Yolo Bypass Fish Monitoring Program Internal Assessment

Phase 2: Scientific Evaluation

Goals & Objectives

Review goal:

- Evaluate the design and scientific robustness of the monitoring program and recommend changes for the future

Sampling method objectives:

1. Examine temporal and spatial patterns in species abundance, composition, and life stage of larval fishes, juvenile outmigrants, resident, and migrating adult fishes and evaluate the effect of physical and environmental conditions on these patterns.

2. Examine temporal and spatial trends in water quality, and abundance and community composition of phytoplankton and invertebrates in the Yolo Bypass. Compare productivity in the bypass to that in the adjacent Sacramento River.

Review Sections

Methodology

- USGS review of program gear types
- UAV "Sister Study"

Data quality

- Lower trophic net tow standardization
- Data QA/QC standardization
- Zooplankton data independent QC study

Data interoperability & use

- Data reporting standardization with IEP
- Zooplankton data
- Data use (shrimp, ichthyo, light attenuation)

Requirements

YBFMP take permits

CDFW SCP

CESA MOU

USFWS ESA

NMFS ESA

MMPA

Regulatory documents that the YBFMP supports

2024 Incidental Take Permit

- DWR responsible for YBFMP – description provided by IEP annual work plan
- BSPP conditions of approval rely on:
  - Nov-Dec salmon at BL1-5 (biweekly year-round)
  - Jan-Jun salmon at STTD (weekdays Jan 1 – Jun 30)
- Implement Big Notch project in accordance with adaptative management & monitoring plan

Yolo Bypass Salmonid Habitat Restoration and Fish Passage (Big Notch) Adaptive Management plan

- Rotary screw trap, beach seines at "key locations": record length and weight of salmon
- Chl a, phyto, zoop, drift at screw trap and Sherwood Harbor

Wallace Weir and Fremont Weir adult fish passage biological opinions

- Fremont Weir passage telemetry study (1.3.3.2) uses fish collected from gillnetting or DWR fyke trap

Delta Smelt Biological Opinion (Action 4) and CVPIA Section 3406(b)(1).

Recommendations

RECOMMEND TO CONTINUE

RECOMMEND CHANGE

RECOMMEND SPECIAL STUDIES

Continue ✓

Recommendations:

1. Support UAV vegetation monitoring sister study

2. Reduce lower trophic sampling tow times

3. Using separate flow meters for each lower trophic net type

4. Use contractors employing accepted methods and taxonomic resolution for the identification and enumeration of zooplankton samples

Reasoning:

1. Evaluate vegetation impacts to the Toe Drain and the aquatic ecology of the system

2. Improves volume estimates during periods of high turbidity

3. Improves accuracy of volume measurements

4. For confidence in data quality and comparability with other IEP programs

Change

Recommendation:

1. Create a data flag for when water is too clear for secchi measurement

2. Add detailed description of condition codes into SOPs and field guides

Reasoning:

1. Make secchi data measurements easier to use or remove during data analysis

2. Improve consistency in condition code usage across crews and time

Change

Recommendation:

Discontinue measurements and egg denotation for shrimp species

Instead create a bycatch section on the fish datasheet for shrimp, crayfish, and tadpoles. Record presence and estimate abundance through a code related to count bins

Potential project idea: paper summarizing spread and 10 yrs of detailed data on Mississippi Grass Shrimp in the bypass

Reasoning:

- Processing estimated to take 1.5 weeks/year of staff time

- Data are rarely used, information not critical to program's objectives

Change

Recommendation:

Discontinue nutrient sampling, except for chlorophyll

Explore replacing some analyte information with EXO probes

Dataset	First Published	Downloads
Fish	2018	2363
Zoop	2020	2736
Drift	2021	130
Phyto	2023	86
Nutrient + Discrete	2023	115
Ichthyo	2024	8

Reasoning:

- Data collection is time intensive (prep, sampling, filtering, documentation, data review)
  - Time spent collecting is disproportionate to use of data, compared to other program data types
- Sampling began to contextualize NDFS sampling data and NDFS is closing out this year
- The most valuable analytes often have concentrations which fall under laboratory reporting limits, hindering their use in evaluating trends
- Improvements in continuous instrumentation can provide more robust information
  - Program utilizes TOE, LIS, and Hood stations
  - Explore bringing an EXO for LT days to collect additional information or outfitting the ProDSS with additional probes

Change

Recommendation:

Discontinue light attenuation

Potential project idea: evaluation of data and how it compares to established relationships between these data and chlorophyll and turbidity

Reasoning:

- YBFMP already collects other data that can support productivity rates/models

  - Productivity rates that could be estimated from these data track chlorophyll data closely, and chlorophyll is generally easier to interpret and report

  - Additionally, USGS has created a relationship using turbidity in FNU that could also help model phytoplankton productivity and the YBFMP collects this data as well
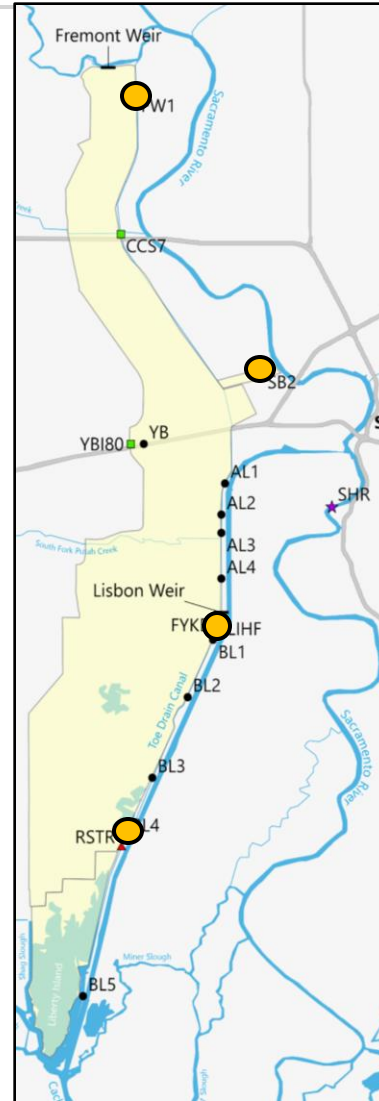
Change

Recommendation:

Reduce high flow beach seine sites every-other-week

Instead of sampling all sites (core+high flow) each week during overtopping, sample all sites every-other-week and in the interim weeks sample a subset of sites spread across the bypass where salmon catch is typically highest (FW1, SB2, LIHF, BL4)

Reasoning:

- Balance data collection with the logistics of expected increased flooding under Big Notch operations

- Generally, the more flooding, the more similar the communities are among beach seine sites

- Selected sites maintain weekly frequency of sites with high salmon densities, spread spatially across the bypass to provide a predicted diversity of growth rates and sizes for evaluating Big Notch performance metrics on a weekly basis

- Weekly sampling does not always add more value, but can be important for salmon specifically during early flooding events

  - Program could consider more sampling during those periods as staffing allows

Change

Recommendation:

Conclude fyke trap sampling on May 31st or a set number of days following the cessation of overtopping, whichever comes later

Currently sampling ends June 30th

Reasoning:

- Little value to the data collected in June
  - Most valuable for late migrating native minnows drawn in by flooding
- Outside of migratory period for native species
- Outside of peak months for nonnative species
- Risk of impact to spring run Chinook during warmer temps

Change
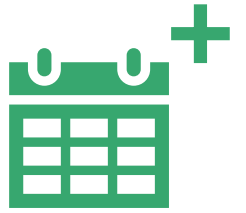
Recommendation:

Pilot lower trophic sampling new bypass locations

Potentially a site just above Lisbon Weir and/or special studies with adjusted methods to sample new areas of the northern and western bypass

Reasoning:

- Increase replication within the bypass

- Better understand communities in the tidal vs. muted tidal portions to pair with fish data

- Better understand productivity across the bypass

Special studies

Recommendation:

1. Zooplankton sampling methods study to evaluate the comparability and feasibly of oblique tows, sampling during different stages of the tidal cycle, pump sampling for microzooplankton, and smaller diameter nets

2. Test alternative littoral fish community sampling techniques for times in which beach seining is infeasible

Reasoning:

1. Possible improvements in zooplankton sampling and compatibility with other IEP programs for synthesis opportunities

2. Adapt/adjust to changes in the system due to vegetation and Big Notch that may reduce the feasibility of beach seining during certain times of the year/flooding conditions

Next steps

1. Report out on changes to EMRR Seniors, DISE management, IEP

2. Wrap up report documentation (EMRR Report, USGS OFR)

3. Create a template for future branch reviews as a report appendix

4. Manuscript focused on ecological response to flood regime concept

- Implement some changes immediately, others as capacity increases
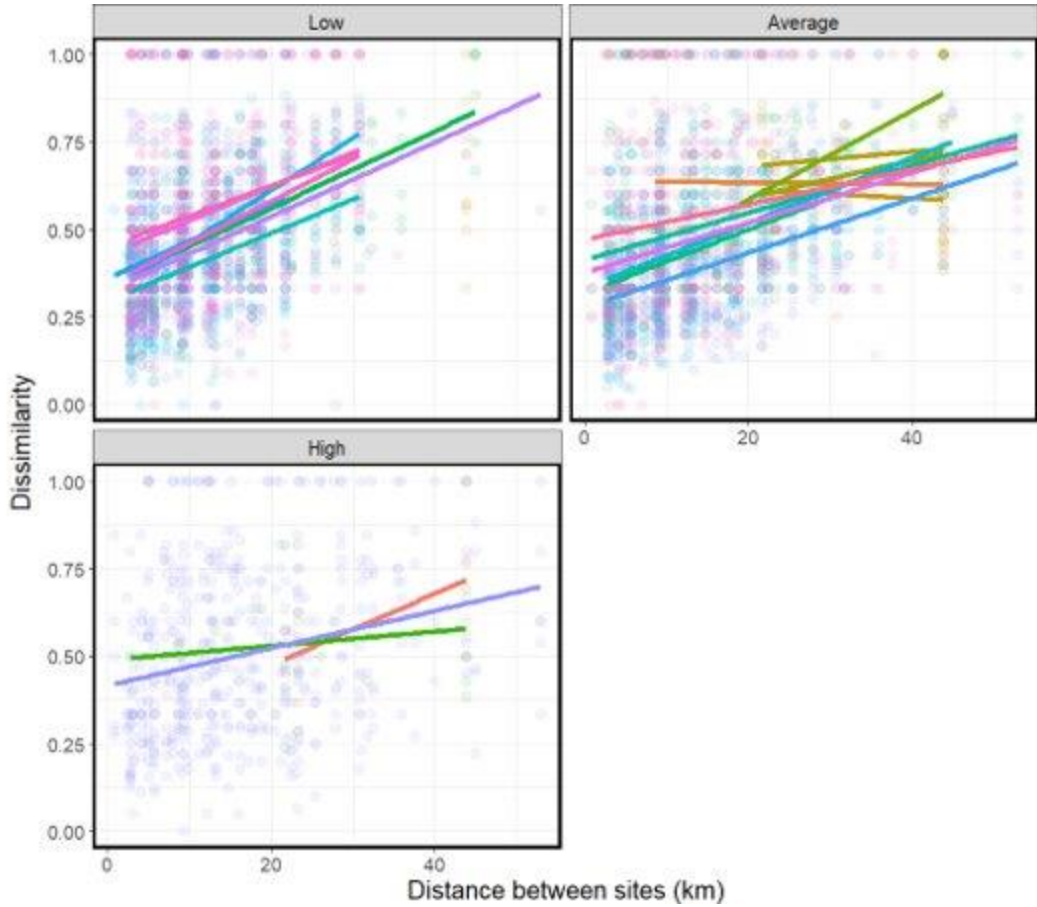
StationCode	CPUE_AVG	CPUE_SD
SB1	0.68864536	0.72857922
FW1	0.46926242	1.20264815
LIHF	0.29947402	0.42234009
SB2	0.14011018	0.29355345
BL1	0.13781658	0.50352597
AL1	0.10742567	0.20624741
BL4	0.09897436	0.17429774
AL4	0.0523777	0.11408651
BL3	0.04185582	0.06267698
LIHFS	0.04020408	0.07217964
AL3	0.03170304	0.12366343
BL5	0.02399154	0.04696319
BL2	0.01795503	0.03452162
YBI80	0.01557698	0.04485747
CCS7	0.01364731	0.03388547
AL2	0	0