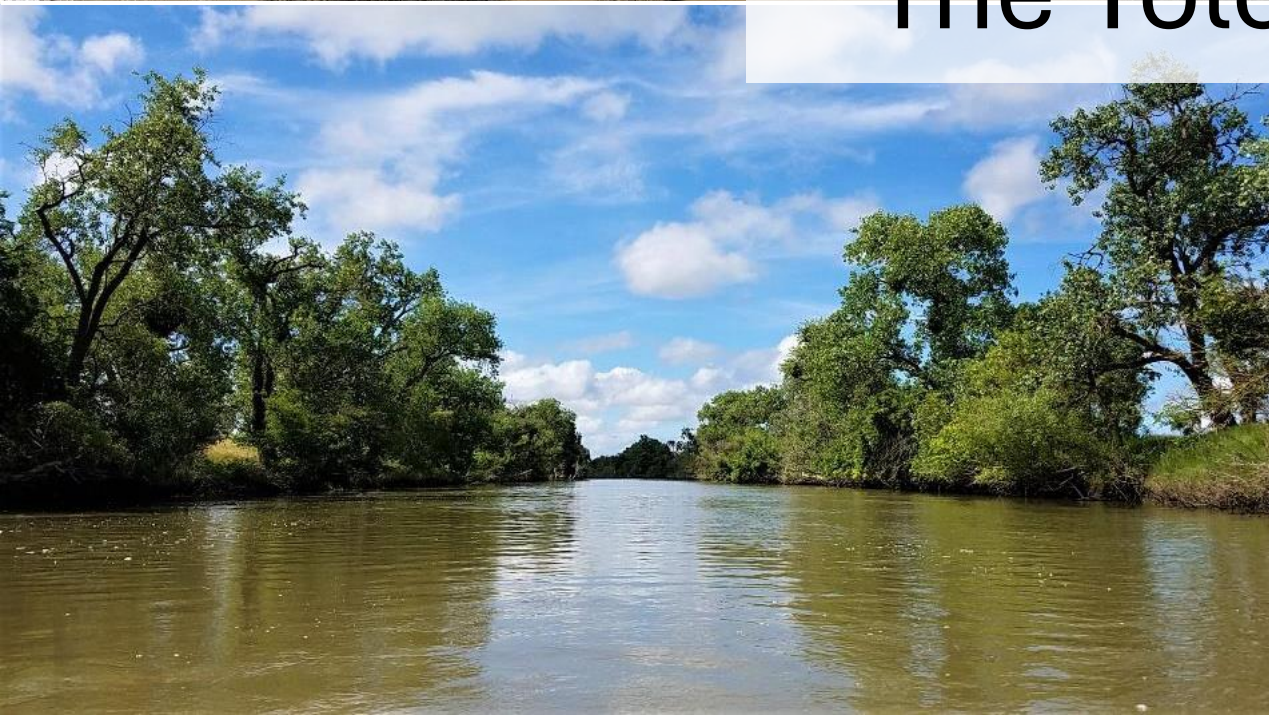


Yolo Bypass Fish Monitoring Program Internal Assessment

Phase 2: Scientific Evaluation

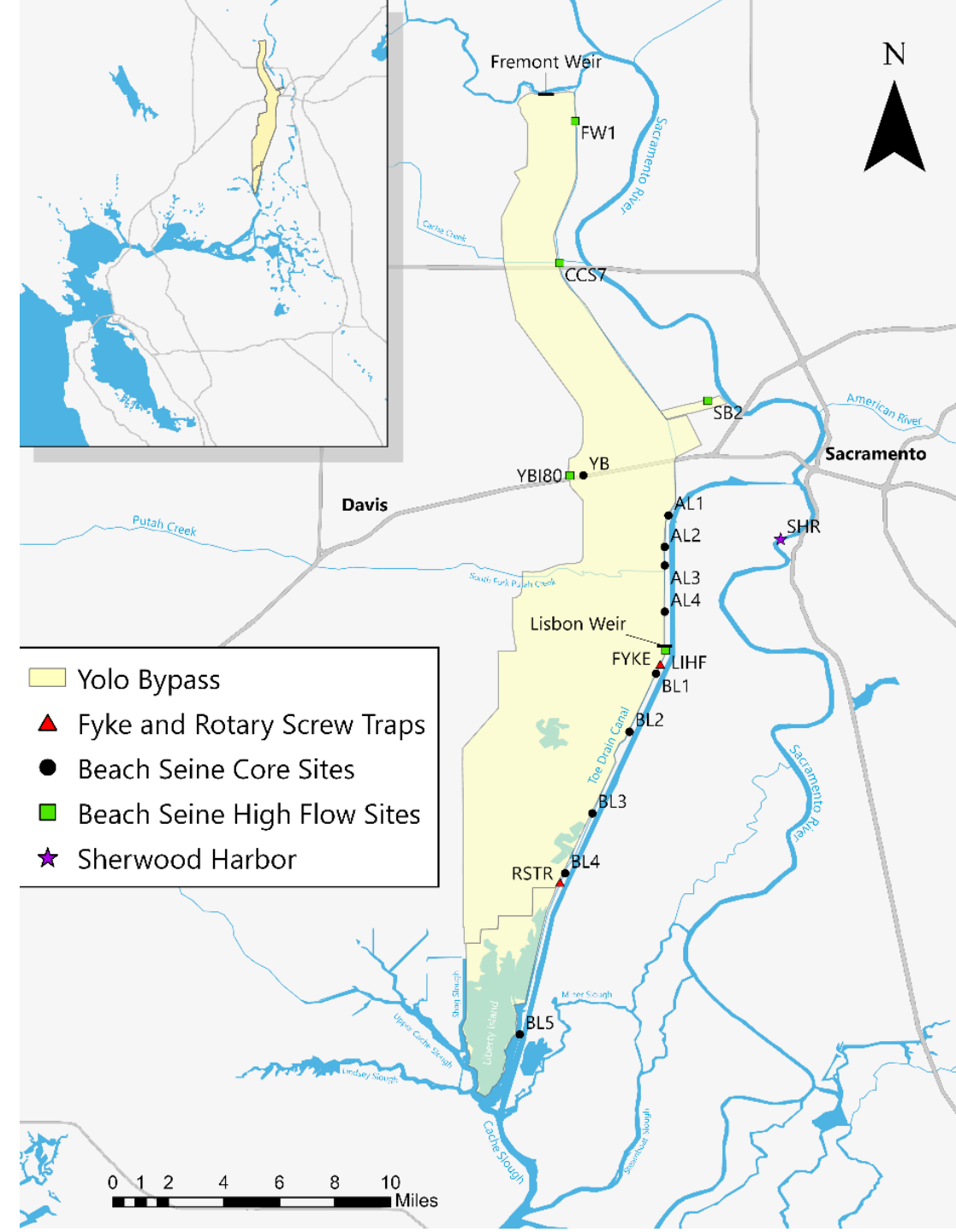


The Yolo Bypass



Monitoring Design

- Nutrients, phytoplankton, zooplankton, & drift invertebrates sampled every 2 weeks, at a site in the bypass and the Sac River
- Beach seining at 8 core sites every 2 weeks
- Fyke trap sampling 5 days/week Oct-June
- Screw trap sampling 5 days/week Jan-June
- Discrete water quality collected during each sampling event





- Phase 1: Programmatic evaluation was completed in 2020 & evaluated the YBFMP:
 - History and background
 - Field and laboratory documentation
 - Permitting
 - Contracting
 - Regulatory support
 - Outreach and engagement
 - Database management
 - Data publication
 - Quality control and assurance

Introduction

This document summarizes ways in which the Yolo Bypass Fish Monitoring Program (YBFMP) informs relevant regulatory and strategy documents. This effort was created as part of the 2020 YBFMP Internal Review. Staff from YBFMP used keywords to skim regulatory documents, pulled out excerpts relevant to YBFMP monitoring, then briefly described how our monitoring was related to each excerpt. See Review Process for more information.

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2019 NMFS BiOp	11
2019 DWR Strategic Plan	13

	Start Date	End Date	Sampling Type	Details
2019 DSP Delta Science Plan.....	7/14/2023	CURRENT	Nutrients & WQ	Conductivity calibration standard for ProDSS changed from 1413uS to 1000uS (pu
2020 DFW ITP	7/6/2023	2/7/2024	BSEINE	AL1 decreasing in length weekly due to primrose and AL3 moved upstream ~3m
2020 IEP Science Strategy.....	8/8/2023	8/23/2023	Nutrients & WQ	Used alternate capsule filters while waiting on shipment of new filters. Used filt
USBR Biological Assessment Appendix	9/11/2023	1/22/2024	BSEINE	BL5 no longer seinable due to large amounts of vegetation.
CVPIA 3406(b)(1) – Fish, Wildlife, Impr	1/22/2024	1/26/2024	FYKE	Pulled Fyke due to vegetation coming down the Toe Drain
Fremont Weir BiOp (Adult Fish Passag	1/25/2024	1/26/2024	RSTR	Pulled screw trap due to vegetation coming down the Toe Drain
Wallace Weir BiOp (Fish Rescue Proje	1/30/2024	2/13/2024	FYKE	Pulled Fyke due to high CFS pushing fyke downstream. Fyke pull cable snapped a
Fremont Weir Big Notch Documents...	1/16/2024	1/26/2024	BSEINE	Water stage too high to seine, water quality taken but condition code 4
Fremont Weir Big Notch EIS/EIR Appe	2/2/2024	2/13/2024	RSTR	Screw trap pulled to side channel during intital flood up and overtopping becaus
Versioning.....	2/14/2024	2/14/2024	RSTR	Screw trap winch cable snapped, replaced 2/14/24
	2/20/2024	CURRENT	FYKE	Pulled Fyke, not sampleable because of CFS and debris
	2/22/2024	CURRENT	RSTR	A-frame bent because of debris load, trap is not fishable until repair is made
	2/26/2024	2/26/2024	Nutrients & WQ	Tows were not performed at STTD because of excessive debris in toe drain, cond
	4/2/2024	5/16/2024	BSEINE	Water stage too high to seine AL sites, water quality taken but condition code 4
	5/1/2024	CURRENT	BSEINE/Fish Data	Removing habitat code from data sheets and upcoming fish data publications du
	5/16/2024	CURRENT	Nutrients & WQ	Begin using pre-(phosphate)buffered formalin.
	6/3/2024	CURRENT	Nutrients & WQ	Transition DOC filtering from stainless steel apparatus to capsule filter methods
	6/12/2024	CURRENT	BSEINE	BL5 no longer seinable due to large amounts of vegetation.
	11/19/2024	11/19/2024	FYKE	Waited a day to set fyke trap due to ramp maintenance.
	11/27/2024	11/29/2024	FYKE	fyke pulled early due to heavy debris flushing after rain, followed by Thanksgiving
	15-Dec	1/23/2025	FYKE, BSEINE	High water level in Toe Drain, did not overtop but was at overbank at some beac
	1/14/2025	CURRENT	Nutrients & WQ	Ceased collection of light attenuation data and water chemistry analytes (DOC/
	2/4/2025	CURRENT	RSTR	Lifted cone up for debris management due to overtopping; 2/5/25 and 2/6/25 sh
	2/4/2025	CURRENT	BSEINE	begin high flow seine schedule
	2/5/2025	CURRENT	FYKE	Fyke pulled higher up levee and not set due to overtopping, heavy debris in chan
	2/10/2025	2/25/2025	Nutrients & WQ	sampled chlorophyll using dip pole during OB since access to platform sampling

Goals & Objectives

Phase 2 evaluation 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.

Assessment Sections

Methodology

- USGS analysis 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 adaptive 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



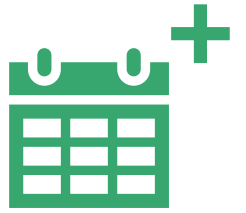
Recommendations:

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

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, there are now relationships using turbidity in FNU that could also help model phytoplankton productivity and the YBFMP collects this data as well

Change



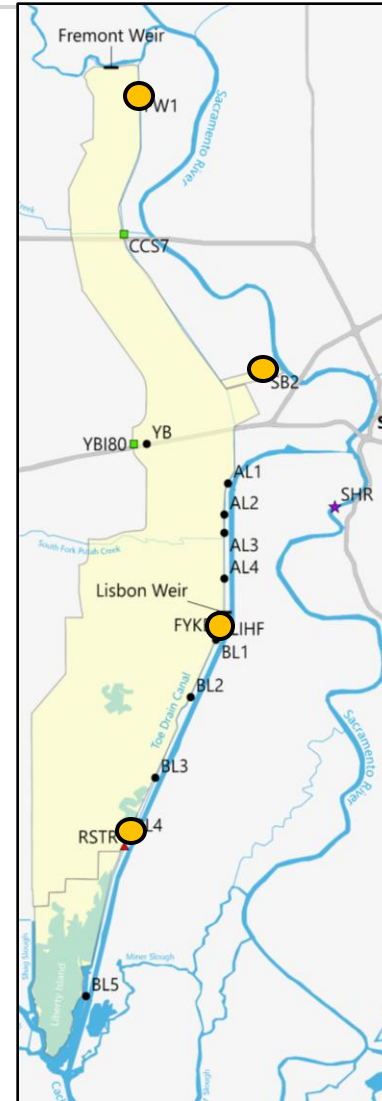
Recommendation:

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 1 month 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 feasibility 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
2. Wrap up report documentation (EMRR Report, USGS OFR)
3. Finalize a template for future branch internal evaluations
4. Complete manuscript focused on ecological response to flood regime concept

Most changes have been implemented, some are in-progress for eventual implementation

YBFMP Data

- Most data posted to EDI, ichthyoplankton coming soon!
 - Fish:
<https://portal.edirepository.org/nis/mapbrowse?packageid=edi.233.4>
 - Drift & ichthyoplankton:
<https://portal.edirepository.org/nis/mapbrowse?packageid=edi.818.4>
 - Zoop:
<https://portal.edirepository.org/nis/mapbrowse?packageid=edi.494.2>
 - Phytoplankton & nutrients:
<https://portal.edirepository.org/nis/mapbrowse?packageid=edi.1391.1>
 - Inundation:
<https://portal.edirepository.org/nis/mapbrowse?packageid=edi.840.2>

