

CVPIA Science Integration Team Meeting

Day One: October 14, 2020





CVPIA SIT Meeting October 14-15, 2020

Agenda Day 1: 9:00am-3:30pm

- 9:10-9:30 **Near-term Restoration Strategy** – Mike Urkov
- 9:30-10:00 **NTRS Schedule** – Megan Cook
- 10:00-10:10 **BREAK**
- 10:10-11:40 **Subgroup Reports**
 - *Proposal*: Survival in the Delta – Cyril Michel
 - *Proposal*: Survival in Sac River – Cyril Michel
 - *Proposal*: Habitat Inputs – Mark Tompkins
 - *Update*: Predator Contact Points – Cyril Michel
 - *Update*: Salmon Demographics – Mike Beakes
 - *Update*: Food 4 Fish – Rod Wittler and Mike Beakes
- 11:40-12:40 **Lunch Break**



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Agenda Day 1: 9:00am-3:30pm

- 12:40-1:10 **Comparison of NTRS Priorities w/ Funded Actions** – Rod Wittler, Mike Urkov
- 1:10-1:50 **Buffer Time for Unresolved Discussions**
 - If open, will move up Data Guidance and EDI Demo (Sadie Gill)
- 1:50-2:10 **BREAK**
- 2:10-2:50 **Agency Briefing on CVP LTO, BiOp, Implementation** – Dave Mooney (USBR), Garwin Yip (NMFS), Donnie Ratcliff (FWS)
- 2:50-3:20 **SIT and Other Science Partnerships**
 - CSAMP & Coordinated Salmon Science Plan (Bruce DiGennaro)
 - Sacramento River Science Partnership (Thad Bettner, Denise Reed)
- 3:20-3:30 **Preview of Day 2 and Adjourn**



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Agenda Day 2: 9:00am-12:00pm

- 9:05-9:20 **Monitoring Requirements** – Jim Peterson, Adam Duarte
- 9:20-9:50 **Data Guidance / EDI Demonstration** – Sadie Gill
- 9:50-11:10 (w/ break) **Project Updates (Monitoring and Data Focus)**
 - Clear Creek Phase 2A & 3C – Derek Rupert
 - Yuba Hallwood – Paul Cadrett
 - Stanislaus – JD Wikert
 - Stanislaus gravel – John Hannon
 - American River – John Hannon
 - Upper Sac – John Hannon, Mandi Bright
- 11:10-11:40 **Monitoring and Data Synthesis Discussion**
- 11:40-12:00 **Next Steps and New Business**



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Near-term Restoration Strategy Next Steps and Takeaways

Mike Urkov, FlowWest



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Reminder: Updates and Primary Edits

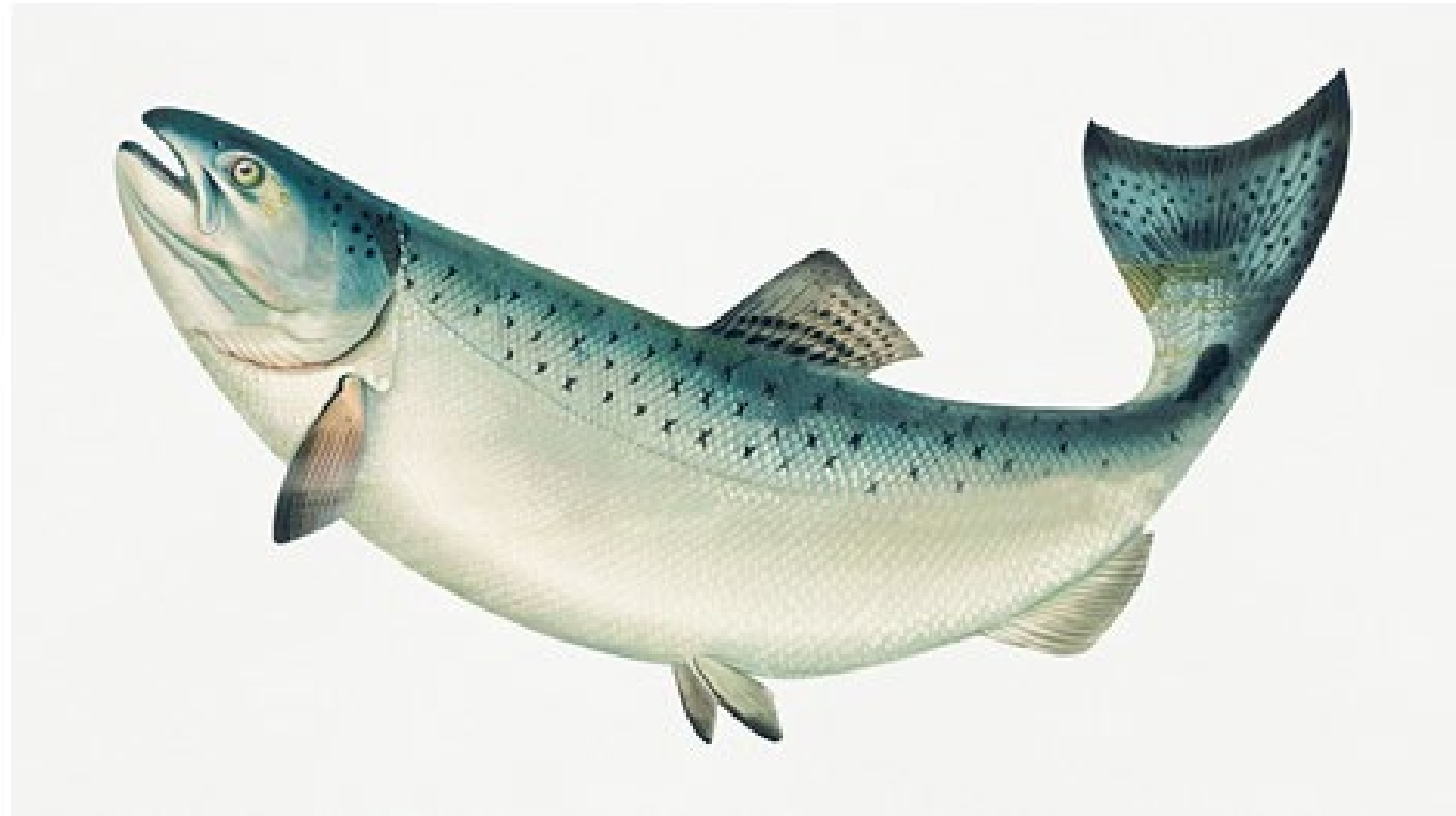
1. Emphasis on ***Structured Decision Making*** and process
2. Executive Summary
3. Clean up of **terminology / consistency**
4. Focused description of single overarching **Strategy** with two **Priorities**:
 - Restoration Actions (9 salmon only)
 - Information Needs (9 salmon / 7 *O. Mykiss* / 5 Sturgeon)
5. **Glossary!**

NO CHANGES TO CONCLUSIONS / PRIORITIES / INFORMATION NEEDS

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Process from here

1. Structure
2. Schedule
3. Standing





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Standing

Two addenda submitted:

- National Marine Fisheries Service
- GSSA





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Comment Summaries:

NMFS	GSSA
"Listen to the River"	More emphasis on abundance
Solicit independent science review	Specific action recommendations
Climate change	- Feather River spawning
Fish passage to historical habitat	- Fall-run Sacramento redd dewatering
Expand Spring-run range	- Improve Delta routing
	- Increase Sacramento flows Jan-Mar
	- Manage passage at Battle Creek



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5-Year Schedule for Near-term Restoration Strategy

Megan Cook, FWS

NTRS Schedule

Reminder of Purpose of NTRS Schedule

- Intentionally slow the SIT process down, particularly for the modeling work
- Account for realistic timelines in obtaining new or updated information for the decision support models
- Acknowledge diminishing returns in changing priorities every year
- Improve capacity to operate in adaptive resource management framework



NTRS Schedule

Summary

- **Year One: Model Development Year**
- **Year Two: Recommendations Year**
- **Year Three: Model Development Year**
- **Year Four: Recommendations Year**
- **Year Five: Develop next NTRS**

3 New DSMs

1. Late fall-run Chinook salmon
2. O. mykiss
3. Sturgeon



NTRS Schedule

Next 6 Months

- **Oct-Dec 2020:** Refactor models (aka “spring cleaning” occurs every few years)
- **Nov 18, 2020:** Monitoring Subgroup Call
- **Jan-Feb 2021:** Prototype model changes based on proposals
- **Jan 2021: SIT Conference Call (2 hours)**
 - Discuss Adaptive Management Update
- **March 2021**
 - Estimated kickoff for FY22 funding process
- **March 2021: SIT Meeting (2 days)**
 - Discuss results of prototype model changes and affirm model changes



NTRS Schedule

Key Milestones

- **Summer 2021: Integrate Model Updates, Model Calibration / Sensitivity Analysis**
- **Approx. October 2021: Next Round of Candidate Restoration Strategies**
 - Bring your next good ideas!
- **By March 2022: Next Version of Revised Priorities Finalized**
 - In time for FY23 funding process by implementing agencies
- **By October 2022: Deadline for next round of model change proposals to enter prototyping step**

Summary Model Change Proposal Process

- 1. Describe change to conceptual model**
 - Identify gap/modification needed, gather subgroup, describe data needed
 - New template for this “pre-proposal” forthcoming
- 2. Present initial idea to SIT**
 - Get comments, feedback, direction from SIT
- 3. Develop full model change proposal**
 - Describe needed modification and data to support change, get SIT thumbs up
 - **Next deadline:** October 2022 for proposals to enter step 4 prototyping
- 4. Prototype model change**
- 5. Discuss results of model change with SIT**
- 6. Based on SIT input, finalize model change**



NTRS Schedule

Year Three (2023): Model Development Year

Year Four (2024): Recommendations Year

Year Five (2025): Complete Next NTRS (FY26–30)

- Complete the next version of the NTRS with recommended priorities for restoration actions and information needs



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Subgroup Updates: Proposal Decisions & Informational Updates



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Model Change Proposal: Survival in the Delta

Cyril Michel, NOAA Fisheries

Proposal 1: Temperature vs. survival relationship for the Delta

Change temperature: survival relationship for juvenile salmon through-Delta survival:

- 50% survival below 15.5 degrees C for Sacramento basin fish, 10% survival for San Joaquin basin fish (based on telemetry estimates)
- decreasing by a factor of 1.55 per degree Celsius increase up to 19.5C, at which point survival goes to zero above 19.5.

Supporting literature

Michel, C. J., M. J. Henderson, C. M. Loomis, J. M. Smith, N. J. Demetras, I. S. Iglesias, B. M. Lehman, D. D. Huff. 2020. Fish Predation on a Landscape Scale. *Ecosphere*

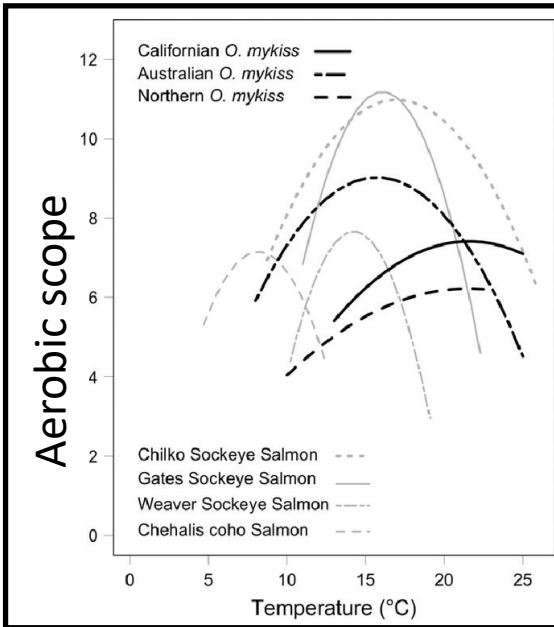
Lehman, B., D. D. Huff, S. A. Hayes, and S. T. Lindley. 2017. Relationships between Chinook salmon swimming performance and water quality in the San Joaquin River, California. *Transactions of the American Fisheries Society* 146:349-358.

Marine, K. R., and J. J. Cech. 2004. Effects of High Water Temperature on Growth, Smoltification, and Predator Avoidance in Juvenile Sacramento River Chinook Salmon. *North American Journal of Fisheries Management* 24:198-210.

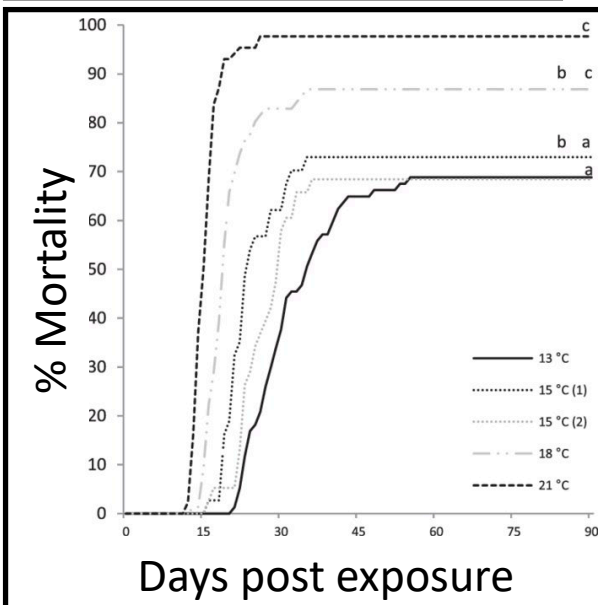
Additional data: telemetry estimates of through-Delta survival for Sacramento and San Joaquin basin

1. Potential Mechanisms: Prey-side drivers

Lab-based



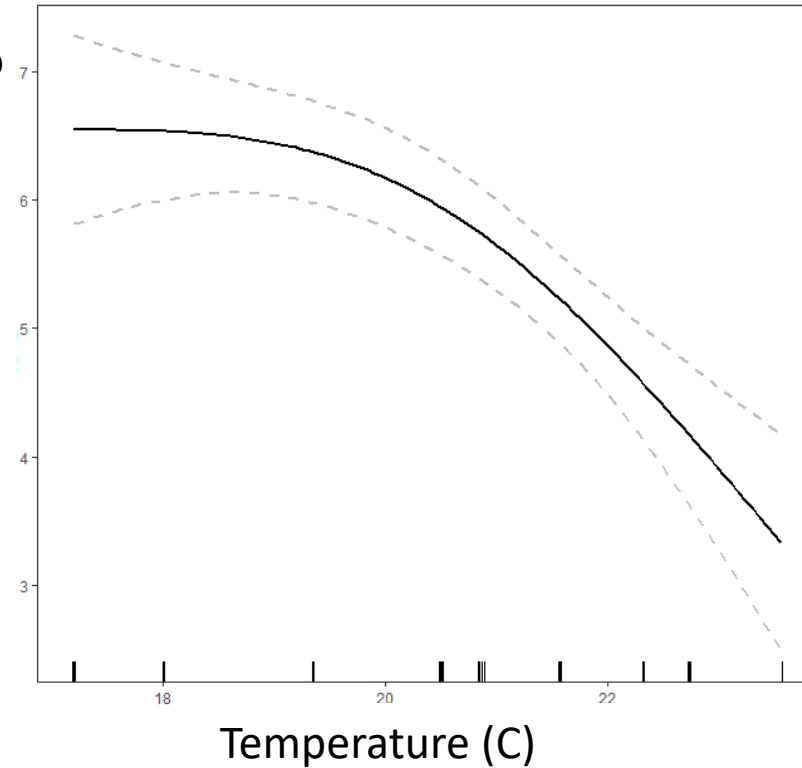
Verhille et al.
2016.
Conservation
Physiology



C. Shasta
mortality:
Ray et al.
2012. J. of
Parasitology

Field-based

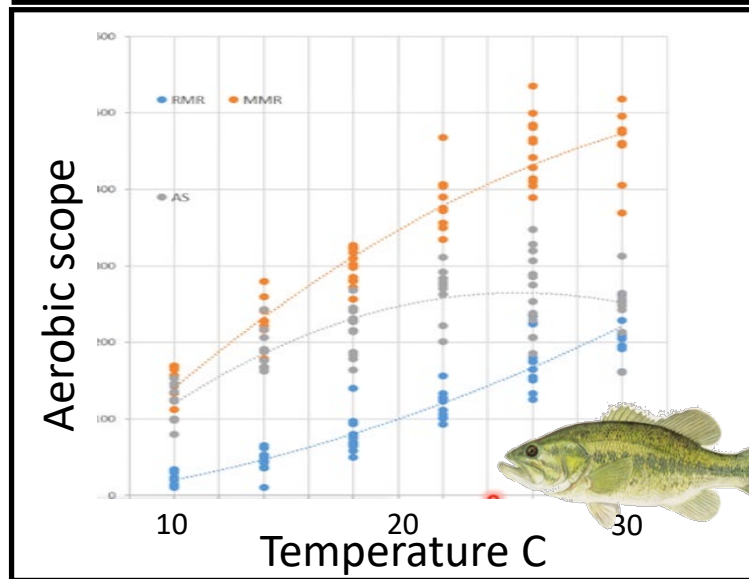
Ucrit: maximum performance measure
of short-term sustained swimming



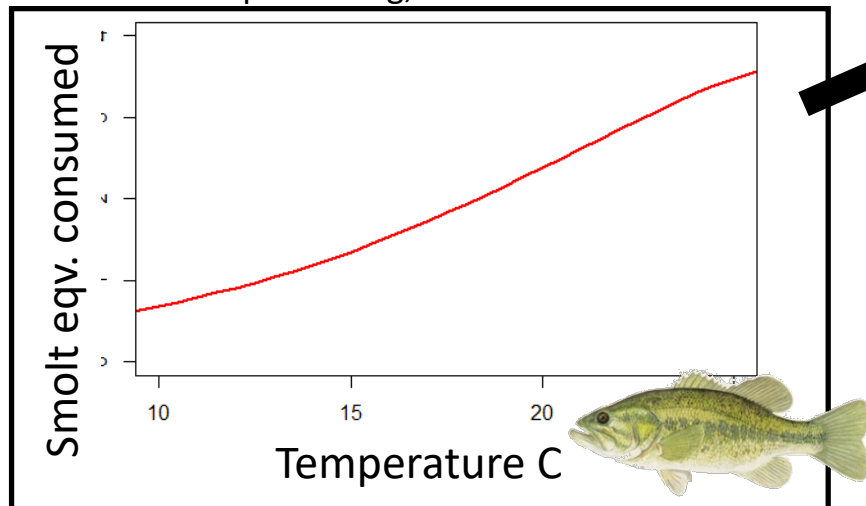
Data from Lehman et al. 2017. Transactions of
the American Fisheries Society

1. Potential Mechanisms: Predator-side drivers

Lab-based

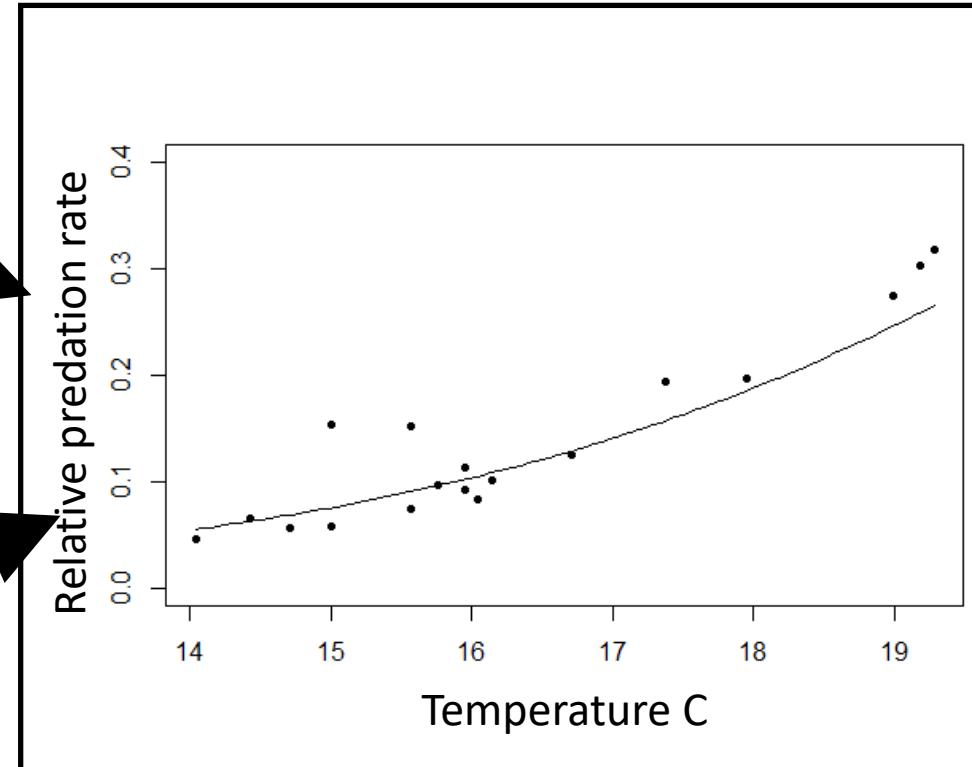


LMB aerobic scope. K. Zillig, 2020. Presentation to SWRCB



LMB energetic demands. Data from Rice et al. 1983. EBF

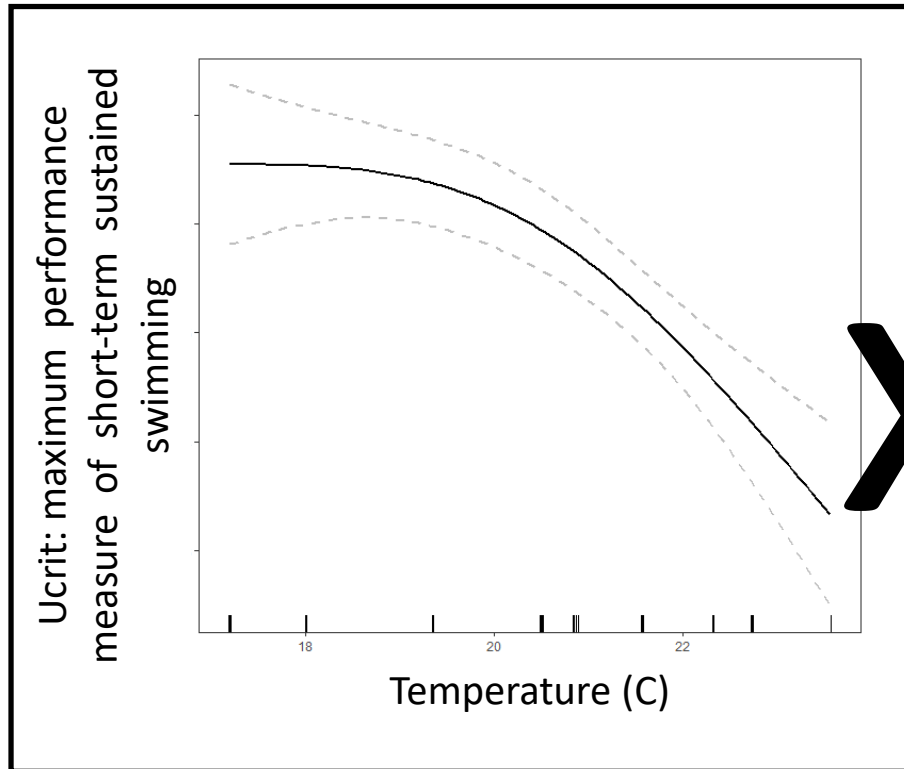
Field-based



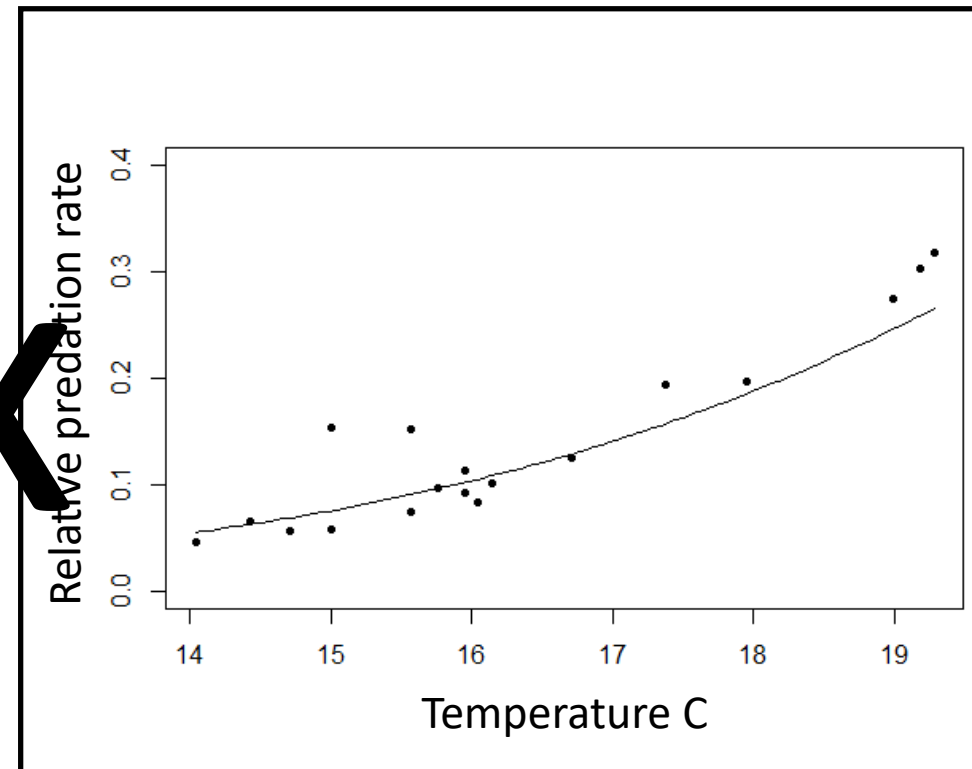
Data from Michel et al. (*in press*). Ecosphere

1. Potential Mechanisms: Interaction

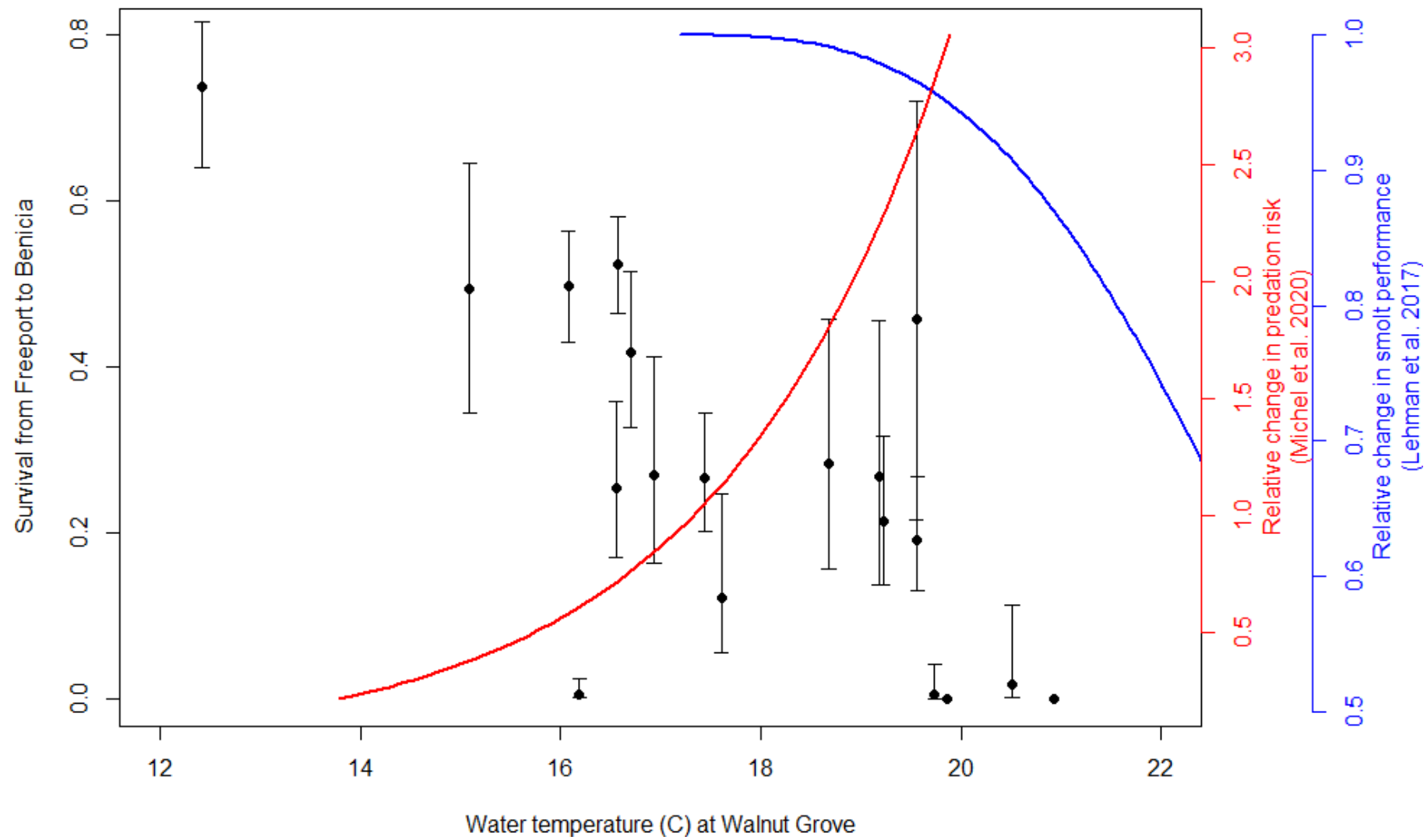
Prey evasiveness

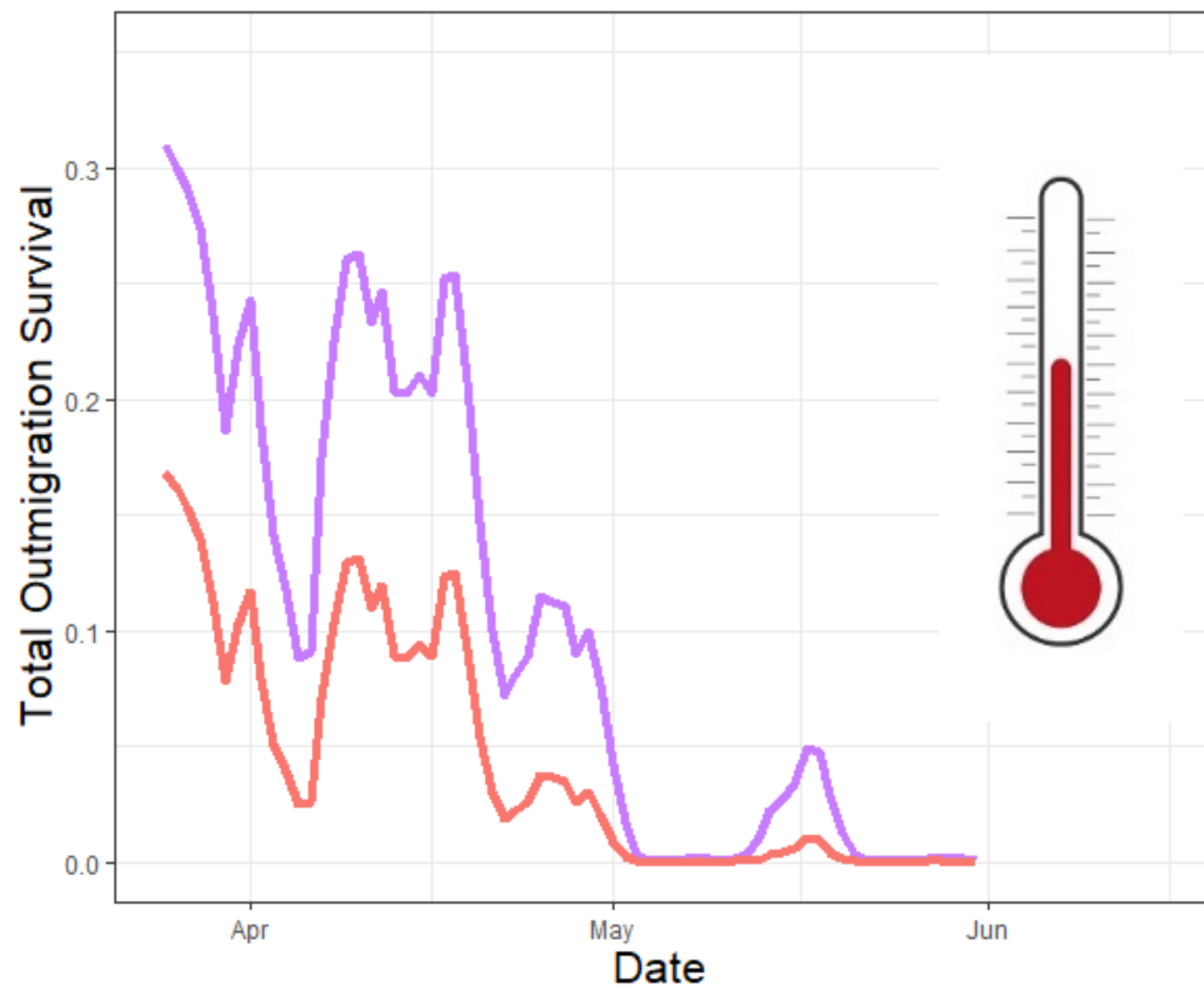


Predator activity



== Nonlinear temperature vs. survival
relationship?







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Model Change Proposal: Survival in Sacramento River

Cyril Michel, NOAA Fisheries

Proposal 2: Flow vs. survival relationship for the Sacramento River

Survival should vary in response to flow in the Sacramento River, with a step function. Specifically, survival for acoustic tagged spring-outmigrating (i.e., fall-run and spring-run) salmon smolts in the upper Sacramento (Deer Ck confluence to Verona):

- 3.0% for flows below 4,259 cfs as measured at Wilkins
- 18.9% for flows between 4,259 and 10,712 cfs
- 50.8% for flows above 10,712 cfs.

Supporting literature

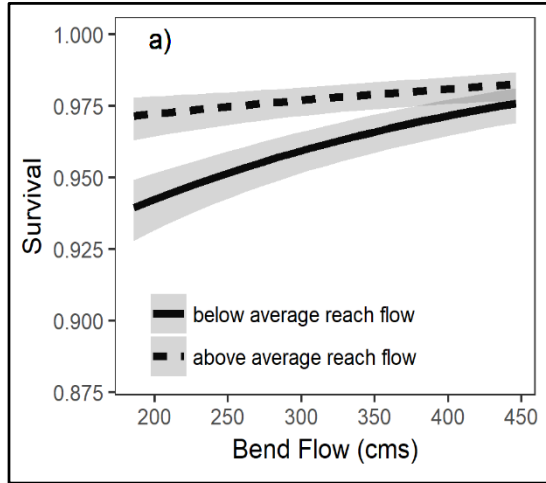
Michel, C. J., J. J. Notch, F. Cordoleani, E. M. Danner. *Currently in review at Ecosphere*. Ecological nonlinearities inform the design of functional flows for imperiled fish in a highly modified river

Notch, J. J., A. S. McHuron, C. J. Michel, F. Cordoleani, M. Johnson, M. J. Henderson, and A. J. Ammann. 2020. Outmigration survival of wild Chinook salmon smolts through the Sacramento River during historic drought and high water conditions. EBF

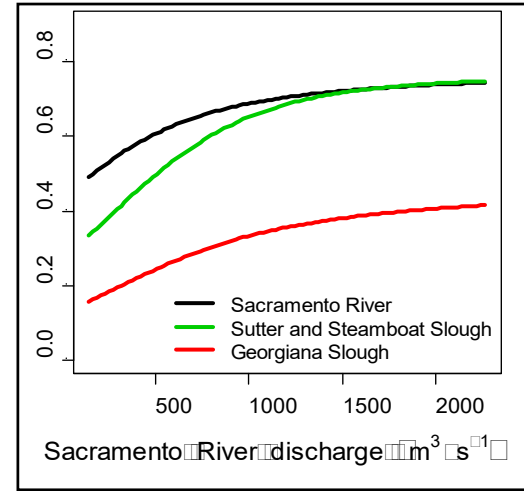
Henderson, M. J., I. S. Iglesias, C. J. Michel, A. J. Ammann, and D. D. Huff. 2019. Estimating spatial-temporal differences in Chinook salmon outmigration survival with habitat- and predation-related covariates. CJFAS **76**:1549-1561.

flow effects on river survival: justification

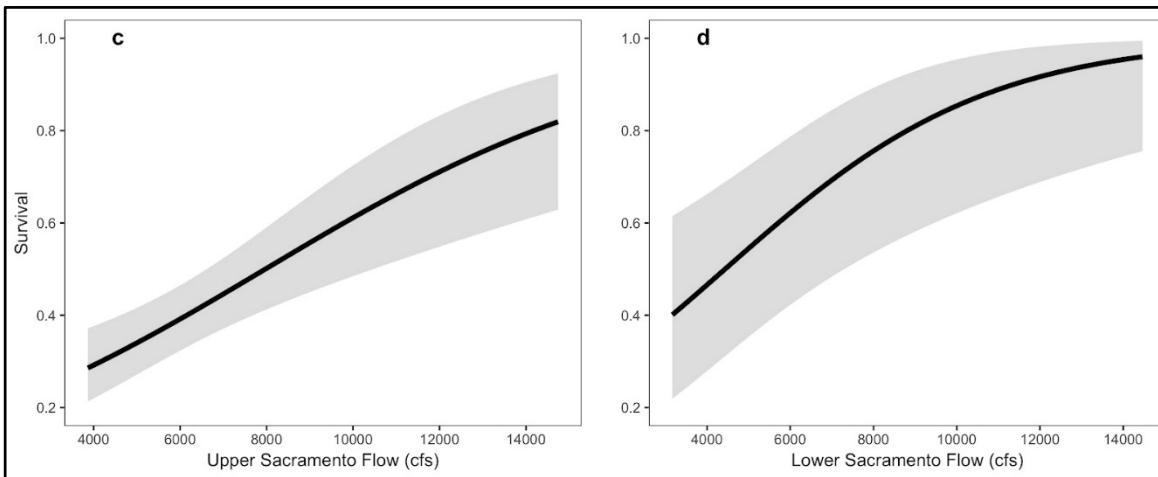
- Past studies have found a strong relationship between flow and juvenile survival during outmigration in the Sacramento River



Henderson et al. 2019. CJFAS



Perry et al. 2018. CJFAS



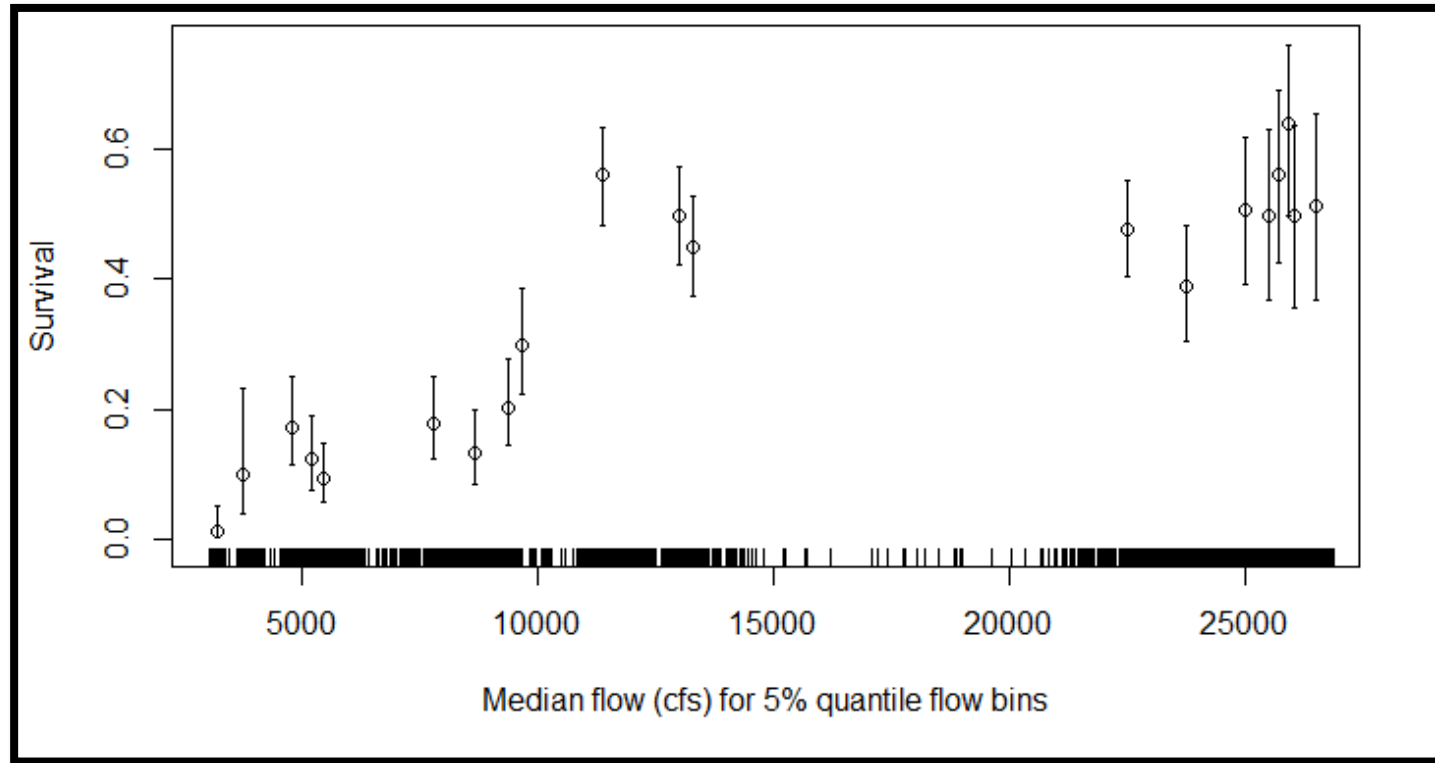
Notch et al. 2020. EBF

Are these **linear** relationships an artifact of analysis technique used?

Let's look for a threshold. For who?

Population	Origin	Year	Release Dates	Release Location	N	Genetic Population Origin
Mill Creek	Wild	2013	Mid-April to mid-May	MCRT	48	74% CCV fall-run 26% CCV spring-run
Coleman	Hatchery	2013	Mid-April	CNFH	285	100% CCV fall-run
Mill Creek	Wild	2015	Mid-April to mid-May	MCRT	110	44% CCV fall-run 56% CCV spring-run
Coleman	Hatchery	2016	Early-April to late-April	CNFH	540	100% CCV fall-run
Mill Creek	Wild	2017	Mid-April to late-April	MCRT	24	100% CCV fall-run
Coleman	Hatchery	2017	Early-April to late-April	CNFH	370	100% CCV fall-run
Sacramento River	Wild*	2017	June 6	RBDD	33	100% CCV fall-run
Sacramento River	Wild*	2018	Early-May to early-June	RBDD	207	100% CCV fall-run
Livingston Stone	Hatchery	2019	March 26	NFBC	199	100% Sacramento winter-run
Coleman	Hatchery	2019	April 11	CNFH	140	100% CCV fall-run
Coleman	Hatchery	2019	Late-May	RBDD	480	100% CCV fall-run
TOTAL		2013-2019	Late-March to early-June		2436	

Preliminary look



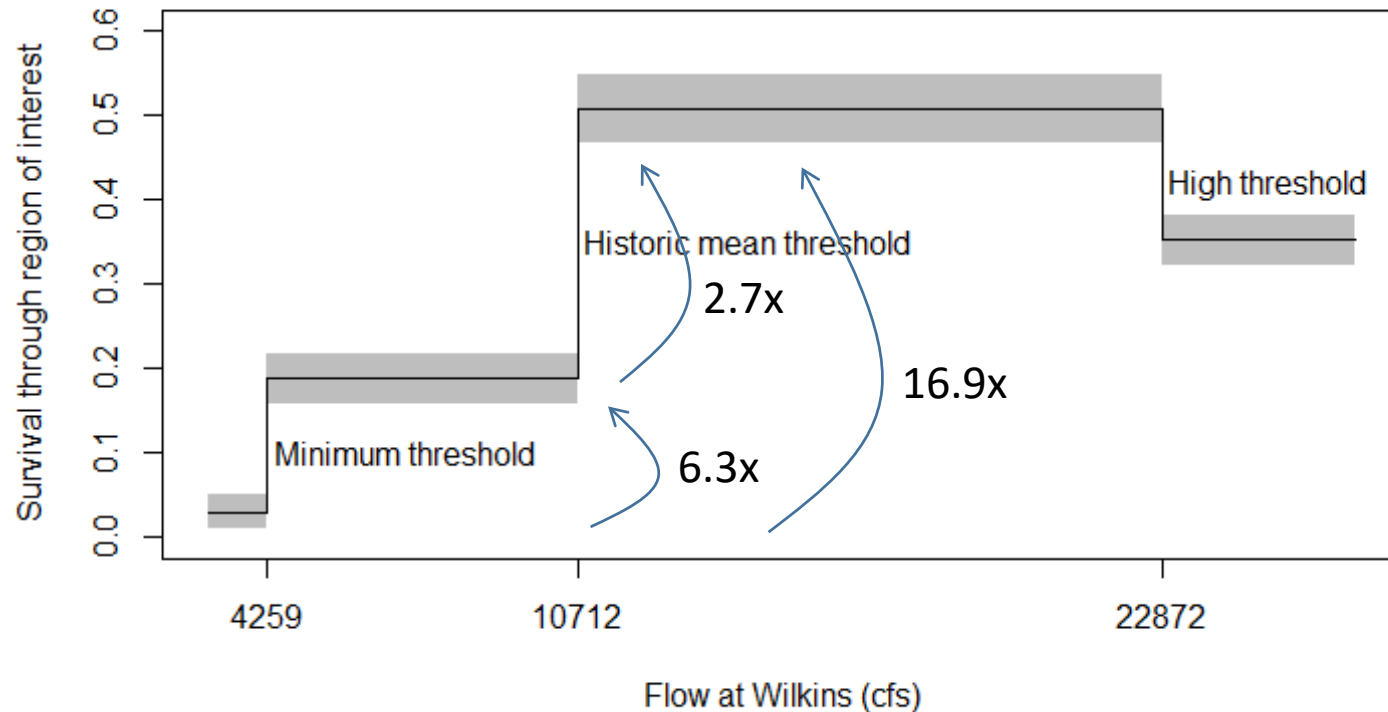
Looks promising! Now let's do this more formally:

Run various mark-recapture survival models allowing for the flow:survival relationship to take different shapes, and assess fit via model selection:

- Linear
- Loglinear
- Polynomial
- Cubic spline
- Step function, i.e., threshold

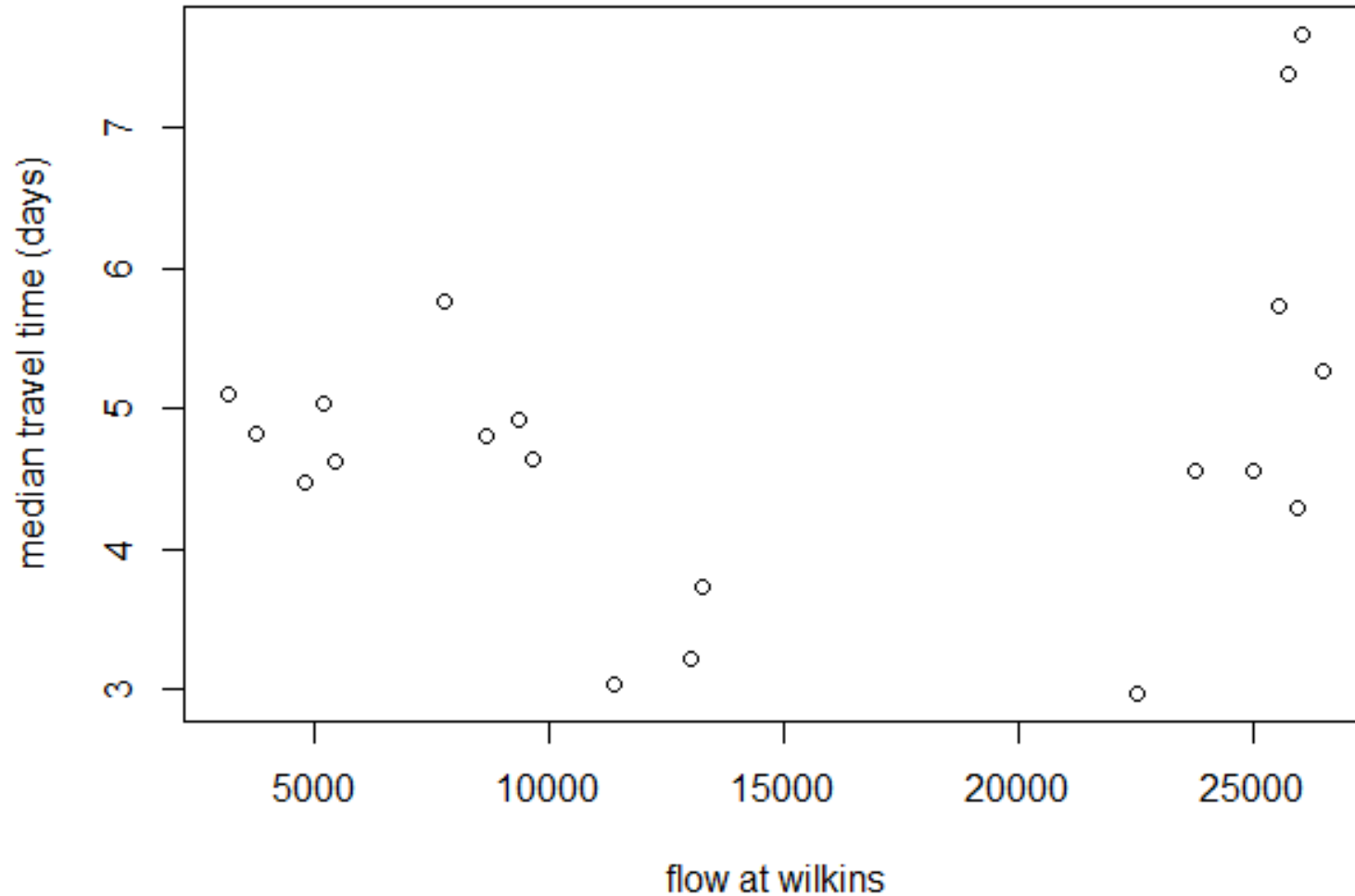
Potential flow thresholds

- Analysis suggests step increases in flow survival relationship exist, with flow thresholds at ~4300 cfs, ~10700 cfs, and 22900 cfs (as measured at Wilkins Slough)



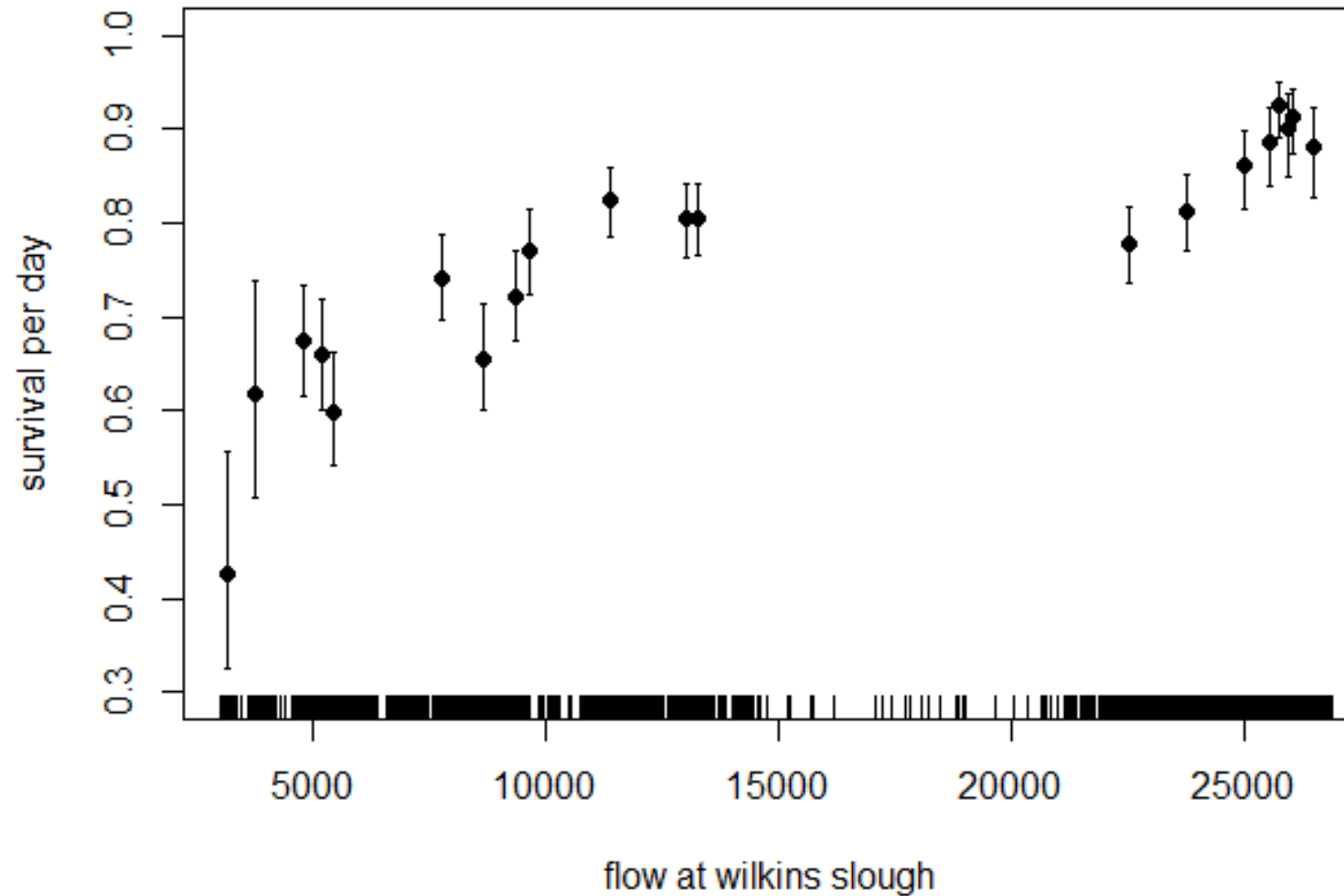
But what are the mechanisms to these thresholds?

➤ Travel time?



But what are the mechanisms to these thresholds?

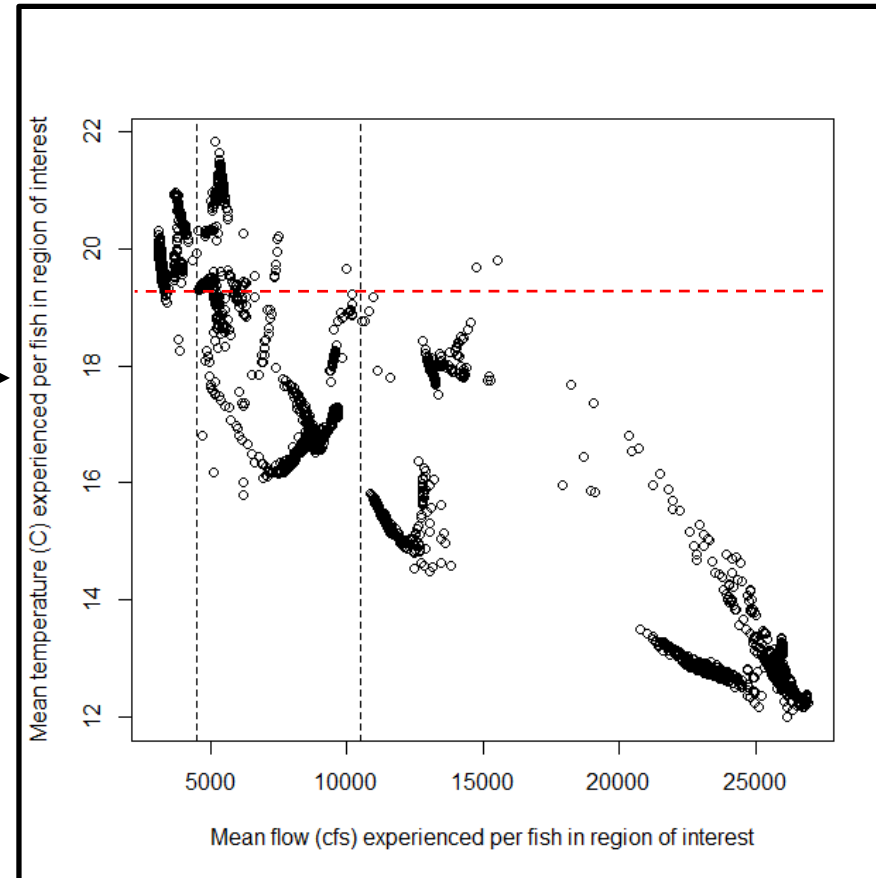
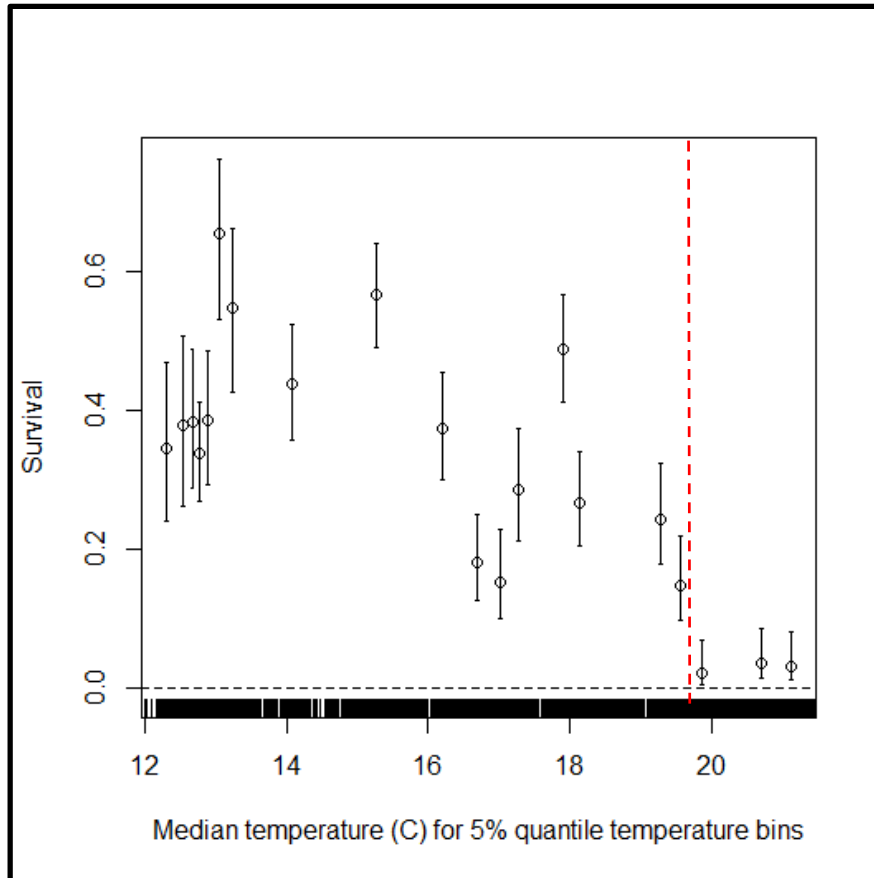
➤ Travel time?



But what are the mechanisms to these thresholds?

- Flow drives, or is strongly correlated with, many other covariates
- 4300 cfs threshold:

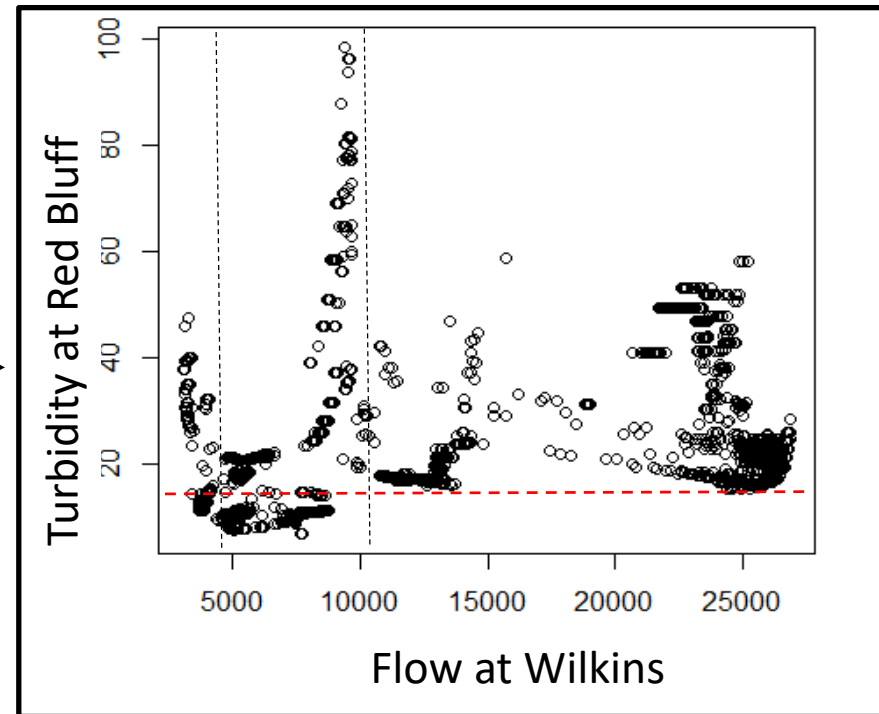
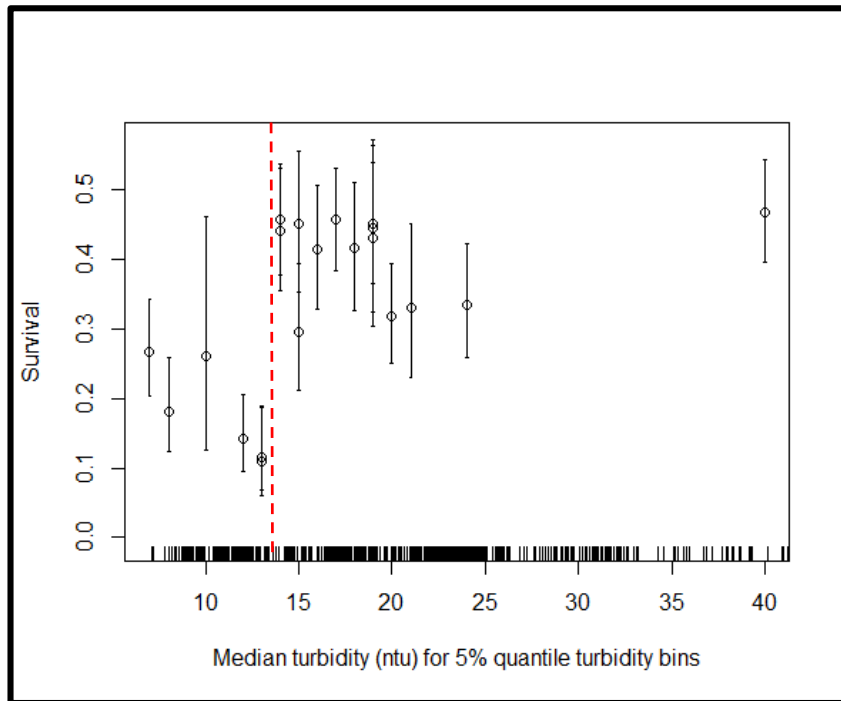
-Water temperatures?



But what are the mechanisms to these thresholds?

➤ Flow drives, or is strongly correlated with, many other covariates
10700 cfs threshold:

- Turbidity?
- Behavioral response of predators?





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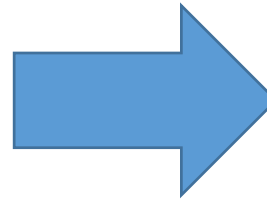
Model Change Proposal: Habitat Inputs

Mark Tompkins, FlowWest

Proposal: Habitat Inputs

SIT Proposal to Change Habitat Inputs to the Life Cycle Models

- ***Overarching Objective***



- ***Hypotheses:***

- 1. More accurate and consistent habitat inputs across all watersheds included in the life cycle models will improve model performance and reduce model uncertainty***
- 2. Certainty of expected effectiveness of restoration actions (as determined by the life cycle models) will be improved with more accurate and consistent habitat inputs across all watersheds.***



Proposal: Habitat Inputs

SIT Proposal to Change Habitat Inputs to the Life Cycle Models

- ***Proposed Inputs***
 - *Hydraulic model outputs (2D) from entire river segment*
 - *Spawning and instream rearing*
 - *Suitability criteria applied in binary manner*
 - *Floodplain rearing*
 - *Functional acres quantified based upon simulated depth and flow, proximity of cover, connectivity, and inundation duration (a proxy for food availability).*



Proposal: Habitat Inputs

SIT Proposal to Change Habitat Inputs to the Life Cycle Models

- ***Integration Instructions***

- ***Prototyping watersheds with 2D models 2020 – 2021 (up for decision today)***
 - *Deer, Tuolumne, Mokelumne, American, Yuba*
 - *Select suitability criteria ranges*
 - *Work out floodplain inundation duration / food production*
 - *Compare new inputs with existing WUA-based inputs*
- ***Watersheds in charter 2022 – 2025***
 - *American, Yuba, Lower-mid Sac, Upper Sac, Clear, Upper-mid Sac, Feather, Butte, Stanislaus, Lower San Joaquin*
- ***Other watersheds 2025 and beyond...***



Proposal: Habitat Inputs

SIT Proposal to Change Habitat Inputs to the Life Cycle Models

- ***Integration Instructions***
 - *Life cycle model must accommodate old and new habitat inputs*
 - *Conduct sensitivity analyses on old vs. new habitat inputs*
 - *Output from sensitivity analyses should guide future habitat input updates*



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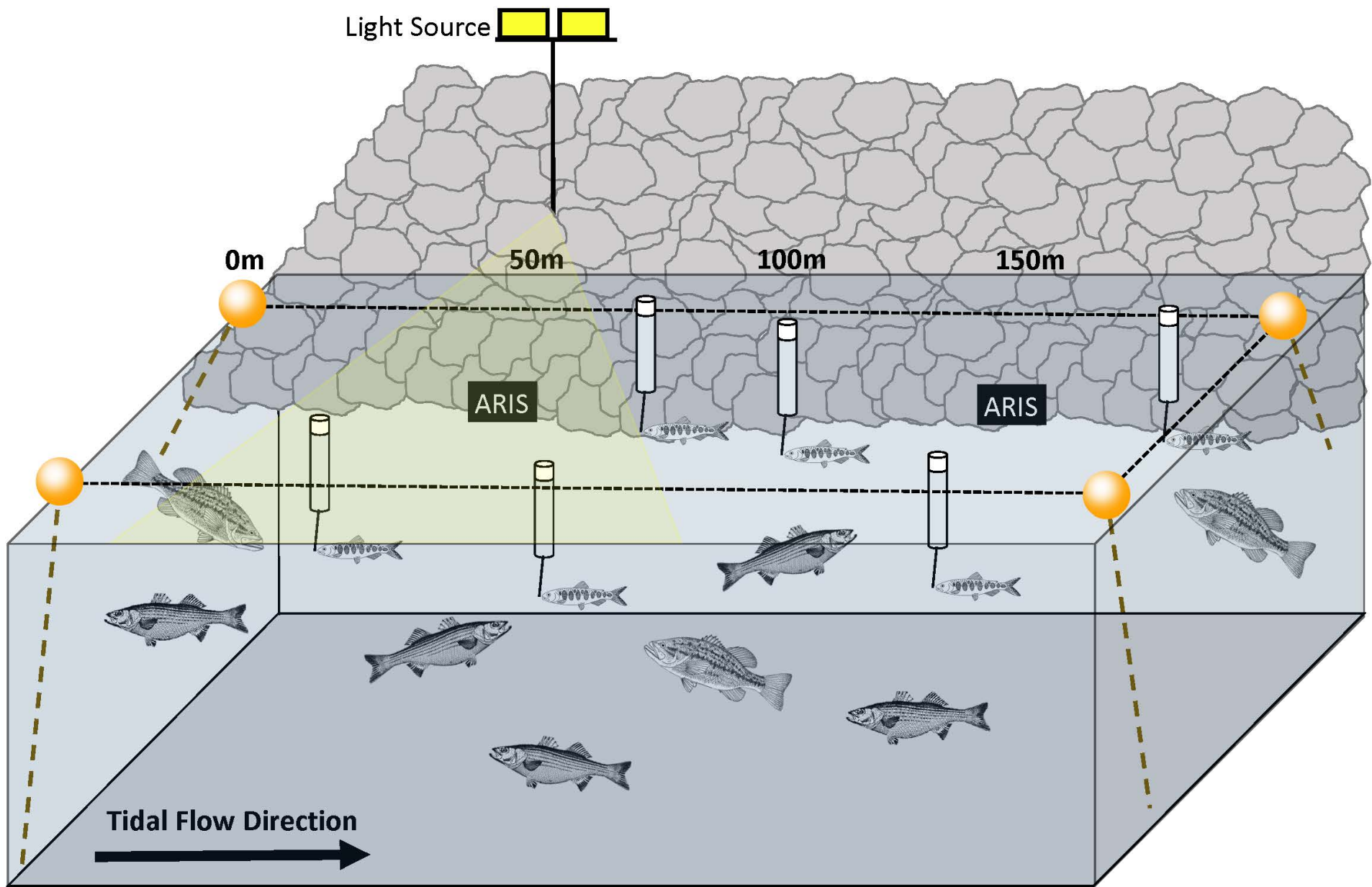
Subgroup Update: Predator Contact Points

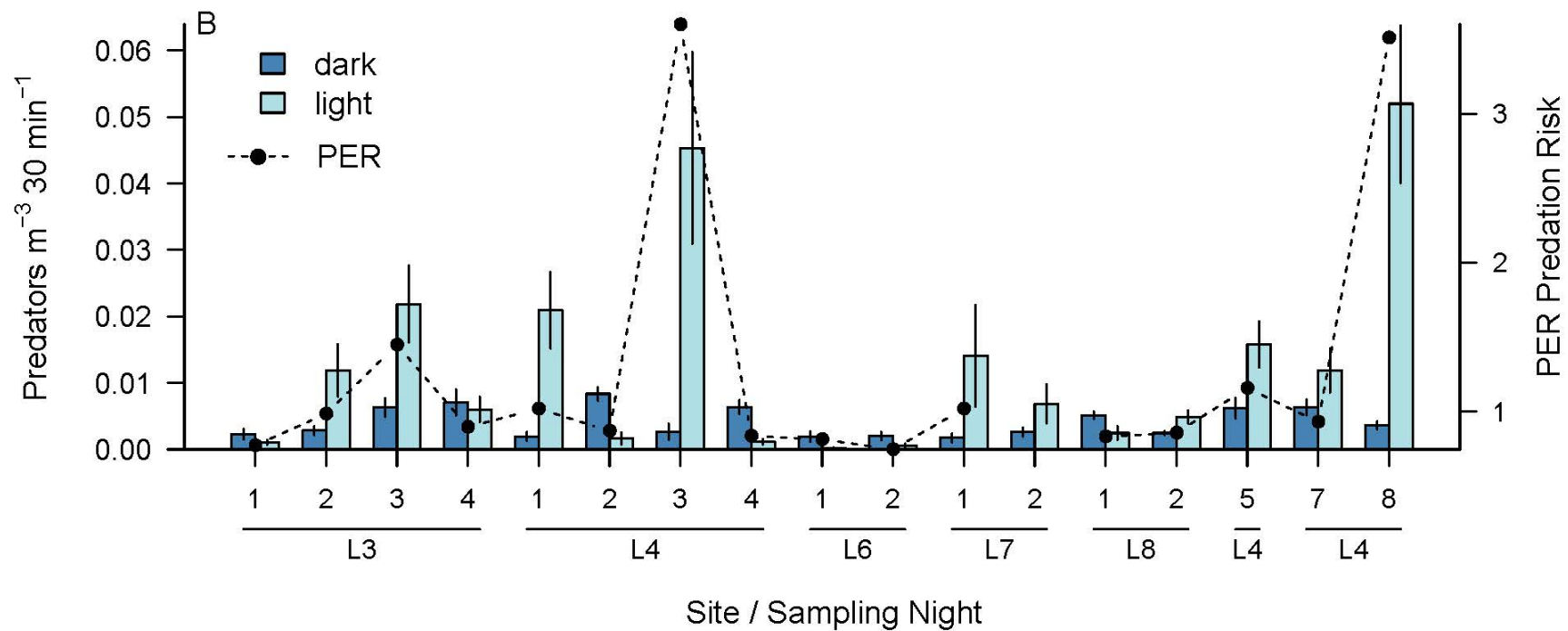
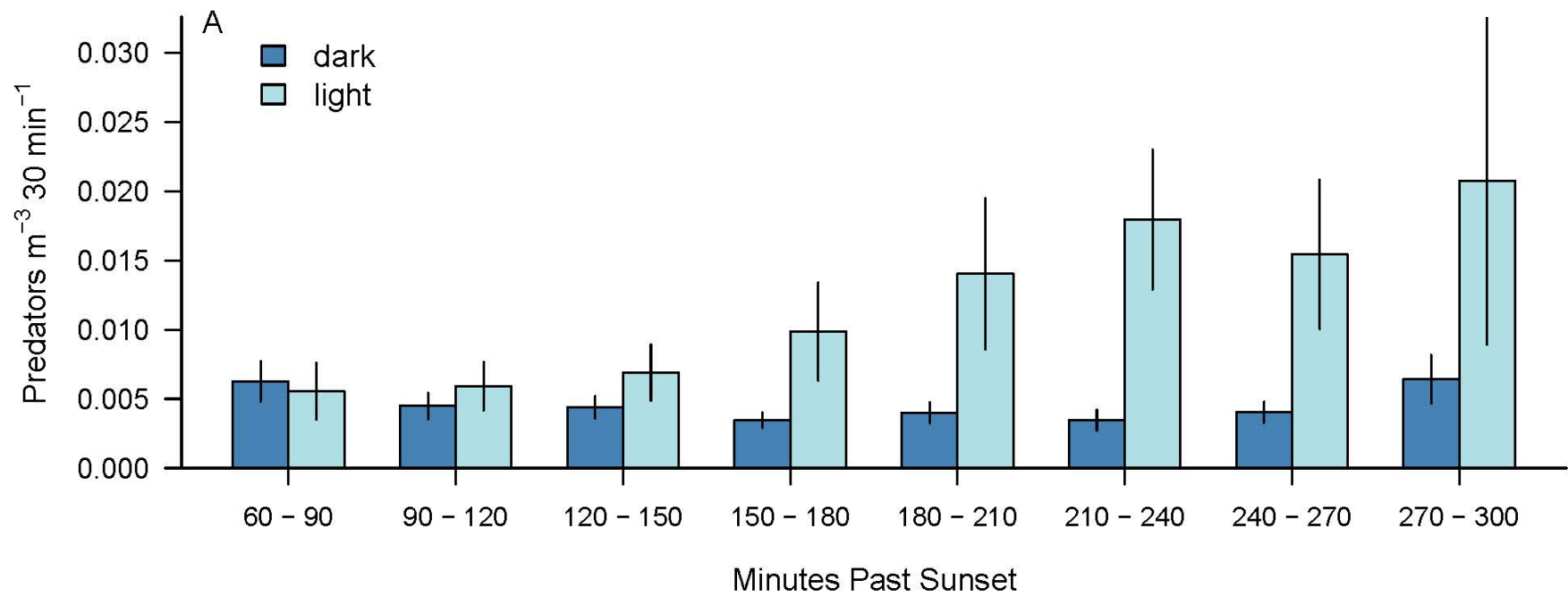
Cyril Michel, NOAA Fisheries

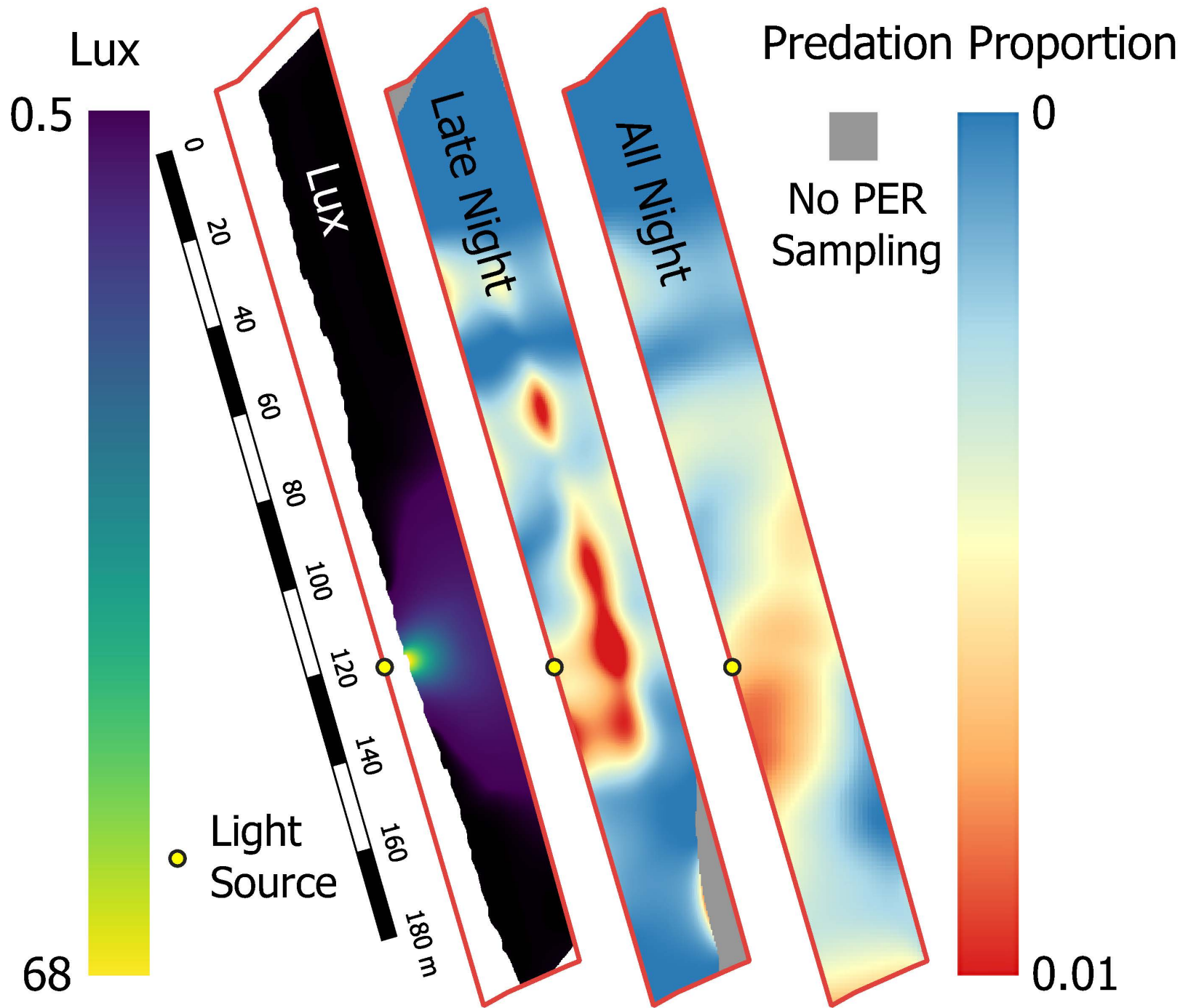
Informational Updates

Predator Contact Points Charter – Cyril Michel









Sundial Bridge, Redding CA

Sampling weeks

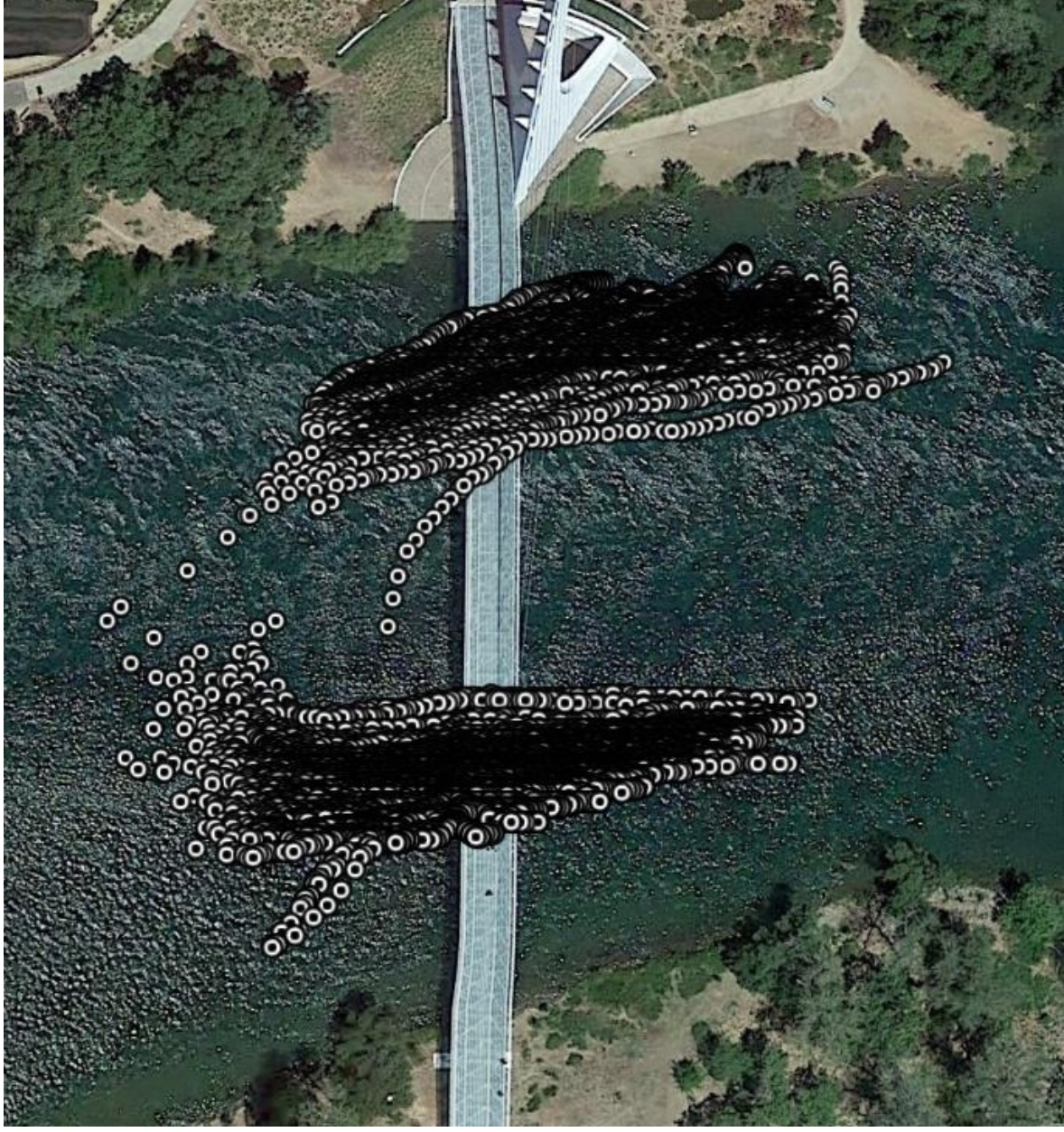
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9/14-9/19
9/21-9/25
9/28-10/2

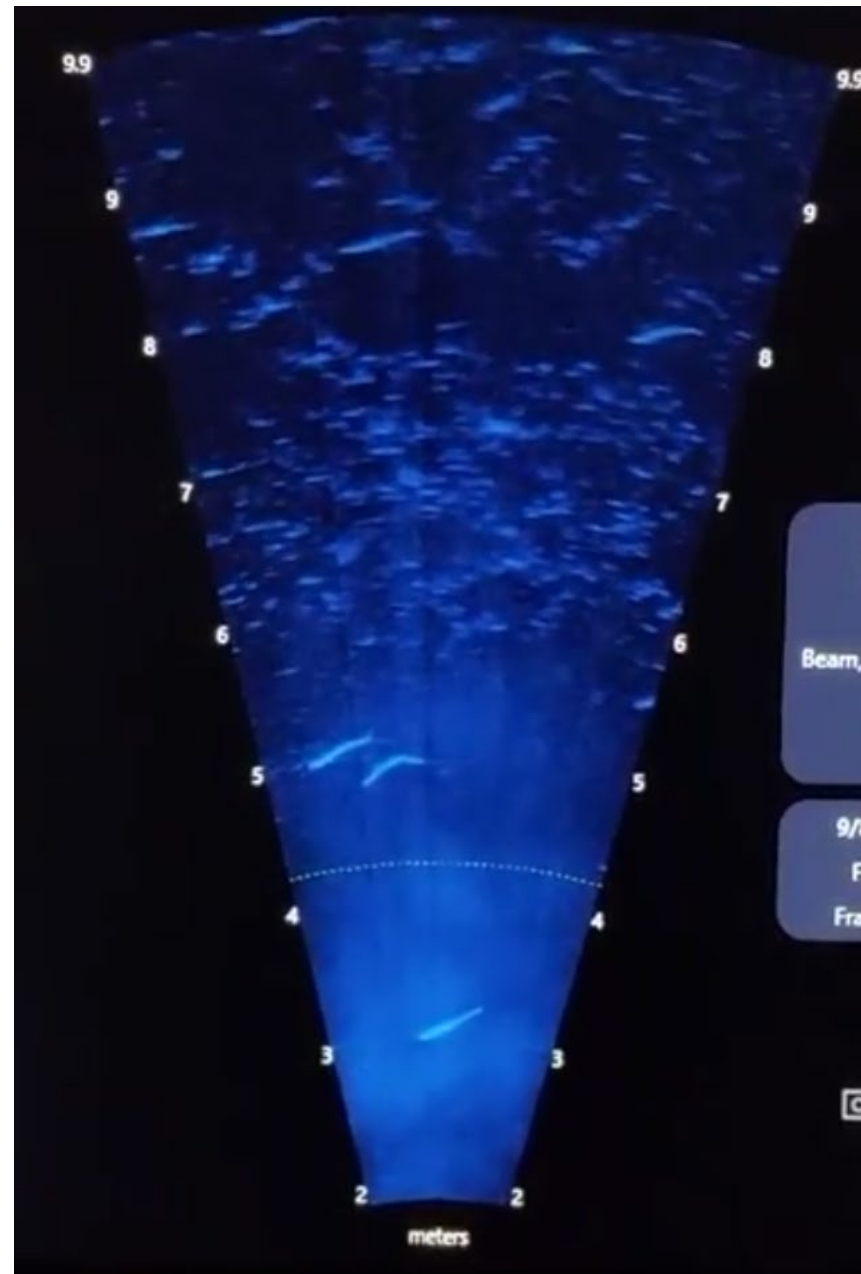


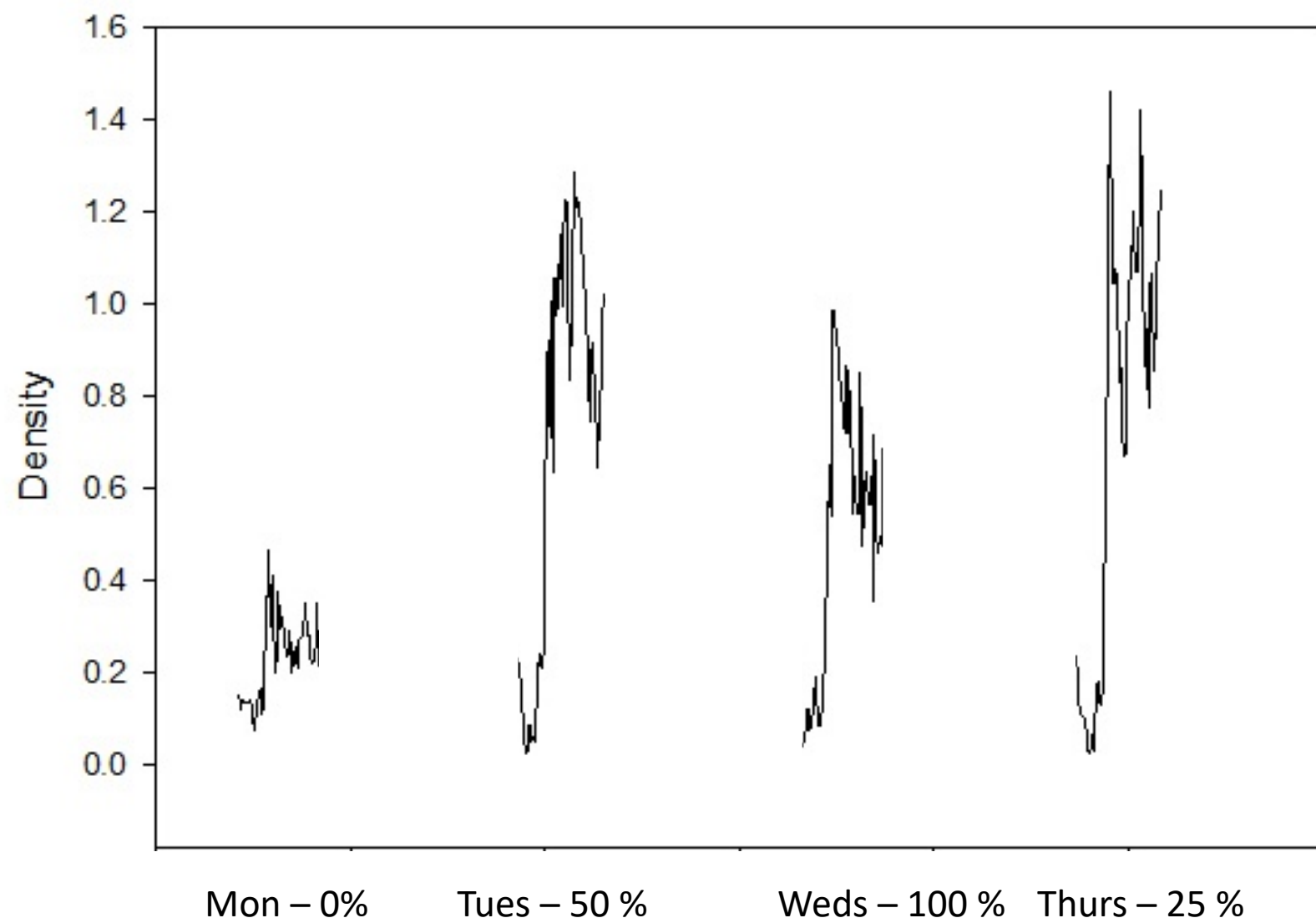
Treatments:

- 0%
- 25%
- 50%
- 100%









Antelope Blvd Bridge, Red Bluff CA

Sampling weeks

- 10/5 – 10/8
- 10/12 – 10/15

Treatments:

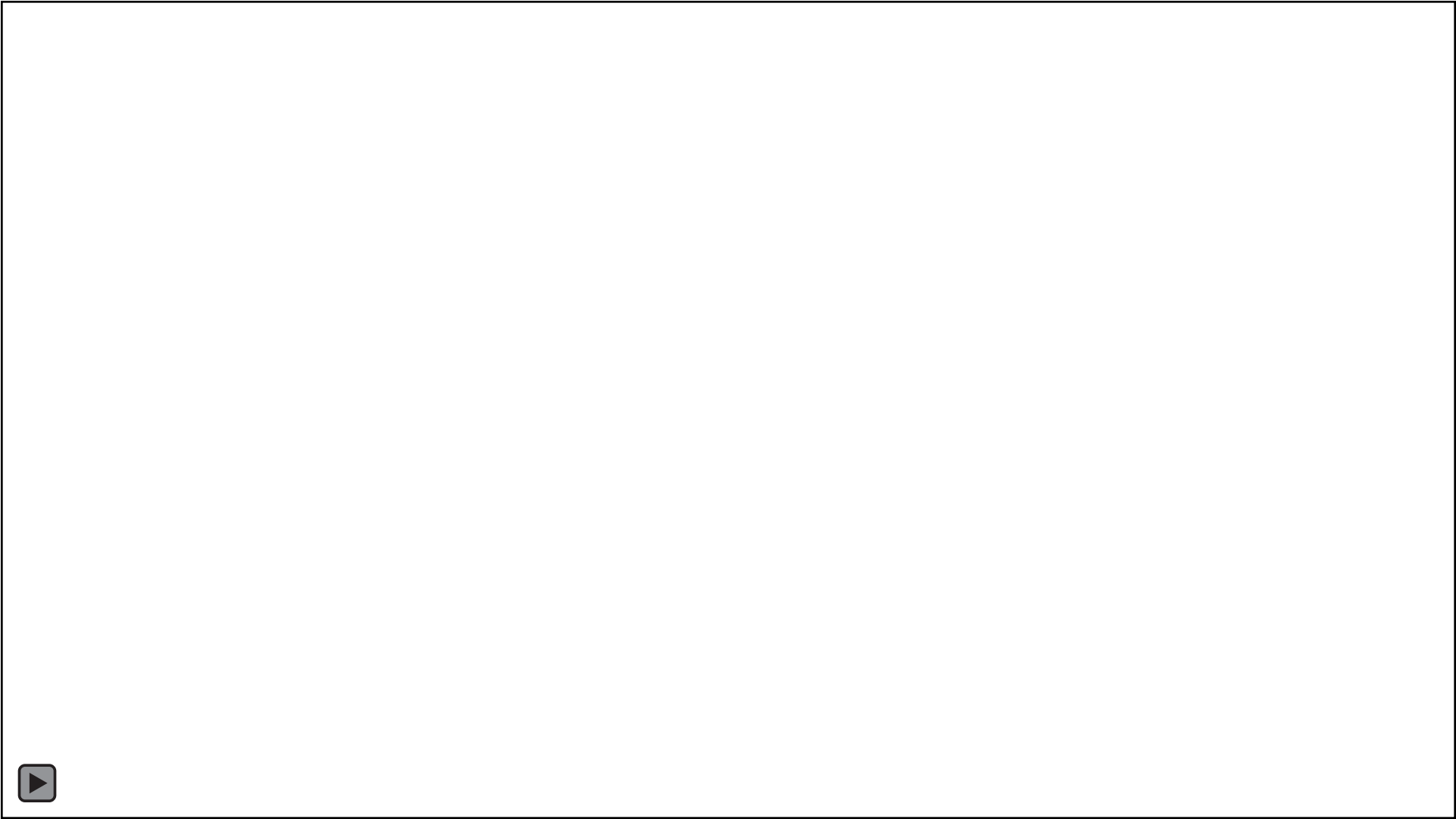
- 0%
- 100%



10_7_20 Sampling

Red Bluff Antelope Bridge





Next steps

- Predation around diversions in Delta
- SAV removal study



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Subgroup Update: Salmon Demographics

Mike Beakes, USBR



Subgroup Update: Salmon Demographics

Study Goals

- ***Address critical uncertainties about demographic parameters informing the SIT's Decision Support Model (DSM).***
 - *Survival and growth of wild juvenile Chinook salmon*
 - *Secondarily, the SIT identified the need to evaluate the movement rule sets used by the DSM.*
- ***Initial effort will focus on studies that design, initiate, and implement a PIT-tag monitoring program to fill these critical knowledge gaps.***
- ***Overarching goal of estimating tributary-level survival, growth transition, and movement probabilities to directly estimate the key demographic parameters in SIT's DSM***



Subgroup Update: Salmon Demographics

Study Approach

- ***Installation of PIT tag arrays in natal tributaries***
 - *Downstream sections before fish exit to the mainstem Sacramento River and Delta*
 - *Along the migratory corridor*
- ***Supplemental seining and spawning surveys to check adult escapees for PIT tags. Data from:***
 - *PIT tag readers will enable estimation of movement and survival*
 - *Seining efforts will enable estimation of growth, habitat use, survival, and movement*
 - *Spawning ground surveys needed to estimate in-ocean and delta survival*



Subgroup Update: Salmon Demographics

Study Timeline

Note funding sources not yet identified

- **Target 2021/2022 - Pilot Study Planning and coordination**
 - *Identify tributaries, coordinate with monitoring agencies and personnel*
 - *Attain permits and equipment*
- **Target 2021/2023 - Pilot Study Implementation**
 - *Install PIT tag monitoring array*
 - *Conduct efficiency trials and power analysis*
 - *Develop sampling and data transfer protocols*
 - *Make study design recommendations*
- **Target 2022/2024 - Study Continuation**
 - *Adjust study design as needed*
 - *Continued multi-agency coordination*
 - *Summarize fish capture and marking efforts*



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Subgroup Update: Reassignment of Habitat Amounts Based on Fate of Trophic Subsidies

No new info since Sept call – planning for an update at
upcoming SIT Meeting

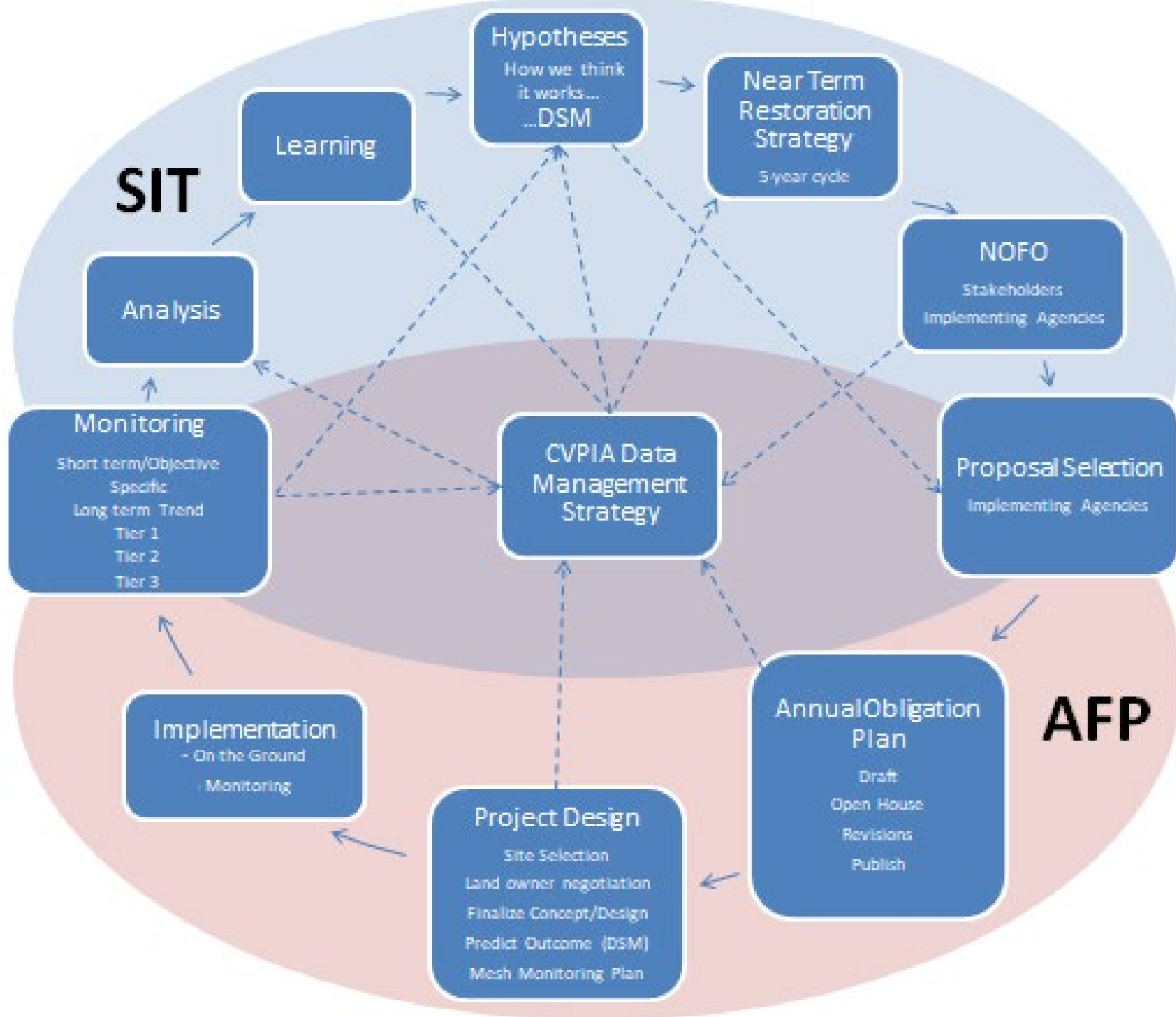


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Comparison NTRS Priorities and Currently Funded Actions

Based on FY20 Obligation Plan

Rod Wittler (USBR), Mike Urkov (FlowWest)

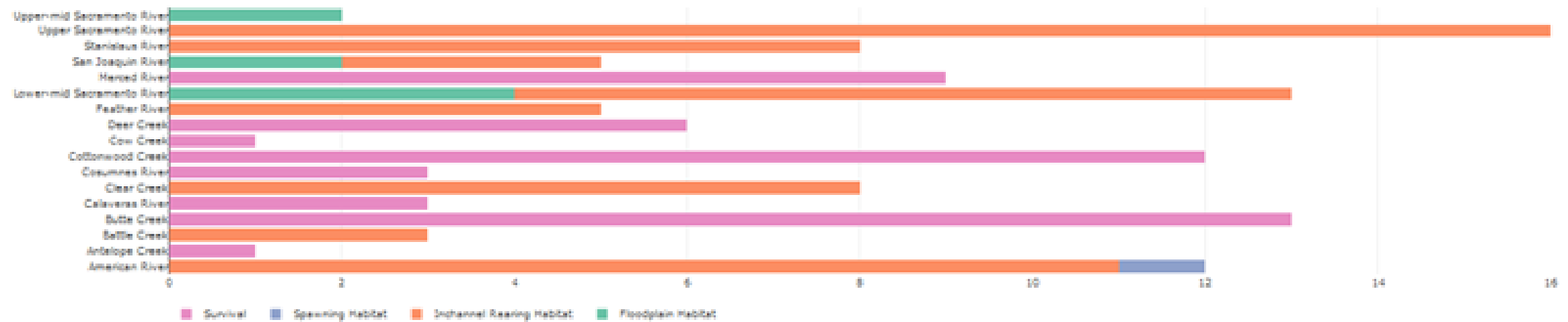


DSM Output

Percent Change from No Actions

Scenario	Juvenile Biomass at Chipps	Natural Spawners
7. Floodplain Only - Mainstem Sac	29.9%	37.0%
8. Winter-run Optimized	1.9%	-2.0%
9. Spring-run Optimized	6.0%	6.8%
10.1. Spring-run In-Channel - Phillis1	6.6%	-1.3%
10.2. Spring-run In-Channel - Phillis2	5.4%	0.5%
11.1. Fall-run Diversity Group Optimized	21.0%	14.7%
12.1. Fall-run Optimized - Beakes	24.4%	12.5%

Action Units



11.1. Fall-run Diversity Group Optimized: Restoration optimized to increase Fall-run population every year (one action in each diversity group)



Public Draft Workplan

Fiscal Year 2020 Obligation Plan for CVPIA Authorities

Central Valley Project, California
Interior Region 10 – California-Great Basin



CVPIA Authorized Projects - Jargon Crosscheck

Bay Delta Office

Real Time Operations
Status and Trend Monitoring
Habitat and Facility Improvement
Intervention
Special Studies

Refuge

- Level 2 and Level 4

Independent

- HRP, SJRRP, and TRRP

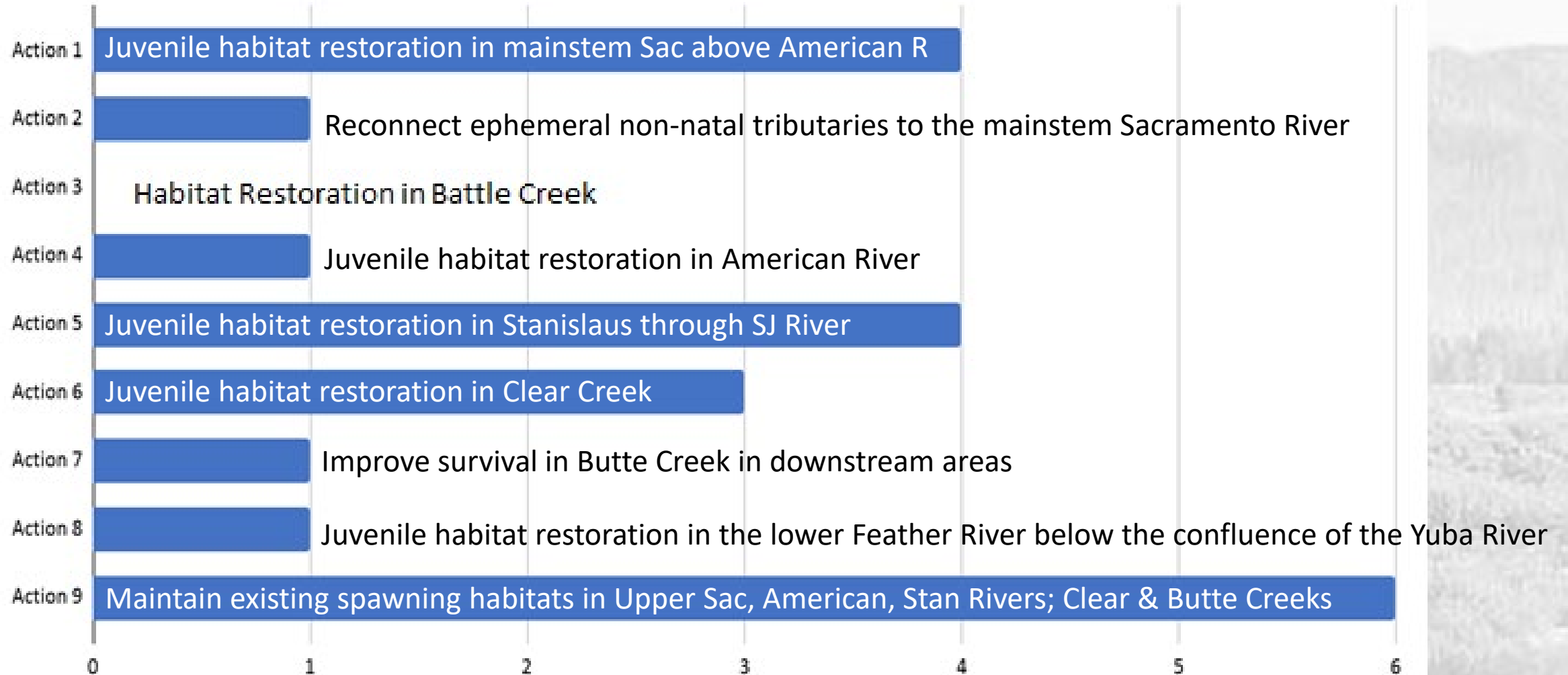
Science Integration Team - NTRS

Restoration Actions

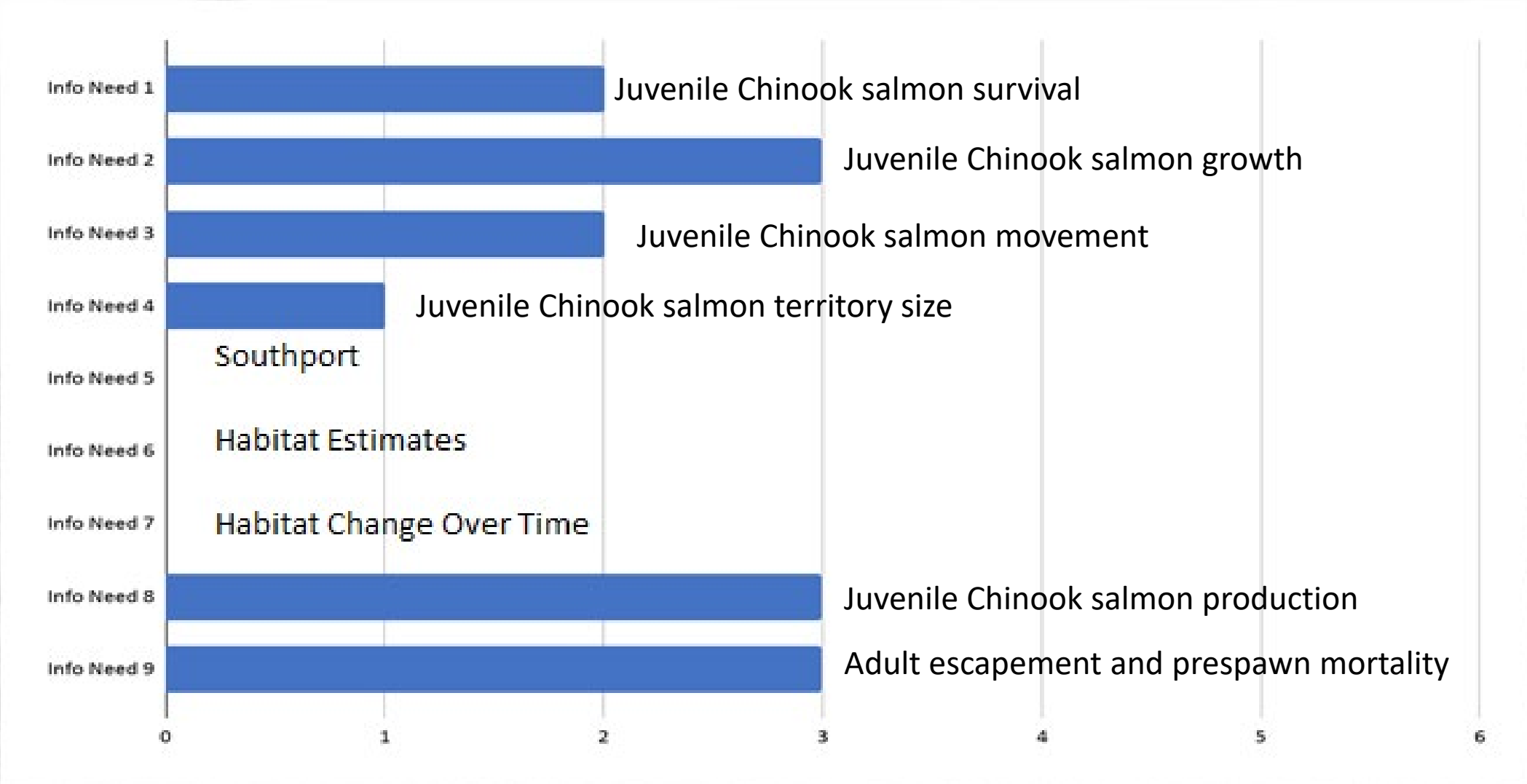
Chinook Information Needs
O. Mykiss Information Needs
Sturgeon Information Needs

Critical Monitoring Needs

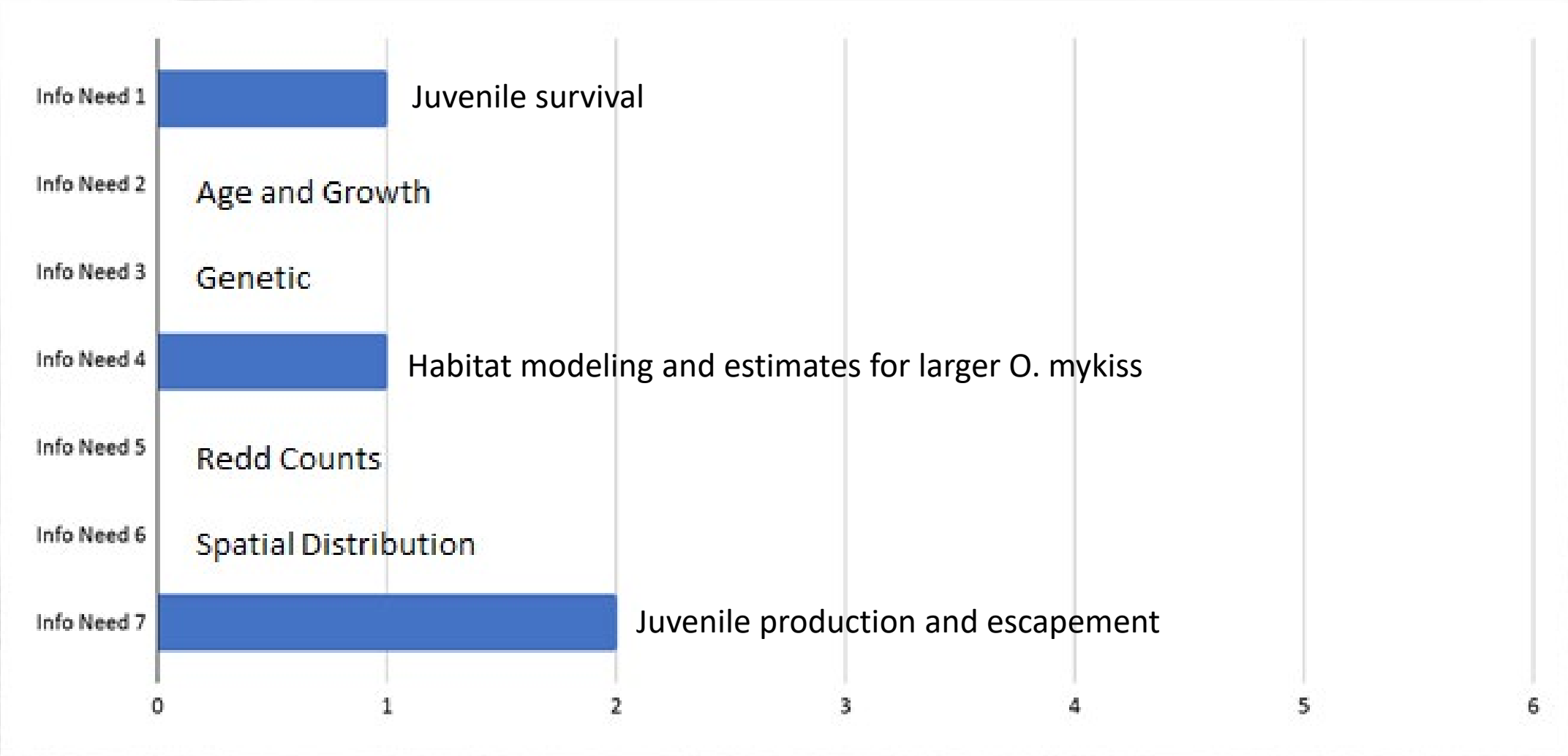
Near-Term Restoration Strategy - 21 Current Actions Address NTRS Priorities



Near-Term Restoration Strategy - 14 Salmon Information Needs



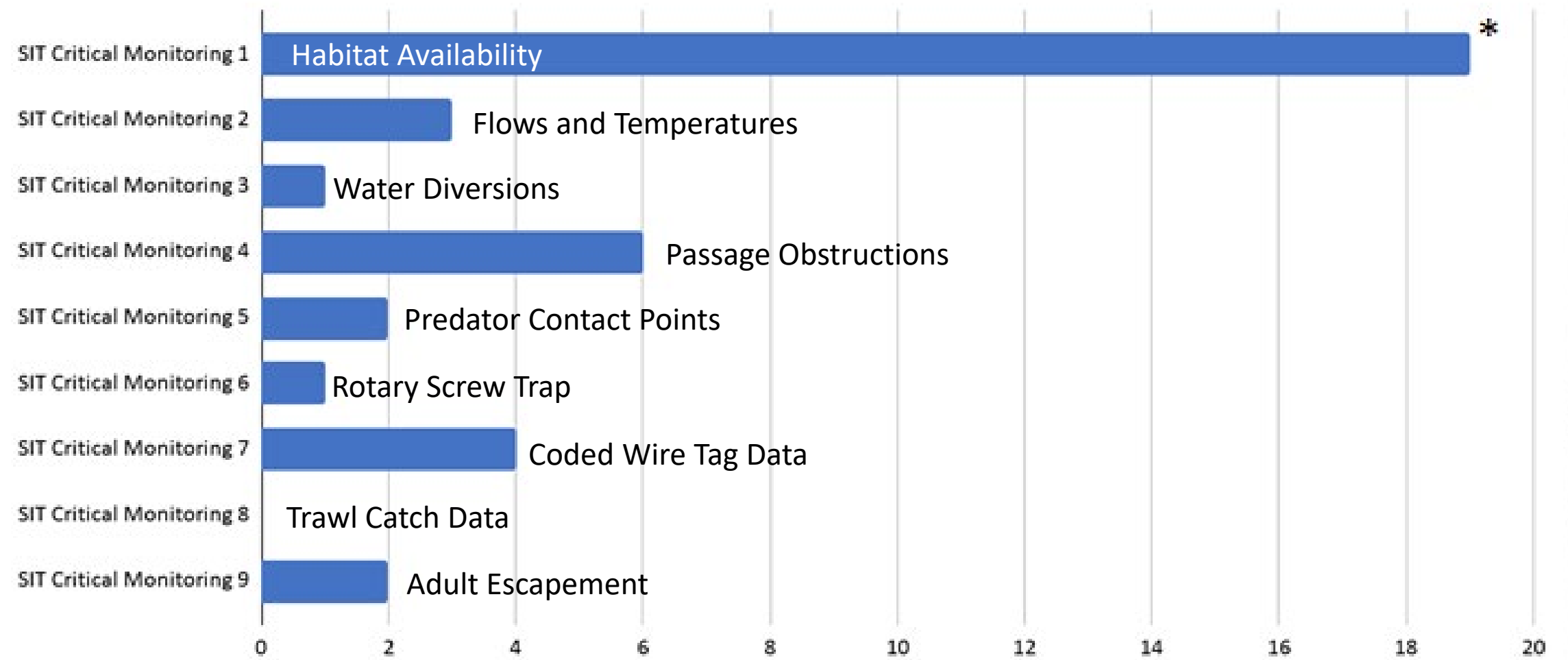
Near-Term Restoration Strategy - 4 O. Mykiss Information Needs



Near-Term Restoration Strategy - Sturgeon Information Needs

Info Need 1	Early juvenile survival and growth of wild fish (larvae to age-1)
Info Need 2	Adult and subadult survival and movement (system wide)
Info Need 3	Spawner abundance monitoring
Info Need 4	Estimate juvenile rearing and adult spawning habitat availability (system wide)
Info Need 5	White sturgeon spawning distribution

Near-Term Restoration Strategy – 38 SIT Critical Monitoring



Healthy Watersheds Restoration Projects

Project	Project Sponsor	Description	Proposed Award
Sacramento River			
Willow Bend	River Partners	Enhancement of 87 acres of floodplain rearing habitat and elimination of fish stranding. Reconnects floodplain; enhances rearing conditions, riparian habitat, and habitat complexity.	\$500,000
Fish Food Pilot Program	Reclamation District 108	Pilot-scale program to determine optimal process to grow fish food on the dry side of the levees and transport it to migrating juvenile salmon in the river. Improves food accessibility for migrating juvenile salmon.	\$2,500,000
Screen Meridian Farms Water Company	Meridian Farms Water Company	Installation of a high-priority fish screen to eliminate the entrainment of native fish species, including migrating salmonids.	\$15,700,000
Tisdale Weir Rehab & Fish Passage	Department of Water Resources	Implementation of an adult fish passage structure to reduce the entrainment of native fish species.	\$8,900,000
Landscape Scale Multi-Benefit Floodplain Feasibility Study	Reclamation District 108	Wetland benefits and restored flood infrastructure on 100,000+ acres. Investigates the potential re-thinking of low flows in the flood system during the winter months and the existing wetted footprint in the Butte Sink, Sutter Bypass and Colusa Basin. Includes investigating combinations of options at the multiple weir and gated outlet structures to ensure they have the flexibility to work together. Develops the necessary models to evaluate options and assembles the team necessary to develop options and create a permitable plan to be implemented.	\$6,000,000
Feather River			
Gravel Augmentation	Department of Water Resources	Installation of approximately 8,000 cubic yards of gravel on the Feather River to improve substrate conditions for spawning salmonids at key riffles; increases the existing suitable spawning habitat area.	\$1,500,000
Yuba River			
Hallwood Project (Phase 1)	Yuba Water Agency	Creation and enhancement of 89 acres of juvenile floodplain rearing habitat to provide 1.7 miles of perennial side channels and 6.1 miles of seasonal side channels, alcoves and swales. Improves natural river morphology and increases floodplain habitat, riparian habitat, instream cover, and habitat complexity, diversity and availability over a broad range of flows.	\$2,875,000



CVPIA SIT Meeting October 14-15, 2020

Agency Briefing on Central Valley Project LTO, Biological Opinion, CVPIA Implementation

David Mooney, Bureau of Reclamation

Garwin Yip, National Marine Fisheries Service

Donnie Ratcliff, U.S. Fish and Wildlife Service



CVPIA SIT Meeting October 14-15, 2020

Other Science Partnerships: CSAMP

Bruce DiGennaro, Essex Partnership

Sacramento River Science Partnership (SRSP)

Thad Bettner, Glenn-Colusa Irrigation District

Denise Reed, University of New Orleans

What is CSAMP?

- Collaborative Science and Adaptive Management Program
 - A collaboration of:
 - state and federal resource agencies;
 - public water agencies; and
 - non-governmental organizations
- focused on science and adaptive management associated with water project operations and species recovery in the Delta



Origins of CSAMP

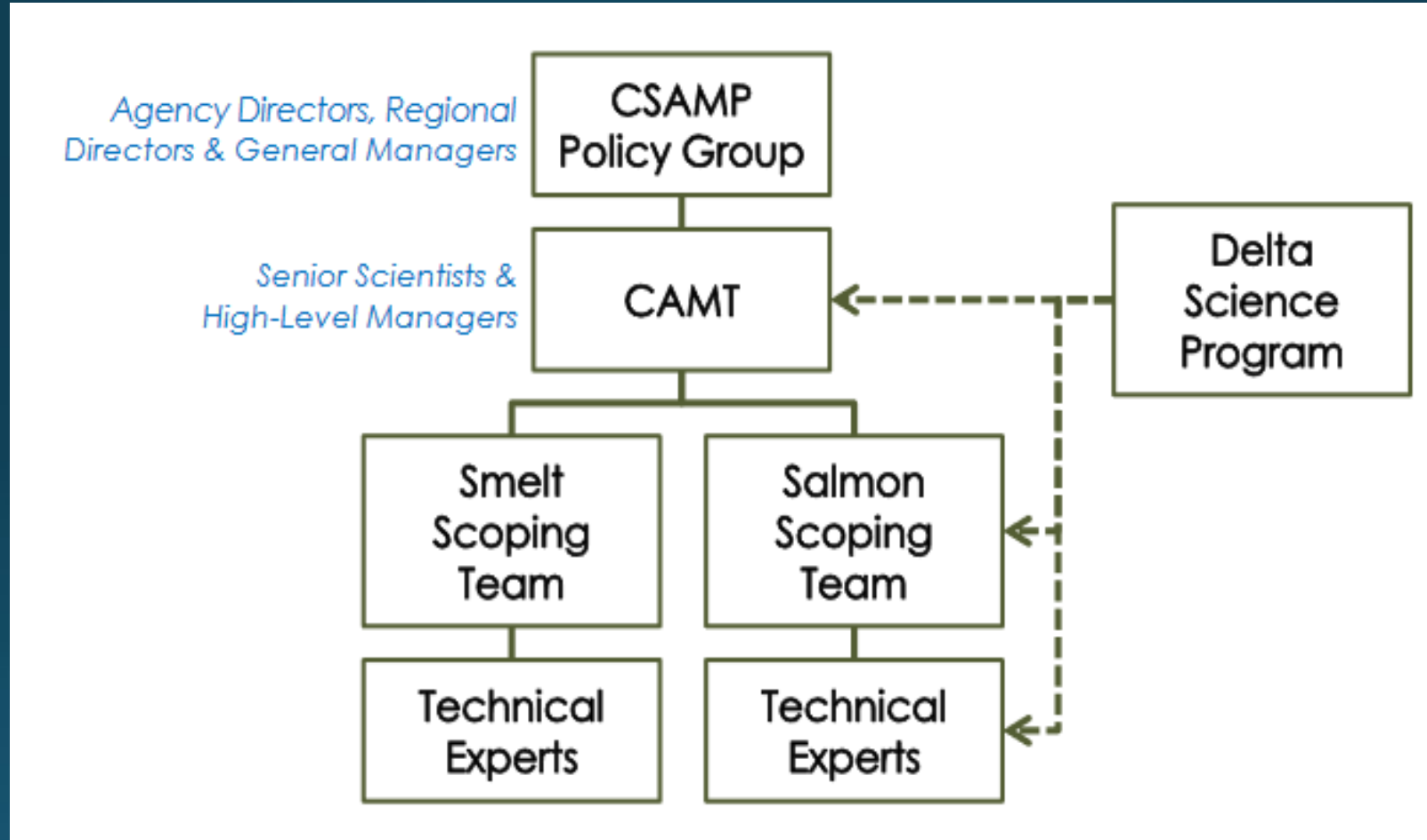
- Outgrowth of BiOp Litigation
- Initiated in April 2013
- In 2015, all parties agreed to continue the Program after final judgements were issued by the Ninth Circuit
- In 2018, CSAMP was expanded to include additional NGOs, upstream and in-Delta PWAs



CSAMP Participants

- CA Department of Water Resources
- CA Department of Fish and Wildlife
- CA State Water Resources Control Board
- Coalition for a Sustainable Delta
- Contra Costa Water District
- Defenders of Wildlife
- Friant Water Authority
- Golden Gate Salmon Assoc. and Water4Fish
- Kern County Water Agency
- Metropolitan Water District of Southern California
- National Marine Fisheries Service
- Natural Resources Defense Council
- Pacific Coast Federation of Fishermen's Associations
- San Luis Delta Mendota Water Authority
- Santa Clara Valley Water Agency
- The Bay Institute
- The Nature Conservancy
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- Westlands Water District

CSAMP Structure



Mission Statement

Work with a sense of urgency to collaboratively evaluate current hypotheses and management actions associated with protection and restoration of species of concern, current and future federal and state regulatory authorizations for the SWP and CVP, and other local and state management actions, to improve performance from both biological and water supply perspectives.



Approach

1. *Provide a **FORUM** for communication among the agencies, NGOs and PWAs;*
2. *Act as a **CATALYST** to address the most contentious and urgent management relevant science issues; and*
3. ***COMPILE AND DISSEMINATE INFORMATION** for decision makers on contentious and urgent science issues in a timely fashion.*

CSAMP Technical Studies

Completed

- Effects of Water Project Operations on Salmon Behavior and Survival
- Review of Delta Smelt Survey Data
- Delta Salmon Rearing Habitat Study
- Delta Smelt Science Plan

Ongoing

- Delta Smelt Entrainment Studies
- Fall Outflow Study
- Structured Decision Making for Delta Smelt
- Coordinated Salmon Science Planning for the Delta

CSAMP Priorities (2021-2022) - Draft

Delta Smelt

- Complete Structured Decision Making (SDM) – Phase 3
- Implement the Delta Smelt Science Plan (DSSP)
- Complete CAMT Fall Outflow Study

Salmonids

- Improve Coordination of Science and Management Activities
- Enhance and Apply Winter Run Life Cycle Model (WRLCM)
- Identify Priority Recovery Activities

Salmon Recovery

Goal: increase coordination and facilitate implementation of high priority management actions (i.e. those likely to have population level impacts) considering the entire life cycle, including hatcheries, tributaries, the Delta and the ocean.

Approach:

1. Formulate a framework/structure for coordination (how things fit together, including roles and responsibilities). Work with existing groups, understand and help coordinate.
2. Examine who is doing what (i.e. what's getting done and what's not and why)
3. Evaluate the benefits and costs of actions
4. Identify joint priorities (high impact projects)



Coordinated Salmonid Science Plan (CSSP)

CAMT Update – Presentation of Draft Report

Natascia Tamburello, Clint Alexander (ESSA)

September 15th, 2020

Goal of The Coordinated Salmonid Salmon Plan (CSSSP)

Use the **best available information to integrate and logically prioritize salmonid science, monitoring, and management activities** in the Delta region to support robust decision-making for the allocation of limited resources dedicated to salmonid conservation and management.



Species/Run-type (in order of priority)

- Winter-run Chinook Salmon
- Spring-run Chinook Salmon
- Steelhead
- Fall-run Chinook Salmon

Life Stages

- Migration (adult and smolt) and rearing survival - YES
- Spawning or incubation - NO

Draft Report Outline

1 Introduction (*High-level*)

1.1 Background

1.2 Purpose and Scope of the CSSP Assessment

2 A Landscape of Perils and Possibilities: Management Context for Delta Salmonid Science (*High-level*)

2.1 Delta Salmonids, Today and Tomorrow

2.2 Key Salmonid Science Uncertainties

2.3 Key Salmonid Management Activities and Players

2.4 Towards a Shared Vision for Salmonid Science in the Delta

3 Triaging the Merits of Science, Management and Monitoring Activities for Delta Salmonids

3.1 Approach

3.2 Results (Includes diagnostic plot + results tables + case studies for All, Sci., Mgmt., Mon.)

Theme 1: Beneficial Activities with the Most Agreement on Benefits

Theme 2: Activities with High Agreement on Low Barriers to Implementation

Theme 3: Beneficial Activities with The Least Agreement on Benefits

3.3 Alignment with Activities Under Consideration in Parallel Processes

5 Looking Ahead: Suggested Next Steps

6 References

7 APPENDICES (List of Interviewees & Qs; List of Foundational Literature; List of Survey Participants; Raw Data Files)



Exploring Opportunities for Alignment

- Key areas of intersection between parallel processes and the CSSP assessment:
 - Habitat Restoration
 - Flow Management
 - Floodplains & Food Supply
 - Migrations and Habitat Connectivity
 - Predators and Aquatic Weeds
- Recommendations for Increasing Alignment:
 1. Creating a more formal **forum for discussing and working on alignment**.
 2. Identifying the **common currencies (a) criteria used and (b) portfolio of considered activities** to understand what is being compared and aligned.
 3. Discussing **how to better align and standardize hybrid methodologies** to allow species and objective trade-off evaluations at broader spatial scales.
 4. Clarifying **different and complementary roles of SDM and Adaptive Management** in moving towards activity selection & implementation planning that is coordinated across parallel initiatives.



Questions

Contacts

Bruce DiGennaro (bruce@essexpartnership.com) – CAMT SSC / Essex Partnership

Rafael Silberblatt (rsilberblatt@kearnswest.com) – Kearns & West

Natascia Tamburello (ntamburello@essa.com) –ESSA



Southwest
Fisheries
Science
Center

Sacramento River Science Partnership Briefing for Science Integration Team

October 14, 2020



SRSP Mission and Membership

- To establish and maintain a science enterprise for voluntary collaborative research, modeling, monitoring, and synthesis relevant to salmonid and other in-river species recovery and water management on the main stem Sacramento River to facilitate joint learning and fact-finding between and among scientists and managers.
- Sacramento River Settlement Contractors
- Bureau of Reclamation
- National Marine Fisheries Service West Coast Region
- National Marine Fisheries Service Southwest Fisheries Science Center
- California Department of Fish and Wildlife
- U.S. Fish and Wildlife Service
- Department of Water Resources



SRSP Science Plan 2020

- Geographic scope - mainstem Sacramento River from Keswick Dam to Verona including the Sutter Bypass
- All four species of Chinook Salmon and Steelhead
- Considers interacting factors that influence abundance: reproduction, growth, mortality, and movement
 - NOT focused on identifying science needed to directly support abundance estimates for species
- Plan identifies scientific activities to support predicting, detecting, and understanding the effects of management actions
 - NOT focused on identifying management actions that will benefit species



SRSP Science Plan 2020

- Focused on issues of interest to the Partnership:
 - Temperature and other conditions necessary for salmonid egg incubation and early life stages
 - Non-temperature sources of mortality
 - Conditions necessary for juvenile Spring-run survival
 - Quantity, condition, and habitat needs of emerging fry and smolts
- Organized by three life stages from SAIL conceptual model:
 - Egg to fry emergence
 - Juvenile rearing to outmigration
 - Keswick Dam to RBDD
 - RBDD to Verona

Predict, Detect, Understand the Effect of Management Actions on Salmonids



Example Science Activities

- How do habitat improvements benefit rearing and out-migrating juveniles?
 - Collaboratively plan and conduct a multi-year Integrated Study to understand how managed flows interact with existing and newly restored habitat features to benefit rearing fry
 - Identify, refine, and test suitable bioenergetics models for use with flow models of in-channel, off-channel and floodplain habitats.
 - Conduct a series of paired releases of tagged hatchery fish into the Sutter Bypass during flooding and the adjacent Sacramento River, to detect whether passage through the Sutter Bypass increases survival for out-migrating juvenile salmonids
 - Develop a synthesis report on the effectiveness of restoration projects in the Upper Sacramento based on monitoring and other available data, including any lessons learned in relation to project evaluation, monitoring or implementation.



Example Science Activities

- Survival of out-migrating juveniles and the potential role of predation
 - Document the relative abundance and distribution of potential predators in the river above RBDD and the types of in-channel habitats with which they are associated with varying flows and environmental conditions.
 - Keswick Dam – RBDD: Plan and conduct a focused study to understand predator distribution and predation in different environments of the river under varying flows and seasonal temperature condition potentially including gut analysis of predators, predation activity, and tracking predator movements with changing environmental conditions and management actions.
 - RBDD-Verona: Strategically plan and conduct boat-based surveys of predators to identify how predator abundance and distribution changes through different reaches of the river.



SRSP Recent and Ongoing Activities

- Charter signed by initial members
- SRSP Science Plan 2020
 - Final approval Sept. 16, 2020
- Science Plan Activities
 - Activity summaries under development
 - Prioritization - Dec. 2020
- Science Workshop 2021 – Floodplain and Habitat
- Governance and Science Protocols
 - Including updates to the Science Plan





CVPIA SIT Meeting October 14-15, 2020

UPDATED Agenda Day 2: 9:00am-12:00pm

- 9:05-9:20 **Monitoring Requirements** – Jim Peterson (USGS), Adam Duarte (USFS)
- 9:20-11:10 (w/ break) **Project Updates (Monitoring and Data Focus) 15 min**
 - Clear Creek Phase 2A & 3C – Derek Rupert (USBR)
 - Yuba Hallwood – Paul Cadrett (FWS)
 - Stanislaus – JD Wikert (FWS)
 - *10 min Break*
 - Stanislaus gravel – John Hannon (USBR)
 - American River – John Hannon (USBR)
 - Upper Sac – John Hannon (USBR), Mandi Bright (Chico State)
- 11:10-11:40 **Monitoring and Data Synthesis Discussion**
- 11:40-12:00 **Next Steps and New Business**