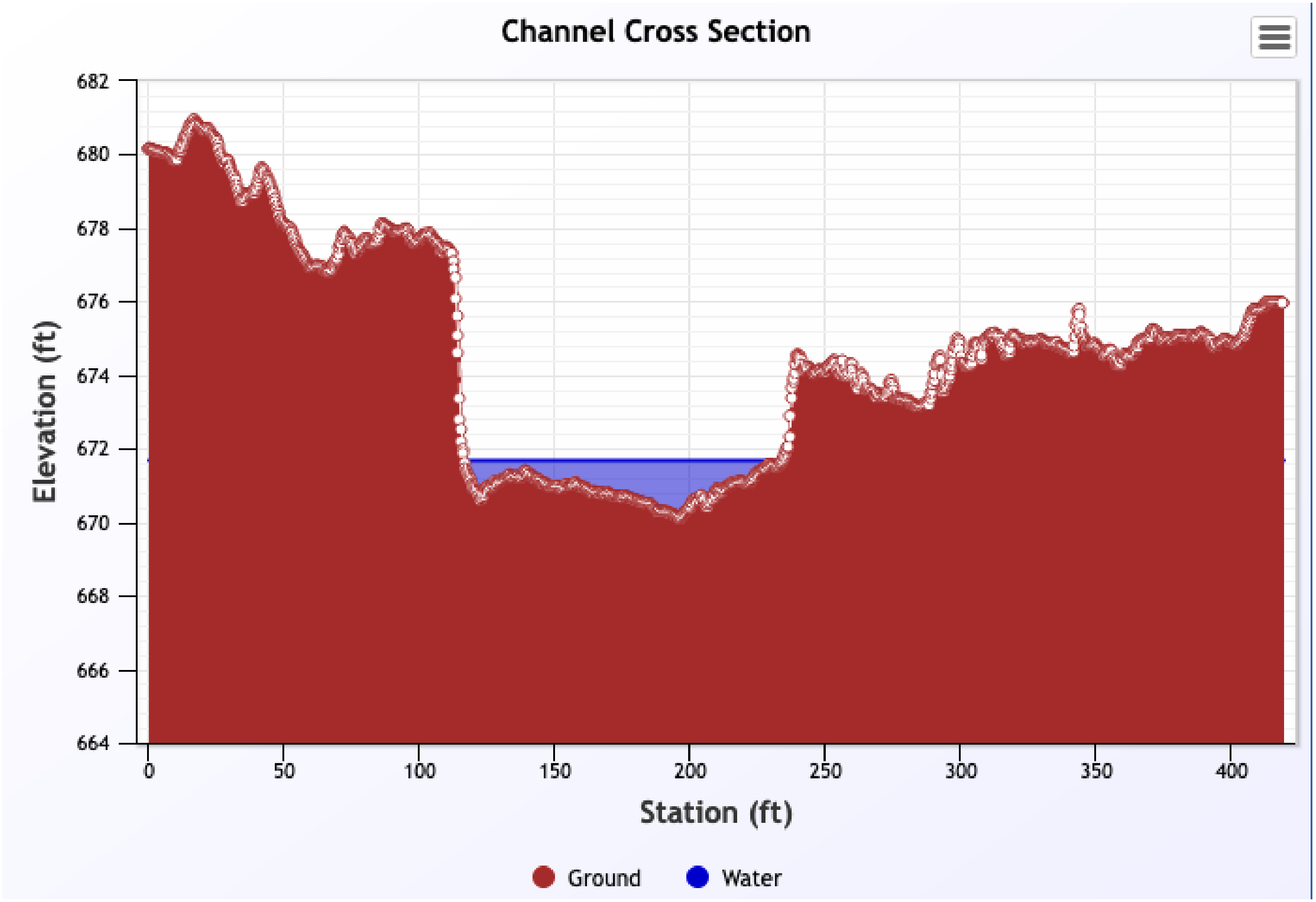
	A	B	C
1	Point	TransectPoin	Elevation
2	0	0	69.5236969
3	1	0.15988263	69.4690018
4	2	0.31976527	69.4578018
5	3	0.4796479	69.4509964
6	4	0.63953053	69.4059982
7	5	0.79941316	69.4001999
8	6	0.95929579	69.3956985
9	7	1.11917842	69.3676987
10	8	1.27906105	69.356102
11	9	1.43894368	69.3396988
12	10	1.59882631	69.3215027
13	11	1.75870895	69.3026962
14	12	1.91859158	69.2881012
15	13	2.07847421	69.2757034
16	14	2.23835684	69.2651978
17	15	2.39823947	69.2477036
18	16	2.5581221	69.2363968
19	17	2.71800473	69.2085037
20	18	2.87788736	69.1905975
21	19	3.03776999	69.1701965
22	20	3.19765263	69.1520996
23	21	3.35753526	69.1427994
24	22	3.51741789	69.1286011
25	23	3.67730051	69.1084976
26	24	3.83718314	69.1019974
27	25	3.99706577	69.0914001
28	26	4.15694841	69.0858002
29	27	4.31683103	69.0931015
30	28	4.47671366	69.0951004



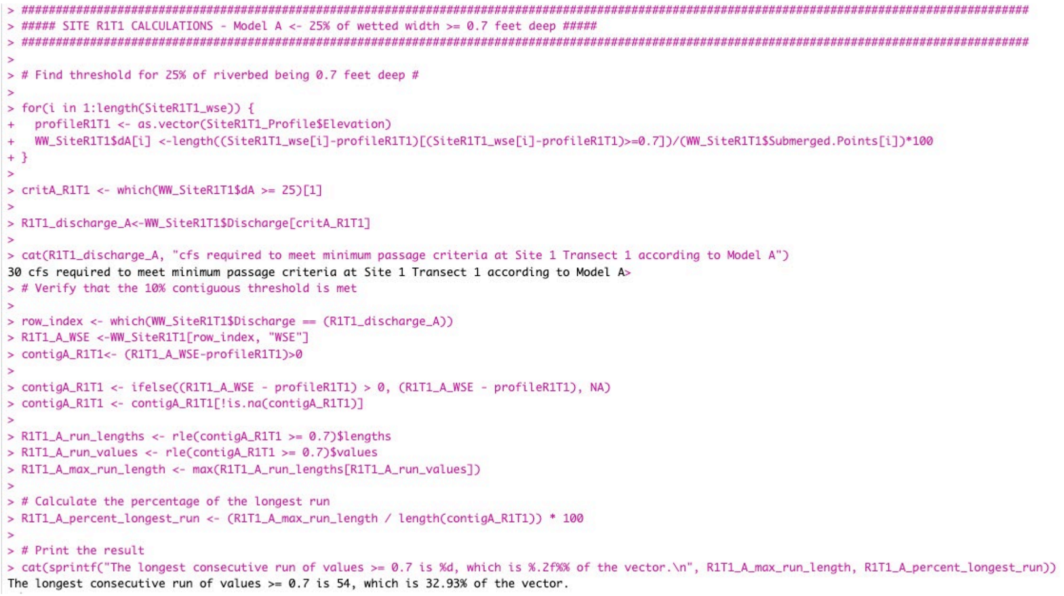
Step 3



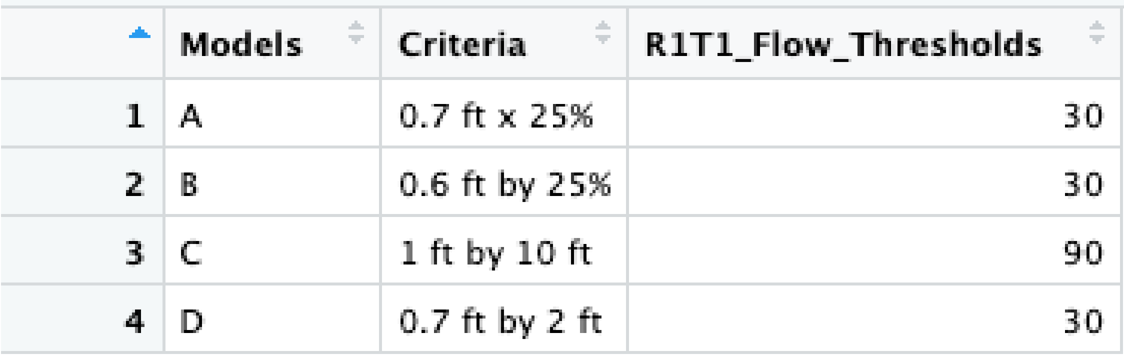
	A	B
1	Discharge	WSE
2	0	0
3	10	61.34
4	20	61.55
5	30	61.67
6	40	61.75
7	50	61.82
8	60	61.87
9	70	61.93
10	80	61.98
11	90	62.03
12	100	62.08
13	110	62.13
14	120	62.18
15	130	62.22
16	140	62.26
17	150	62.31
18	160	62.35
19	170	62.38
20	180	62.42
21	190	62.45
22	200	62.5
23	210	62.53
24	220	62.57
25	230	62.61
26	240	62.64
27	250	62.68
28	260	62.7
29	270	62.72
30	280	62.79
31	290	62.83
32	300	62.86
33	310	62.9



Step 4



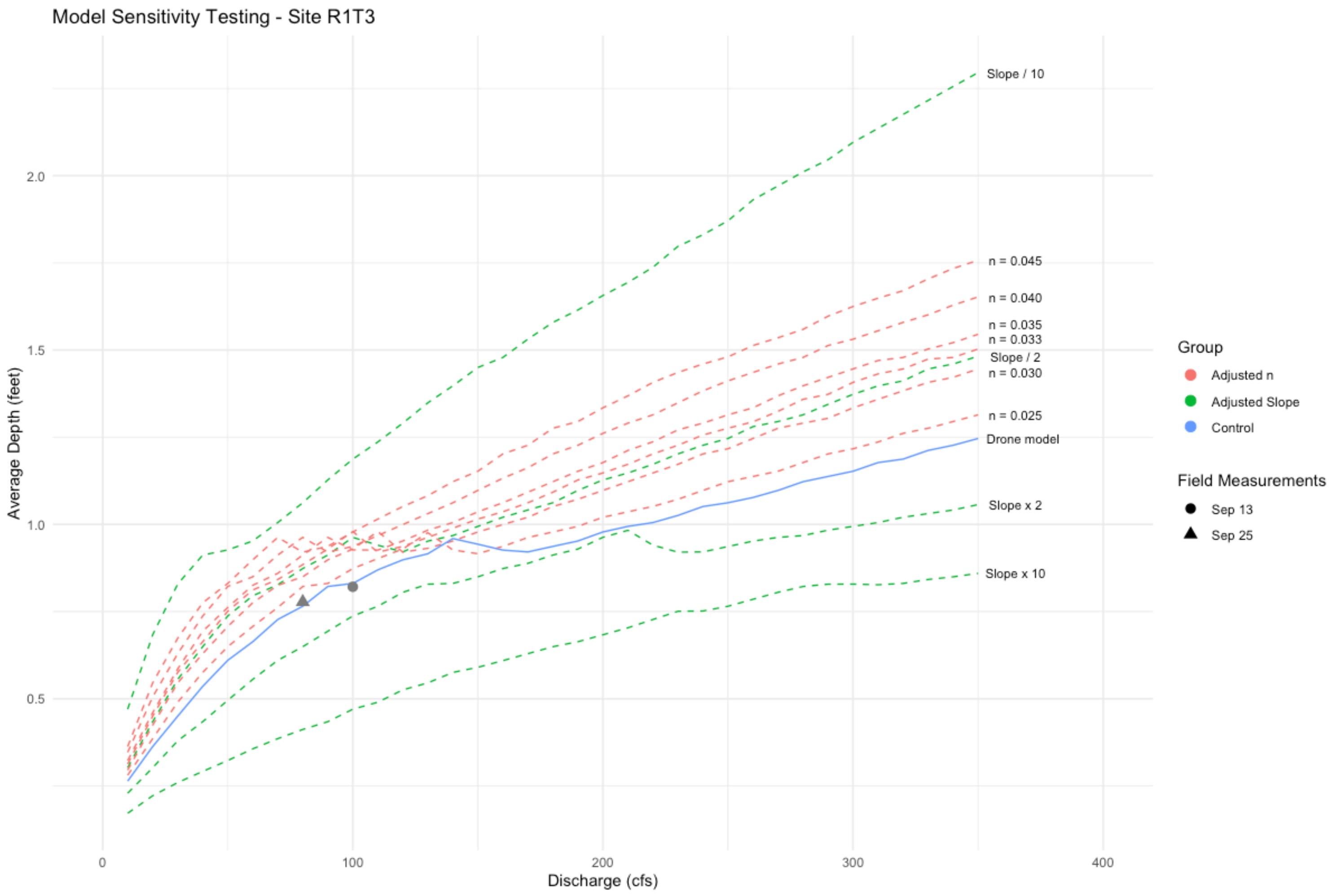
```
> ###################################################################################################################################################
> ##### SITE R1T1 CALCULATIONS - Model A <- 25% of wetted width >= 0.7 feet deep #####
> ###################################################################################################################################################
>
> # Find threshold for 25% of riverbed being 0.7 feet deep #
>
> for(i in 1:length(SiteR1T1_wse)) {
+   profileR1T1 <- as.vector(SiteR1T1_Profile$Elevation)
+   WW_SiteR1T1$dA[i] <-length((SiteR1T1_wse[i]-profileR1T1)[(SiteR1T1_wse[i]-profileR1T1)>=0.7])/(WW_SiteR1T1$Submerged.Points[i])*100
+ }
>
> critA_R1T1 <- which(WW_SiteR1T1$dA >= 25)[1]
>
> R1T1_discharge_A<-WW_SiteR1T1$Discharge[critA_R1T1]
>
> cat(R1T1_discharge_A, "cfs required to meet minimum passage criteria at Site 1 Transect 1 according to Model A")
30 cfs required to meet minimum passage criteria at Site 1 Transect 1 according to Model A>
> # Verify that the 10% contiguous threshold is met
>
> row_index <- which(WW_SiteR1T1$Discharge == (R1T1_discharge_A))
> R1T1_A_WSE <-WW_SiteR1T1[row_index, "WSE"]
> contigA_R1T1<- (R1T1_A_WSE-profileR1T1)>0
>
> contigA_R1T1 <- ifelse((R1T1_A_WSE - profileR1T1) > 0, (R1T1_A_WSE - profileR1T1), NA)
> contigA_R1T1 <- contigA_R1T1[!is.na(contigA_R1T1)]
>
> R1T1_A_run_lengths <- rle(contigA_R1T1 >= 0.7)$lengths
> R1T1_A_run_values <- rle(contigA_R1T1 >= 0.7)$values
> R1T1_A_max_run_length <- max(R1T1_A_run_lengths[R1T1_A_run_values])
>
> # Calculate the percentage of the longest run
> R1T1_A_percent_longest_run <- (R1T1_A_max_run_length / length(contigA_R1T1)) * 100
>
> # Print the result
> cat(sprintf("The longest consecutive run of values >= 0.7 is %d, which is %.2f%% of the vector.\n", R1T1_A_max_run_length, R1T1_A_percent_longest_run))
The longest consecutive run of values >= 0.7 is 54, which is 32.93% of the vector.
```



	Models	Criteria	R1T1_Flow_Thresholds
1	A	0.7 ft x 25%	30
2	B	0.6 ft by 25%	30
3	C	1 ft by 10 ft	90
4	D	0.7 ft by 2 ft	30

Step 5

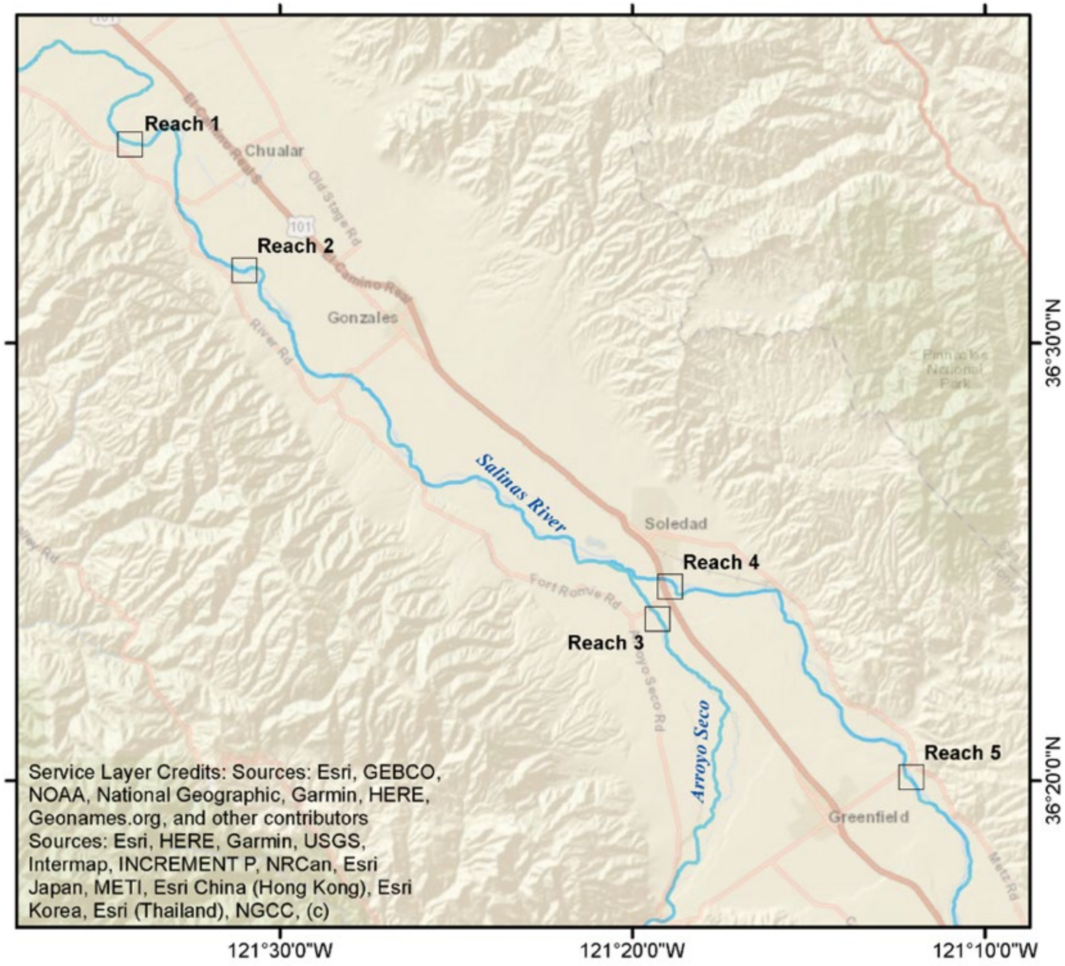
Step 6


Model Sensitivity Testing - Site R1T3
Average Depth (feet)
2.0
1.5
1.0
0.5
0
100
200
300
400
Discharge (cfs)
Slope / 10
n = 0.045
n = 0.040
n = 0.035
n = 0.033
Slope / 2
n = 0.030
n = 0.025
Drone model
Slope x 2
Slope x 10
Group
Adjusted n
Adjusted Slope
Control
Field Measurements
Sep 13
Sep 25

Timeline of Data Collection

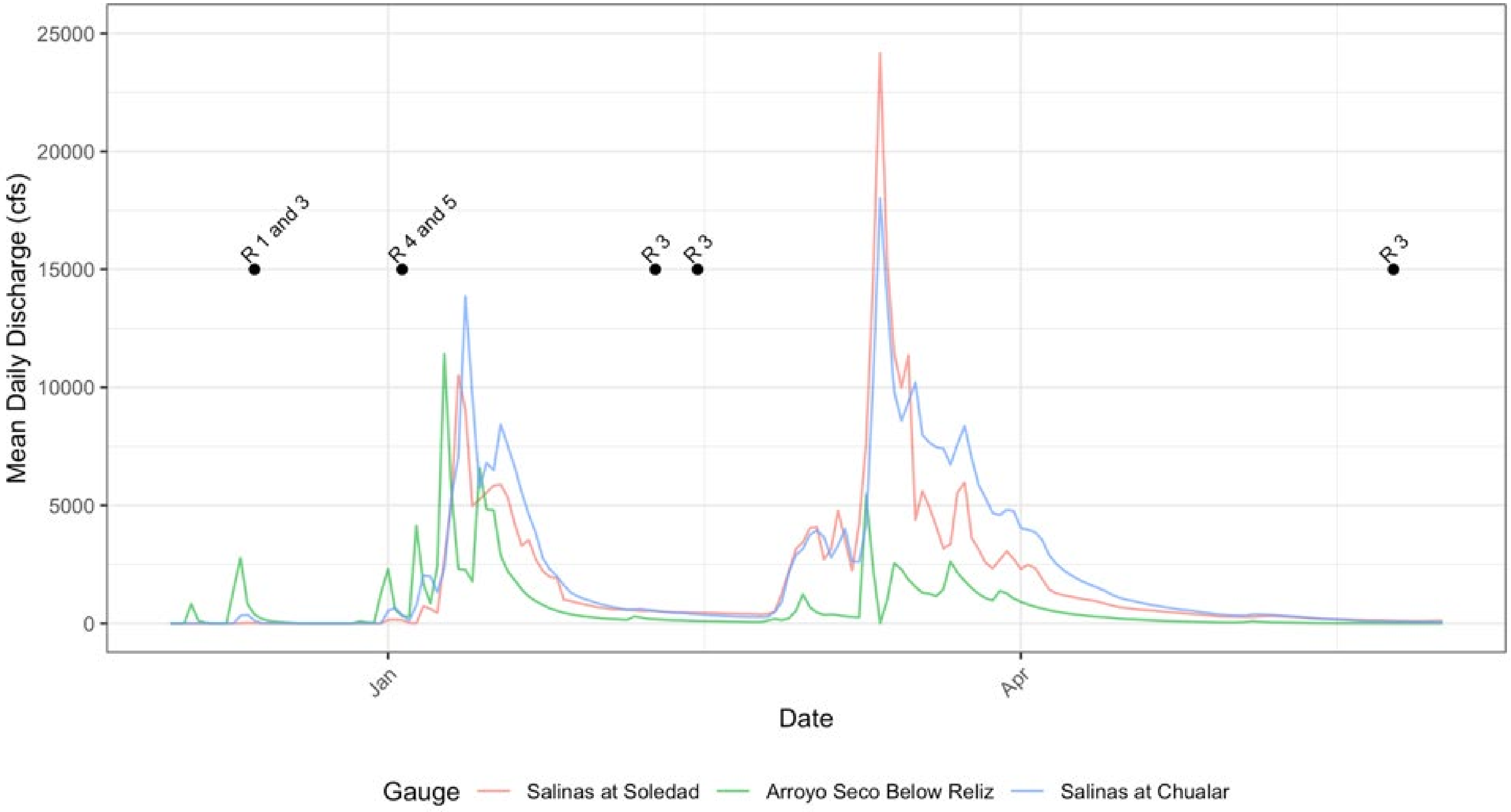
- December 2022 through December 2023
- A total of 10 days spent collecting field validation data across flows of ~30-400 cfs
- First Round – December 22 and January 23; nine transects across reaches 1, 4, and 5
- Major channel altering event in March of 2023 (peak flow of 24,000 cfs)
- Second Round – June, September, and December 2023;14 transects across reaches 1, 2, 4, and 5

Target Reaches

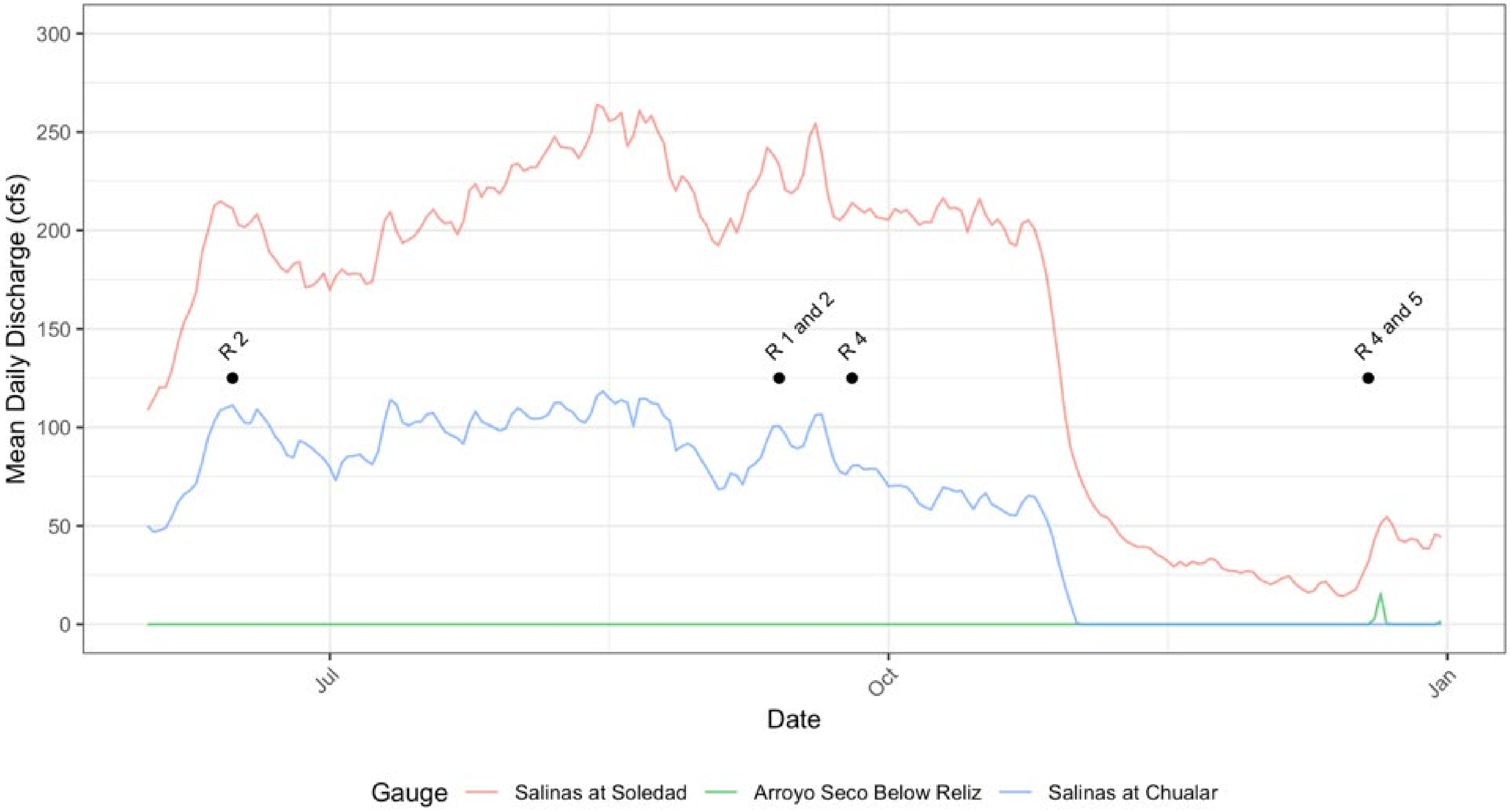


Service Layer Credits: Sources: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributors Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)

Timeline of Data Collection
First Round of Modeling



Timeline of Data Collection
Second Round of Modeling



Profile Survey Period	Profile Survey Method	Gauge	Reach	Number of Transects Assessed	Average Passage Threshold (cfs)	Standard Deviation of Passage Threshold (cfs)	Maximum Threshold
December, 2022	Drone	Chualar	1	3	46.67	11.55	80.00
November, 2023	Drone	Chualar	1	4	37.50	17.08	60.00
November, 2023	Drone	Chualar	2	3	46.67	11.55	60.00
December, 2022	Drone	Soledad	4	4	47.50	23.63	80.00
December, 2023	Laser Level	Soledad	4	3	116.67	55.08	180.00
December, 2022	Drone	Soledad	5	2	75.00	42.43	110.00
December, 2023	Laser Level	Soledad	5	4	127.50	93.59	220.00
				Chualar Average	**43.61 cfs**	**Chualar Maximum**	**80.00 cfs**
				Soledad Average	**91.67 cfs**	**Soledad Maximum**	**220.00 cfs**

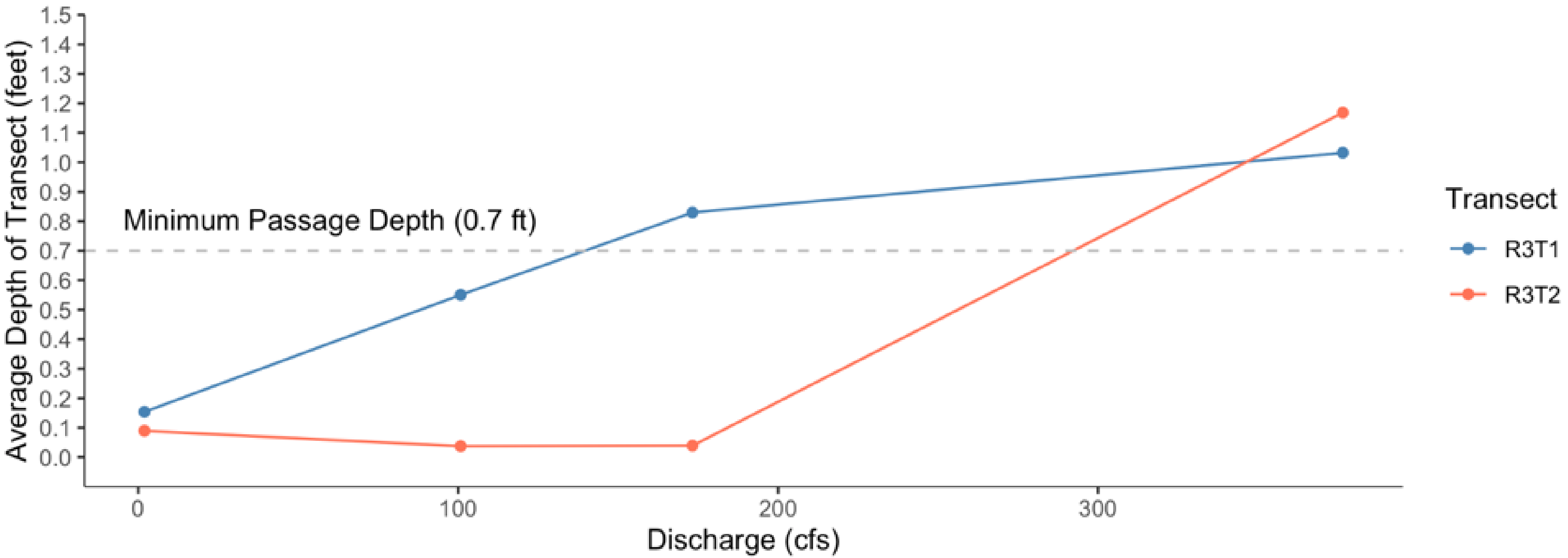
Field Survey Date	Reach	Number of Transects Assessed	Average Difference between Model and Field Values (inches)	Standard Deviations of Differences between Model and Field Values (inches)
12/13/22	1	3	-1.52	3.36
01/03/23	4	4	-0.87	1.57
01/03/23	5	2	-1.08	1.70
09/13/23	1	4	-1.17	1.34
09/13/23	2	3	-3.08	0.77
09/25/23	1	4	-0.45	1.11
12/18/23	5	4	-0.78	2.00
12/19/23	4	4	-0.06	1.41
06/15/23	2	3	-3.6	0.48
		Overall Average	**-1.13**	

Site	Mean Difference Between Model Outputs and Field Measured Depths (in)	Standard Deviation of Difference (in)	Profile Measurement Method	Field Depth Measurement Method	Days Between Profile and Field Depth Measurement
Reach 1	0.42	3.36	Drone	ADCP/Stadia	7
Reaches 4 and 5	-0.94	1.43	Drone	ADCP	-14
Reach 2	**-3.60**	**0.48**	**Drone**	**Stadia**	**145**
Reaches 1 and 2	**-1.66**	**1.46**	**Drone**	**Stadia**	**55**
Reach 1	-0.45	1.11	Drone	Stadia	43
Reach 4	**-3.72**	**3.17**	**Laser Level**	**Stadia**	**85**
Reaches 4 and 5	-0.57	1.70	Laser Level	Stadia	0

Arroyo Seco (Reach 3)

- Drone-based model did not work well in Arroyo Seco
- Differences in substrate (Manning’s n)
- Challenges in getting elevation profiles
- Average transect depths were plotted against discharge to gain insight into the flow thresholds

Arroyo Seco (Reach 3)



- Assessment suggests that a minimum discharge of approximately 90 cfs would achieve Model A passage criteria at the Reach 3 Transect 1
- Reach 3 Transect 2 did not meet passage criteria at discharges greater than this
- Suggests the true minimum to allow passage would be somewhat higher

Arroyo Seco (Reach 3)

- Arroyo Seco is not under the control of water managers, but identifying a passage threshold would improve understanding of the flow conditions required to allow steelhead access.
- Development of a data-informed passage threshold would require additional field sampling across a wider range of flows, particularly on the descending limb of the hydrograph.
- Given the ephemeral nature of the river, it likely does not experience extended periods of water surface elevations near the margin of passability

Key Takeaways

- Model predictions appeared to align well with field data that were collected within a short period after mapping flights
- A minimum flow of 80 cfs as measured at Chualar would achieve CDFW passage criteria (80% buffer over mean threshold)

Key Takeaways (continued)

- This passage threshold at Chualar would also achieve estimated passage thresholds near Soledad
- Agreement with Cluer and McKeon (2005)
  - They determined minimum flows for passage ranged from 150-230 cfs at transects in Soledad
  - This matches with predicted flows at Soledad (150-208 cfs) corresponding to the threshold flow of 80 cfs at Chualar

Key Takeaways (continued)

- New flow targets will need to be developed collaboratively with NMFS and others
- No final determinations have been made about new flow targets
- Meeting tomorrow (March 8) to discuss results with NMFS technical team
- Final flow targets may incorporate additional information and constraints

Questions?

FISHBIO
Oakdale, California
Chico, California
Santa Cruz, California

FISHBIO Laos
Vientiane Capital, Lao PDR

FISHBIO CR
Boca del Rio Sierpe
Costa Rica

Addressing Future Projects with Operational Impacts

Bernadette Clueit – ICF

Developing a Covered Activities List

Step 1: Compile all potential activities

- ➢All actions that could result in take of listed species for which permit will be applicable
    - Specific projects
    - On-going operations or maintenance
    - Include restoration, habitat enhancement, monitoring

Step 2: Apply screening criteria

- ➢Defensible and consistent method of determining covered activities

Step 3: Draft, review, and finalize covered activities

Covered Activity Screening Criteria

- **Control or Authority.** The covered activity **must be under the direct control** of the permittee, or the permittee has the authority for direct control through their jurisdiction or regulation (e.g., a permit or authorization).
- **Location.** The covered activity will occur within the permit area.
- **Timing.** The covered activity will occur during the permit term. For now, we assume that the permit term may be 15-30 years.
- **Impact.** The covered activity has a reasonable likelihood of resulting in take as defined by the ESA of one or more covered species.
- **Project Definition.** **The location, footprint, and type of impacts** resulting from the activity **are well understood and can be evaluated** in the Plan to the satisfaction of USFWS, NMFS, and CDFW. Specifically, the impacts resulting from the activity and associated mitigation must be technically and economically feasible and can be reasonably evaluated in the plan.
- **Practicability**. The activity can be included in the Plan **without substantially increasing** the scope and cost of Plan development or implementation (e.g., adding new covered species, adding significant complexity to the analysis, or adding significant new controversy).

Adding Future Projects

Tiered Plan

- Build the project in with a trigger for future implementation
- Utilized in development plans with uncertainty around intensity of future development
- Project must be well enough understood to meet covered activity criteria

Plan Amendment

Plan Amendment Process

Minor Amendment

- No increase to incidental take limits
- Covered activities do not change beyond what was originally analyzed

Major Amendment

- Change to the Plan that may affect impact analysis or conservation strategy
- Requires same formal review process as original Plan and permit (NEPA, Federal Register notice, internal Section 7)

Plan Amendment Process con't

USFWS and NMFS Responsibility

- Determine level of review needed for amendment under ESA, NEPA, and other related regulations
- Review of No Surprises assurances to confirm they remain sufficient
- Compliance review - permit cannot be renewed, amended or transferred if there are compliance deficiencies with original permit

Major Considerations

- Unauthorized take of an ESA-listed species is a violation of the ESA
- There is no take authorization during the plan development process
- Existing permit remains in place during amendment process, thereby providing take coverage throughout the process and limiting liability
- Implementation and monitoring of the HCP will inform any new negotiation with Services

Questions and Comments?

Project Information:

salinasrivermanagementprogram.org

Project Team Contact:

SalinasRiverHCP@icf.com