# Yolo Bypass Fish Monitoring Program Internal Review Appendices

**Phase 1 Programmatic Review**

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## Review Questions

In crafting overarching questions for this review, we referenced reviews by other monitoring programs and modified their questions. The other reviews referenced were:

1) 2013 Interagency Ecological Program's Scientific Advisory Group review of the USFWS Delta Juvenile Fish Monitoring Program
2) 2019 Interagency Ecological Program's pilot Long-term Monitoring Review for demersal fishes
3) 2020 DWR Environmental Monitoring Program's 3-year review

Due to the scope of our phase one programmatic review, the following questions focused on documentation and communication related elements only. Questions pertaining to study design and scientific methodology were set aside to address in the phase two scientific review. The goal of these review questions was to extract meaningful and concise narratives from the review elements to assess broad program-level objectives.

*Phase one review questions:*

1. Are YBFMP goals and objectives explicitly clear and identified?
    a. Are goals and objectives easily found and publicly accessible?
    b. How does YBFMP manage changing goals and objectives to facilitate adaptive management, new stakeholders, and responsiveness to new regulatory mandates?
2. Are data disseminated to users in useable formats and in relevant time periods?
    a. Are data collection methods documented in a thorough, useful, transparent, and accessible way (e.g., sample and data archiving)?
    b. Has the YBFMP identified and documented data limitations?
    c. What is the frequency of peer-reviewed publication and report writing?
3. Is YBFMP data being used to inform restoration and management of the Yolo Bypass, and if so, how is the information communicated?
4. Are YBFMP data and results communicated to, and used by, the scientific community, stakeholders, and managers? Are the data and results communicated in a way that is useful?
5. Who does YBFMP collaborate with or assist with sample collection?

a. How do these collaborations originate, and how are the relationships communicated and documented?
b. What are the range of products from these collaborations?

# Documentation Review Process

After establishing the scope of the internal review, AES drafted an outline of elements that would be reviewed during phase one. AES identified 27 elements covering the range of YBFMP activities, as well as the logistical, operational, regulatory, and intellectual components of the program (see Appendix A). A small team of AES staff were assigned to each element, with the most experienced staff assigned as the lead. In addition to these review element teams, a review coordination team was formed to provide guidance, consistency and accountability during the process.

An EOR document was created in order to give each group a place to collaboratively record information and assess the documentation for each element. All EOR documents included a general description, accounting of current practices, evaluation of documentation, and recommendations for improvement. At the discretion of the element review team, subsections and contents of each EOR varied depending on the type of activity or topic and its specific needs. Main activities included exploration and evaluation of metadata, standard operating procedures (SOP), research questions, safety, QA/QC, training, sampling flowcharts, changes over time, chain of custody, and other relevant documentation (Appendix A).

The YBFMP internal review coordination team created a document review protocol to outline the evaluation of all types of documents encountered during the programmatic review (Appendix C). Each element's related documents were evaluated under the 'Evaluations of Documentation' heading located in each EOR document. First, element review teams created a short review narrative which included review start and completion dates, authors, a folder path for the original document, and a general description of the purpose of the document. Next, reviewers completed an evaluation of the document which included whether the document exists, when it was last updated, who the previous authors were, an evaluation of the quality of the document, and a list of any edits made. Finally, a list of recommendations for improvement was made for any proposed actions falling outside the scope of the review. Throughout the review process, a SharePoint folder structure was used to store, track and share documents among staff.

During the document evaluation process, element review teams tracked the status of documents in a 'Working Documents Tracker' Excel worksheet on SharePoint. This tracker listed the relevant element, title, authors, and status of the document. The element review teams located individual review documents in the 'Shared Drive' folder on the AES 2020 YBFMP Review SharePoint. This shared drive was replicated from the internal Yolo Bypass Network Shared Drive (to facilitate online usability and real-time sharing during COVID-19 telework while also keeping the original files on the network as an archival backup). Review document files were then copied to the relevant folder in the 'YBFMP Review Working Folders' folder on SharePoint using the naming convention 'element_document_original' (a backup to revert to if needed), and within the same subfolder, another copy of the same document renamed 'element_document_revisions' was created as the working version for the element review teams. All changes completed as part of the review process were made using track changes within the revisions document. Review teams were advised to use their best judgment on what changes should be made as part of the review versus making a recommendation for improvement for future completion. In general, edits for clarity, grammar, organization, and minor content additions were made as part of the review. Edits for major content additions, up to the creation of entire documents, were often listed as recommendations for the future. However, many of these recommendations were carried out due to extra staff resources granted by COVID-19-cancelled fieldwork.

Upon completion of each EOR, element review teams ensured EOR completeness and that its related documents followed the revised naming convention and additional copies of files were removed (e.g., earlier iterations of files). Element review teams then added completed EOR information to the 'Completed Review Elements' document to track the progress of the review. The completion of the review was split into three steps: EOR document finalization, revised documents finalization, and final report writing. An EOR finalization committee was formed to complete step one and a revised document finalization committee was formed to complete step two. Finally, the internal review coordination team focused on drafting the final report.

# Review Finalization

The EOR finalization committee worked through each EOR document together to eliminate any potential discrepancies. Within a new sheet titled 'Finalization check-list' in the 'Completed Review Elements'

document, the committee would answer a series of questions for each section of the EOR. For example, EORs were reviewed for obvious gaps in the review, appropriateness of documents, applicability and existence of metadata and SOPs (and if they were created as part of the review). Additionally, the EOR evaluation itself was finalized by ensuring the documents were complete, thorough, accessible, consistent with other documents in scope and format, and included file pathways for all documents listed, and that all edits, changes, and associated documents were complete. As the committee finalized elements, they could make small edits or changes to the EOR documents for consistency. However, if any larger edits or changes were needed, the committee would contact the original review team to request changes to the document(s). Finally, the committee added recommendations from each element to a master list of recommendations and created a summary that included a link to the EOR document, a short narrative of the element's outcomes, and a table of documents reviewed.

The revised document finalization committee was responsible for finalizing standard operating procedures, metadata documents and other miscellaneous documents. Guidelines and document finalization tracking were incorporated into the 'Working Documents Tracker Finalization' document mentioned previously. A systematic process was developed to track document status and completion, consistent formatting and structure, appropriate content, grammar, and accessibility to ensure compliance with American's with Disabilities Act (ADA) guidelines. Small corrections were made by the revised document finalization committee and documents with larger issues were sent back to the element review teams for corrections. Once these corrections were made and approved by the committee, the final documents were then saved to a network drive and older versions were archived.

The last step in completing the YBFMP internal review was the final report writing itself. Once all the EOR documents and associated documents were finalized, the review coordination team went over all EOR summaries and the recommendations for improvement, drafted answers to the review questions laid out at the start of the review, and received feedback from YBFMP staff on how they felt about the process and their ideas on how to improve the review process in the future. This information was then used to make recommendations for further review, new YBFMP documents, or additional activities to address any programmatic deficiencies.

# Appendix C: Protocol for Evaluating Documents as part of the 2020 YBFMP Review [Abbreviated Version]

[NOTE: Review guidance outline not included in this abbreviated Appendix version]

The purpose of this document is to outline how to evaluate all types of documents encountered during the YBFMP's 2020 programmatic review. The step by step process provided should be followed for each document used to provide information about one of the elements of review.

## Document Review Process

1. Reference the "Review Guidance Outline" below for your review assignments and for guidance on the scope of your review task.
2. Evaluations should be done under the "Evaluations of Documentation" heading located in each element document in "2020 YBFMP Review\outline and guidance docs\elements of review" folder on SharePoint. Amanda has created an example element review titled "Review Process Example – CWT".
3. Locate the document you are reviewing in the "Shared Drive" folder on SharePoint.
4. Locate the relevant folder in the "YBFMP Review Working Folders" folder on SharePoint and copy the document you are reviewing here using the naming convention element_document_original.docx (e.g. RSTR_metadata_original.docx).
5. Within the same subfolder, create a copy named element_document_revisions.docx. This will be where all changes will be made as part of the review process. **Always use track changes when editing this document.**
6. In the "Elements of Review" subfolder, locate the relevant Program Documentation file, this will be your review template. This document will be your review narrative.
7. Conduct the review using the "Guidance Outline" below and the template and making changes in the _revisions.docx file as you go (**using track changes**). Use your best judgement on what changes to make during the review and what changes to detail in

the "Recommendations for Improvements" section for future completion.

8. Generally, edits for clarity, grammar, and organization should be made in the _revisions document as you review (using track changes). Minor content additions can also be made this way, at the discretion of the reviewing team.
9. Edits for major content additions, up to the creation of entire documents that don't currently exist, should generally be detailed in the recommendations section at the end of the review document.
10. Update the status of the document in the Working Documents Tracker excel sheet on SharePoint.
11. Upon completion of the review, ensure that all documents in the subfolder follow the naming convention and there are not superfluous files present (i.e. multiple copies of _revisions.docx). However, be careful not to delete edits from one revision that are not in another. If necessary, use the Compare feature in Word to compare documents word for word (located in the Review tab of MS Word, to the right of Track Changes).
12. A subsequent team will come back to review the _revisions.docx changes and finalize the document with the naming convention element_document_v1.docx.

# Evaluations of Documentation (Outline)

Review Narrative for [element] [document]

[review completion date]

[author(s)]

[folder path for element_document folder]

General Description

[A high level, general description of the purpose of the document. Reference the description in the guidance outline as a starting point for this language.] (Example: The Standard Operating Procedure for "element" should thoroughly describe the step-by-step process of collecting a certain kind of data or operating a certain type of equipment. Steps should be detailed enough to allow a novice to perform the task with only basic training. The level of detail should be sufficient to ensure consistency of sampling between crews.)

Evaluation

1. Does this document exist?

[y/n with explanation if the intent of the existing document doesn't match the general description above. If no, then stop here and leave this template file in the appropriate New Shared Drive subfolder.]

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   [date and brief summary of previous versions and update frequency, if applicable]

3. Who were the authors of the previous document?

   [list if known, especially for document authored by entities outside AES]

4. Evaluate the quality of the document.

   [Write a brief narrative of the results of the evaluation. This can be purely narrative or a detailed outline. Reference the Guidance Outline for elements to include in the review. For Metadata and SOP documents, evaluate existing documents against the templates provided.]

5. What edits were made, if any?

   [Brief narrative of what changes were made to _revisions.docx document]

# Recommendations for Improvements

[List and/or narrative of all recommended changes or improvements for document. Do not list changes already made in _revisions.docx file. Be as specific as possible, enough to let someone not on the review team to understand what steps to take to improve the document. If document is of satisfactory quality, provide brief explanation of why no further improvements are warranted at this time.]

# Appendix D: Element of Review (EOR) Documents

## History and Background of YBFMP

### General Description/Narrative

1. Purpose

The Yolo Bypass is a 59,000-acre floodplain designed primarily as a flood management area of the Sacramento Valley, approximately doubling the wetted area of the Delta during major storm events. Largely supported by the Interagency Ecological Program (IEP), the Aquatic Ecology Section (AES) within the Department of Water Resources (DWR) has operated a fish and aquatic ecology monitoring program in the Yolo Bypass since 1998. The Yolo Bypass Fish Monitoring Program (YBFMP) has provided a wealth of information regarding the significance of seasonal floodplain habitat to native fishes. As the Yolo Bypass has been identified as a high restoration priority by the US Fish and Wildlife Service and National Marine Fisheries Service biological opinions for Delta Smelt (Hypomesus transpacificus) and winter and spring-run Chinook Salmon (Oncorhynchus tshawytscha), and by California EcoRestore, baseline data from this program are critical for evaluating the success of future restoration projects. The YBFMP informs the restoration actions that are mandated or recommended in these plans and has already served to increase our understanding of the role of the Yolo Bypass in the life history of native fishes by providing critical baseline data on the ecology of the bypass and how it interacts with the broader San Francisco Estuary. In addition, the YBFMP has played a significant role in identifying critical habitat improvements for listed species as well as developing innovative management tools, highlighting the value of long-term ecological monitoring for the management of our complex ecosystem. Some major key findings include: (1) Yolo Bypass is a major factor regulating year class strength of splittail, Pogonichthys macrolepidotus (Sommer et al., 1997; Feyrer et al., 2006; Sommer et al., 2007a); (2) Yolo Bypass is a key migration corridor for adult fish of several listed and sport fish (Harrell and Sommer 2003); (3) it is one of the most important regional rearing areas for juvenile Chinook Salmon (Sommer et al., 2001a; 2005); (4) Yolo Bypass is a source of phytoplankton to the food web of the San Francisco Estuary (Jassby

and Cloern 2000; Schemel et al., 2004; Sommer et al., 2004); (5) Inundation of the Yolo Bypass enhances the quantity and quality of phytoplankton to the downstream estuary (Lehman et al. 2007), (6) the Yolo Bypass season floodplain-tidal slough complex supports life history benefits for juvenile Central Valley Chinook salmon compared to the Sacramento River (Goertler et.al. 2018); and, (7) the Yolo Bypass provides refugium and critical nursery habitat for the endangered Delta smelt population during drought conditions (Mahardja B et. al. 2019).

## 2. Program objectives

The basic objectives of the project are to: (1) collect baseline data on lower trophic level biota (phytoplankton, zooplankton, and invertebrate drift), juvenile and adult fish, hydrology, and water quality parameters within the Yolo Bypass; and (2) investigate of the temporal and seasonal patterns in chlorophyll-a concentrations, including whether high concentrations are exported from the Bypass during agricultural and natural flow events and the possibility of manipulating bypass flows to benefit listed species like Delta Smelt (Hypomesus transpacificus) and Chinook salmon (Oncorhynchus tshawytscha). The YBFMP operates a rotary screw trap and fyke trap and conducts biweekly beach seine and lower trophic surveys in addition to maintaining water quality monitoring instrumentation in the bypass. The YBFMP serves to fill information gaps regarding environmental conditions in the bypass that trigger migrations and enhanced survival and growth of native fishes, as well as provide data for IEP synthesis efforts. YBFMP staff also conduct analyses of our monitoring data to address pertinent management related questions as identified by IEP.

The four main sampling methods that support the YBFMP baseline data objectives include (1) beach seine, (2) rotary screw trap, (3) fyke trap, and (4) lower tropic sampling.

1. The beach seine surveys are conducted in the Yolo Bypass's perennial channel (Toe Drain), perennial ponds, seasonal ponds, and inundated floodplain. The objectives for the perennial ponds are: (1) to examine seasonal fish species abundance and diversity in the Yolo Bypass versus the Sacramento River; and, (2) to examine species abundance and composition in different water year types. For Toe Drain and inundated floodplain sampling the objectives are: (1) to examine species abundance and composition in different water year types; (2) to compare fish abundance and diversity between Yolo Bypass regions; and, (3) to estimate growth rates and densities of salmon in the Yolo

Bypass versus the Sacramento River. Seine sampling in seasonal ponds is designed (1) to measure the diversity and abundance of fish species trapped in ponds located in different regions and habitats; (2) to compare relative densities of fish before and after floodplain drainage; (3) to examine the sources of fish mortality in seasonal ponds including temperature, desiccation and predation; (4) to develop long-term annual Yolo Bypass stranding indices for reference locations; and, (5) to examine relationships between annual stranding indices and physical variables such as hydrology and temperature.

2. The rotary screw trap sampling objectives are to (1) examine species composition of juvenile outmigrants and resident small-bodied fishes; (2) identify general salmonid emigration attributes such as timing, abundance, life stage composition, condition, and investigate the influence of the factors initiating downstream migration such as flow, tidal cycle, time of day, turbidity, and water temperature; (3) to compare fish species composition and densities in the Yolo Bypass Toe Drain and floodplain; and, (4) develop an estimate of juvenile salmon residence time using Coded Wire Tags (CWT).
3. The objectives of the fyke trap are to (1) examine adult species composition; (2) identify general timing and duration of anadromous species use relative to different physical conditions; and, (3) to compare timing and duration of species captured in the Yolo Bypass to those captured in other Sacramento Valley tributaries.
4. The lower trophic sampling element monitors baseline data of seasonal variation in species densities and trends of zooplankton, drift invertebrates, fish eggs and larvae, and water quality (nutrients, phytoplankton and chlorophyll) between the Sacramento River and the Yolo Bypass. The lower trophic objectives are to (1) compare productivity between the Sacrament River and the Yolo Bypass; (2) identify the aquatic and terrestrial insects available for juvenile and adult fish; and, (3) determine the annual presence, timing, and recruitment success of fishes utilizing the Yolo Bypass.

## 3. Timeline of YBFMP

- **1998**: Yolo Bypass Fish Monitoring Program (YBFMP) is established (pre-program exploratory beach seine surveys occurred from 1997-2002 where sampling was conducted in more locations than from 2002 to present).
- **1998**: Inundated floodplain sites (high-flow sites) were established at Fremont Weir (FW1), I-5 at Rd. 22 (RD22; formally CCS1-6 in 2007 and 2008), Yolo Causeway (YBI80), Lisbon Weir (LIHF or LI), and the screw trap site (BL4).

- **1998**: During the first year of the program, a high flow year, a traditional winged fyke net was deployed intermittently near the Yolo Bypass Causeway bridge from January – February. This method was removed from the program after 1998.
- **1998**: Drift invertebrate sampling began and was generally conducted once monthly from February – April.
- **1998 & 1999**: Pilot sampling years involved operating various sampling methods:
    - Two rotary screw traps were deployed, a 5 ft screw trap was used for less than one month in January and February during high flows, after which the current 8 ft screw trap was used.
    - Additional seining efforts during high flood years were conducted. In addition to the 50 ft seine (SEINE50), other methods such as SEIN30 (30 ft), SEINE100 (100 ft), SEINCOVE (beach seine cove set), SEINENCL (beach seine enclosure), and PSEIN100 (100 ft purse seine) were tried.
    - Two fyke traps fishing four months per year and seven days a week.
- **1999:** Fyke monitoring began using a fyke trap, a funnel-shaped metal cage design, as the standard method for the fyke sampling effort.
- **1999:** Zooplankton monitoring began. 1999-2001 were pilot years. From 2001, sampling was conducted using a 150-micron net at least once monthly during the months of January – June.
- **1999 – 2010:** Egg and Larval sampling was typically conducted at least once monthly from March – June. During some years, sampling was started in January and/or conducted weekly during the inundation and drainage of the Yolo Bypass.
- **2000 – 2009**: A high number of sampling hours were due to the fyke and screw trap often being fished over weekends and checked every 1-2 days.
- **2001 & 2002**: A second fyke trap was deployed.
- **2001**: Drift invertebrate sampling conducted at least once monthly from January-June (previously conducted once monthly from February-April).
- **2002**: YBFMP adds shrimp catch to its monitoring effort after shrimp *spp*. invade the San Francisco Estuary in 2000.
- **2002**: Beach seining effort was reduced to what it is today in order to help provide a long-term database on fish use of the basin.
- **2003 – 2009**: The fyke trap was checked every-other day instead of daily.
- **2007 & 2008**: Additional beach seine sites were sampled for a special study in the Cache Slough complex.

- **2010:** The fyke trap operation protocols changed to daily checks with no weekend fishing.
- **2010**: The rotary screw trap operation protocols changed to daily trap checks and only set on weekend during some flooding events.
- **2010**: The additional above Lisbon Weir (AL 1-4) and below Lisbon (BL 1-5) beach seine sites were added as year-round sampling to provide better spatial and temporal data on fish assemblages within the Yolo Bypass Toe Drain.
- **2011**: The rotary screw trap is replaced after damage to the original trap during flooding event.
- **2011**: Genetic sampling (via fin clip or swab) of smelt begins.
- **2011 – 2014**: Egg and larval sampling was conducted at least biweekly (every other week) year-round and weekly during floodplain inundation and drainage events at STTD and SHR.
- **2011**: Year-round, biweekly zooplankton and drift invertebrate sampling initiated (weekly during inundation and drainage events).
- **2012**: The North Delta Flow Action study begins, incorporating YBFMP lower trophic monitoring.
- **2012**: During low flows (usually June-January) lower trophic samples at Sherwood are collected from a boat (rather than from shore) to ensure sufficient flow for adequate sample collection.
- **2012**: Beach seine sampling switches from a 50 ft x 4 ft net to a 25 ft x 4 ft net.
- **2012**: Screw trap operations begin in December to capture early season flooding event.
- **2012**: Genetic identification of Chinook Salmon run-type begins.
- **2013**: A revolution counter was installed on rotary screw trap.
- **2014**: Clogging by water hyacinth likely reduced trap efficiency for some period and the trap was out of operation and then temporarily relocated to a downstream location (station code: Alt_Fyke). Trap was not operated October 10th to November 13$^{th}$.
- **2015**: Site BL6 was added to beach seine sampling because of difficulty sampling BL5 in 2012, 2013, and 2014 due to clogging from water hyacinth (e.g. complete site coverage).
- **2015 – 2017**: Proposed reduction of egg and larval sampling at STTD and SHR to at least biweekly from January – June, and weekly during inundation and drainage events due to minimal catch.
- **2015**: A 50-micron net was added to the zooplankton sampling procedure to capture smaller zooplankton that may be important prey for larval and juvenile fish.
- **2015**: The fyke trap is temporarily relocated downstream (station code: Alt_Fyke) in the fall due to heavy water hyacinth presence below Lisbon Weir.

- **2016**: Sampling fin clips for genetic analysis began to help identify the different runs of salmon present in the Yolo Bypass and allow for more accurate federal and state take reporting. Genetics on YBFMP-collected salmon were also analyzed from 2012-2016, in collaboration with the Ecological Restoration Program (CDFW).
- **2016**: Turbidity data collected with YSI water quality probe (Hach turbidimeter discontinued).
- **2016**: YBFMP staff begins processing Chinook salmon coded wire tags (CWT).
- **2017**: Year-round egg and larval sampling was suspended at SHR due to low catch for effort involved.
- **2012 - 2017**: Knaggs Ranch Study: A study showing that managed flooding on rice fields in the Yolo Bypass floodplain (Knaggs Ranch) could provide novel rearing habitat for Chinook salmon.
- **2018**: AL-2 was removed from the beach seine sampling sites based on analyses of AL sites showing homogenous fish catches across sites during both wet and dry years (report available upon request), and AL1 was moved 30 m upstream due to erosion during the 2017 flood.
- **2018**: Egg and larval samples collected year-round at STTD.
- **2018 & 2019**: Genetic sampling (via fin clip) of Hitch was conducted for a special study.
- **2018**: Genetic sampling (via fin clip) of Sacramento Blackfish began.
- **2019**: Genetic sampling (via fin clip) of Lamprey began.
- **2019**: Egg and larval sampling schedule modified to follow screw trap operation schedule (typically from January – June).
- **2020**: DFW issues Incidental Take Permit for SWP Operations (YBFMP named as a mandated monitoring program).

| Water Year | Water Year Conditions |
|---|---|
| **1997** | Wet |
| ***1998** | Wet |
| ***1999** | Wet |
| ***2000** | Wet |
| ***2001** | Dry |
| ***2002** | Dry |
| ***2003** | Above Normal |
| ***2004** | Below Normal |
| ***2005** | Below Normal |
| ***2006** | Wet |
| **2007** | Dry |
| ***2008** | Critical |
| **2009** | Dry |

| | |
|---|---|
| **2010** | Below Normal |
| ***2011** | Wet |
| ***2012** | Below Normal |
| ***2013** | Dry |
| **2014** | Critical |
| ***2015** | Critical |
| ***2016** | Below Normal |
| ***2017** | Wet |
| ***2018** | Below Normal |
| ***2019** | Wet |
| **2020** | N/A |
| ***Additional sampling years due to inundation or drainage events** | |

## 4. Publications

**2020**

Johnston M, Frantzich J, Espe MB, Goertler P, Singer G, Sommer T, Klimley AP. (2020). Contrasting the migratory behavior and stranding risk of White Sturgeon and Chinook Salmon in a modified floodplain of California. Environmental Biology of Fishes. 1573-1522. https://doi.org/10.1007/s10641-020-00974-9

Kwan N, Stuart C, Robinson J, Casby A, Schreier B. 2020. "2017-2018 Yolo Bypass Fisheries Monitoring Status and Trends Report." IEP Newsletter. In Review.

Interagency Ecological Program (IEP), B.M. Schreier, C.L. Pien, and J.B. Adams. 2020. Interagency Ecological Program: Zooplankton catch and water quality data from the Sacramento River floodplain and tidal slough, collected by the Yolo Bypass Fish Monitoring Program, 1998-2018. ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/ea437db178d6f7b93213cc0e4a915885 (Accessed 2020-07-01).

**2019**

Kwan N, Stuart C, Shakya A, Jenkins J, Schreier B. 2019. "2016-2017 Yolo Bypass Fisheries Monitoring Status and Trends Report." IEP Newsletter. Volume 36, Number 1.

Interagency Ecological Program (IEP), B. Schreier, B. Davis, and N. Ikemiyagi. 2019. Interagency Ecological Program: Fish catch and water quality data from the Sacramento River floodplain and tidal slough, collected by the Yolo Bypass Fish Monitoring Program, 1998-2018. ver 2. Environmental Data Initiative. https://doi.org/10.6073/pasta/b0b15aef7f3b52d2c5adc10004c05a6f (Accessed 2020-07-01).

Frantzich J, Jenkins J, Shakya A, Fogg S, Tung A, Schreier B. 2019. "2011 – 2016 Yolo Bypass Lower Trophic Monitoring Status and Trends Report." IEP Newsletter. Volume 36, Number 1.

Mahardja B, Hobbs JA, Ikemiyagi N, Benjamin A, Finger AJ. (2019). Role of freshwater floodplain-tidal slough complex in the persistence of the endangered delta smelt. PLoS ONE 14(1): e0208084. https://doi.org/10.1371/journal.pone.0208084

**2018**

Frantzich, J., Sommer, T., & Schreier, B. (2018). Physical and Biological Responses to Flow in a Tidal Freshwater Slough Complex. San Francisco Estuary and Watershed Science, 16(1). Retrieved from https://escholarship.org/uc/item/6s50h3fb

Goertler PAL, Sommer TR, Satterthwaite WH, Schreier BM. 2018. Seasonal floodplain-tidal slough complex supports size variation for juvenile Chinook salmon (Oncorhynchus tshawytscha). Ecol Freshw Fish.2017:1–14. https://doi.org/10.1111/eff.12372

Goertler, Pascale, Kristopher Jones Jeffery Cordell Brian Schreier Ted Sommer. 2018. Effects of Extreme Hydrologic Regimes on Juvenile Chinook Salmon Prey Resources and Diet Composition in a Large River Floodplain. TAFS Volume 147, Issue 2: 287-299.

Herbold, B., Carlson, S. M, Henery, R., Johnson, R. C, Mantua, N., McClure, M., et al. (2018). Managing for Salmon Resilience in California's Variable and Changing Climate. *San Francisco Estuary and Watershed Science*, 16(2). Retrieved from https://escholarship.org/uc/item/8rb3z3nj

Johnston, M. E, Steel, A. E, Espe, M., Sommer, T., Klimley, A. P, Sandstrom, P., & Smith, D. (2018). Survival of Juvenile Chinook Salmon in the Yolo Bypass and the Lower Sacramento River, California. *San*

*Francisco Estuary and Watershed Science*, 16(2). Retrieved from https://escholarship.org/uc/item/8bq7t7rr

**2017**

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## Recommendations for improvements

- Import all references into a combined Mendeley or Endnote file to easily cite and locate relevant articles and annual reports.
- Determine what sections will be saved and how they will be used for documenting future YBFMP references
    - Save the timeline and continue adding relevant information (COVID-19 sampling suspension).
- Discuss whether the history and background information will be incorporated in other documents or should be produced as a separate document.

# Resource Assessment

## General Description/Narrative

This section evaluates the documentation for the funding, budgeting, and time management of the YBFMP. How is the program funded, how is budget planning done, timelines, how does YBFMP procure necessary materials, etc. Much of this material exists elsewhere, so review should focus only on aspects specific to YBFMP.

1. Purchasing

    Purchasing and procurement for YBFMP equipment and activities.

2. OT

    Overtime procedure for YBFMP activities.

3. Costs/budgets

    Funding sources and budgeting for YBFMP operations.

4. Contracting

    Contracts and contracting processes for YBFMP operations.

## Accounting of current practices

1. Purchasing

    All purchasing and procurement for YBFMP shall follow all applicable State, Departmental, and Division protocols and policies. The YBFMP has one CalCard (credit card) issued to a staff member (currently Naoaki Ikemiyagi). This card is used for small purchases (< $1,500) and immediate need purchases (< 4 weeks). For larger purchases, YBFMP uses the requisition process and submits purchase orders, following DWR policy, through DES admin staff. All YBFMP purchases get charged to V10790YLFM15.

Purchasing of mobile equipment (trailers, boats, vehicles) is coordinated through DES and DWR's Mobile Equipment Office. Vehicle purchases are planned out a minimum of 3 years to allow for the lengthy acquisition process, and field vehicle equipment is requested from the outset on form 509 (winch, camper shell, boat lift, outboard mount). Vessel purchases, depending on cost, are planned 3+ years out, though rooftop boats and outboards can be purchased relatively quickly if a need arises.

2. OT

Overtime is requested on a monthly basis, in advance, per DES policy. From December to May, OT requests assume the possibility of Yolo Bypass inundation to allow for increased sampling if flooding occurs. Field leads and Sci Aides have weekly OT hours preplanned for this period, and Environmental Scientists have biweekly OT hours preplanned. All OT is submitted at the Aquatic Ecology Section level, not YBFMP program level.

3. Costs/budgets

The YBFMP is fully funded internally by DWR using SWP funds. Project budgeting and planning is coordinated through the EWQES branch chief and follows DES and SWPAO (State Water Project Analysis Office) procedures. All YBFMP expenses and time is billed to a dedicated internal order number, V10790YLFM15. YBFMP is under the Interagency Ecological Program fund center.

4. Contracting

(Please see the dedicated contracting review element for more details on contracting procedures)

## Recommendations for Improvement

- As these processes are governed by higher level State and Departmental policies, we do not recommend creating additional YBFMP documentation (beyond this document) for resource assessment procedures. New staff should work with the section and branch chiefs to become familiar with these policies, as applicable. We do, however, recommend that all ES level staff be familiar with purchasing, overtime, and contracting policies and procedures to facilitate redundancy and minimize mistakes when meeting YBFMP resource needs.

# Sample Archiving

## General Description/Narrative

The YBFMP archives samples collected from a variety of sampling activities. Samples are stored, preserved, or discarded based on a set of guidelines that vary from sample to sample. Sample types include:

a) Phytoplankton

Phytoplankton identification and enumeration is carried out by **BSA Environmental Services, Inc**. After samples have been processed and data sent to DWR, BSA will store the samples for no more than 90 days and transfer samples back to DWR. At DWR, phytoplankton samples are stored in their original amber vial containers in Lugol's solution, in the warehouse cage and chemical storage room. A more thorough survey is needed to identify which samples are currently stored at DWR. A recent inventory check was conducted in 2020 to determine what phyto samples are currently being stored and where. Samples found were from 2008-2010, 2015, and 2017.

b) Zooplankton

Zooplankton identification is contracted out to **BSA Environmental Services, Inc**. After samples have been processed and data sent to DWR, BSA will store the samples for no more than 90 days and transfer samples back to DWR. At DWR, zooplankton samples are stored in containers in the warehouse cage and chemical storage room. A more thorough survey is needed to identify which samples are currently stored at DWR.

c) Eggs and larval fish

The eggs and larval fish sample collection for the YBFMP is contracted out to **EcoAnalysts, Inc.** for identification of ichthyoplankton from the Sacramento-San Joaquin Delta. Contract language states that, "EcoAnalyst, Inc. will store samples for no more than 90 days [post-analysis] and transfer archived samples back to DWR for a suitable storage location." DWR currently has archived eggs and larval samples stored in containers in its warehouse equipment cage and chemical storage room. A recent inventory check was conducted in 2020 to determine the current state of archived eggs and larval fish samples. Samples currently archived range from dates 2005, 2011-2017, and 2019. A more thorough investigation is recommended to detail all the individual samples that have been archived and a determination of shelf life will be evaluated by this committee to decided how long samples should be stored in the future.

d) Drift Invertebrates

The drift invertebrate sample collection for the YBFMP is contracted out to **EcoAnalysts, Inc.** for identification of ichthyoplankton and drift invertebrates from the Sacramento-San Joaquin Delta. Contract language states that, "EcoAnalyst, Inc. will store drift samples for no more than 90 days [post-analysis] and transfer archived samples back to DWR for a suitable storage location." DWR currently has archived drift invertebrate samples stored in containers in its warehouse equipment cage. A recent inventory check was conducted in 2020 to determine the current state of archived drift invertebrate samples. Samples currently archived range from dates 2005, 2011-2017, and 2019. A more thorough investigation is recommended to detail all the individual samples that have been archived and a determination of shelf life will be evaluated by this committee to decided how long samples should be stored in the future.

e) Whole Fish

There is a variety of archived frozen fish samples ranging from 1998 to present that are stored in the chest and standing freezers in the lab. Frozen fish samples vary between whole fish and fish heads. The YBFMP has no active record nor any protocol for archiving whole fish samples.

f) fin clips

Fin clips are given to the Genomics Variation Lab (GVL) at UC Davis either in EtOH or dried. Once the DNA has been extracted and analyzed, the remaining DNA is stored at the GVL, in case of future analyses.

g) Otoliths

Otoliths are extracted and preserved for special studies. Sample archiving is not currently documented nor is it part of any YBFMP protocols. There is a small set of otolith samples from 2015 stored on site however, proper documentation does not exist.

h) gut contents

As a part of YBFMP salmon stomachs are removed for gut content analysis. Often times other species of interest have gut content analysis as well as a part of special studies. The stomachs are removed from the fish and placed in glass vials with 10% formalin. After the gut contents are analyzed the samples are kept by the

contractor and not returned. Delta smelt studies gut contents are analyzed by a contractor.

## Accounting of current practices

### 1. Data

The Yolo Bypass Fish Monitoring Program (YBFMP) currently collects several different kinds of biological samples as part of different monitoring programs and more short-term projects:

a) Phytoplankton
   - Contractor spreadsheets are stored on the Yolo Bypass Data Shared Drive:
     YOLO BYPASS DATA\Yolo Biological Data\Lower Trophic. Each individual year's folder contains a Phyto folder that stores the data sent by contractors.
   - Phyto data is archived from 2015-present

b) Zooplankton
   - Primarily stored in Lower Trophic Access database
   - Contractor spreadsheets are stored on the Yolo Bypass Data Shared Drive:
     YOLO BYPASS DATA\Yolo Biological Data\Lower Trophic. Each individual year's folder contains a Zoop folder that stores the data sent by contractors.
   - Contractor spreadsheets are printed out for data entry and stored in lower trophic binders once the data have been entered
   - Data of varying thoroughness exist in shared drive from 2002 – present.
   - Data regarding archived samples: does not currently exist

c) Eggs and larval fish
   - No current record available of eggs and larval fish samples that are archived.
   - Contractor spreadsheets are stored on the Yolo Bypass Data Shared Drive:
     YOLO BYPASS DATA\Yolo Biological Data\Lower Trophic. Each individual year's folder contains an egg and larval folder that stores the data sent by contractors.
   - Eggs and larval data are returned electronically and entered into the Access database. This could be used to help create a better inventory list.

d) Drift Invertebrates
   - There is currently no active record of archived drift invertebrate samples. It is highly recommended that a detailed list of current and future samples be created and updated frequently to keep an accurate record of archived drift invertebrate samples.

- Contractor spreadsheets are stored on the Yolo Bypass Data Shared Drive:
  YOLO BYPASS DATA\Yolo Biological Data\Lower Trophic. Each individual year's folder contains a drift invertebrates folder that stores the data sent by contractors.
- Drift invertebrate data are returned electronically and entered into the Access database.

e) Whole Fish
- The YBFMP has no past or current record of archived whole fish samples.

f) Fin clips
- raw data from genetic IDs are stored in several places, based on fish being IDd:
- salmon: W:\Yolo biological Data\Fish\Genetics Data\Salmon
- smelt: W:\Yolo biological Data\Fish\Genetics Data\Smelt
- all other fish: W:\Yolo biological Data\Fish\Genetics Data\fish ID
- Once data is received from UCD, the date received is added to a tracking sheet, located in each contracts folder, to ensure all samples that were sent have been analyzed.

g) Otoliths
- The YBFMP has no past or current record of archived otolith samples.

h) Gut contents
- Diet analysis data from salmon 2012 – 2018 was considered a part of a special study by Pascale Goertler. The data can be found in the Yolo Bypass Data Drive here: "\\cnrastore-des\DESSRV20\M & A Branch Data\Yolo Bypass\YOLO BYPASS DATA\Yolo Biological Data\Fish\Diet\Diet_PG_2012-2018 - Shortcut.lnk" or in the Shared Yolo Bypass Drive here: "Y:\Special Studies\Diet_PG_2012-2018".
- An analysis of blackfish diets was done in 2018. **location of data unknown**
- 2019 and 2020 salmon and Wakasagi diet analysis has not been completed yet so there is no data.
- Delta smelt data is kept separate.

## 2. Chain of Custody (COC) - Data Tracking

Samples are usually inventoried using a chain of custody (COC) or some similar excel document.

a) Phytoplankton
- COC's from the most recent contract cycle (2018-2021) are stored in the Yolo Bypass Shared Drive:
  Yolo Bypass\Contracts\Lower Trophic Contracts\2018-2021_Yolo

Lower Trophic Contracts\BSA_Phyto and Zoop_2018-2021\COC & Invoices
    - COC's are also stored physically in the BSA 2018-2021 Contract binder (at Cat's desk)

b) Zooplankton
    - COC's from the most recent contract cycle (2018-2021) are stored in the Yolo Bypass Shared Drive: Yolo Bypass\Contracts\Lower Trophic Contracts\2018-2021_Yolo Lower Trophic Contracts\BSA_Phyto and Zoop_2018-2021\COC & Invoices
    - COC's are also stored physically in the BSA 2018-2021 Contract binder (at Cat's desk)

c) Eggs and larval fish
    - The YBFMP currently has records of COC's sent to EcoAnalysts, Inc between 2018 and 2020. Yolo Bypass:\YB_Contracts\Lower Trophic Contracts\2018-2021_Yolo Lower Trophic Contracts\EcoAnalysts_Drift Inverts and EggsLarvae_2018-2021

d) Drift invertebrates
    - The YBFMP currently has records of COC's sent to EcoAnalysts, Inc between 2018 and 2020. Yolo Bypass:\YB_Contracts\Lower Trophic Contracts\2018-2021_Yolo Lower Trophic Contracts\EcoAnalysts_Drift Inverts and EggsLarvae_2018-2021

e) Whole Fish
    - There is no COC processing of archived whole fish because the YBFMP does not have any contract language about whole fish transfers or shipments with other organizations.

f) Fin clips
    - salmon sample tracking
        i. COCs are located in the X:\Contracts\2016-2021 Salmon Genetics Contracts\COCs folder
        ii. Within each COC folder is an annual tracking sheet for tracking samples that have been collected, when they've been sent, and when the data was received.
            1. Ex: 2020 CHN genetic sample list_COC tracking.xlsx
    - Fish ID (smelt and all other fish)
        i. COCs are located in the X:\Contracts\2018-2021 UC Davis Fish ID\COCs folder
        ii. In the main Fish ID folder, is a tracking sheet for tracking samples that have been collected, when they were sent, and when the data was received
            1. Genetic sample list_COC tracking.xlsx

g) Otoliths

- There is no COC processing of archived otolith samples because the YBFMP does not have any contract language about whole fish transfers or shipments with other organizations.

h) Gut contents
   - There is no official COC for gut contents analyzed by DWR employees however there is a dissection log. This records what fish were dissected which is helpful but it should also include what is done with the fish when finished.
   - There are COCs for the delta smelt gut contents analyzed by the University of Washington. These COCS are located here: "Y:\Contracts\Diet Contracts\2015-2020 Diet Contract\COCs". There are only COCs from 2019 in the folder despite the fact that the contract started in 2015.

## 3. Storage

a) Phytoplankton
   - Archived phyto samples are stored in the AES warehouse cage and the chemical storage room.
   - Samples are in their original amber 50 mL bottles with Lugols.

b) Zooplankton
   - Archived zooplankton samples are stored in the AES warehouse cage and the chemical storage room.
   - Ethanol has evaporated from some of the samples. Samples should be stored in a way that they can be checked easily, and they should be checked annually and topped up with 70% ethanol as needed.

c) Eggs and larval fish
   - Archived eggs and larval fish samples are stored in the AES warehouse cage and the chemical storage room. Most labels are correct and clear.
   - Multiple samples ethanol has evaporated. As part of the archive process, samples should be checked annually (maybe every other year?) to be sure the samples are still in good condition and ethanol can be refilled if necessary to keep the quality of the sample.

d) Drift invertebrates
   - Archived drift invertebrate samples are stored in the AES warehouse cage, in properly packages containers with proper labeling.

e) Whole fish
   - Whole fish and fish heads are stored in either the standing or chest freezer located in the laboratory.

f) Fin clips
   - extracted DNA from fin clips are stored at GVL

g) Otoliths

- Current otolith samples have been stored in cabinets in the laboratory, although proper storage and future storage protocols are unknown.
- Future Recommendations suggested in recommendation section.

h) Gut contents

- There is no documentation to distinguish what was done to the 2012-2018 analyzed samples. When inventory of the lab space and AES cage was done in April 2020, there were no stomach samples from 2012 – 2018 found.
- Pascale confirmed that the stomachs were kept by the contractors but we should document this somewhere.
- 2018 blackfish samples are located in the lab cabinet (see lab cabinet storage inventory)
- 2019/2020 samples are located in the lab cabinet (see lab cabinet storage inventory) note that these samples are not analyzed though.
- Delta smelt gut contents are preserved in 70% ethanol according to the contract but there is no language stating if the samples are returned to DWR or kept at the University of Washington, and for how long.
- Samples stored in EtOH shouldn't be used for weight analysis as EtOH changes weights of contents
- Samples can be stored long term in EtOH or Formalin

When data is returned from a contractor, it is stored in the corresponding data folder. When samples are returned from the contractors, they are stored in either the chemical room or the Aquatic Ecology Section (AES) cage.

## 4. Sample lifespan

Prior to this review, no sample lifespan standards have been established. Based on recommendations from our contractors, the following are what this review has determined to be the best practice.

a) Phytoplankton

- Samples should only be stored for 2 years and then discarded.
- Sample bottles can be cleaned with soap and water (rinse several times) and can be reused.

b) Zooplankton

- can be stored for 20 years plus, if samples are maintained well and ethanol remains at a high level and at 70% (John Beaver, BSA). It is likely that ethanol will evaporate if the jars are not tightly sealed,

leading to degradation sooner. Based on our low reanalysis rate and small amount of storage space, we recommend:

- zooplankton samples be stored for up to 5 years and then discarded.
- if space is limited and more samples need to be disposed of, we recommend that zooplankton samples 3 – 5 years old should be discarded.
- If possible, samples will be examined and topped off annually.

c) Eggs and larval fish

- Eggs and larval fish samples can be stored for up to 10 years.

*based on space and ability to keep up the condition of samples, we recommend samples be stored up to 5 years and then be discarded.

d) Drift invertebrate samples

- Varies based on how the samples are maintained (Shanda McGraw, EcoAnalysts, Inc.). Based on our low reanalysis rate and small amount of storage space, we recommend:
    - Invertebrate samples be stored for up to 5 years (space permitting) and then discarded.
    - If space is limited, invertebrate samples 3-5 years should be discarded.
    - If possible, samples will be examined and topped off annually.

e) Whole fish

- kept in the upright and chest freezers in the OWQEE lab

f) Fin clips

- extracted DNA from fin clips are stored at UC Davis Genomic Variation Lab. As long as sample DNA is stored in TE buffer and frozen at -80 C it should be good for a year. If dried or in EtOH and frozen at -80 C, it could last several years.

g) otoliths

- Since otoliths are calcified, they don't degrade quickly and therefore can be stored for many years. (Naoaki's advice/input)

h) gut contents

- Currently no recommended or known sample lifecycle.

## Evaluations of Documentation

This section will evaluate the documentation for the YBFMP sample archiving procedure. What samples are kept, for how long, and for what purpose.

There were no sample archiving documents already existing so the review team found all the relevant information then created a sample archiving guide and inventory sheet that can be found here.

Protocol/Guide: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/Sample%20Archiving/Sample%20Archiving%20Protocol%202020.docx?d=wc5aff89e40de40cca56dd3bdd3af37d7&csf=1&web=1&e=8o0TfY

Inventory sheet: https://cawater.sharepoint.com/:x:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/Sample%20Archiving/AES%20Sample%20Archiving%20and%20Inventory.xlsx?d=w4a1f2dafb50d43348c8d40291458d586&csf=1&web=1&e=WLAysS

## Recommendations for improvements

- Utilize initial inventory data sheets to direct which samples to discard and help build archiving catalog.
    - Discard old samples
    - Move samples to new storage areas and inventory samples present and location
    - Top off samples and check lids
- As part of sample archiving guidance, make a complete sample inventory list that is updated yearly.
- Keep the chest freezer locked so that random samples are not added without our knowledge. List contact information for an ES on the freezer so that if other groups need freezer space we are kept in the loop.
- Come up with unique identifier to link sample collected to lab sample to archived sample and the databases. Our group is going to continue brainstorming outside of this review element because we think this issue/recommendation reaches further than the scope of review but is still very important and relevant.
- **Future Recommendations for Otolith Storage:** Otoliths can be stored a number of recommended ways. If the otoliths are clean and completely free of fish parts, then they can be stored dry. Otoliths can

be frozen (limiting the freeze/thaw action) or preserved in EtOH greater than 70%. (Naoaki's advice/input)

# Stakeholder engagement

## General Description/Narrative

### 1. Collaborators

- YBFMP studies that we are full research collaborators on:
    - ERP salmon genetics, sturgeon and salmon acoustic tagging - salmon genetics forthcoming
    - North Delta Flow Action Study
        - SFSU
        - USGS
        - UCD
    - Yolo Restoration group salmon acoustic tagging
    - Wakasagi synthesis project
        - UCD
        - USFWS
    - Managed Agricultural Floodplain Study (aka Knaggs Ranch study)
        - UCD
        - CDFW
        - USBR

### 2. Facilitated research

- Helping with logistics of someone else's project but not participating in the study design, analysis, etc.
    - SIU salmon pesticide prop 1 study
    - Zoltan's sturgeon acoustic tagging study
    - Lamprey genetics
    - Splittail selenium study (USGS)
    - UCD acoustic receiver deployment
    - Sturgeon blood for ploidy study (UCD)
    - Osmerid swabbing UCD – possible field testing of Sherlock ID
    - UCD metabarcoding study
    - USGS pesticide study
    - USGS minnow tagging study
    - UCD salmon otolith isotope study
    - UCD/MET zooplankton productivity salmon subsidies
    - UCD striped bass tagging study (not started)

## 3. Data consumers/users

- Data requests that we are fulfilling
    - Larry Brown climate change
- Analytics from EDI
- DSC Zooplankton metadata report

## 4. Education and outreach targets

- YBFMP scope only
    - PAO distance learning talk on Native Fish
    - Interagency fish ID workshop
    - Media interviews ([https://www.capradio.org/articles/2017/02/07/flood-waters-create-unique-habitat-in-yolo-bypass/](https://www.capradio.org/articles/2017/02/07/flood-waters-create-unique-habitat-in-yolo-bypass/))
    - New IEP website
    - Estuaries Portal website
    - DWR Kid's Day
    - Rio Vista school system outreach
    - Frontiers: will have an article about floodplains, including YBFMP efforts.

## 5. Scientific community (presentations, posters, publications)

- Any YBFMP presentations, newsletters, manuscripts, posters, etc.
    - Conference presentations (oral and poster):
        - IEP 2019: Spatial and Temporal Effects on Zooplankton Communities in Response to the North Delta Flow Action (MB)
    - PWT/Working Team presentations:
        - "Use of the Yolo Bypass by Winter Run Chinook Salmon" 12/5/2019 (NK)
        - "From field to portal: Discussion of the Yolo Bypass Fish Monitoring Program's open data efforts and challenges" 8/1/19, EET, (CP, MB)
    - Newsletter Articles:
        - "2017-2018 Yolo Bypass Fisheries Monitoring Status and Trends Report" *in review*
        - "2016-2017 Yolo Bypass Fisheries Monitoring Status and Trends Report" IEP Newsletter Volume 36, Number 1, 2019
    - Peer Reviewed Publications:
        - See Publication list in History and Background EOR

## 6. PWTs & Working Groups

- PWTs at which YBFMP data and/or expertise has been shared:

    - Winter Run Salmon PWT
    - Estuarine Ecology Team
    - Climate Change PWT
- Working teams at which YBFMP data and/or expertise has been shared:
    - Sutter Bypass Working Group
    - Zoop Synthesis Team
    - Yolo Bypass Fisheries and Engineering Technical Team
    - Climate Change MAST Floodplains Working Group

## Accounting of current practices

### 1. Collaborators

- Wakasagi project: Wakasagi catch data, including locations, effort, and environmental data, from screw trap and beach seines.
- North Delta Flow Action: YBFMP collects, processes, and hosts discrete water quality data (e.g., nutrients and environmental) and lower trophic data including phytoplankton and zooplankton for NDFA. While some of YBFMP's routine monitoring is part of NDFA, additional stations and data are collected specifically for NDFA.
- UC Davis smelt eDNA work: with Ann Holmes from UC Davis, AES helped design, take water samples, and filter eDNA samples in conjunction with the first installation of smelt cages.

### 2. Facilitated research

- USGS pesticide fate research – collected live zooplankton sample during 2019 and 2020 for Jim Orlando at USGS. Also took water grabs for analysis.

### 3. Data consumers/users

- Data requests: YBFMP data requests usually come from other agencies or consultants, and are filled by YBFMP staff and saved on the Shared Drive (YOLO BYPASS DATA/Data Requests/).
    - Larry Brown Climate Change
- Environmental Data Initiative: YBFMP are/will be publishing its data to EDI, and updating data annually, making data accessible to the public, and simplifying data requests. Number or downloads is available on the site.

4. Education and outreach targets

- IEP Website: Will include a page about core monitoring surveys, including YBFMP, as well as links to publications and IEP newsletter articles.
- California Estuary Portal: Includes a YBFMP page, data visualizations, and links to YBFMP data on EDI. https://emp.baydeltalive.com/projects/14280

5. Scientific community (presentations, posters, and publications)

- Interagency Ecological Program Annual Workshop
- Bay Delta Science Conference
- Environmental Science Workshop (DWR only)
- American Fisheries Society
- Salmon Restoration Federation
- IEP Newsletter: YBFMP publishes newsletter articles about monitoring survey results.

6. PWTs

- Estuarine Ecology Team: good group for preliminary results, advice on projects or issues.
- Winter Run Salmon PWT
- Climate Change PWT: development of a floodplain conceptual model within the MAST

***No documents to evaluate***

## Recommendations for improvements

- Create spreadsheet:
    - to document stakeholder engagement that encompasses all AES projects and collaborations- short description of each plus note whether it is a YBFMP specific collaboration or a more general AES one
        - include names and affiliations
        - funding (if applicable)
        - years active
        - citations
    - include a tab for fulfilled data requests
    - tab for outreach activities (with any relevant links)
    - tab for poster and oral presentations (pull together past poster and talks that can be found in the yolo drive); include presentations to PWTs and other working groups as well
    - include in introductory tab

    - shortcut to Word publication list
    - place to track changes to the document
- Create a folder with collaborative project proposals and resulting reports, spreadsheet could live in this folder too; include a place to store factsheets

# Programmatic Safety

## General Description/Narrative

1. Documentation

    Documentation for the safety program is currently located in the Yolo Bypass\Safety folder. This folder contains documentation on training completed by staff, general safety plans, emergency contact records, float plans, job hazard analyses (JHAs) and standard procedures (SPs), and tailgate meeting forms. Hard copies of tailgate meetings and copies of certificates from training are kept in a binder located in the AES safety coordinator's cubicle.

2. Training

    The Yolo Bypass Fish Monitoring Program performs sampling in diverse habitats including in terrestrial, riparian, in and on the water. Also, most sampling is year-round or muti-seasonal in various weather conditions. Working in these adverse environments requires various safety trainings. A list of current crew's trainings and records are located in Yolo Bypass\Safety\Training.

## Accounting of current practices

1. Documentation

    The AES General Field Safety Plan is located in the Yolo Bypass\Safety\Safety Plans &Tailgates folder. A hard copy should be printed and stored in all truck safety binders. The safety plan details contact information for the AES safety coordinator, the AES supervisor, and EWQES branch chief in case of emergency. It outlines best practices to promote safety, expectations of field crew, general safety procedures, general PPE and gear that field crew should use, who to call for emergencies, directions to the Toe Drain to tell emergency responders, and directions to the three nearest hospitals. This document is updated periodically, usually when safety office or supervisor has changed. It was last updated in June 2020. When it is updated, new versions are printed out for each field/truck binder and the old one is discarded.

## Standard Procedures (SP) DWR-9720b

A blank standard procedure (SP) form is available in the Yolo shared drive>Safety>Standard procedures folder. This form is required by DWR safety guidelines and is used to create standard procedures for any field or laboratory procedures. The standard procedures folder also contains any standard procedures that have been created for YBFMP operations. The SP is a document which does the following: outlines the purpose of the SP for specific operations, the prerequisites needed to perform the operation, the responsibilities of employees involved with the operation, any relevant reference materials, an explanation or definition of specific terminology, detailed hazard assessment, emergency contingency plans/contacts, and a hazard assessment review and sign page.

## Job Hazard Analysis (JHA) DWR-9720

A blank Job Hazard Analysis 9720 form is available in the Yolo shared drive>Safety>Job Hazard Analyses folder. This form is required by DWR safety guidelines and is used to create a Job Hazard Analysis (JHA) for any field or laboratory procedures. The Job Hazard Analysis folder also contains any JHA's that have been created for YBFMP operations. The JHA is a document which does the following: general information about the operation including the scope of the work, a general hazard assessment, applicable safe work practices, special precautions to take, personal protective equipment needed, emergency contingency plans/contacts, detailed hazard assessment/analysis, and a JHA review and sign page.

## Incident Reporting

The folder for incident reporting and related information is available in the Yolo shared drive>Safety>Incident Forms & Medical Treatment Facilities folder. The folder contains several standard documents (i.e., Occupational Health, DWR) that explain the process for incident reporting and resources for managing incidents. Documents in the folder include:

- DWR_OccupInjury_ProcessGuide.pdf
  - Includes policy description, reference/resource list, responsible parties, general information including the forms required for incident reporting, and a table of procedures
- 4239_NoMedicalTreatment.docx
  - A form to complete for minor injuries
- 4239a_Witnesses.docx
  - A form with list and contact information for witnesses of injury/illness

- DWR Incident Report Form.docx
  - A form to document and evaluate each incident
- Physician's report_4208.pdf
  - A form to be completed by the attending physician
- SCIF3301.pdf
  - Workers Compensation Claim Form (DWC 1) & Notice of Potential Eligibility
- There are also several resource documents for both emergency and non-emergency situations with information on providers and driving directions to providers in various locations

## Material Safety Data Sheets (MSDS) & Chemical storage room inventory

Chemical storage room inventory is updated periodically, on a nonregular basis. Documentation is located in the Yolo Bypass\Safety\Chemical Storage Room Inventory folder. MSDS for chemicals found in the storage room are located in a binder near the light switch in the storage room. No MSDS documentation is currently kept in the lab. MSDS information can be printed from https://sdsbinderworks.com/.

Username: dwr
Password: water

## Certificates

Hard copies of all training certificates are kept in the safety binder located in the AES safety coordinators cubicle. After training is completed by an AES employee, they should photo copy the certificate and give a copy to the safety coordinator. The safety coordinator then enters the completion date and expiration date into the most recent Safety Training. Personnel Records excel document located in the Yolo Bypass\Safety\Training folder.

## Emergency contacts

A list of emergency contacts for each AES employee is located in the Yolo Bypass\Safety\Emergency Contacts folder. It is updated annually or when a new person is hired. New versions are printed out for each truck/field binder and the old version is discarded.

## Remote work safety plan

A remote work plan was created for the Fyke and includes details about location of the work, trucks being used in the field, a check in system, and contact information for all of AES. This plan is located in the Yolo Bypass\Safety\Safety Plans &Tailgates folder. It is updated

periodically but not regularly. When it is updated, new versions are printed out for each field/truck binder and the old one is discarded.

## Float plans

Archived boating float plans are stored in the Yolo Bypass:\Safety\Float Plans. Float plans are required to fill out and distribute to all the crew members and designated contact prior to each trip. The float plan should contain the purpose of the trip, the date & time range, emergency contact, crew members, plan recipient/contact, launching & destination locations, towing vehicle, vessel, and emergency procedures.

## AEDs

Currently, there is only one file (AED Maintenance Log.xlsx) in the AED folder, located in the Yolo Bypass shared drive at Yolo Bypass\Safety\AED. Other documentation, such as AED information including service schedules and history is available http://tracaed.com/ to registered users at DWR (see your supervisor or safety coordinator for more information). There is very little entered into the spreadsheet in the AED folder, and it is probably redundant with information stored on the website (I'm not sure if the spreadsheet has been phased out or not). Ryan Pabst is the AED site coordinator for the branch (OWQEE) and may have additional documentation or information.

## First aid kits

Documentation for first aid kits is located in the Yolo Bypass shared drive at Yolo Bypass\Safety\First Aid Kits. Within this folder, there are several spreadsheets for first aid kit inventory and ordering. There are no electronic documents with protocols for assessing, stocking and replenishing first aid kits or for providing vendor information and purchasing guidelines.

## Field Phonnes

- Documentation:
  - Currently there is very brief info under: Yolo Bypass\Safety\Safety Plans & Tailgates\General Field Safety Plan_2018Aug.docx, in the "Field Communication" section
- Actions:
  - "Each field crew should carry a work cellular phone for communication with other field crews and staff. Emergency contact information and all AES member cell phone numbers should be carried in the event of emergency."

    - Current field phone does not get adequate service at the rotary screw trap.

## Marine Radio/Hummingbird

- Documentation:
    - Currently just saved as MMSI certificates from the US Power Squadrons: Yolo Bypass\AES_Vehicle&Vessel\MMSI Handheld Radio.pdf and Yolo Bypass\AES_Vehicle&Vessel\MMSI Rouge Splittail.pdf
    - No documentation for the Hummingbird besides physical manual – NOT currently connected to the radio
- Actions:
    - No relevant actions. The MMSI numbers were put into both the boat and handheld radio. This is so if a distress call is placed, the Coast Guard will have the information on your vessel that was registered under the MMSI.
    - The Hummingbird can send detailed GPS coordinates during a distress call if it is connected to the boat radio, however, ours is not currently because it would require a special type of connection. This means that for the Coast Guard to receive GPS coordinates on the vessel a crew member would need to read the coordinates from the Hummingbird and share that information over the radio with the Coast Guard.

## Vehicle logs

Department of General Services vehicle log books (blue books) are provided in each state vehicle to log each use and record pre/post check list. The blue books also contain the Department Emergency Contacts. Vehicle usage logs need to be turn in at the end of every month to the division vehicle manager. Information on how to submit these are included in the Equipment and Maintenance SOP.

## Boat Operation/Logs/Check Lists

- Documentation:
    - Currently located in two places: Yolo Bypass\AES_Vehicle&Vessel\Boat Binder Materials & Checklists\Boat Operation Protocol and Safety Guidelines_2016Dec.docx and Yolo Bypass\Safety\Safety Plans & Tailgates\ Boat Operation Protocol and Safety Guidelines_2016Dec.docx
    - Blank logs and checklist copies exist under: Yolo Bypass\AES_Vehicle&Vessel\Boat Binder Materials & Checklists

folder; hard copies of completed logs and checklists live in Nicole's cube in a specified binder

- Actions:
  - Safely secure the boat for trailering
  - Complete Boat & Trailer "pre-sampling" checklist to ensure all gear and safety equipment is aboard and that the boat is in safe operating condition
  - Fill out a Pre-Sampling Plan GAR worksheet if preparing for a new task, preparing to work in challenging conditions, or including an inexperienced crew member
  - Safely trailer and launch the boat, use the Launching-Retrieving checklist
  - Safely operate the boat on the water
  - Safely dock, load, and trailer the boat back, use the Launching-Retrieving checklist
  - Fill out the Boat Log, boat blue book, and the Boat & Trailer "post-sampling" checklist
  - Note: safety notes are extensive so I did not include them all here but discuss them further in the "Evaluation of Documentation" section

## Emergency binders in trucks

Each AES field truck has a safety binder which contains emergency contact lists, remote work plans, directions to local hospitals, and the AES field and lab manual. These are updated periodically if field and lab manual has been edited or personnel changes occur and contact information changes on lists and field plans.

## Heat Illness Prevention Plan

- Documentation:
  - DWR Heat Illness Prevention Plan:
    - Yolo Bypass\Safety\Safety Plans & Tailgates\HeatIllnessPreventionPlan.pdf
  - PowerPoint Presentation by Mallory:
    - Yolo Bypass\Safety\Training\Heat Illness Prevention Plan.ppt
- Actions:
  - We currently bring out a 2- or 5-gallon cooler of ice water during the summer when temperatures start reaching approximately 80ºF and above. We wash the cooler well (with soap) once/week.
    - 1 quart per employee per hour is recommended

        - Water containers should be cleaned with soapy water and triple-rinsed before use
    - On extremely hot days (90ºF and above), staff shift fieldwork to start an hour earlier and may bring an extra cooler of water.
    - Staff discuss altering field schedule on especially hot field days and may cut days short if necessary. Staff have stop work authority if conditions are too hot.
    - When staff are starting to feel overheated, they communicate to other staff on the field crew and take a water break in the shade. Sometimes this requires shuttling back to shore from the screw trap. Staff can also take a break in the truck with the AC turned on.

### Microcystis Prevention

- Documentation:
    - Added a fact sheet to Safety folder (Yolo Bypass\Safety\Safety Plans & Tailgates\MicrocystisFactSheet.pdf) but otherwise cannot find documentation.
    - Lab & Field Safety Guide
    - Yolo Bypass Shared Drive: Yolo Bypass\Safety\Safety Plans & Tailgates\Yolo Bypass\Microcystis Safety Protocol 080414.doc
- Actions:
    - "Training" on *Microcystis* at the start of summer

## 2. Training

### Field trainings/ tailgate meetings

A record of tailgate or field safety meeting forms (DWR576) are filled out and collected when the field safety training is performed. The forms are stored in the safety binder.

Field trainings/ tailgate meetings consist of going over each sampling safety standard operation procedure. The trainings/ meetings are performed in the beginning of the season, arrival of a new crew member, or requested by crews or supervisor.

### MOTC

Motorboat Operator Training Course (MOTC) needs to be completed every 5 years. The course records are in Yolo Bypass\Safety\Training\Safety_Training_Personnel_Records. The course offers the knowledge, skills, and abilities to safely perform as the operator or crew while on board a motorboat. The courses are offered by the Department of Interior and/or the University of

California Davis Scientific Boating Safety Association. The training certificate should be photocopied and stored in the safety binder.

### Swiftwater Rescue

There are no electronic documents for swiftwater rescue. A record of trainings (including swiftwater training) for AES personnel is kept in the Yolo Bypas\Safety\Training folder\Safety_Training_Personnel_Records. Swiftwater training is to be completed once every 3 years by all personnel working in the field on moving water (e.g., Yolo Bypass and Sacramento River). The process for updating these electronic records is unclear. Copies of certificates are kept in the safety binder and the original copies should be retained by the staff member that earned the certification.

### Wilderness first aid

Wilderness first aid and CPR certification needs to be completed every 2 years. Our current vendor is Sierra Rescue. Brian is the contract manager and will schedule trainings. The training records matrix should be checked at the beginning of the new calendar year and anyone who needs to take the training should be communicated to Brian. Once the training is complete, the first aid certification and CPR certification cards should be photocopied and stored in the safety binder. The new dates should be entered into the training records matrix.

### Defensive driver

There are no electronic documents specifically for Defensive Driver training in the Yolo Bypass shared drive. A record of trainings (including Defensive Driver training) for AES personnel is kept in the Yolo Bypass\Safety\Training folder (but it is unclear how these records are updated). Defensive Driver training is to be completed once every 4 years by all personnel driving state or personal vehicles for work duties. Copies of certificates are kept in the safety binder and the original copies should be retained by the staff member that earned the certification.

## Evaluations of Documentation

This section will evaluate the documentation for the YBFMP safety system. How well do we document our safety practices? How consistent are we in our safety documentation and procedures? Are we meeting all applicable state and DWR guidelines regarding safety? How can we improve?

# Review Narrative for: Boat Operation Protocol and Safety Guidelines_2016Dec.docx

[5.20.2020]

[Nicole Kwan]

[Yolo Bypass\AES_Vehicle&Vessel\Boat Binder Materials & Checklists

ALSO FOUND AT Yolo Bypass\Safety\Safety Plans & Tailgates]

## General Description

This document provides safety protocols for trailering, launching, operating, and retrieving boats used as part of the YBFMP and other studies in which AES staff assist on.

## Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   12/15/2016, does not have a set update frequency

3. Who were the authors of the previous document?

   Unknown

4. Evaluate the quality of the document.

   The document is relatively thorough but would be challenging for someone unfamiliar with our boat or relatively new to boating to follow along with because of the use of technical terms referring to specific boat components. The document is also out of date and includes specific references to our old boat and no new details relative to the Splittail.

5. What edits were made, if any?

   None at this time

# Review Narrative for: Checklists, Sampling Plans, Boat Log.xlsx

[5.20.2020]

[Nicole Kwan]

[Yolo Bypass\AES_Vehicle&Vessel\Boat Binder Materials & Checklists]

## General Description

This spreadsheet provides blank templates for the Boat Log, Pre-Sampling Plan, Boat & Trailer Checklist, and Launching-Retrieving Checklist that are printed and put into the Boat Binder for use each time a crew (AES or otherwise) uses the Splittail. These forms help ensure that the boat is in safe operating condition, has all required safety equipment aboard, is safely towed, launched, and retrieved, and that all use and any relevant operating issues are documented. The Pre-Sampling Plan/GAR worksheet is available to ensure crew discuss and maximize safety. The goal of these checklists is to ensure safety as well as accountability for this shared resource. A cover page [Yolo Bypass\AES_Vehicle&Vessel\Boat Binder Materials & Checklists\Intro Page.docx] helps explain use of these resources.

## Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Sometime in fall of 2019

3. Who were the authors of the previous document?

   Nicole Kwan

4. Evaluate the quality of the document.

   This document is thorough and was created specifically for the Splittail, so it is current with the new boat.

5. What edits were made, if any?

   -created a new tab on the boat Checklists, Sampling Plans, Boat Log.xlsx spreadsheet to document changes to the forms and the author of those changes.

Yolo Bypass:\YB_Vehicle & Vessel\Boat Binder Materials & Checklists\

## Recommendations for improvements

- Update boat operation SOP with Splittail-relevant information and either LOTS of photos to go with each step or a SOP video
- Create list of safety documents that need to be updated when personnel leave or are hired:
    - remote work plan
    - emergency contacts
    - float plans?
- Create remote work plan for screw trap and beach seine sites and add to truck/cage binders?
- Add additionally safety communication device for when we have no reception at field sites- Follow up about satellite communication device (Garmin) – talk to Brian/DWR
    - Put this document in the Safety folder as a reference (separate from other review materials, or shortcut)
    - Staff training excel sheet: conditional formatting to remind you when someone is overdue (consult Andrew or someone look into it)
    - Add calendar events on Yolo calendar for safety checks, e.g. AED, First Aid Kit, Fire Extinguishers on boat and in truck, boat flares
    - Add to HIPP documentation/presentation: Recommend bringing a buff/sarong that can be dunked into ice water
    - Have a meeting on HIPP and Microcystis at the beginning of the summer season (and maybe mid-summer as well), to remind everyone of HIPP, Microcystis and emergency protocols.
    - Digitize tailgate safety forms at the end of the year

# Programmatic QA/QC

## General Description/Narrative

This section will evaluate the QA/QC system for YBFMP. Some parts of this review will be redundant with YBFMP activities but should still be included here in order to facilitate a holistic assessment of YBFMP's QA/QC program. QA/QC is critical for the YBFMP and is of a high priority for OWQEE, DWR, and IEP. Relevant guidance documents from these entities should be consulted, and the OWQEE QA program (Rachel Pisor) should be consulted early on as part of this section.

### 1. Data QA processes

Different parts of YBFMP have different QAQC records and standard locations of QAQC documents are not established (e.g., QAPPs may or

may not be located in sub-program folders, QAQC documents may be old, non-existent and/or non-standard). Nonetheless, QAQC documentation most consistently exists in SOP and Metadata documentation (when available). QA procedures usually consist the step by step procedures for reviewing and archiving of relevant components such as Field Data, Field Data Sheets, Taxonomic Data, Laboratory Data, etc. Generally, and as noted in other program documentation, "Data undergo quality checks in the field, when being entered, and by another staff member after data have been entered." Once the program transfers to the WISKI database, there will also be preset QA checks in place to flag suspicious data.

Currently, the QA Committee is undergoing development of document control policies that will create standardized procedures for handling SOPs from creation to approval and use. This will involve evaluation of QA protocols for programs and creation of standard SOP templates. This will aid in the final step to make sure individual datasets comply with QA section recommendations.

Additionally, the IEP DUWG (Data Utilization Workgroup) has recently formed a QA Subcommittee, which plans to provide best practices for QA-related topics, including SOPs, data review, data management, and more technical instrument, equipment, and sampling QAQC. Recommendations will further inform QAQC procedures for the YBFMP.

## 2. Instrumentation QC/calibration

The YBFMP utilizes numerous instruments for it's monitoring activities, all of which need to be tracked, maintained, and calibrated. Currently for water quality monitoring, we utilize 8 YSI Exo2 sondes for continuous monitoring at 2 year long sites: STTD and LIS. Sondes are also deployed for special studies, like cage installations. For our main daily sampling activities (screw trap, fyke, beach seine and lower trophic), we use a YSI ProDSS to record discrete water quality parameters. We also currently maintain a set of HOBO temperature loggers, which are deployed at 4 sites around the bypass: Ag Crossing 4, AL1, LIS, and SHR.

When conducting lower trophic sampling, we measure light attenuation using a LICOR LI-250A light meter and LI-193 spherical underwater quantum sensor. Zooplankton nets and the egg and larval net all are fitted with General Oceanics 2030R flow meter with either a low or regular rotor, depending on time of year and flow at sampling sites. Flowmeter calibration is not currently standardized, but are beginning to be checked annually to ensure a minimum number of rotations.

## 3. Fish ID

Currently, for programmatic QAQC there are no specific protocols for fish ID. Our field staff participates in AES fish ID workshops hosted by section staff and USFWS fish ID workshops. As often as possible, an experienced field lead is a part of the sampling efforts in order to help ID fish if other field crew are unsure. Juvenile minnow ID sheets are readily available for field crew if there is a challenging fish to ID. For fish that are often misidentified, such as juvenile Sacramento Blackfish and California Roach, a fin clip is taken for genetics. Any unidentifiable fish is either photographed or euthanized and saved.

A fish ID binder is available at the office for field crew members to refresh and check their fish ID skills at any time.

## 4. SOP consistency

We currently lack detailed SOPs for many data types. The SOPs that do exist are not standardized as they have been created by different staff at different times. During the internal review, a template will be created to guide new SOP creation, so in the future, SOPs will be updated or created in the same format.

In the future, the DWR QA group and the IEP DUWG QA group will be providing SOP templates. At that time, the YBFMP will likely modify its current template to become more standardized with DWR/IEP.

## 5. Sampling effort consistency

Some flow charts do exist to help with making decisions about fish handling and sampling. Most changes to sampling protocols are based on observing current environmental conditions like flow, turbidity, debris in the water, or presence of microcystis and then deciding if these conditions would impact sampling. In the past, decisions have been made to pull traps during high flows and large debris loads. If water appears to be very silty or turbidity measurements are high, lower trophic tow times are decreased in order to avoid net clogging.

## 6. QAPP

A Quality Assurance Project Plan, or QAPP, is a document that details aspects of a project from start to finish, and could include: background, task description, quality objectives, special training, documents and records, sampling process, sampling methods, analytical methods, quality control, instrument maintenance and calibration, consumables tracking, data reports, data review,

verification and validation of methods. It is usually signed off and approved by the manager and branch chief.

## Accounting of current practices

### 1. Data QA processes

- Metadata and SOP documents for individual data types

### 2. Instrumentation QC/calibration

- Thermometers are currently checked twice a year using a 5-point and 2-point check. The SOP is outlined in Yolo Bypass:/Instrument inventory and maintenance/thermometer verification records. This TAV is applied to YSI ProDSSs, EXO2 sondes, and HOBO loggers. TAV records are scanned and sent to QA and then stored in: Yolo Bypass:/Instrument inventory and maintenance/thermometer verification records.
- The QA/QC committee is currently getting approval for a department wide continuous sensor SOP (Add to EXO's folder when complete), which is based off of input and experiences from groups who routinely do sonde calibration and maintenance. Currently, our calibration procedures are based off of EMP field practices. Our only current documentation for the calibration of YSI ProDSSs, 6 series sondes, and EXO2 sondes are cheat sheets that were created by Mallory during her training and copies of EMP field's SOP.
    - ProDSS calibration cheat sheets: Yolo Bypass:/Instrument inventory and maintenance/YSI ProDSS/YSI Pro DSS calibration cheat sheet_V3.docx
- For YSI ProDSSs, DO is calibrated daily before leaving for field work. In addition to monthly calibrations of all probes, the pH probe is checked every 2 weeks after calibration to ensure it is not drifting. Records are kept in the YSI ProDSS binders in Mallory's cube.
- Each probe and module on the Exo2 sondes and YSI ProDSSs are being tracked in excel documents to ensure quality. Each serial number and installation date is recorded for each instrument and warnings appear when it's time to change probes or modules. These documents are located:
    - EXOs: Yolo Bypass:/Instrument inventory and maintenance/EXOs/ North Delta Probe Tracking.xlsm
    - ProDSSs: Yolo Bypass:/Instrument inventory and maintenance/YSI ProDSS/YSI ProDSS Tracking.xlsm
- Each spherical sensor used for light attenuation has a serial number and it's own set of calibration constants. When the sensor was purchased, it came with a calibration certificate which is currently

stored in the light meter documentation binder in Mallory's cube and entered into an excel sheet located at: Yolo Bypass:/Instrument inventory and maintenance/LI-COR Light Meter/Sensor Bulb calibration constats.xlsx. Some light meters have all the constants taped to them to check that the right constants are entered in for the spherical sensor being used.
- Flowmeters are beginning to be checked annually using a flowmeter spin tester. The manual for the tester is located at Yolo Bypass:/Instrument inventory and maintenance/general oceanics flow meters/2030CF Manual-flow meter checker.pdf.

## 3. Fish ID

- Genetics SOP (evaluated by Mallory and Amanda in genetics element of review)
- Genetic Sampling and Fish take cheat sheet (evaluated by Naoaki and Nicole in the Listed Species Handling element of review)
- In the "Reference Library" folder in the Shared Yolo Bypass Drive, there is a subfolder named "Yolo Fish ID" with field guides, fish ID pictures, and fish ID PowerPoint presentations.
    - The Fish ID binder is located in the Scientific Aid cubicles and is available for review at any time.

## 4. SOP consistency

- YBFMP Review Template located in 2020 YBFMP Review/Outline and guidance docs/Document Review Resources/SOP Template 2020.docx

## 5. Sampling effort consistency

- Decisions to pull traps are usually based on the judgement of experienced trap operators and current environmental observations.
- A flow charts exists to determine if juvenile salmon need to be culled and is located in section III of the AES_YBFMP field to lab manual.
- A flow chart exists to determine what to do if a smelt is captured and is located in section IV of the AES_YBFMP field to lab manual.
- No documentation currently exists for when to switch out flow meter rotors.
- No documentation currently exists for when to shorten lower trophic tow times.
- Flow meters are now being checked annual using a rotor checker, which checks to make sure they spin a minimum number of times when the counter chamber is dry. This is currently documented in the LT sampling equipment binder in Mallory's cubicle. The manual from

General Oceanics is currently located in Yolo Bypass:/Instrument inventory and maintenance/General Oceanics Flow Meters.

### 6. QAPP

The YBFMP currently does not have any approved QAPPs.

## Recommendations for improvements

### General

- Create a document (QAPP? QA Metadata?) listing general QA Procedures (procedures consistent across data types)
    - links to more specific details for different QAQC procedures
    - detailing changes in QAQC procedures over time
- Each document will have a single document owner responsible for revising the document.
- A naming convention will be utilized for all documents described in the document control SOP including: QAPPs, SOPs, forms, technical document, and training documents.
    - Naming convention: DCN prefix_document type_version number_Document title
        - Ex: DES-6-SOP-001_v1.0_rotary screw trap.pdf
            - DES-6 = AES
            - SOP-001- sequential numbering of SOPs
- Documents will be reviewed on an annual basis and will be coordinated and overseen by the document owner.
- Create a versioning system for major and minor changes, if QA/QC does not provide one.

### Data QC

- Come up with some consistent QC tests and code for all data types to more easily run checks
- Come up with consistent guidelines on flagging data (or use guidelines from QA groups once they come out with recommendations)

### Fish ID

- An annual fish ID course/refresher for the AES section. There are a lot of really good fish ID photos that could be used for a short quiz at the end as well. I am not sure if we need a specific document for this, but maybe a person responsible for organizing it annually rather than on an as needed basis.
    - This could be strategically held when new staff who will be in the field often (field leads, sci aids) join the section

    - Utilize feedback from the USFWS ID test to give refreshers targeting fish that staff members commonly misidentified
- Some sort of juvenile focused fish ID training or document that distinguish between some commonly mistaken species would be beneficial for those in the field.
- Reconsider how we classify small, hard to ID species and enter them into the database. For example, small minnows and bass at 25mm are extremely hard to ID an we could be entering them wrong and creating inaccurate data. A more general fish ID might be appropriate for certain species when at a small size.
- Create fish ID flashcards that staff can use to test their knowledge and learn about fish species found in Yolo. Have these as printable document so they can be reproduced and edited as needed.

## Sampling effort consistency

- Determine standard criteria for when to switch out flow meters and add to LT sampling SOP
- Discuss situational criteria for considering the times to potentially lift RSTR cone or pull Fyke trap during unusual trap operation conditions.
- Determine standard criteria for when to shorten lower trophic tow times and add to LT sampling SOP
- Determine general criteria for determining beach seine site order/when to survey different sites (both regular and high flow)
- Change to using military time for consistency
- Change to using just PST to match other sections/ instruments in the field

## Instrument Calibration

- Reorganize instrument inventory and maintenance folder and protocols and manuals folder. Protocol folder should just be SOPs and all instrument documentation go in Instrument Manuals & Maintenance
    - Add continuous SOP to EXO's folder in Instrument Inventory and maintenance.
    - Use Discrete vs. Continuous for YSI instrumentation.
- Ensure that calibration constants for each spherical sensor are taped to each light meter
- Develop flowmeter calibration protocol (wait for guidance from CDFW)

## QAPP

- Develop guidelines for when a QAPP is needed
- Develop a template for QAPP

# Rotary Screw Trap (RSTR)

## General Description/Narrative

A rotary screw trap is installed at the lower end of the Yolo Bypass Toe Drain and operated weekdays during January through June to capture fish on their outmigration from the Yolo Bypass. Each day that the RSTR is operated a RSTR log sheet and a Yolo Bypass Fish datasheet is filled out. The fish datasheet contains details such as date, time, water quality information, trap status, tide, revolution count, and condition/vegetation codes. The datasheet is also used to collect information about the fish sampled. All fish are identified and counted: fork length is measured to the nearest millimeter on a wetted measuring board for up to 50 of each native species and 20 of each invasive species.

## Accounting of current practices

### 1. Metadata

- YBFMP_Metadata_ScrewTrap_2018_final
- Fish_Metadata_EDI

### 2. SOP

- AES_YBFMP field to lab manual – needs more updates but contains section on RSTR, once all SOPs are updated, this document will get updated.
- RST SOP_KR draft – an out of date start to a RSTR SOP. Needs work but it is started

### 3. Research questions

- Listed in SOP and Metadata:
    - examine species composition of juvenile outmigrants and resident small-bodied fishes
    - identify general salmonid emigration attributes such as timing, abundance, life stage composition, condition, and investigate the influence of the factors initiating downstream migration such as flow, tidal cycle, time of day, turbidity, and water temperature
    - to compare fish species composition and densities in the Yolo Bypass Toe Drain and floodplain
    - develop an estimate of juvenile salmon residence time using Coded Wire Tags (CWT).

### 4. Safety

- AES_YBFMP field to lab manual – last updated 2016 pg. 65-69(safety)

- RSTR Standard Procedure PDF (in the safety folder) – updated in 2019. Very official looking but still informative. May not be useful to a someone going out to the trap everyday but useful for management and liability.
- Yolo Bypass Tailgate Safety Meeting_RSTR-061015 – updated in 2015. Could be longer and updated.
- Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19 - updated in 12-18-2019 Additional safety for high flow events
- RSTR_emergency_release_protocol-010515 – needs updates and could be combined into one larger RSTR SOP...?

## 5. QA/QC

Documented in RSTR SOP and Data Entry SOP

The trap operation goes through instant QAQC by the field crew having a group of 2 or more people. The crew is able to work as a team to make sure all components of the trap operation are done correctly. When the live well is being fished, the netter will get as much debris out as possible, then use a crowder to get all the specimens into one side of the trap. The individual continues to net that section until they get two zero catches, then another individual nets the section to get a third zero. If they do not get a zero then they must continue to net until they get three zeros in a row.

The Yolo Bypass fish datasheet goes through two rounds of QAQC. In the field, the datasheet is checked by an individual who did not do any data recording. They check to make sure all sections of the datasheet are filled out and that all recorded values are legible and make sense. Once the datasheet has been entered in the Yolo Fish database, it goes through another QAQC process. The database entry is checked for any discrepancies from the transfer to physical datasheet to electronic. Errors are fixed and if there are more than three, then it goes through another round of QAQC by a different individual. After the QAQC process, the datasheet is moved to a binder corresponding to year and trap to be saved for future reference if necessary. All datasheets are also scanned into the shared drive to save a electronic version in case the physical datasheets are unavailable.

## 6. Training

For volunteers and new employees, the field lead will go over the tailgate safety documents to introduce the individual to what a screw trap is and the safety precautions that must be taken. Once at the

actual trap, the field lead continues to guide any new individuals. The training is very hands on.

7. Sampling flowcharts?

   None for trap operations specifically but there are some for fish sampled.

8. SOP videos?

   None

9. Changes over time

   Documented in metadata.

   1998: a 5 ft rotary screw trap (RTSR5) was used for one less than month in January and February during high flows after which the 8 ft screw trap (RSTR8) was used to current, 2018.

   2000-2009: the rotary screw trap was often set over weekends and checked every 1-2 days.

   2010: the operation of the trap was changed to daily checks and only set on weekends during some flooding events.

   2011: Damage due to high debris loads resulted in several weeks of no operation in late March and April.

   2012: High catches of ESA listed species resulted in shorter daytime only sets intermittently from January through March.

   2016: High catches of ESA listed species resulted in shorter daytime only sets intermittently for one month (March 29th through April 26th).

   2017: Short day-time only sets intermittently from January to May due to high floods.

   Changes in datasheet (need access to shared drive or folders to find old datasheets)

   Changes in how we record set, check, pull

   2019: Short day-time only sets intermittently from February to May due to high flows

   2020: Not sampled from 3/18/20 - _____ due to COVID-19 pandemic.

10. COCs

Yes but already covered in other sections

11. Other Documents Relevant to Current Operations

N/A.

## Evaluations of Documentation

Review Narrative for: RSTR SOP

[started: 4/21/2020, completed: 5/27/2020]

[Amanda Casby, and Nicole Kwan]

"Yolo Bypass:\Protocols & Instrument Manuals\RSTR & BSEINE\RST SOP_KR draft_JF.docx"

### General Description

The rotary screw trap (RSTR) standard operating procedure is used to inform personnel of the correct way to conduct sampling with the rotary screw trap. This document creates a standard to follow to avoid discrepancies between different individuals doing sampling. This document also works for a training document if an individual has not used a rotary screw trap before, this document should guide them through the sampling process from start to finish.

### Evaluation

1. Does this document exist?

   Yes, there is a RSTR SOP draft started, however it is not complete.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   [Last revised on 11/20/2011, but no notes as to what was changed or when the original was created.]

3. Who were the authors of the previous document?

   [Kevin Reece, Jared Frantzich (no name actually listed, but JF initials)]

4. Evaluate the quality of the document.

   The SOP has a lot of quality and well detailed information however the formatting is not sufficient for an SOP and needs to be edited. It doesn't seem like a lot of information will need to be added but rather

it needs to be edited to reflect current practices and put in a better format for an SOP.

5. What edits were made, if any?
    - A lot of reorganization was done in order to make the flow of information more practical and have the information fit the SOP template.
    - An equipment list was added to the beginning of the document.
    - A methods section was added to the document with three subsections covering safety/precautions before operation, day to day operation, and high flow operation.
    - The appendices were reorganized and added to. A contributors list was added to the end of the document. Font size, headings, and font style were changed for ADA accessibility.
    - The installation and removal portions were moved to a new document titled: Rotary Screw Trap Installation and Removal since they are not a part of regular operating procedures Installation and Removal SOP
    - An outline for RSTR maintenance was added, but more details and photos will be added after the next years maintenance.

    Revisions document: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Rotary%20Screw%20Trap%20(RSTR)/RSTR_SOP_revisions.docx?d=w55c2b984a04c44559c689f50c0180074&csf=1&web=1&e=lA4TEe

## Review Narrative for: RSTR YBFMP_Metadata_ScrewTrap_2018_Final

[started: 4/22/20, completed: 5/18/20]

[Nicole Kwan]

"Yolo Bypass:\Protocols & Instrument Manuals\RSTR & BSEINE\YBFMP_Metatdata_ScrewTrap_2018_Final.docx"

### General Description

The metadata document for the rotary screw documents the history and background of the sampling effort, the changes to operation over the course of the monitoring program, and the specifications of the trap and sampling protocol.

### Evaluation

1. Does this document exist?

Yes, though it is not fully up to date.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   January 2018. There is no updating schedule, seems infrequent.

3. Who were the authors of the previous document?

   Pascale Goertler & Brittany Davis.

4. Evaluate the quality of the document.

   Overall the document provides useful background on the RSTR operations but could use improvements to increase the level of detail on the program's history and to make sure current procedures are updated to match new/updated SOP's.

5. What edits were made, if any?

   No edits were made because this document will be archived.

## Review Narrative for: RSTR Fish_Metadata_EDI

[review completion date: 5/18/20]

[Nicole Kwan]

"Yolo Bypass Data:\Metadata\Metadata ON EDI\"Yolo Bypass:\Protocols & Instrument Manuals\RSTR & BSEINE\YBFMP_Metatdata_ScrewTrap_2018_Final.docx"

### General Description

The metadata document for the rotary screw documents the history and background of the sampling effort, the changes to operation over the course of the monitoring program, and the specifications of the trap and sampling protocol. This metadata document is formatted to follow the IEP Guidelines and will be published on EDI, for all YBFMP fish collection methods and data.

### Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

June 2018.

3. Who were the authors of the previous document?

   Brittany Davis and Brian Schreier.

4. Evaluate the quality of the document.

   This document meets all expectations of the IEP Metadata table but includes more than just screw trap metadata and is not up to date.

5. What edits were made, if any?
   - Copied the info from this document into the new metadata template from Cat
   - Removed non-relevant parts of the template
   - Blended in some info from the old Screwtrap Metadata document
   - Updated through 2020
   - New document: "ScrewTrap_Metadata_NewTemplate_revisions.docx"
     - https://cawater.sharepoint.com/sites/dwrdoc-aes/_layouts/15/Doc.aspx?sourcedoc=%7B91128cd7-fabe-43cb-990f-458f992e00db%7D&action=edit&wdPid=21d5cf62&CT=1589327900715&OR=OWA-NT&CID=ce485ab1-9f6a-848b-bf51-9e7ac556d734

## Review Narrative for: RSTR Safety

[started: 4/21/2020, completed: 5/26/20]

[Naoaki Ikemiyagi, Amanda Casby, and Nicole Kwan]

### General Description

The safety documentation for the Rotary Screw Trap (RSTR) sampling element should include all safety information related to how to safely and appropriate operate the RSTR and note any and all safety risks involved. It should also list ways to mitigate any unsafe practices. All sampling elements should include a safety tailgate, job hazard analysis (JHA), and standard procedure (SP) documents.

### Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

AES_YBFMP field to lab manual – last updated 2016 pg. 65-69(safety)

RSTR Standard Procedure PDF (in the safety folder) – updated in 2019

Yolo Bypass Tailgate Safety Meeting_RSTR-061015 – updated in 2015

9720 - Yolo Bypass Rotary Screw Trap (Job Hazard Analyses (JHA) DWR 9720) - last modified 12/7/2015?

Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19 - updated in 12-18-2019

SP_2019_RSTR & SP_2019_RSTR_cont. (Standard Procedure (SP) DWR 9720b) – 7/29/2019

3. Who were the authors of the previous document?

   AES_YBFMP field to lab manual pg. 65-69 – Document curator Brittany Davis, section Brian Mahardja?

   RSTR Standard Procedure PDF (in the safety folder) – Hard copies bound by Mallory Bedwell

   Yolo Bypass Tailgate Safety Meeting_RSTR-061015 – Brian Mahardja?

   9720 - Yolo Bypass Rotary Screw Trap (Job Hazard Analyses (JHA) DWR 9720) - Brian Schreier?

   Yolo Bypass Tailgate safety Meeting High Flow_12.09.19 - Nicole Kwan

   SP_2019_RSTR & SP_2019_RSTR_cont. (Standard Procedure (SP) DWR 9720b) – Naoaki Ikemiyagi

4. Evaluate the quality of the document.

   The quality of the safety documentation is high. Revisit and simplify or combine repeated information?

5. What edits were made, if any?

   None.

## Recommendations for improvements

### Metadata

- Update new metadata document with otolith procedures
- Add end date of COVID-19's impact on 2020 sampling, when possible

SOP

- It could be helpful to incorporate some references to SOP videos. There are a lot of portions of the screw trap operation that are hard to write down in easy to understandable terms so creating a few SOP videos and referencing them in the SOP as "for more clarification see … video" could be very helpful.
- An appendix for the yearly trap maintenance done at the beginning of the trapping season would be helpful. We suggest that the next time this maintenance is done that the process is thoroughly documented and photographed. Then a scientific aid could add it to the SOP and Naoaki and Nicole can approve it. Outline started in SOP.

# Fyke

## General Description/Narrative

Fyke trap sampling is one of the four main elements of the YBFMP. The fyke trap is designed to examine species composition and the timing and duration of large fish migrations through the Yolo Bypass relative to different physical conditions. The focus has been on anadromous fish species (i.e. adult Chinook Salmon and sturgeon); however useful data is also collected on other fishes. The fyke trap is deployed in the Yolo Bypass Toe Drain just below Lisbon Weir at levee mile six and is typically operated from October through June. The trap site has been selected based on ease of installation, operation, and maintenance, including: (1) suitable depth: greater than ten feet at high tide during low flow; (2) suitable anchoring point; (3) suitable bank: absent of large woody debris; and (4) limited public access. Each day that the fyke trap is operated, a Yolo Bypass fish datasheet is filled out. The fish datasheet contains details such as date, time, water quality information, trap status, tide, and condition/vegetation codes. The datasheet is also used to collect information about the fish sampled. During periods of sturgeon or salmon presence, all sturgeon and salmon are prioritized and carefully identified. Then all other fish are identified and counted: fork length is measured to the nearest millimeter on a wetted measuring board for up to 50 of each native species and 20 of each non-native species.

## Accounting of Current Practices

1. Metadata

- Fish_Metadata_EDI_original.docx

## 2. SOP's

- AES_YBFMP field to lab manual_DRAFT_12.19.19.docx
- Yolo Bypass Tailgate Safety Meeting_FYKE-112116.docx (SOP's included in document)

## 3. Research questions

- Research questions from AES_YBFMP field to lab manual_DRAFT_12.19.19:
    - examine adult species composition
    - identify general timing and duration of anadromous species use relative to different physical conditions
    - to compare timing and duration of species captured in the Yolo Bypass to those captured in other Sacramento Valley tributaries.

## 4. Safety

- Yolo Bypass Tailgate Safety Meeting_FYKE-112116.docx
- 9720 - Yolo Bypass Fyke Trap.pdf – Job Hazard Analyses (JHA)
- SP_Fyke.pdf – Standard Procedure (SP)
- AES_YBFMP field to lab manual – Fyke Trap Safety pg. 64
- Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19

## 5. QA/QC

QA/QC steps are listed in the AES_YBFMP field to lab manual_DRAFT_12.19.19.docx:

QA/QC is a four-stage process. First, the data sheets are error checked at the end of each site samples by someone other than the recorder. Data is then entered into a Microsoft Access form with automatic error-checking and data validation. Third, a third-party compares the original data sheets to the electronic database for any errors in transferring. They fix any errors and if there are more than three then another round of error checking is done by a different person. Finally, each data field within Access is sorted and/or summarized based on unique records to highlight erroneous outliers.

## 6. Training

Training for the Fyke trap is done by one of the field leads before and during trap operation. First, the field lead uses the tailgate safety sheet to explain how the trap operates and highlight all safety precautions we take. Once at the fyke trap site, the field lead explains the steps to the trainee and makes sure they understand each component of the operation. The training process is very hands on and

takes a few consecutive sessions to be fully trained. There is currently no formal training for operating the fyke trap

For fish identification, new and current staff are instructed to review the Fish ID PowerPoints created by USFWS in the Shared Drive, and fish ID training is conducted on a yearly basis at the USFWS in Lodi.

7. Sampling flowcharts?

Sampling flowcharts do not exist for fyke trap sampling.

8. SOP videos?

i) No SOP videos exist but would be useful.

9. Changes over time – no documentation evaluation needed

Changes over time are documented in Fish_Metadata_EDI_original.docx document and then updated and included in the History and Background of the YBFMP EOR

10. COCs

11. Other Documents Relevant to Current Operations

## Evaluations of Documentation

Review Narrative for: Fyke Sampling Metadata

[Started 4/2/2020; Completed 6/17/2020]

[Craig Stuart; Naoaki Ikemiyagi]

Fish_Metadata_EDI_original.docx (most recent metadata document only exists in SharePoint)

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Fyke/Metadata/Fish_Metadata_EDI_original.docx?d=we225106c0ecb444c988cc5b78d200513&csf=1&web=1&e=j9UYeL

### General Description

Metadata for the fyke sampling element of the YBFMP should include the program history, sampling changes to date, trap specifications, and site information. The fyke metadata also comprises of QA/QC and changes over time. This information should be updated frequently and be as detailed as possible.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   08/14/2018. Should be updated annually.

3. Who were the authors of the previous document?

   Brittany Davis

4. Evaluate the quality of the document.

   The overall quality of the document is good. There is plenty of information about the entirety of the fyke sampling. However, recent updates are needed and transfer to new metadata template is currently taking place.

5. What edits were made, if any?

   No edits were made to the original document.

   Updated metadata template is being made here: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Fyke/Metadata/Fyke_Metadata_NewTemplate_revisions.docx?d=w28a8e6c3af4c4b09a7fb092413772748&csf=1&web=1&e=uz5OfE

# Review Narrative for: Fyke Sampling SOP

[Started 4/2/2020; Completed 6/17/2020]

[Craig Stuart; Naoaki Ikemiyagi]

Yolo Bypass:\Protocols & Instrument Manuals\AES_YBFMP field to lab manual_DRAFT_12.19.19.docx

Yolo Bypass:\Safety\Safety Plans & Tailgates\Yolo Bypass\Yolo Bypass Tailgate Safety Meeting_FYKE-112116.docx

## General Description

The fyke sampling SOP should list a step-by-step outline detailing the produces for setting, checking, and pulling the trap. The SOP should give enough detail to follow the procedures the same way, every time, so long

as safe conditions are met. A new employee with little to no experience should be able to perform fyke sampling efficiently with the help of experienced crew members after reading SOP.

## Evaluation

1. Does this document exist?

   There is no separate SOP document for fyke trap sampling. There is a field collection methods section in the AES_YBFMP field to lab manual_DRAFT_12.19.19 and some procedural steps in the tailgate safety documents that will be evaluated for this review.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   AES_YBFMP field to lab manual_DRAFT_12.19.19.docx - 12/19/2019

   Yolo Bypass Tailgate Safety Meeting_FYKE-112116.docx - 11/21/2016, should be updated whenever safety issues/concerns change.

3. Who were the authors of the previous document?

   unknown

4. Evaluate the quality of the document.

   Poor. The SOP is not in its own document file. A SOP document needs to be created and updates are required.

5. What edits were made, if any?

   No edits were made to existing SOP documentation but a new SOP was created as part of this review:

   https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Fyke/SOP/FYKE_SOP_Template%202020.docx?d=w47c59fcbc5ab4c119177ab82bbd00ff5&csf=1&web=1&e=0O5ZTK

# Review Narrative for: Fyke Sampling Safety

[Started 4/2/2020; Completed 6/17/2020]

[Craig Stuart; Naoaki Ikemiyagi]

Yolo Bypass:\Safety\Safety Plans & Tailgates\Yolo Bypass\Yolo Bypass Tailgate Safety Meeting_FYKE-112116.docx

Yolo Bypass:\Safety\Job Hazard Analyses\9720 - Yolo Bypass Fyke Trap.pdf

Yolo Bypass:\Safety\Standard procedures\SP_Fyke.pdf

Yolo Bypass:\Protocols & Instrument Manuals\AES_YBFMP field to lab manual – Fyke Trap Safety pg. 64

Yolo Bypass:\Safety\Safety Plans & Tailgates\Yolo Bypass\Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19

## General Description

The safety documentation for the fyke trap sampling element should include all safety information related to how to safely and appropriate operate the beach seine and note any and all safety risks involved. The tailgate safety document includes information regarding truck safety, proper winch use, launch and retrieval procedures, and personal care. It should also list ways to mitigate any unsafe practices. All sampling elements should include a safety tailgate, job hazard analysis (JHA), and standard procedure (SP) documents.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Yolo Bypass Tailgate Safety Meeting_FYKE-112116 – 11/21/2016

   9720 - Yolo Bypass Fyke Trap.pdf – Job Hazard Analyses (JHA) – 12/7/2015

   SP_Fyke.pdf – Standard Procedure (SP) – 7/29/2019

   AES_YBFMP field to lab manual – Fyke Trap Safety pg. 64 – 12/19/2019

   Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19 - 12-18-2019

3. Who were the authors of the previous document?

   Yolo Bypass Tailgate Safety Meeting_FYKE-112116 – Brian Mahardja

   9720 - Yolo Bypass Fyke Trap.pdf – Job Hazard Analyses (JHA) - Brian Schreier

SP_Fyke.pdf – Standard Procedure (SP) - Nicole Kwan and Mallory Bedwell

AES_YBFMP field to lab manual – Fyke Trap Safety pg. 64 – Document curator Brittany Davis

Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19 - Nicole Kwan

4. Evaluate the quality of the document.

   The quality of the safety document is very high. It should be updated with more recent safety precautions, but overall the correct information is included.

5. What edits were made, if any?

   No edits were made to existing documents.

### Recommendations for improvements

A video SOP and training guide would be a helpful.

# Beach Seine

## General Description/Narrative

The beach seine sampling effort is one of four main elements of the Yolo Bypass Fish Monitoring Program (YBFMP). The beach seine sampling element is an integral part under the Interagency Ecological Program (IEP) umbrella and aims to monitor nearshore habitat use by small adult and juvenile fish in the Yolo Bypass. Beach seine sampling is conducted year-round on a biweekly basis at one perennial pond (YB) and eight core sites (AL1, AL3, AL4, BL1, BL2, BL3, BL4, and BL5) along the perennial channel (Toe Drain) situated at the east-end of the Yolo Bypass floodplain. During times of seasonal floodplain inundation, sampling is increased to weekly, and five high-flow sites (RD22, FW1, SW, LIHF, and YB180) are added to the sampling effort. A 25 foot by 4 foot (8 x 1.2 meters) pole seine with 1/8 in. sq. mesh is used to conduct all beach seine samples. At most sites, a modified beach seine haul is conducted parallel to shore because of the steep levee banks. Captured fish are identified to species, counted, and fork length is measured to the nearest millimeter for up to 50 individuals for native species and 20 for nonnative species.

## Accounting of Current Practices

### 1. Metadata

- YBFMP_Metadata_Beach Seine_Jan2018_final.docx
- YBFMP_Stations_Coordinates_Info.xlsx
- Yolo Bypass Sampling Locations.xls
- Yolo Bypass Seine Lengths.xlsx

### 2. SOP

- AES_YBFMP field to lab manual_DRAFT_041519.docx

### 3. Research questions

- Research questions are stated in the AES_YBFMP field to lab manual:
- For the perennial ponds:
    - to examine seasonal fish species abundance and diversity in the Yolo Bypass versus the Sacramento River; and,
    - to examine species abundance and composition in different water year types.
- For the Toe Drain and inundated floodplain sampling:
    - to examine species abundance and composition in different water year types;
    - to compare fish abundance and diversity between Yolo Bypass regions; and,
    - to estimate growth rates and densities of salmon in the Yolo Bypass versus the Sacramento River.
- Seine sampling in seasonal ponds is designed:
    - to measure the diversity and abundance of fish species trapped in ponds located in different regions and habitats;
    - to compare relative densities of fish before and after floodplain drainage;
    - to examine the sources of fish mortality in seasonal ponds including temperature, desiccation and predation;
    - to develop long-term annual Yolo Bypass stranding indices for reference locations; and,
    - to examine relationships between annual stranding indices and physical variables such as hydrology and temperature.

### 4. Safety

- Yolo Bypass Tailgate Safety Meeting_BeachSeine-120315.docx
- 9720 - Yolo Bypass Beach Seine.pdf – Job Hazard Analyses (JHA)
- SP_2019_BeachSeine.pdf – Standard Procedures (SP)
- AES_YBFMP field to lab manual_DRAFT_041519.docx

  - Beach Seine Safety pg. 59
- Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19

5. QA/QC

QA/QC details are noted in the YBFMP_Metadata_Beach Seine_Jan2018_final.docx:

Data QA/QC is a four-stage process. First, the data sheets are error checked at the end of each site sampled by a crew member, other than the recorder. Data is then entered into a Microsoft Access form with automatic error-checking and data validation. Third, a third-party compares the original data sheets to the electronic database. Finally, each data field within Access is sorted and/or summarized based on unique records to highlight erroneous outliers.

6. Training

New staff and volunteers are trained informally in the field. There is currently no formal training for beach seining.

For fish identification, new and current staff are instructed to review the Fish ID PowerPoints in the Shared Drive, and fish ID training is conducted on a yearly basis at the USFWS in Lodi.

7. Sampling flowcharts?

N/A

8. SOP videos?

No SOP videos exist but would be useful.

9. Changes over time

Changes over time are documented in the YBFMP_Metadata_Beach Seine_Jan2018_final.docx document and then updated and included in the History and Background of the YBFMP EOR.

10. COCs

See Genetics for more information about relevant COCs

11. Other Documents Relevant to Current Operations

## Evaluations of Documentation

Review Narrative for: Beach Seine Sampling Metadata

[Started 4/1/2020; Completed 6/17/2020]

[Craig Stuart; Naoaki Ikemiyagi; Cat Pien]

Yolo Bypass Data:\Metadata\Archive YBFMP Metadata\2018 Metadata Fish &

WQ\YBFMP_Metadata_Beach Seine_Jan2018_final.docx

Yolo Bypass Data:\Metadata\YBFMP_Stations_Coordinates_Info.xlsx

Yolo Bypass Data:\Metadata\Yolo Bypass Sampling Locations.xls

Yolo Bypass Data:\Metadata\Yolo Bypass Seine Lengths.xlsx

## General Description

The metadata for the beach seine element should describe the background of the YBFMP and beach seine sampling, the site information and overall methods for sample collection, the QA/QC protocols, and changes over time to the program. This information should be updated frequently and be as thorough as possible.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   YBFMP_Metadata_Beach Seine_Jan2018_final.docx - 01/2018

   YBFMP_Stations_Coordinates_Info.xlsx – 01/2020

   Yolo Bypass Sampling Locations.xls - unknown

   Yolo Bypass Seine Lengths.xlsx - 3/3/2020

3. Who were the authors of the previous document?

   YBFMP_Metadata_Beach Seine_Jan2018_final.docx - Brittany Davis

   YBFMP_Stations_Coordinates_Info.xlsx – Catarina Pien

   Yolo Bypass Sampling Locations.xls - unknown

   Yolo Bypass Seine Lengths.xlsx - JT Robinson

4. Evaluate the quality of the document.

   Overall the quality of the beach seine metadata is good. The information within the metadata section is quite extensive and provides a lot of details about the changes, history, and specifications

for AES's long-term beach seine sampling effort. The metadata needs to be updated with more detailed methods of collection, sampling site history, and years of inundation.

5. What edits were made, if any?

   The beach seine metadata was updated and transferred to the new template. You can find this document in SharePoint only: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Beach%20Seine/Metadata/BeachSeine_Metadata_NewTemplate_revisions.docx?d=w2e49324cd0fa4c7fa23d838b9a529097&csf=1&web=1&e=HH9CNO

## Review Narrative for: Beach Seine Sampling SOP

[Started 4/1/2020; Completed 6/17/2020]

[Craig Stuart; Naoaki Ikemiyagi; Cat Pien]

Yolo Bypass:\Protocols & Instrument Manuals\AES_YBFMP field to lab manual_DRAFT_041519.docx

### General Description

The SOP of the beach seine element should include a step-by-step procedure on how to properly and effectively perform a beach serine sample collection for the YBFMP. This guide is to be followed the same way, every time so long as safe conditions permit. The SOP will include a list of all required materials and an instructions on how to collect fish using a beach seine. It should include all information so that any new employee could read through it and feel confident in their ability to perform a beach seine sample, with guidance from experienced crew members.

### Evaluation

1. Does this document exist?

   No individual SOP for the beach seine sampling element exists. However, the AES_YBFMP field to lab manual_DRAFT_041519.docx provides a brief summary of collection methods.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

The AES_YBFMP field to lab manual_DRAFT_041519.docx was last updated on 4/10/2020

3. Who were the authors of the previous document?

   Brittany Davis was the original author of the AES_YBFMP field to lab manual_DRAFT_041519.docx

4. Evaluate the quality of the document.

   The quality of this document is poor. It can be hard to find as the AES_YBFMP field to lab manual_DRAFT_041519.docx is a large document and the collection methods described only cover a few procedural components of beach seining.

5. What edits were made, if any?

   Edits were made to the new SOP and is located here: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Beach%20Seine/SOP/YBFMP_BeachSeine_SOP_2020.docx?d=w21936b67c86744e2a6c031f13acb44c9&csf=1&web=1&e=cHr9fZ

## Review Narrative for: Beach Seine Sampling Safety

[Started 4/1/2020; Completed 6/17/2020]

[Craig Stuart; Naoaki Ikemiyagi; Cat Pien]

Yolo Bypass:\Safety\Safety Plans & Tailgates\Yolo Bypass\Yolo Bypass Tailgate Safety Meeting_BeachSeine-120315.docx

Yolo Bypass:\Safety\Job Hazard Analyses\9720 - Yolo Bypass Beach Seine.pdf

Yolo Bypass:\Safety\Standard procedures\SP_2019_BeachSeine.pdf

AES_YBFMP field to lab manual_DRAFT_041519.docx (Beach Seine Safety pg. 59)

Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19

### General Description

The safety documentation for the beach seine sampling element should include all safety information related to how to safely and appropriately operate the beach seine and note any and all safety risks involved. It should also list ways to mitigate any higher risk practices. All sampling

elements should include a safety tailgate, job hazard analysis (JHA), and standard procedure (SP) documents.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Yolo Bypass Tailgate Safety Meeting_BeachSeine-120315 – 12/3/2015

   9720 - Yolo Bypass Beach Seine – Job Hazard Analyses – 12/3/2015

   SP_2019_BeachSeine – Standard Procedure (SP) – 7/29/2019

   AES_YBFMP field to lab manual – Beach Seine Safety pg. 59 – 12/19/2019

   Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19 - 12-18-2019

3. Who were the authors of the previous document?

   Yolo Bypass Tailgate Safety Meeting_BeachSeine-120315 – Brian Mahardja

   9720 - Yolo Bypass Beach Seine – Job Hazard Analyses – Brian Schreier?

   SP_2019_BeachSeine – Standard Procedure (SP) – Catarina Pien

   AES_YBFMP field to lab manual – Beach Seine Safety pg. 59 -

   Document curator Bittany Davis

   Yolo Bypass Tailgate safety Meeting_High Flow_12.09.19 - Nicole Kwan

4. Evaluate the quality of the document.

   The quality of the safety documentation is very high. There are multiple precautionary documents regarding our safety procedures.

5. What edits were made, if any?

   NA

## Recommendations for improvements

- Update metadata information, authors.
- Update the sampling locations and coordinate excel sheets to be one combined document.
- Create sampling flowchart to help field crew decide when to sample a site under sets of different conditions.
- Potentially include how we make determinations for substrate type and habitat type (and add to data sheet) in SOP.
- Create complementary beach seine video SOP (examples at different sites if seining is done different in different circumstances) and a more formal training protocol, possibly video training.
- Consider updating beach seine research questions to more accurately reflect results from scientific review conclusion.

# Egg and Larval

## General Description/Narrative

The egg and larval sampling component of the YBFMP is an important element in determining the annual presence, timing and recruitment success of adult fishes utilizing the Yolo Bypass. The YBFMP initiated this sampling element, under the IEP umbrella, to collect fish larvae and eggs from the ~~Sacramento River Channel~~ and the Yolo Bypass in order to compare seasonal variations in densities and species trends. To collect samples, a fixed larval net is fished just below the surface for 10 minutes and volume is recorded using a flowmeter (General Oceanics Model 2030R) mounted and centered in the mouth of the net. The larval net is conical shaped and is 2.5 m long with a 0.75 m diameter opening. The net is constructed with 500-micron mesh and is equipped with a cod-end made of a polyethylene jar with 500-micron mesh to collect organisms. Sampling is conducted at the Yolo Bypass Screw Trap (STTD) sites, from January through June. When there is sufficient flow (typically from January - June), sampling at the Yolo Bypass screw trap site is collected during the ebb tide from the deck of the rotary screw trap anchored in the middle of the channel. In the absence of sufficient downstream flow, (typically from July-November) Yolo Bypass samples are taken from a boat moving approximately 1-2 mph upstream near the screw trap or dock. Sampling is conducted biweekly but increases to weekly sampling during inundated periods. Egg and larval samples are transferred into 70-80% ETOH at least two weeks post collection before delivery to contractor for taxonomic identification and enumeration.

## Accounting of Current Practices

### 1. Metadata

- EggLarval_Metadata_02_16_2019.docx

### 2. SOP

- Yolo Egg and Larval Evaluation SOP.docx
- Lower Trophic Sampling SOP.docx

### 3. Research questions

- Research questions are stated in the AES_YBFMP field to lab manual:
    - Compare the seasonal variations in densities and species trends within ~~a) Sacramento River channel~~, and b) the Yolo Bypass, the river's seasonal floodplain. (the Sacramento River part of this objective is no longer applicable as this sampling effort does not sample egg and larval at Sherwood)
    - The collection of fish egg and larval samples is an important element in determining the annual presence, timing and recruitment success of adult fishes utilizing the Yolo Bypass.

### 4. Safety

- Yolo Bypass Tailgate Safety Meeting_LowerTrophicSampling-151915.docx
- 9720 - Yolo Bypass Lower Trophic Sampling.pdf – Job Hazard Analyses
- SP_Lower Trophic Sampling.pdf – Standard Procedure (SP)

### 5. QA/QC

j) QA/QC process is detailed in metadata:

k) QA/QC is a four-stage process. First, the data sheets are error checked at the end of each site samples by someone other than the recorder. Data is then entered into a Microsoft Access form with automatic error-checking and data validation. Third, a third-party compares the original data sheets to the electronic database. Finally, each data field within Access is sorted and/or summarized based on unique records to highlight erroneous outliers.

### 6. Training

Training is usually conducted onsite during a sampling event and taught by one or more experienced crew leads. There is no formal training but the SOP can be used for egg and larval sampling training.

7. Sampling flowcharts

Sampling flowcharts do not exist for lower trophic sampling.

8. SOP videos?

None, but would be beneficial to have in the future.

9. Changes over time

Changes over time are documented in EggLarval_Metadata_02_16_2019_original.docx document and then updated and included in the History and Background of the YBFMP EOR.

10. COCs

- Yolo Bypass:\YB_Contracts\Lower Trophic Contracts\2018-2021_Yolo Lower Trophic Contracts\EcoAnalysts_Drift Inverts and EggsLarvae_2018-2021

  Samples are securely packaged to prevent leakage or breakage. All bottles are inspected and verified, and a chain of custody form is filled out with the sample collection time and date, study, site, and number of jars per sample. Signatures are required of both the person responsible for sending the sample package, and the person receiving it. The chain of custody form is signed and sent to the Eco Analyst contractor with the samples, and the contractor is notified of approximate date of delivery.

11. Other Documents Relevant to Current Operations

## Evaluations of Documentation

### Review Narrative for: Egg and Larval Sampling Metadata

[Started 4/6/2020; complete 6/17/2020]

[Craig Stuart; Mallory Bedwell, Naoaki Ikemiyagi]

Yolo Bypass Data:\Metadata\Metadata NOT on EDI\2019\EggLarval_Metadata_02_16_2019.docx

#### General Description

The metadata for the egg and larval sampling element should describe in detail the background of the sampling effort, the objectives, the study area and sampling sites, any changes that have occurred during the duration of the program, the overall collection methods, and QA/QC protocols.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   2/16/2019

3. Who were the authors of the previous document?

   Brittany Davis

4. Evaluate the quality of the document.

   The quality of the 2019 egg and larval metadata is good. The metadata needs a 2020 update and to be converted to the new metadata template.

5. What edits were made, if any?
   - Transferred metadata to new standard metadata template.
   - Updated contractor information

   The new metadata document can be found here: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/E%26L/Metadata/EggLarval_Metadata_NewTemplate_revisions.docx?d=we51fbe0f3db641ef99ac956fe63cf5a3&csf=1&web=1&e=YtYPCp

# Review Narrative for: Egg and Larval Sampling SOP

[Started 4/6/2020; complete 6/17/2020]

[Craig Stuart; Mallory Bedwell, Naoaki Ikemiyagi]

Yolo Bypass Data:\Protocols & Instrument Manuals\Lower Trophic Sampling\zoop_drift_E&L_sample collection/Yolo Egg and Larval Evaluation SOP

Yolo Bypass Data:\Protocols & Instrument Manuals\Lower Trophic Sampling\zoop_drift_E&L_sample collection/ Lower Trophic Sampling SOP

## General Description

The SOP of the egg and larval sampling element should include a step-by-step guide on how to properly and effectively perform the collection of

the E&L sample for the YBFMP. This guide is to be explicitly followed the same way, every time so long as safety conditions allow. It should include all information so that any new employee could read through it and feel confident in their ability to perform an egg and larval sample, with guidance from experienced crew members.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

l) Yolo Egg and Larval Evaluation SOP – 3/11/2015
m) Lower Trophic Sampling SOP – 4/5/2012

3. Who were the authors of the previous document?

   Yolo Egg and Larval Evaluation SOP – Jared Frantizch

   Lower Trophic Sampling SOP - Jared Frantizch

4. Evaluate the quality of the document.

   The information contained in the two SOP's are of moderate quality. There is important information, however, both documents are incomplete and lacking step-by-step procedures to perform the egg and larval sampling. A new SOP document is needed, and updates are required. The egg and larval SOP will be part of the larger Lower Trophic SOP.

5. What edits were made, if any?

   An individual SOP is being created as part of this review and can be found here: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/E%26L/SOP/LT_Egg%26Larval_SOP_revisions.docx?d=wb82b55a289dd40e8a740bbe97b62a2df&csf=1&web=1&e=N7RZAH

# Review Narrative for: Egg and Larval Sampling Safety

[Started 4/6/2020; complete 6/17/2020]

[Craig Stuart; Mallory Bedwell, Naoaki Ikemiyagi]

Yolo Bypass:\Safety\Safety Plans & Tailgates\Yolo Bypass \Yolo Bypass Tailgate Safety Meeting_LowerTrophicSampling-151915.docx

Yolo Bypass:\Safety\Job Hazard Analyses\9720 - Yolo Bypass Lower Trophic Sampling.pdf

Yolo Bypass:\Safety\Standard procedures\SP_Lower Trophic Sampling.pdf

## General Description

The safety information for the egg and larval sampling is provided under the general lower trophic safety protocols. These safety guidelines are to ensure DWR personnel are following the most appropriate actions to perform sampling events with the least amount of risk. Safety documents should provide mitigations for any risks that one may face during sampling.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Yolo Bypass Tailgate Safety Meeting_LowerTrophicSampling-151915.docx – 12/3/2015

   9720 - Yolo Bypass Lower Trophic Sampling.pdf – Job Hazard Analyses – 12/3/2015

   SP_Lower Trophic Sampling.pdf – Standard Procedure (SP) – 7/29/2019

3. Who were the authors of the previous document?

   Yolo Bypass Tailgate Safety Meeting_LowerTrophicSampling-151915.docx – Brian Mahardja

   9720 - Yolo Bypass Lower Trophic Sampling.pdf – Job Hazard Analyses - unknown

   SP_Lower Trophic Sampling.pdf – Standard Procedure (SP) - Anji Shakya

4. Evaluate the quality of the document.

   The quality of the safety documentation is good. There are multiple documents that are up to the departments safety compliance protocols

and cover the major safety concerns with egg and larval sampling. The only document that needs to be updated is the tailgate safety document.

5. What edits were made, if any?

   NA

## Recommendations for improvements

- The metadata file needs to be updated with the most recent updates to sampling frequency and year-round sample changes to SHERWOOD.
- The objectives and goals of the Egg and Larval catch need to be reassessed. If we are no longer collecting egg and larval data from the Sacramento River, then we cannot really say that we collect comparison data anymore. I think in the Phase 2 of the review, we will need to address this.
- Field photos for SOP clarification
- Determine the standard for the egg and larval sampling name. Name needs to be consistent throughout documents. It has been referenced as "fish egg and larval", fish larvae and egg", and "egg and larval"
- A video SOP/training.

# Zooplankton

## General Description/Narrative

Fixed zooplankton nets (150 micron and 50 micron mesh) are used to collect zooplankton samples from the Yolo Bypass at the base of the Toe Drain and the Sacramento River at Sherwood Harbor. Both plankton nets have a 0.50 m diameter outer mouth and are 2 meters in length. They taper to 0.076 m at the cod-end where a polyethylene jar screened with the corresponding mesh size collects the organisms. A General Oceanics Model 2030R flowmeter is mounted inside each net mouth. Samples are collected on an ebb tide, either on a biweekly or weekly basis (during floodplain inundation). In the Yolo Bypass, nets are deployed year-round from the rotary screw trap, which is anchored in the middle of the Toe Drain channel. At the Sacramento River site, nets are deployed dockside during periods of higher flows (typically January-June), and from a boat at 2-3 mph when downstream flows are insufficient (e.g. <2 fps, typically July-December). The 150 micron net is fished for 5 minutes, and the 50 micron net is fished for 2 minutes, though sampling times may be shortened when high levels of debris interfere with sample collection. Tow times are recorded with each sampling event. Samples are washed down with deionized water and

preserved in 10% Formalin with Rose Bengal dye to aid in separating organisms from detritus and algae. After fixing for at least two weeks, zooplankton samples are concentrated and retained in the laboratory by pouring them through a sieve screened with 106 micron mesh wire. The sample is transferred to 8% Lugol's before delivery to contractor for taxonomic identification and enumeration.

## Accounting of Current Practices

### 1. Metadata

- EDI Metadata: https://portal.edirepository.org/nis/mapbrowse?scope=edi&identifier=494
- YOLO BYPASS DATA:\Metadata\YBFMP_Stations_Coordinates_Info_20200716.xlsx
- YOLO BYPASS DATA:\Metadata\Contractor_record_20200511.xlsx

### 2. SOP

- LowerTrophicSampling_SOP.docx

### 3. Research questions

The goals of the zooplankton monitoring program are to compare the seasonal variation in species densities and trends between (1) the Sacramento River channel, and (2) the Yolo Bypass, the river's seasonal floodplain. Data on zooplankton catch and associated water quality parameters are presented in this dataset.

[Research questions are listed in Zooplankton_MetaData_Final_Dec2015.docs and included in the most recent metadata document]

### 4. Safety

- Standard procedures (SPs) do exist in the safety folder for all of lower trophic sampling.
- SP_Lower Trophic Sampling.pdf

### 5. QA/QC

These procedures are listed in the metadata documents:

- *Calibrations*:
  YSIs are calibrated for pH, turbidity, dissolved oxygen (DO), and electrical conductivity (EC) monthly. pH is also checked every 2

weeks after calibration to ensure the measurement is not drifting. Percent dissolved oxygen is also calibrated daily to local barometric pressure before use in the field.

- *Sample Identification Quality Control*
  Contractors re-identify 10% of samples to ensure 90% similarity.
- *Data Quality Control*
  Four levels of quality control are conducted on data:
  - Field data are checked by someone other than the data recorder prior to leaving each field site,
  - Datasheets are checked while being entered into the Microsoft Access database, which has customized error-checking and data validation checks, (these will be replaced by new checks in the new WISKI database)
  - A separate DWR staff member compares data from original field sheets to data entered into the database,
  - Data are examined and visualized in R to look for outliers by station, year, and month. Values that are out of range are flagged, and select values are modified and/or re-calculated (see table below for more information). Water quality data are overlaid on real-time sonde data from Lisbon (data obtained from the California Data Exchange Center or CDEC) to ensure values are within range.
    - PQC: Physical data outliers/errors are flagged, and incorrectly entered values are modified.
    - QC1: Flowmeter difference values are filtered and flagged for exceedingly high and low values. Select values are re-calculated.
    - QC2: Samples with comments indicating poor sample collection are flagged (see table for more details)
    - QC3: CPUE values are filtered and flagged for exceedingly high values (see table for more details). Select values are re-calculated. See EDI metadata for more specific information about flags and QAQC.

## 6. Training

- Specific training documents do not exist, but several SOPs outline sampling, sample transfers, sample transport, and egg and larval evaluation

## 7. Sampling flowcharts?

- None (see recommendations)

8. SOP videos?

- none

9. Changes over time

There is not currently a mechanism for recording changes as they occur. There is scattered information in the metadata documents, and Cat has found some contract documentation to better flesh out contractor history (see Contractor.record.xlsx), but there is still some missing information.

Currently, some historical documentation links include:

- EDI Metadata has a historical changes section on changes to sample methods, sample gear, lab procedures, and contractors: https://portal.edirepository.org/nis/mapbrowse?scope=edi&identifier=494
- Details on all Yolo stations:
  - YOLO BYPASS DATA:\Metadata\YBFMP_Stations_Coordinates_Info_20200716.xlsx
- Details on contractor history for lower trophic data:
  - YOLO BYPASS DATA:\Metadata\Contractor_record_20200511.xlsx

10. COCs

Samples are tracked on an excel spreadsheet (addressed further in Sample Transfer EOR). A chain of custody (COC) listing sample number, date, time, location, type, and study/project is sent to contractors, who check that all samples are accounted for. Signatures are required of both the person responsible for sending the sample package, and the person receiving it.

- YOLO BYPASS/Contracts/Lower Trophic Contracts/2018-2021_Yolo Lower Trophic Contracts/BSA_Phyto and Zoop_2018-2021/COC & Invoices

11. Other Documents Relevant to Current Operations

N/A

## Evaluations of Documentation

Review Narrative for: Zooplankton Metadata

[Review started: 4/28/2020; Completed 6/17/2020]

[Catarina Pien, Mallory Bedwell, Jesse Adams]

Yolo Bypass Data:\Environmental Data Initiative\Zooplankton_2020\Files Used to Publish\Metadata\Metadata_EDI_Zooplankton_2020-04-04_FINAL.docx

## General Description

The metadata for Zooplankton should describe the background of YBFMP, zooplankton sampling procedures, overall methods for the entire process of invertebrate data, from sample collection to data entry and QAQC to sample archiving. The metadata should also detail any historical changes in sampling and processing procedures, as well as contractors.

## Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Published in mid-April 2020 on EDI, with some minor updates for the internal review template in late April 2020.

3. Who were the authors of the previous document?

   Catarina Pien

4. Evaluate the quality of the document.

   This document is pretty comprehensive (with limitations on information that could not be found). It details updated QAQC procedures and historical information, which was not necessarily contained in previous versions of the metadata.

5. What edits were made, if any?

   Added some references and image of data sheet for the program metadata (compared to EDI metadata).

   https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Zooplankton/Metadata/Zooplankton_Metadata_Final_v1.0.docx?d=w705ad4cf0c014ec89c713caab173eb39&csf=1&web=1&e=1Hv04S

# Review Narrative for: Zooplankton Sampling SOP

[Review started: 4/28/2020; Completed 6/17/2020]

[Catarina Pien, Mallory Bedwell, Jesse Adams]

Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\zoop_drift_E&L_sample collection\Lower Trophic Sampling SOP.docx

## General Description

The SOP for zooplankton sampling should describe the step by step methods for taking a zooplankton samples using both net sizes. It should also cover the hazards associated with this method.

## Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   2011. Updated infrequently

3. Who were the authors of the previous document?

   Unknown. Jared Frantzich?

4. Evaluate the quality of the document.

   Document is vague and lacks step by step methods. Lacks information about 50 micron net.

5. What edits were made, if any?

   No changes made to this document because a new Zooplankton SOP was created as part of this review:

   https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Zooplankton/Standard%20Operating%20Procedures/ZooplanktonSampling_SOP_revisions.docx?d=wdd868ad0be82498a8bebb9482048e03c&csf=1&web=1&e=gWUzuj

# Review Narrative for Zooplankton section of Lower Trophic Sampling SP

[Review started: 8/3/2020; Completed 6/17/2020]

[Mallory Bedwell, Catarina Pien, Jesse Adams]

https://cawater.sharepoint.com/:b:/r/sites/dwrdoc-aes/Shared%20Documents/Yolo%20Bypass%20Drive/SP_Safety/Standard%20Procedures/SP_Lower%20Trophic%20Sampling.pdf?csf=1&web=1&e=Zli3P5

## General Description

The SP for Lower Trophic Sampling evaluates the hazards for each step of collecting a zooplankton sample from travel to the site, collecting the sample, and processing.

## Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Created in 2019. Hasn't been updated since.

3. Who were the authors of the previous document?

   Anji Shakya

4. Evaluate the quality of the document.

   Document is broad to cover all aspects of lower trophic sampling and water quality grabs. But it does go over the hazard associated with collecting a zooplankton sample, though it is not explicit that the step is related to zooplankton sampling.

5. What edits were made, if any?

   none

# Recommendations for improvements

- Keep better track of both significant and insignificant changes to any process – data collection, database, data entry, QAQC, staff in the section, contractor language – to be able to create better metadata.

Create a document that is accessible to all staff, and include any significant changes in annually-updated metadata.

- Add details to LT SOP about data entry
- Get flowmeter guidance from flowmeter group once they have finished coming up with recommendations (also add guidance to QA/QC review)
- Edit some of the folder structure for contracts.
- Flowcharts would be helpful for some sampling procedures where protocols might change depending on circumstances. These could be incorporated into a current SOP.
    - These should be created for sampling consistency portion of QA/QC, but flow charts should be incorporated into LT SOP
        - Sampling from dock vs boat?
        - When to change flow meter rotors?
        - Decreased tow times
- Standardize sampling side/ cleat for each net and add to SOP
    - STTD
    - Boat

# Phytoplankton

## General Description/Narrative

The Yolo Bypass Field Monitoring Program (YBFMP) conducts bi-weekly lower trophic sampling at 3 sites around the Yolo Bypass: Lisbon Weir (LIS), Screw Trap on the Toe Drain (STTD), and Sherwood Harbor on the Sacramento River (SHR). At each of these sites, sample water is collected in Nalgene bottles, placed on ice, and brought back to the lab for processing. The water from each site is homogenized and then processed. A subsample of this water is poured into a 50 mL amber glass bottle with Lugol's solution to preserve phytoplankton. The phytoplankton sample bottles are then sent to a contractor for identification and enumeration.

## Accounting of Current Practices

1. Metadata

There are no metadata files specific to YBFMP phytoplankton. There is a file 'phytoplankton MetaData_EMP_TBrown.doc' titled "IEP Bay-Delta Monitoring and Analysis Section
Phytoplankton Meta Data" on the yolo data shared drive which could be used for reference, however, some of the methods are not the same as those for YBFMP.

2. SOP

- NonFltr_SOP.docx**. -** This document will be evaluated then edited to reflect just the phyto section of non-filtered water quality.

3. Research questions

As paraphrased from the document, Metadata for the Yolo Bypass Aquatic Ecology Study (Last updated 2004): [To] collect baseline data on phytoplankton in Yolo Bypass, a net source of phytoplankton to the SFE food web. (also added to revised SOP)

4. Safety

Gloves should be worn when collecting water in the field and in the lab when pouring samples into glass collection bottles. Collection bottles contain Lugol's solution (iodine), so be cautious not to overfill bottle.

5. QA/QC

For BSA's internal QA/QC procedures, please read "2017 BSA DATA QAQC QAPP Phytoplankton excerpt". Most QA/QC procedures for phytoplankton are conducted by the contractor to ensure that equipment, reagents, and counts are consistent. All organism IDs are confirmed by a second taxonomist and 10% of samples are randomly selected for checking counts, to make sure that identifications are 90% similar.

Currently, YBFMP does not have any QA/QC procedures for the phytoplankton data. The only record of what has been analyzed is the COC documentation.

6. Training

Combine with WQ sampling training/ LT sampling training

7. Sampling flowcharts?

None. See recommendations

8. SOP videos?

None.

9. Changes over time - Jesse

None that is currently documented.

10. COCs - Mallory

Chain of Custody documents (COCs) are located in the corresponding contract folder (currently BSA). There is a Working folder, for COCs that

have not been sent yet and are being updated with samples, and a Final folder, which contains COCs that have been sent to the contractor. On the COC, which also keeps track of zooplankton samples, different tabs maintain lists of samples:

- that have been taken
- when a sample has been transferred to it's final container for shipping
- once it's ready to be shipped, added to the COC tab that will be printed and sent to the contractor.

11. Other Documents Relevant to Current Operations - Amanda

## Evaluations of Documentation

### Review Narrative for: Phytoplankton SOP

[started: 4/14/2020, completed: 5/12/2020]

[Amanda Casby]

"Yolo Bypass:\YB_Standard Operating Procedures\Water Quality\Non Filtered Water SOP.docx"

#### General Description

The phytoplankton standard operating procedure is used to inform personnel of the correct way to create a phytoplankton sample. This document creates a standard to follow to avoid discrepancies between different individuals doing the sampling. This document also works for a training document if an individual has not done a phytoplankton sample before, this document should guide them through the process from start to finish.

#### Evaluation

1. Does this document exist?

   Yes. There is a non filter SOP which contains a breif section about phyto

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   There is no date listed on this document of when it was last updated. 8/13/2014 is the most recent saved date on the shared drive.

3. Who were the authors of the previous document?

   Unknown. No listed authors anywhere on the document.

4. Evaluate the quality of the document.

   This document is poor quality. The document is missing a lot of information in the methods including where the water comes from, how to label the bottles, how to prep the bottles, where to store the bottles, and why phytoplankton sampling is done. The format is not up to date with the current SOP template, and no authors or contributors are listed.

5. What edits were made, if any?
   - Equipment list added
   - Methods elaborated on
   - Formatting updated to match SOP template
   - Authors/contributors list started.

Revised SOP: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Phyto/Phyto_SOP_revisions.docx?d=wfef8d331ff9a4fa9bc46f3d16c9fa88a&csf=1&web=1&e=zOOLAm

## Recommendations for improvements

- A flowchart could be added to the SOP to detail decision making when sampling different conditions and show a general order of operations
- Not sure if a stand-alone metadata document for phytoplankton is needed, maybe, or a place to document changes over time could be included in a metadata document for water quality
- Photos could be added to the SOP but it is not necessarily needed.
- Use COCs to compare against data received and track that all samples have been analyzed
- Use COCs to help create archive inventory for when samples are shipped back (also put in archiving group)
- Compare newest data received from contractor to historical data to QC for species comparisons/ trends

# Water Quality

## General Description/Narrative

The water quality (WQ) element of the YBFMP is divided into two sections; 1) Discrete and Continuous environmental monitoring, and 2) nutrient and chlorophyll water sample analysis.

Discrete WQ measurements are taken using a YSI ProDSS outfitted with dissolved oxygen (DO), pH, conductivity, temperature, and turbidity probes.

We currently have 3 YSI ProDSSs that we rotate into the field. ProDSSs are calibrated monthly according to the QA/QC committee calibration SOP. DO is calibrated daily before use. pH is checked 2 weeks after calibration to ensure it is not drifting. Continuous measurements are taken using a YSI Exo2 sonde outfitted with DO, pH, conductivity, temperature, turbidity, chlorophyll, and fDOM. Before 2019, YBFMP used YSI 6600 sondes but then switched to Exo2s that had been purchased for the North Delta Flow Action (NDFA). Up until 2020, sondes were installed at the screw trap (STTD) and at Lisbon Weir (LIS) and were maintained by AES. In 2020, we entered into a resource agreement with NCRO to maintain the LIS sonde and discontinue the installation of the STTD sonde, except for periods during the NDFA. Sondes are changed out monthly, unless the site is unreachable due to inundation. Before deployment, the new sonde and a verification sonde are calibrated within 48 hours. At the site, an arrival reading is taken with the new sonde. The old sonde is removed and then a dirty reading and clean reading are taken against the verification sonde. Drift measurements are taken in the lab with the old sonde within 24 hours of return. Continuous data is downloaded from the sonde and then uploaded to Hydstra. Data is then visually QC'd for outliers. Several HOBO temperature loggers are also deployed in the field year-round. Data is periodically downloaded and saved to the YOLO DATA drive. All instruments with thermometers (ProDSSs, Exo2s, and HOBOS) go through annual thermometer accuracy verification (TAV) which is also outlined in the QA/QC element of review.

The nutrient and chlorophyll sample collection and analysis of the WQ element falls under the YBFMP's lower trophic sampling component. Nutrient and chlorophyll samples are collected in the field, filtered in the lab, and sent to DWR's Bryte Laboratory (Bryte) for analysis. Levels of chlorophyll-a, pheophytin-a, and other nutrients in the water at the time the samples are collected are analyzed. WQ samples are typically collected biweekly following the lower trophic sampling schedule (and weekly during times of high flows or inundation). Surface water samples are collected in four pre-labeled 1-liter Nalgene bottles at our lower trophic sampling sites: Screw Trap on the Toe Drain (STTD), Lisbon Weir (LIS), and the Sacramento River at Sherwood Harbor (SHR). Water samples are immediately placed on ice and transported back to the West Sacramento office to be filtered. Water samples are filtered through a nutrient and chlorophyll procedure and collected in pre-labeled bottles for analysis by the Bryte. The Field and Laboratory Information Management System (FLIMS) database is used to coordinate sample processing and analysis between the YBFMP and Bryte. Prior to collecting nutrient and chlorophyll samples, a run submittal for the week's sampling

event is created in FLIMS. Labels are printed out on waterproof paper and bottles are prepped for sample collection and filtration. Once nutrient and chlorophyll samples have been properly filtered into their respective bottles, a Chain of Custody (COC) is produced from the FLIMS run submittal for the proper handoff of samples. After samples have been analyzed, Bryte will send a copy of the results and chlorophyll data will be entered electronically on the Lower Trophic Access Database. Bryte will enter the nutrient data results on the water data library (http://wdl.water.ca.gov/waterdatalibrary/).

## Accounting of Current Practices

### 1. Metadata

a) Water Quality:
- Chlorophyll Metadata.xls
- Plan_Submittal Containers.xlsx
- SOP WQ Sample Collection for Laboratory Analysis Final.pdf (Metadata Section)
- YBFMP_Stations_Coordinates_Info.xlsx

b) Continuous/Discrete measurements of Environmental Conditions:

None

- Raw continuous data is currently stored on YOLO BYPASS DATA\YSI Continuous Data. Data is then uploaded into Hydstra where it goes through a visual QC.
- Discrete data is stored alongside the sampling program it was measured for (fish or lower trophic) and would be stored in that respective database.

### 2. SOP

a) Water Quality:
- SOP WQ Sample Collection for Laboratory Analysis Final.pdf
- Standard Operating Procedures for the Collection and Filtration of Chlorophyll Samples.docx
- AES_YBFMP field to lab manual_DRAFT_12.19.19.docx – pg. 15-16
- Saturated Magnesium Carbonate Solution.docx
- churn splitter and blank SOP.docx
- NonFltr_SOP.docx
- YBFMP_LT_Bottle Prep and Post Fieldwork SOP.docx

b) Continuous/Discrete measurements of Environmental Conditions:
- YSI ProDSS Handheld SOP_120616update.docx

- YSI ProODO_SOP.docx
- YSI Pro DSS calibration cheat sheet_V3.docx

3. Research questions

None documented – recommendation made

4. Safety

SOP WQ Sample Collection for Laboratory Analysis Final.pdf – Section 4

5. QA/QC

SOP WQ Sample Collection for Laboratory Analysis Final.pdf – Section 9

6. Training

There is no formal training for ProDSS or sonde calibration. New staff that are brought on board receive training from an experienced crew member. Usually, staff watch and take notes while the experienced crew member performs the calibration. Then on the next occasion, the experience crew member watches the new staff calibrate.

Currently, there is no formal training for the nutrient and chlorophyll sample collection or filtration. Normally, an experienced field crew member will demonstrate the proper collection methods in the field and the filtration methods in the lab. Once personnel have practiced multiple times, they are cleared to collect and filter water quality samples.

There is no formal training for the bottle prep and FLIMS procedures. The SOP's should provide sufficient information for properly conducting all tasks for these procedures.

7. Sampling flowcharts?

No sampling flowchart for chlorophyll and nutrient sampling exists but would be helpful to have in the future

8. SOP videos?

No SOP videos for chlorophyll and nutrient sampling exists but would be helpful for training purposes.

9. Changes over time

Bryte notes on filtering issues.docx – documents issues that have occurred and changes to the filtering protocol that were verbally communicated from Bryte with chlorophyll and nutrient sampling.

### 10. COCs

A standard Chain of Custody (COC) form is derived from the FLIMS database. COC's are filled out and signed by a member from the YBFMP and Bryte Laboratory. A copy is digitized and saved in the Yolo Bypass Data Shared Drive by year (Yolo Bypass Data:\Yolo Environmental Data\Bryte\COCs).

### 11. Other Documents Relevant to Current Operations

Hard copies of calibration records, field records, and drift checks for the YSI ProDSSs and Exo2s are located in labeled binders in Mallory's cube.

## Evaluations of Documentation

### Review Narrative for: Nutrient and Chlorophyll Metadata

[started 5/15/2020; completed 8/18/2020]

[Craig Stuart]

Yolo Bypass:\Protocols & Instrument Manuals\Water Quality\SOP WQ Sample Collection for Laboratory Analysis Final.pdf

Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\Chlorophyll\Chlorophyll Metadata.xls

Yolo Bypass:\Protocols & Instrument Manuals\Water Quality\Plan_Submittal Containers.xlsx

Yolo Bypass:\Metadata\YBFMP_Stations_Coordinates_Info.xlsx

#### General Description

The metadata for the nutrient and chlorophyll sample collection of the water quality element should describe the purpose and background, the sampling site locations, contract information, chlorophyll and nutrient analysis, and QAQC protocols. The metadata should also document any changes that have occurred to the collection or filtration methods.

#### Evaluation

1. Does this document exist?

   Yes, metadata for nutrient and chlorophyll sampling is detailed in multiple documents. The more general information is documented in the SOP WQ Sample Collection for Laboratory Analysis Final.pdf however, the rest of the documents (Chlorophyll Metadata.xls and

YBFMP_Stations_Coordinates_Info.xlsx) details the metadata of the chlorophyll filtering and sample site locations for the YBFMP.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Chlorophyll Metadata.xls – 1/23/2020

   Plan_Submittal Containers.xlsx – 8/31/2014

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf – 1/1/2019

   YBFMP_Stations_Coordinates_Info.xlsx – 01/2020

3. Who were the authors of the previous document?

   Chlorophyll Metadata.xls – Scott Waller (EMP)

   Plan_Submittal Containers.xlsx – Jared Frantzich

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf – QA Committee

   YBFMP_Stations_Coordinates_Info.xlsx – Cat Pien (AES)

4. Evaluate the quality of the document.

   All the documents combined support good quality information about the nutrient and chlorophyll metadata. Beside the lack of program-specific study questions, the current metadata provides information on the history and purpose, nutrient and chlorophyll element analysis, site coordinates, and QAQC protocols.

5. What edits were made, if any?

   No edits were made because the SOP WQ Sample Collection for Laboratory Analysis document is from the QA Committee and updates/edits are determined by them.

## Review Narrative for: Nutrient and Chlorophyll SOP

[started 5/15/2020; completed 8/18/2020]

[Craig Stuart]

Yolo Bypass:\Protocols & Instrument Manuals\Water Quality\SOP WQ Sample Collection for Laboratory Analysis Final.pdf

Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\Chlorophyll\Standard Operating Procedures for the Collection and Filtration of Chlorophyll Samples.

Yolo Bypass:\Protocols & Instrument Manuals\AES_YBFMP field to lab manual_DRAFT_12.19.19.docx – pg. 15-16

Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\Chlorophyll\Standard Saturated Magnesium Carbonate Solution.docx

Yolo Bypass:\Protocols & Instrument Manuals\Water Quality\churn splitter and blank SOP.docx

Yolo Bypass:\Protocols & Instrument Manuals\Water Quality\NonFltr_SOP.docx

Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\YBFMP_LT_Bottle Prep and Post Fieldwork SOP.docx

## General Description

The standard operating procedures of the nutrient and chlorophyll sample collection of the water quality element should include a step-by-step guide on how to properly and effectively perform the collection, filtration, and analysis of nutrient and chlorophyll samples. As a section, we have adopted the QA Committee's WQ SOP that is approved for use by the department. For this review, the older SOP's for this task will not be updated but will be archived. The SOPs for this section also include detailed steps for creating a run on FLIMS, prepping bottle for sample collection and filtration, and data entry into the lower trophic Access database. These guides are to be followed the same way, every time so long as safety conditions allow. A new or unfamiliar employee should be able to read through it and feel comfortable in their ability to perform each procedure with the guidance from an experienced crew member.

## Evaluation

1. Does this document exist?

   Yes. There are multiple SOP involved in the nutrient and chlorophyll sample collection. The more specific procedures are documented in the SOP WQ Sample Collection for Laboratory Analysis Final.pdf however, the SOPs for FILMS, bottle prep, and data entry also provide steps for completing this task.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf – 1/1/2019

   Standard Operating Procedures for the Collection and Filtration of Chlorophyll Samples.docx – 1/23/2020

   AES_YBFMP field to lab manual_DRAFT_12.19.19.docx (pg. 15-16) – 4/10/2020

   Saturated Magnesium Carbonate Solution.docx – 1/23/2020

   churn splitter and blank SOP.docx – 10/31/2019

   NonFltr_SOP.docx – 8/13/2014

   YBFMP_LT_Bottle Prep and Post Fieldwork SOP.docx – 7/12/2019

3. Who were the authors of the previous document?

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf – QA Committee

   Standard Operating Procedures for the Collection and Filtration of Chlorophyll Samples.docx – Craig Stuart

   AES_YBFMP field to lab manual_DRAFT_12.19.19.docx (pg. 15-16) Brittany Davis and Craig Stuart

   Saturated Magnesium Carbonate Solution.docx – Craig Stuart

   churn splitter and blank SOP.docx – Mallory Bedwell

   NonFltr_SOP.docx – Jared Frantzich

   YBFMP_LT_Bottle Prep and Post Fieldwork SOP.docx – Craig Stuart

4. Evaluate the quality of the document.

   The SOP information is in decent quality. The information is present but spread out on multiple individual documents. The nutrient and chlorophyll sampling procedures are complex and require multiple individual SOP's for review. However, the SOP information is sufficient for completing the task but a recommendation to consolidate SOP's is advised.

5. What edits were made, if any?

No revisions were made to any existing SOP documents. However, a new SOP for the chlorophyll and nutrient sampling process was created using the new SOP template and can be found here:

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Water%20Quality/Standard%20Operating%20Procedures/WQ_Field-SOP_2020.docx?d=w2004251ee8954ba781fb56852e50c2e3&csf=1&web=1&e=7iypIE

## Review Narrative for: Nutrient and Chlorophyll Safety

[started 5/15/2020; completed 8/18/2020]

[Craig Stuart]

Yolo Bypass:\Protocols & Instrument Manuals\Water Quality\SOP WQ Sample Collection for Laboratory Analysis Final.pdf (Section 4)

### General Description

The safety information for nutrient and chlorophyll sampling is provided in section 4 of the QA's WQ sample collection and laboratory analysis document. These safety guidelines are to ensure DWR personnel are following the most appropriate actions to perform sampling events with the least amount of risk. Safety documents should provide mitigations for any risks that one may face during sampling.

### Evaluation

1. Does this document exist?

   Yes. It is part of the larger SOP WQ document.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf (Section 4) – 1/19/2020

3. Who were the authors of the previous document?

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf (Section 4) – QA Committee

4. Evaluate the quality of the document.

The safety section (section 4) of this document addresses the major safety concerns around this sampling procedure. The quality of this document is good.

5. What edits were made, if any?

   No edits were made because this document is part of the QA committee program and they determine when updates/edits are made.

## Review Narrative for: Nutrient and Chlorophyll QAQC

[started 5/15/2020; completed 8/18/2020]

[Craig Stuart]

Yolo Bypass:\Protocols & Instrument Manuals\Water Quality\SOP WQ Sample Collection for Laboratory Analysis Final.pdf (Section 9)

### General Description

The QAQC information is documented in the quality control section (section 9) of the SOP WQ Sample Collection for Laboratory Analysis Final document, prepared by the QA Committee. This information provides a detailed list of ways to ensure samples and data are collected following the most error-free methods.

### Evaluation

1. Does this document exist?

   Yes. It is part of the larger SOP WQ document.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf (Section 9) – 1/19/2020

3. Who were the authors of the previous document?

   SOP WQ Sample Collection for Laboratory Analysis Final.pdf (Section 9) – QA Committee

4. Evaluate the quality of the document.

   The quality of the QAQC information is great. It details everything required by the QAQC protocols. It is easy to read and accessible in the shared drive.

5. What edits were made, if any?

No edits were made because this document is part of the QA committee program and they determine when updates/edits are made.

## Review Narrative for: continuous/discrete environmental measurement SOP

[Started 8/3/2020; Completed 8/18/2020]

[Mallory Bedwell]

Yolo Bypass\YB_Standard Operating Procedures\Water Quality\Archive\YSI ProDSS Handheld SOP_120616update.docx

Yolo Bypass\YB_Standard Operating Procedures\Water Quality\Archive\YSI ProODO_SOP.docx

Yolo Bypass\YB_Instrument Manuals & Maintenance\YSI ProDSS\YSI Pro DSS calibration cheat sheet_V3.docx

### General Description

Currently documentation exists for the calibration of YSI ProDSSs, which are used for discrete environmental measurements. This SOP is similar to the calibration of YSI 6 series and Exo2 sondes, with some modification for additional probes and the presence of wipers. The QA committee is currently developing and in the process of approving a department wide SOP for the calibration of continuous instruments, which should be incorporated and utilized by our group after approval.

We currently do not have an SOP for using Exo2 sondes for taking environmental measurements. A field operation section in the YSI ProDSS Handheld SOP_120616update.docx details how to use the ProDSS. These steps should be added to each of the respective sampling programs SOPs once created (fish and lower trophic).

### Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

YSI ProDSS Handheld SOP_120616update.docx - 2016

YSI ProODO_SOP.docx -2015

YSI Pro DSS calibration cheat sheet_V3.docx-2020

3. Who were the authors of the previous document?

YSI ProDSS Handheld SOP_120616update.docx – Jared Frantzich

YSI ProODO_SOP.docx - Jared Frantzich

YSI Pro DSS calibration cheat sheet_V3.docx- Mallory Bedwell

4. Evaluate the quality of the document.

YSI ProDSS Handheld SOP_120616update.docx – details the buttons on the YSI ProDSS, how to operate in the field, and how to charge the battery. Good foundation for new discrete measurement SOP

YSI ProODO_SOP.docx – details daily calibration of DO probe before field work. This is what we currently have in the DO binder in the cage.

YSI Pro DSS calibration cheat sheet_V3.docx- details in step by step way how to calibrate a YSI ProDSS. Details should be added about bi weekly pH drift checks.

5. What edits were made, if any?

   NA

## Recommendations for improvements

- add gloves to SOP when sampling water and filtering in the lab
- create a single metadata document with combined metadata information for discrete and continuous WQ monitoring and chlorophyll and nutrient WQ monitoring from this review.
- Update research questions to reflect WQ objective for each discrete and continuous and chlorophyll and nutrients sections of the WQ element.
- add HOBO to metadata document
- Reorganize the Water Quality and Lower Trophic Sampling folders to more accurately reflect the sampling processes within.
- Archive the Plan  Submittal Containers.xlsx document since metadata for this is covered in the QA committee WQ document. Chlorophyll Metadata.xls and YBFMP_Stations_Coordinates_Info.xlsx documents are specific to YBFMP and should be kept active.
- Archive the Standard Operating Procedures for the Collection and Filtration of Chlorophyll Samples, Standard Saturated Magnesium Carbonate Solution, churn splitter and blank SOP since these SOP's are documented in the QA Committee SOP document. The NonFltr_SOP.docx, YBFMP_LT_Bottle Prep and Post Fieldwork

SOP.docx, and Lower Trophic Data Entry SOP.docx are specific to the YBFMP and should be kept active.
- Move YSI Pro DSS calibration cheat sheet_V3.docx from instrument manuals and maintenance folder to SOP folder

# Drift Invertebrate

## General Description/Narrative

An aquatic drift net is used to capture aquatic insects, aquatic non-insects, terrestrial insects, and terrestrial non-insects. The drift net is 0.91m long, made of 500-micron mesh, with a 0.46m x 0.3m rectangular mouth that is harnessed to a floated stainless-steel frame. One buoy is placed along each vertical side of the net to keep approximately one third of the net mouth above the surface of the water. The net tapers to 0.076 m at the cod-end where a polyethylene jar screened with 500-micron mesh collects organisms. When there is sufficient flow (typically from January – June), Toe Drain samples are collected during the ebb tide from the rotary screw trap anchored in the middle of the channel, and Sacramento River/Sherwood Harbor samples are taken dockside. In the absence of sufficient downstream flow, (typically from July-November) Sacramento River and Yolo Bypass samples are taken from a boat moving approximately 1-2 mph upstream near the screw trap or dock.  Net tow times have varied through the years, with shorter tows occurring with high flows and/or debris loads. Generally, tows have been 10 minutes long, and tow times are recorded with every sampling event. Flows are measured using a General Oceanics 2030R

Flowmeter that is attached to a concurrently taken ichthyoplankton sample. All samples are preserved in in the field with 10% formalin with Rose Bengal dye to aid in separating organisms from detritus and algae. After fixing for at least two weeks, samples are concentrated and retained in the laboratory by rinsing samples through a 250-micron mesh sieve. The sample is transferred to 70% EtOH before delivery to contractor for taxonomic identification and enumeration.

## Accounting of Current Practices

### 1. Metadata

- "\\cnrastore-des\DESSRV20\M & A Branch Data\Yolo Bypass\YOLO BYPASS DATA\Metadata & QA-QC\Metadata NOT on EDI\InvertDrift_MetaData_Final_Aug2016.docx"
- YOLO BYPASS DATA/Metadata/YBFMP_Stations_Coordinates_Info.xlsx

## 2. SOP

- "Y:\Protocols & Instrument Manuals\Lower Trophic" Sampling\zoop_drift_E&L_sample collection\Lower Trophic Sampling SOP.docx"
    - Lower Trophic Sampling SOP: This SOP is for all of lower trophic sampling. It contains a small section about drift but is not extensive or individual
- "Y:\Protocols & Instrument Manuals\AES_YBFMP field to lab" manual_DRAFT_103119.docx"
    - The field manual provides the same information as the SOP just compiled with other sampling efforts as well.

## 3. Research questions

- What aquatic invertebrates are present in the Yolo Bypass and Sacramento River?
- How do the Sacramento River and Yolo Bypass's invertebrate communities differ?
- Do invertebrate communities in the Sacramento River and Yolo Bypass change over time, water year, and/or season?

*Research questions obtained from the metadata document.

## 4. Safety

- "Yolo Bypass:\Safety\Safety Plans & Tailgates\Yolo Bypass\Yolo Bypass Tailgate Safety Meeting_LowerTrophicSampling-151915.docx"

The tailgate safety meeting document could use some updating. However, I don't know if it's important to have a specific Drift document, I think having it applicable to all of LT and then being sure to include more safety notes in the SOP would be sufficient.

## 5. QA/QC

The QA/QC process for Drift (or lower trophic in general) is listed in the metadata document for Drift, however it needs to be updated and it should be added to the SOP.

Field data are collected and recorded onto datasheets by DWR personnel. At the end of a day of sampling, these datasheets are check by someone other than the recorder who was on the field crew to assure that all sections are complete and accurate. These data are then entered by DWR personnel into the AES Lower Trophic Access database. Afterwards, another DWR personnel will compare what was entered into the Access

database to the datasheet to check for accuracy and completeness. Paper datasheets are then digitized and archived in binders that are stored at the West Sacramento, Industrial Blvd. DWR office. When taxonomic results are received via email from the contractor, the results are printed, then entered by DWR personnel into the AES Lower Trophic Access database. Afterwards, another DWR personnel will compare what was entered into the Access database to the results sheet to check for accuracy and completeness. Electronic copies of results for taxonomic analyses are archived on DWR/AES Network drives. Hard copies are printed and archived in binders at the West Sacramento, Industrial Blvd. DWR office.

6. Training

There is no formal training in place for drift invertebrate/lower trophic sampling. Currently, informal training for all portions of the Drift sampling process are given as needed. Experienced staff demonstrate how drift samples are taken; once the trainee feels ready, they collect the sample with supervision, then without supervision. Currently the SOP is not sufficient to be used by someone with no experience.

7. Sampling flowcharts?

None

8. SOP videos?

None, might be good to make

9. Changes over time

Early in the monitoring program, sampling was generally conducted once monthly from February-April. Beginning in 2001, sampling was conducted at least once monthly during January-June. In some years, sampling was conducted weekly during the inundation and draining of the Yolo Bypass floodplain. Since 2011, sampling is conducted biweekly (every other week) year-round and weekly during floodplain inundation and drainage events. *This is outlined in the metadata.

10. COCs

- "Y:\Contracts\Lower Trophic Contracts\2018-2021_Yolo Lower Trophic Contracts\BSA_Phyto and Zoop_2018-2021\CoC & Invoices\COC\2020\Working\Phyto_Zoop_sample list for shipping_COC_template.xlsx"

Since the drift samples are sent to a contractor for analysis, a COC is necessary. There is a COC template for this, a working version for the most recent sample shipment, and all saved final versions.

11. Other Documents Relevant to Current Operations

N/A

## Evaluations of Documentation

### Review Narrative for: Invertebrate Drift Lower Trophic Sampling SOP

[started: 3/30/2020 completed: 4/24/2020]

[Amanda Casby, Cat Pien, and Jesse Adams]

"Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\zoop_drift_E&L_sample collection\Lower Trophic Sampling SOP.docx"

#### General Description

The Standard Operating Procedure for Invertebrate Drift Lower Trophic Sampling should thoroughly describe the step-by-step process of collecting a drift sample. Steps should be detailed enough to allow a novice to perform the task with only basic training. The level of detail should also be sufficient to ensure consistency of sampling between crews.

#### Evaluation

1. Does this document exist?

   Yes. There is a lower trophic sampling SOP however, it has very little detail about physically collecting the drift sample.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   4/5/2012 - It is not frequently updated because some of the information is incorrect based on current methods. Also, it is not clear what edits or revisions were made on this date or who it was done by.

3. Who were the authors of the previous document?

   Jared Frantzich is the only person listed as an author on this document.

4. Evaluate the quality of the document.

The drift sampling portion of the lower trophic sampling SOP is currently very poor quality. The document will need to be edited to fit the SOP template for clarity and organization. Some details will need to be added to the document such as equipment list and more expansive methods. These changes should greatly increase the quality of the document and accomplish to goals of the SOP.

5. What edits were made, if any?

   The document LowerTrophicSampling_SOP_revisions was created and contains Drift revisions in Appendix A. This document follows the SOP template. Portions of the drift section from the original Lower Trophic Sampling SOP were incorporated into this document. An equipment list and a more detailed description of the methods was added. A list of collaborators was also added to the end of the document.

   LowerTropicSamlpling_SOP_revisions:

   https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Lower%20Trophic%20Combined%20Documents/LowerTrophicSampling_SOP_revisions.docx?d=w468d210b7e824b91859164856d1bce51&csf=1&web=1&e=4g0Vg8

   Appendix A: Drift

   https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Lower%20Trophic%20Combined%20Documents/InvertDrift_SOP_original.docx?d=we6d93a3b845e4007bb45315cb5a15cd8&csf=1&web=1&e=s9TwT6

## Review Narrative for: Invertebrate Drift Metadata

[started: 4/22/2020 completed: 4/24/2020]

Catarina Pien]

"\\cnrastore-des\DESSRV20\M & A Branch Data\Yolo Bypass\YOLO BYPASS DATA\Metadata & QA-QC\Metadata NOT on EDI\InvertDrift_MetaData_Final_Aug2016.docx"

### General Description

The metadata for Invertebrate Drift should describe the background of YBFMP, drift invertebrate sampling, overall methods for the entire process

of invertebrate data, from sample collection to data entry and QAQC to sample archiving. The metadata should also detail any historical changes in sampling and processing procedures, as well as contractors.

### Evaluation

1. Does this document exist?

   Yes. There was an original version from 2016 (with small updates in 2019), and an updated version created for this review.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   The old version was primarily updated in 2016 (with small updates in 2019), and the updated version was updated 4/22/2020

3. Who were the authors of the previous document?

   Jared Frantzich (2016 version), Catarina Pien (2019 version), Catarina Pien (2020 version)

4. Evaluate the quality of the document.

   Old version needed updates. New version should be reviewed by some other staff. This version is designed to be streamlined for publication, so will need updates (QAQC procedures, data tables, script files) once the dataset is being published.

5. What edits were made, if any?

   Mostly updates to the layout of the document. Added some more information about historical contractors, staff, and other information from the template. Revised metadata can be found here:

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Main%20Activities/Drift/Metadata/InvertDrift_Metadata_NewTemplate_revisions.docx?d=w18da659788d841b9839ceda4b8edb319&csf=1&web=1&e=aFzyg4

## Recommendations for improvements

### SOP

- Add QAQC protocols to overall Lower Trophic SOP when documents are combined.

- Sampling flowchart would be useful to describe our on-the-fly and more pre-planned decisions regarding sampling
- Video SOP would be useful to show the setup of the nets, the distance from the cleat, how to check flowmeter and add water, how we set the net and get air bubbles out
    - E.g. when to use boat/land, number of minutes to set the net, flowmeter reading issues and when to redo the sample

### Metadata

- Not completely related to metadata, but we need to discuss the CPUE calculation. It is currently not accurate to what we are doing.
- Address whether or not to add COC form to metadata document.
- Do we want COC form in the document?
- How should we work with references?
- Do we want to include the extra EDI sections in the metadata?

# Listed Species Handling

## General Description/Narrative

The Yolo Bypass Fish Monitoring Program is capable of capturing certain listed species including: spring and winter run Chinook Salmon, Coho salmon, Delta Smelt, Longfin Smelt, Central Valley Steelhead, and Green Sturgeon. When these species are caught, special handling and sampling procedures take effect to minimize stress and collect useful information such as genetics, weight, and photos.

## Accounting of Current Practices

### 1, Metadata

None.

### 2. SOP

No specific SOP. However, two documents are currently used for listed species handling SOP:

- AES_YBFMP field to lab manual_DRAFT_12.19.19.docx (Section 1C/2C and 3C)
- 2020 genetic sampling and take cheat sheet.docx

### 3. Research questions

Research questions are listed in revised SOP

- What listed species are present in/pass through the Toe Drain? (main question)

- How are salmon growing in the bypass?
- Can we distinguish Delta, Longfin, and Wakasagi smelt apart based on morphological features?
- Where do adult salmon go after our fyke trap?
- Are Central Valley Steelhead using the Toe Drain as a migratory corridor? Can we distinguish them from Rainbow Trout?

## 4. Safety

Some elements of safety measures exist in other SOPs which discuss fish handling and the tailgate safety forms which focus on safety to personnel.

Safety measures for staff include:

- Utilizing multiple people to handle and secure large fish
- Proper lifting technique
- Using caution when handling scissors for genetic samples

Safety measures for the fish include:

- Using a cradle to transport large fish
- Handling fish with ungloved hands to keep their mucous coat intact
- Removing fish from the water for the shortest amount of time possible
- Using aerators to keep oxygen levels high in buckets/tubs pre and post measurements
- Allowing fish to recover before release if needed
- Monitoring water temperature and adding ice to buckets/tubs if needed

## 5. QA/QC

QAQC information is currently not directly listed in any documents related to listed species.

## 6. Training

Training currently is provided by an experienced staff member on-site.

## 7. Sampling flowcharts?

Yes, there is a salmon and smelt flowchart in the Field to Lab manual.

## 8. SOP videos?

None.

## 9. Changes over time

Not documented.

### 10. COCs

COCs are collected when whole or parts of listed species are transferred to entities outside of DWR.

### 11. Other Documents Relevant to Current Operations

N/A.

## Evaluations of Documentation

### Review Narrative for: YBFMP Field to Lab Manual (sections 2C & 3C)

[review completion date: 4/10/20]
[author(s): Nicole Kwan]

"Yolo Bypass:\Protocols & Instrument Manuals\AES_YBFMP field to lab manual_DRAFT_12.19.19.docx"

#### General Description

Section 1C/2C and 3C of this document discuss fish handling, specifically that of juvenile salmon, adult salmon, and Delta Smelt. It goes over how many fish to collect, what data to collect for them, and how to process the fish. Section 3C mentions what to do when adult salmon are caught in the fyke trap.

#### Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Presumably 12/19/19 based on the end of its document title.

3. Who were the authors of the previous document?

   AES staff, specific staff unknown.

4. Evaluate the quality of the document.

   The relevant sections of this document have useful information but are lacking details on safety, best practices for reducing stress to the fish, and it does not include details for other listed species besides salmon and Delta Smelt.

5. What edits were made, if any?

No edits were made to the Field to Lab Manual since this document is likely to be revamped after the internal review, we suggest leaving sections 1C/2C and 3C as-is for now and focusing on creation of a new fish handling SOP.

A new SOP has been made and was finalized 4/29/2020. This SOP includes:

1. The safety points listed above in "accounting for current practices"
2. Photos of proper fish handling techniques
3. Examples of special procedures for listed fish with reference to the Genetic Sampling and Take Cheat Sheet
4. Details on listing status and identifying characteristics

Listed_Species_Handling_SOP_revisions:

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Listed%20Species%20Handling/Listed_Species_Handling_SOP_revisions.docx?d=weae3fdf6acba45c298c80926536e2176&csf=1&web=1&e=yCCa6f

## Review Narrative for: 2020 Genetic Sampling and Take Cheat Sheet

[review completion date: 4/10/20]
[author(s): Naoaki Ikemiyagi and Mallory Bedwell]

"YOLO BYPASS DATA\Yolo Biological Data\Fish\Genetics Data\Species of Interest log Sheets\2020 Species of Interest Log Sheets\2020 genetic sampling and take cheat sheet.docx"

### General Description

This cheat sheet breaks down what type of samples need to be collected for various listed species. This document is a useful field reference to remind staff what and how many samples need to be collected for each fish and what take limits are. Since take guidelines change annually, this updated spreadsheet is an important way to make sure field staff are following new permitting regulations.

### Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

2020 – should be updated annually.

3. Who were the authors of the previous document?

   Naoaki Ikemiyagi and Mallory Bedwell

4. Evaluate the quality of the document.

   This quality of this document is good as long as spreadsheet is updated annually with current take limits and produces.

5. What edits were made, if any?

   None.

### Recommendations for improvements

- Create a COC spreadsheet (potentially under the Permits & Take folder). Potential items to include in the spreadsheet include: species, quantity, date the specimen(s) left DWR, entity receiving, purpose of transfer (ie. Project), DWR staff who transferred the specimen(s), outside entity person who received specimen(s), location/file patch of/for scanned COC (there are already relevant locations for some of these to be stored so this spreadsheet would just point people where to go)

## Data Publication

### General Description/Narrative

While the Yolo Bypass Fish Monitoring Program (YBFMP) only began to formally publish its data online in 2018, the program has published overviews of monitoring results in the IEP newsletter since 2012. IEP newsletter articles include information about water quality trends, and fish and invertebrate abundance and distribution, and are currently updated approximately on an annual basis. YBFMP has also published some of the conclusions from its monitoring data in scientific journals. For formal data publication, data undergo quality checks. Datasets, in addition to metadata and processing code, are then published on the Environmental Data Initiative (EDI), where they obtain a digital object identifier (DOI) that can be easily shared with the public. Datasets are also linked on the California Natural Resources Agency (CNRA) Portal to comply with AB 1755. As of May 2020, the fish and zooplankton datasets have been published, and by the end of 2020, the remaining lower trophic datasets will also be published. Once all the data have been published, they will be updated on approximately an annual basis.

## Accounting of Current Practices

### 1. Metadata

For the IEP newsletter and scientific journal publications, relevant methods are described in the publications themselves.

Metadata are published on EDI following the EDI template. R scripts also include metadata about how the original raw data have been processed/manipulated to produce the final dataset.

The CNRA Portal also has options to enter metadata, but YBFMP datasets link to EDI from the CNRA Portal in order to reduce duplication and confusion.

### 2. SOP

Guidelines for IEP newsletter authors can be found in the Yolo Bypass Shared Drive/ YB_Manuscripts, Reports, Newsletters (AES)/YoloBypass_AnnualReport_Fish/WY2019/Guide-toAuthors.pdf, but there is not currently an internal SOP for writing the newsletter article.

There is no SOP for manuscript publication, but there are usually author guidelines associated with each particular scientific journal.

There was no internal SOP for data publication prior to the review, but there were some IEP "SOPs" for EDI publication. There was no SOP in any form for CNRA or Estuaries portal prior to the review.

Some resources for data publishing existed prior to the review, and some resources are also being updated and created (some as part of the review, but mostly as a separate effort).

Resources:

- Environmental Data Initiative:
    - Overview of publishing methods: https://environmentaldatainitiative.org/welcome/submit-data/ and there will be an updated overview on the IEP GitHub, which is currently undergoing a remodel. https://github.com/InteragencyEcologicalProgram/Open-Data-and-Data-Publishing
- IEP to EDI Publishing Links:
  See comment above about IEP GitHub.
- CNRA:

- Since the review, Jenna and Cat have written an SOP that will be on the IEP GitHub. This was not initiated by the review.

## 3. Research questions

NA

## 4. Safety

NA

## 5. QA/QC

(Relevant to all types of data publication) QA/QC of the data being published is up to the discretion of the database manager/data publisher.

(Relevant to Data repository publication) QA/QC of the published products (R scripts, metadata, final dataset) includes review of materials and running of code by another party (e.g. other staff member or staff members) to make sure code runs and produces the desired dataset, and to make sure code and code documentation make sense. Procedures will likely be informed by the QA Outlier Detection Subcommittee's products, which just recently formed in mid-2020 (unsure of when this group will have products). Location of QA/QC documentation will be informed by the QA group sometime in 2020 or 2021. Currently, specific QA/QC practices are currently listed in each sampling type's metadata.

## 6. Training

Environmental scientists in YBFMP usually take the lead on initiating writing for the IEP newsletter, and will recruit scientific aids and other staff to help run plots and analyses, and put together the article. Staff who have previously worked on writing will train newer staff. Similarly for scientific manuscripts, more experienced staff may train less experienced staff on helping with writing and analysis.

(Data repository related): There have been some events held describing open science practices, including the overall process and guidelines for publishing data (e.g. at 2019 IEP Workshop, 2019 Data Management Showcase), but there is currently no formal training in place.

Links to Data Management Showcase:

- YouTube video: https://www.youtube.com/watch?v=rgGFogjhePc
- Agenda and slides are on the IEP GitHub (links are still being updated).

7. Changes over time

While the fish reports in the IEP newsletter have been published more regularly, the lower trophic report was just recently published for the first time in 2020. Reports will include multiple water years until caught up to the current water year, at which point reports will be published annually.

Data began being published in 2018 after the DUWG (Data Utilization Workgroup) decided EDI was the most appropriate data repository for its needs. EDI includes versioning, which gives each update of the dataset a new doi (data object identifier).

8. COCs

N/A

9. Other Documents Relevant to Current Operations

N/A

## Evaluations of Documentation

### Review Narrative for: Data Publication SOP

[Review started: 5/1/2020 Review edited: 7/30/2020]

[authors: Catarina Pien, Jesse Adams]

*IEP newsletter:* No internal SOP exists, but there is a guide for authors provided by IEP.
*Data repository:* No internal SOP existed prior to the review, but some IEP "SOPs" existed on the IEP GitHub https://github.com/InteragencyEcologicalProgram/Open-Data-and-Data-Publishing. This page is currently being updated with new resources and a new organization.

#### General Description

Guideline for Data Publication should include a description of the different publishing portals, as well as detailed instructions for preparing and publishing your data on your portal of choice.

Guidelines for IEP Newsletter would also be useful to point to any relevant author guidelines, past reports, and example code.

*EDI SOP's are not part of YBFMP documentation. SOP's are external documents used for EOR reference.

### Evaluation

1. Does this document exist?

   No, but IEP resources exist for EDI data publication.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   EDI SOPs were last updated on May 30, 2019. The DUWG Publication Subcommittee is planning to update the website, and potentially the documents, in the near future.

3. Who were the authors of the previous document?

   EDI SOPs - Brittany Davis

4. Evaluate the quality of the document.

   EDI SOPs - Good overview document, and detailed instructions. There are updates needed for the some of the metadata creation documents (EMLAssemblyLine method), since R packages have been updated since the last date of publication.

5. What edits were made, if any?

   None/ guidelines were created for data repository data publication.

   - Newly created guidelines for EDI, CNRA, Estuaries portals: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/_layouts/15/Doc.aspx?sourcedoc=%7B8C8B0771-2B7E-41AD-BD80-5F4702E4F5A7%7D&file=DataPublication_SOP_original.docx&action=default&mobileredirect=true.

## Recommendations for improvements

- Internal portal-publishing guidelines that were created as part of this review will need to be updated once GitHub resources are updated.
- Create some guidance (may be informal) or location for putting existing materials relevant to publishing to IEP newsletter.
- Call any created documents for this element "Guidance" rather than "SOP" since these are more unofficial, informal documents that don't necessarily need to go through a high level of review.

- Potentially create guidance for publishing for Bulletin 132. This does not include YBFMP data, so not necessarily part of this review, but is relevant to section duties.
- Check in with QA Outlier Detection Subcommittee and QA group towards early 2021 to guide how data are QA/QCed prior to data publication, and where detailed QA/QC methods should be documented (metadata, SOP or separate QA document).

# Coded Wire Tag Recovery

## General Description/Narrative

Coded wire tags (CWT) are found in adipose clipped Chinook salmon sampled by the Yolo Bypass Fish Monitoring Program's rotary screw trap and beach seine. During the summer, we are responsible for recovering and reading CWTs from preserved adipose clipped Chinook salmon. The CWT recovery includes two physical datasheets, photos of the CWT, and two electronic entry locations. The CWT recovery uses one datasheet to keep track of fish dissection order and another datasheet to detail the CWT and fish information. The physical tag is also stored in a small bag and attached to the more detailed datasheet in case it needs to be viewed again. Photos are taken with a stereomicroscope as the recovery takes place. The photos are saved by FishTagID in a folder specific to year on the section laptop. The folder is then transferred from the section laptop to the shared drive at the end of the CWT recovery for that year. The physical datasheets are used to enter the data onto the Yolo Fish database (Access) CWT table and an Excel sheet specifically for that year. Once the data has been entered and QAQC'ed the physical datasheets get placed in a CWT binder located in the scientific aid cubes. By using the RMIS database, we are also able to get information on the tagged fish including hatchery, release location, release date, run type, and percentage tagged. Reporting the fish and CWT we sample can also be done in RMIS.

## Accounting of current practices

1. SOPs

   The YBFMP has a CWT recovery SOP - Salmon_CWT SOP_2019Aug.docx

2. QA/QC

   During the CWT recovery process, generally two people work as a team to dissect and record data. The data recorder works as the first QC, checking the tag along with the dissector. When all recoveries are done, another person goes through the photos of the CWT and confirms that the numerical code recorded on the physical datasheet matches the

photo. If the person disagrees with any codes, they can pull out the saved tag and clean it again or look at it under the microscope to make their final decision. This same person should then use the physical datasheets to look over the fish database table and excel sheet to make sure there were no transferring errors. Any errors should be fixed. If there are more than 3 errors in transferring the data, another person will QAQC. These instructions are all listed in the CWT SOP.

3. Safety

No specific safety document – PPE is listed in SOP/Protocol.

Safety goggles or glasses are worn during CWT recovery to protect the participants eyes from flying tags or fish. Gloves are worn as well to protect the participants skin from 70% Isopropyl Alcohol and fish guts.

4. Training

In early 2020, JT Robinson and Amanda Casby provided a CWT training for all members of the Aquatic Ecology Section. Participants were given step by step instructions on how to recover a CWT and then were able to practice a CWT recovery on their own.

5. Research questions

How do Chinook salmon utilize the Yolo Bypass floodplain?

How many hatchery fish make their way through the Yolo Bypass floodplain?

How does hatchery Chinook salmon presence vary depending on water year type?

*Included in SOP as part of overview

6. SOP videos?

None.

7. COCs

None.

8. Other Documents Relevant to Current Operations

N/A

## Evaluation of Documentation

Review Narrative for: CWT Standard Operating Procedure

[Completed: 4/24/2020 ]

[Amanda Casby and Nicole Kwan]

Original SOP: "Yolo Bypass:\Protocols & Instrument Manuals\FishDissection-CWT-Fin Clips\Salmon_CWT SOP_2019Aug.docx"

## General Description

The coded wire tag standard operating procedure is used to inform personnel of the correct way to conduct a coded wire tag recovery process. This document creates a standard to follow to avoid discrepancies between different individuals doing the extractions. This document also works for a training document if an individual has not performed a CWT recovery before, this document should guide them through the process from start to finish.

## Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated?

   In the last year. This was the first time it had been updated since it was made.

3. Who were the authors of the previous document?

   Pascale Goertler, JT Robinson, Amanda Casby.

4. Evaluate the quality of the document.

   This document has very high quality information and is extensive but needs to fit the SOP template better. It also should include more information on our new procedure of what to do with fish that do not beep or if the tag is lost during the recovery process.

5. What edits were made, if any?
   - Many edits to the format of the SOP were made in order to fit the SOP template.
   - Font size and style was changed to be ADA compliant.
   - Alt text was added for photos and photos were arranged in-line with text to be ADA compliant.
   - Two “Notes” sections were added with instructions on what to do if no tag is found in a fish, or if a tag is lost.
   - A collaborators section was also added to the end of the SOP with brief descriptions of the updates made over time to this SOP.
   - The reporting for CWT recoveries at the end of each season was added to the end of the CWT.

CWT_SOP_revisions.docx:
https://cawater.sharepoint.com/:f:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/CWT?csf=1&e=0zf1Ee

## Recommendations for improvements

- Microscope use instructions (in the SOP) should be written out in their own sub-section. Currently these instructions are located within an image which is less accessible to all users.

# Dissection

## General Description/Narrative

A number of smelt, fall, late-fall and spring run Chinook salmon, and other juvenile fish species of interest are preserved for the monitoring programs fish collection. These fish are dissected depending on species type and, for salmon, the presence of adipose fins. For smelt species, detailed photos are taken to add to a database of defining characteristics, which can be used to help in species identification tools. For salmon, fish collected across a variety of sizes and sampling dates in order to create a representative collection that could be utilized in future salmon studies. The primary goal for these fish is to collect genetic data, preserve stomachs for potential diet analysis, and save heads for potential otolith microchemistry and tissue sampling. Other species of interest may be collected and dissected for various special studies, with focus generally on diet analysis.

## Accounting of Current Practices

1. SOP

- JuvFishDissection_2016Dec.docx

2. QAQC

Only lab weight is QAQC'ed (as part of genetics datasheet entry).

3. Safety

- SP_2019_Dissections.pfd – Standard Procedure (SP)

4. Training

Conducted as-needed with experienced staff providing the training to new staff.

5. Research questions/goals (Listed in SOP)

- Creating an archive of Chinook Salmon for future directed floodplain research studies
- Fish diet analyses
- Archiving Delta Smelt and Wakasagi, of which detailed photos can be used for morphological comparison database.
- Save heads for potential otolith microchemistry and tissue sampling

6. Sampling flowcharts?

None.

7. SOP videos?

None.

8. Changes over time

Not documented.

9. COCs

None unless archived fish are transferred to another agency/university for analysis.

10. Other Documents Relevant to Current Operations

N/A

## Evaluations of Documentation

Review Narrative for: Dissection Standard Operating Procedure

[Started 4/6/2020, completed 4/17/2020]

[Nicole Kwan, Amanda Casby, and Craig Stuart]

Original SOP: "Yolo Bypass:\Protocols & Instrument Manuals\FishDissection-CWT-Fin Clips\JuvFishDissection_2016Dec.docx"

### General Description

The dissections standard operating procedure is used to inform personnel of the correct way to dissect juvenile fish lethally sampled by the Yolo Bypass Fish Monitoring Program. This document creates a standard to follow to avoid discrepancies between different individuals doing the dissections. This document also works for a training document if an individual has not performed a dissection before, this document should guide them through the process from start to finish.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   12/28/2016 – updated infrequently

3. Who were the authors of the previous document?

   Pascale Goertler

4. Evaluate the quality of the document.

   This document is a good start to an SOP however it needs formatting edits and better organization. A materials/supplies list is missing and the organization/flow of the methods could be improved by adding better headers and labels. All photos need alternate text. The CWT portion could be removed or shortened to include a note to reference the CWT SOP. Updates to the data recording methods and what to do with the datasheet when finished would be helpful.

5. What edits were made, if any?
   - Added alternative text to images
   - Made minor changes to content
   - Added comments regarding whether or not we still use certain elements of the SOP
   - The SOP will need to be reformatted to the standard template
   - Reformatted using styles and different organization for ease of navigation.
   - Added a section for smelt processing
   - Deleted the CWT section and mentioned to refer to the CWT SOP
   - Updated language in methods.
   - Added a note about referencing the 10% Formalin Mixture SOP

   Revised SOP: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/_layouts/15/Doc.aspx?sourcedoc=%7BF5970496-B84F-4948-932E-751052119D57%7D&file=Dissections_SOP_revisionsV2.docx&action=default&mobileredirect=true

# Review Narrative for: Dissection Safety

[Started 4/6/2020, Completed 4/17/2020]

[Nicole Kwan, Craig Stuart, and Amanda Casby]

Original SP: "Yolo Bypass:\Safety\Standard procedures\SP_2019_Dissections.pdf"

## General Description

The purpose of this safety document is to describe the hazards and mitigations associated with fish dissection procedures. It was created in compliance with the department's safety regulations for daily operations. It can be referenced at any time when safety measures are in question.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   7/29/2019 – updated infrequently

3. Who were the authors of the previous document?

   Catarina Pien

4. Evaluate the quality of the document.

   The standard procedure (SP) safety document is of very good quality as it provides a hazard assessment for each task describes in the procedures. It follows the Department of Water Resources safety compliance guidelines and required documentation for daily operations. This document was created recently and does not need updates or improvements.

5. What edits were made, if any?
   - Titled changed to "Fish Dissections"
   - Task 2, Hazard 2, Mitigation – added "remove gloves properly"
   - Task 2, Hazard 4, added "properly fitted" before "respirator"

Revised SP: https://cawater.sharepoint.com/:b:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Dissection/SP_2019_Dissections_revisions.pdf?csf=1&web=1&e=R39ahW

## Recommendations for improvements

- Training tool for fish dissection – Video training: includes SOP and safety guidelines.

# Genetics

## General Description/Narrative

Genetic verification is done for species of interest sampled by the Yolo Bypass Fish Monitoring Program's rotary screw trap, beach seine, and fyke trap. The species of interest include juvenile and adult Chinook salmon, Sacramento Blackfish, Hitch, Rainbow Trout, Delta Smelt, Longfin Smelt, and Wakasagi. Small upper caudal fin clips are taken in the field and preserved in ethanol. For each species of interest, every individual that is fin clipped has a corresponding record with details about the fish. This information is also copied onto the Yolo Bypass Fish datasheet for that sampling event. These two hard copy datasheets are then transferred to the filled-in species of interest log sheets and Yolo Fish database, respectively. The physical datasheets are kept in binders when documentation process is completed. The fin clips are sent to the Genomic Variation Laboratory at UC Davis for identification and an excel sheet with the results are returned to us. The results include first, second, and third best estimate when necessary. These results are recorded in multiple electronic locations depending on species.

## Accounting of Current Practices

### 1. Metadata

None existed prior to this review.

### 2. SOP

- Fish DNA Sample Collection Protocol
- Tissue and Fish Sample Collection Protocol
- Fish Tissue Sampling for Osmerid/Smelt SOP
- Fish Tissue Sample Labeling SOP
- Tissue collection for DNA studies SOP
- 2016 CHN DNA Collection Protocol SOP
- PROTOCOLS FOR YOLO BYPASS ERP TISSUE COLLECTIONS
- Species of Interest Genetics SOP

### 3. Research questions

- Found in the Species of Interest Genetics SOP:

  What species of fish are we catching in our sampling methods?

Are we correctly identifying fish in the field?

Are we correctly assigning run type for Salmon using length by date estimates?

## 4. Safety

Not too many safety issues for this task. We are using small scissors so do not run with them. EtOH is flammable and should be handled with care. Fish could carry zoonotic diseases or have environmental toxins on their skin. Wash hands after handling fish.

*These safety issues were not originally documented but were added to the SOP as part of the evaluation.

## 5. QA/QC

- QAQC details can be found in the Species of Interest Genetics SOP

The Yolo Bypass Fish datasheet and species of interest log sheet goes through the first round of QAQC in the field. The datasheets should be checked by someone other than the data recorder to make sure all sections are filled out and that there are no discrepancies in recording. When a species of interest is sampled, the QCer should also check to make sure the log sheet and fish datasheet contain the same information. The Yolo Bypass fish datasheet is QAQC'd after it has been entered into the fish database. The QCer checks that the information was transferred correctly into the database and that there are no missing details for species of interest. They fix the errors, and if there are more than three then another person will complete a secondary QAQC check. After QAQC protocols are finished, the datasheet is put in a storage binder corresponding to year and sample method in case of need to reference later. The excel sheets for filled in species of interest log sheets are QAQC'd after an entire physical datasheet has been filled up OR at the end of the calendar year, depending on which comes first. The QCer checks that all information on the physical sheet was correctly transferred over and fixes any errors. If there are more than three errors another person will complete a secondary QAQC check. After the process, physical species of interest log sheets are placed in a storage binder containing all past log sheets.

Periodically, tissue samples are transferred from the tissue sampling kit to the genetic ID contract manger. The manger adds the new record from the species of interest log sheets into a chain of custody (COC) form. These new entries are compared to the samples tubes to ensure all

samples are present and that all the data has been added to the COC. Before sending the samples for analysis, the COC is checked against the sample tubes to ensure all samples are present. The lab manager checks all the samples upon receipt and sends back a signed copy of the COC. Once samples have been sent, sample ID and other corresponding information are copied to a tracking sheet in the contract folder. When the results for the sample are received, the date it has been completed is noted, in order to make sure that all samples are analyzed and results have been received.

## 6. Training

Training for genetics tends to be given on an as needed basis. New aquatic ecology members get trained on genetics when a species of interest is sampled in the field by watching other members first then participating with supervision. The SOP also works as a training document.

## 7. Sampling flowcharts?

- Species Take Guide (cheat sheet) - Updated early. Current update is in species of interest 2020 folder
- Salmon Field to Lab Decision Tree – pg 19-24 of AES_YBFMP field to lab manual. Updated by Nicole Kwan December 2019. Maybe this could be in a separate document as well to make it easier to update and find.

## 8. SOP videos?

None

## 9. Changes over time

Species of interest have changed slightly over time. By looking at the species of interest log sheets located in the Shared Yolo Bypass Data drive these changes over time were determined and added to the new metadata document:

**2015:** Genetic analysis of species of interest started. A fin clip for genetic analysis was taken from Juvenile Chinook salmon and their catch Date, catch time, catch site, catch gear, fork length, weight, and presence or absence of adipose fin were recorded. Adult Chinook salmon were fin clipped and their catch date, location of catch, time of catch, acoustic tag ID and serial number, fork length, sex, presence or absence of adipose fin, and floy tag number were recorded. Delta Smelt, Longfin Smelt, and Wakasagi were fin clipped and their catch date, catch time, catch site,

catch gear, fork length, weight, sex, and number of chromatophores were recorded.

**2016:** Genetic analysis for juvenile Chinook salmon, adult Chinook salmon, Delta Smelt, Longfin Smelt, and Wakasagi continued, however gear type was no longer recorded. Also, direct or indirect take, poor or good fish condition, and fin clip taken or not began to be recorded for all species. For Delta Smelt and Wakasagi, V-shape on caudal peduncle and release information were recorded as well. Reproductive condition (milt, eggs, or unknown) also began to be recorded for Delta Smelt. Rainbow Trout was added to the species of interest genetic analysis with all the same parameters recorded as juvenile Chinook salmon including gear type.

**2017:** Genetic analysis for juvenile Chinook salmon, adult Chinook salmon, Rainbow Trout, Delta Smelt, Longfin Smelt, and Wakasagi continued. For Adult Chinook salmon, acoustic tag ID and serial number was no longer recorded.

**2018:** Genetic analysis for juvenile Chinook salmon, adult Chinook salmon, Delta Smelt, Longfin Smelt, and Wakasagi continued and Hitch and Sacramento Blackfish were added as well. Hitch were fin clipped and catch date, catch time, catch site, catch gear, fork length, weight, direct or indirect take, and fin clip taken or not was recorded. Sacramento Blackfish were processed the same way as Hitch except presence or absence of PIT tags were recorded as well. Total length and weight began to be recorded for adult Chinook salmon.

**2019:** Genetic analysis for juvenile Chinook salmon, adult Chinook salmon, Delta Smelt, Longfin Smelt, Wakasagi, Rainbow Trout, Hitch, and Sacramento Blackfish continued. Whether the fish was smolting or not and a distinction between lab weight and field weight began to be recorded for juvenile Chinook salmon. The number or dorsal rays and anal rays began to be recorded and weight was no longer recorded for Hitch. Lab weight instead of field weight started to be recorded for Sacramento Blackfish. Lamprey was added to the species of interest genetic analysis. Catch date, catch time, catch site, catch gear, fork length, presence or absence of eyes, direct or indirect take, condition, and whether or not a fin clip was taken were recorded. Weight was no longer recorded for adult Chinook salmon.

**2020:** Genetic analysis for juvenile Chinook salmon, adult Chinook salmon, Delta Smelt, Longfin Smelt, Wakasagi, Rainbow Trout, Sacramento Blackfish, and Lamprey continued. Genetic analysis was no longer done for Hitch, due to inability for the current locus used for genetic identification to distinguish between Hitch, California Roach, and Blackfish. Life stage (ammocoete or macropthalmia) was recorded for Lamprey. Stage (smolt, parr, or fry) was recorded for juvenile Chinook salmon rather than if they were smolting or not.

## 10. COCs

COCs are maintained are archived in the Yolo Bypass Shared:/Contracts/2018-2021 UC Davis Fish ID/COCs folder. There is a folder for COCs that have been sent, a folder for a working COC where samples that haven't been sent yet are being added to, and a folder for COCs that have been signed and scanned by UCD as a receipt of receiving the samples. Each COC receives a number based on the sequential COC number for that year and the year. EX:

COC#3-20 = 3rd COC for 2020

## 11. Other Documents Relevant to Current Operations

Another document is updated and maintained with a complete list of all samples analyzed under this contract. It's located in the Yolo Bypass Shared:/Contracts/2018-2021 UC Davis Fish ID folder and is called genetic sample list_COC tracking.xlsx. It contains the sample ID, the source of the clip, the field ID, field measurements, COC number it was added do, and the date the data was received.

Raw data sent to us from UCD is saved in the YOLO BYPASS DATA:/Yolo Biological Data/Fish/Genetics Data folder. All smelt ID data is saved in the smelt folder and all other IDs (blackfish, hitch, lamprey, etc.) is saved in the fish ID folder.

Salmon run and smelt data is entered into the Access Fish Yolo Database and each of the two fish has it's own data table

Salmon run data is also appended to the CHN Genetics IDs_YBFMP_2015-2019 table located in the "\\cnrastore-des\DESSRV20\M & A Branch Data\Yolo Bypass\YOLO BYPASS DATA\Yolo Biological Data\Fish\Genetics Data\Salmon\CHN genetic IDs_YBFMP_2015-2019.xlsx"

Species of interests data logs contain physical measurements and data about sampled fish

# Evaluations of Documentation

## Review Narrative for: Genetics SOP

[started 4/2020; completed 8/12/2020]

[Amanda Casby and Mallory Bedwell]

In the folder: "Yolo Bypass:\YB_Standard Operating Procedures\Fish Sampling & Processing\Archive"

- Fish DNA Sample Collection Protocol
- Tissue and Fish Sample Collection Protocol
- Fish Tissue Sampling for Osmerid/Smelt SOP
- Fish Tissue Sample Labeling SOP
- Tissue collection for DNA studies SOP
- 2016 CHN DNA Collection Protocol SOP
- PROTOCOLS FOR YOLO BYPASS ERP TISSUE COLLECTIONS

Species of Interest Genetics SOP (only found in Sharepoint, because it was a new document made at the beginning of telework in March 2020)

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/Shared%20Drive/Protocols%20%26%20Instrument%20Manuals/FishGenetics/Species%20of%20Interest%20Genetics%20SOP%202020.docx?d=w6b9d26d293b74b8c898d794cf3f2a2d5&csf=1&web=1&e=p1wkRw

### General Description

The genetics standard operating procedure is used to inform personnel of the correct way to conduct the genetics process that the Yolo Bypass Fish Monitoring Program goes through. This document creates a standard to follow to avoid discrepancies between different individuals completing the tasks. This document also works for a training document if an individual has done any genetic sampling or data entry before, this document should guide them through the process from start to finish.

### Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Fish DNA Sample Collection Protocol – 2012

Tissue and Fish Sample Collection Protocol – 2011

Fish Tissue Sampling for Osmerid/Smelt SOP – Jan 2018

Fish Tissue Sample Labeling SOP – 2017

Tissue collection for DNA studies SOP – 2011

2016 CHN DNA Collection Protocol SOP – 2016

PROTOCOLS FOR YOLO BYPASS ERP TISSUE COLLECTIONS – 2016

Species of Interest Genetics SOP - March 2020

3. Who were the authors of the previous document?

   Fish DNA Sample Collection Protocol – unknown

   Tissue and Fish Sample Collection Protocol – unknown

   Fish Tissue Sampling for Osmerid/Smelt SOP – Pascale?

   Fish Tissue Sample Labeling SOP – unknown

   Tissue collection for DNA studies SOP – unknown

   2016 CHN DNA Collection Protocol SOP – unknown

   PROTOCOLS FOR YOLO BYPASS ERP TISSUE COLLECTIONS – unknown

   Species of Interest Genetics SOP - Amanda Casby and Nicole Kwan

4. Evaluate the quality of the document.

   All of the archived SOPs contained quality information on how to take a tissue sample but did not outline the entire process that AES does for species of interest.

   The Species of Interest genetics SOP contains a lot of important and relevant information. The outlined process is strong and does not need much if any edits. The format of the document could be updated to better fit the SOP template. Photos need alternative text in order to be ADA compliant. Styles and some font changes could be made to make the document easier to navigate and ADA compliant.

5. What edits were made, if any?

   Alternative text was added to all photos, formatting edits were made to match the SOP template and ADA compliance, and a general

description and equipment list were added. A note on cross contamination was added.

Revisions document: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Genetics/Genetics_SOP_revisions.docx?d=w6f1fa7a0e8bd4686950bc03e2c28fcba&csf=1&e=DxIZDF

## Review Narrative for: Genetics Metadata

[started: 4/14/20; completed: 8/17/20]

[Mallory Bedwell and Amanda Casby]

[No file path because metadata did not exist prior to this review]

### General Description

The metadata for the genetics should describe the background of the YBFMP and genetic sampling, the site information and overall methods for sample collection, the QA/QC protocols, and changes over time to the program. This information should be updated frequently and be as thorough as possible. This dataset is comprised of genetic identification results from sampling conducted by the YBFMP, as well as other agencies who needed samples analyzed. It is made up of salmon run ID data (2010-2020) and species identification (2019-2020).

### Evaluation

1. Does this document exist?

   No.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   N/A

3. Who were the authors of the previous document?

   N/A

4. Evaluate the quality of the document.

   This document is being created as part of the review.

5. What edits were made, if any?

A new metadata document for genetics was created. Edits were made by Amanda and Mallory. It can be found here:

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Genetics/Genetics_Metadata_revisions.docx?d=w169e338d9da948ed9c836c7ed2dce537&csf=1&web=1&e=PnFu5y

## Recommendations for improvements

- Complete the metadata for genetics
  - Update data table section to reflect new tables in KISTERS database
  - and determine whether salmon and fish ID be separate
- Streamline genetics data pipeline once the new database is complete:
  - -Species of interest logs
  - -access database
  - -salmon sample excel log
  - -raw data files
- Finding a better way to maintain the fish ID data. Options include: keep as raw data, create excel sheet, enter into DB. Will ID's be changed if field ID different than genetic ID?
- Make the Salmon Field to Lab Decision Tree (pg 19-24 of AES_YBFMP field to lab manual) a separate document to make it easier to update and find.

# Contracting

## General Description/Narrative

Contracts are used for services that cannot be conducted within the Aquatic Ecology Section (AES). Staff within AES manage contracts with the help of DWR's contracting department. Current contracts are in place for water quality analysis, zooplankton identification, drift invertebrate identification, ichthyoplankton identification, phytoplankton identification, fish genetic identification, and fish gut analysis. For competitive contracts, contract managers help prepare an invitation for bid (IFB) by preparing a scope of work and other supporting documents, and select the most appropriate contract based on state guidelines and contract needs. Once a contract is in place, contract managers coordinate sample delivery, communicate with contractors, keep track of budgets and scheduling, check and sign invoices, and deliver data to the appropriate recipients.

## Accounting of Current Practices

1. Metadata

   There is no metadata for contracting. See "Changes Over Time" for information regarding changes in contracts over time.

2. SOP

   No SOP currently exists.

3. Research questions

   Not applicable.

4. Safety

   Not applicable.

5. QA/QC

   Not applicable.

6. Training

   Contract managers are required to take DWR's 3-day contract management training. During the course, a manual is provided describing the various phases of managing a contract, and including examples of forms needed for initiating, managing, and closing a contract. An additional day-long Scope of Work training provides guidance on writing a scope of work. Individual contracts within AES are managed by AES staff. Information about managing each individual contract is passed down by verbal instruction from the previous contract manager. Take Contract Management Training to learn how to avoid being liable for any mistakes while managing contracts.

   Contract Management Training and Scope of Work Training are provided by DWR on DELTA. Contract Management Training is (as of 2019) required for contract managers.

7. Sampling flowcharts?

   These do not exist. A flowchart could be useful as an SOP format.

8. SOP videos?

   These do not exist, and are probably not useful for contracting.

9. Changes over time

   **Contract information:** There is a working document attempting to track contract numbers and contractors over time for AES. It has been difficult to figure this information out. For the zooplankton dataset, Catarina Pien

attempted to track down historical contracts, with some help from Kathi Bristow, but she had a hard time tracking down contractors without knowing the contract number. Information found about historical contracts and changes in methods were published with the zooplankton dataset metadata on EDI.

This document is currently located in the Yolo Bypass Shared Drive: Yolo Bypass\Metadata\Metadata NOT on EDI\Contractor_record_20200511.xlsx

**Scope of work and other contract documentation:** Taxonomic resolution is an important component of contract scope of work, since data can only be compared if taxonomic resolution is recorded. While contract documents exist in a contracts folder by Kathi Bristow, the contract number is needed to find these documents. Recent documentation has been slightly better (2015-2021), with documents stored in the Yolo Bypass Shared Drive Contracts folder. There should definitely be better tracking of contracts in the future (including contract number, contractor information, contract manager, years of the contract, data analyzed during the contract, detailed scope of work for the contract, especially taxonomic resolution). Any deviations from the scope of work should also be listed.

### 10. COCs

COCs are required when samples are transferred between DWR and other entities. Both parties sign the COC upon delivery and/or receipt of samples. COCs are stored on YBFMP's Yolo Bypass Shared Drive in the Contracts folder. See sample archiving review, Sample Transfer Element and the Contracting SOP for more information.

### 11. Other Documents Relevant to Current Operations

Links to budgeting spreadsheet examples, shipping documents, and COCs are included in the Contracting SOP document. Invoice checklist (created by Mallory) is currently in hardcopy form, but will be digitized.

## Evaluations of Documentation

### Review Narrative for: Contracting SOP

[Started 5/11/2020; completed 5/13/2020]

Catarina Pien, Mallory Bedwell, Nicole Kwan, Jesse Adams

Links to resources:

- **General Contracting SOP**: Contract Management Manual (unsure if this has been digitized)

### General Description

The purpose of the contracting SOP should be to provide both broad and detailed information about how to manage specific contracts, and include information about any major changes to contract management procedures.

### Evaluation

1. Does this document exist?

   Did not exist prior to this review.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   It should probably be reviewed annually, or at least for each new contract cycle (every 3 years at the beginning of the fiscal year).

3. Who were the authors of the previous document?

   There was no previous document.

4. Evaluate the quality of the document.

   No document to evaluate. SOP document created as part of this review.

5. What edits were made, if any?

   For this review, a more formal SOP is being written for each individual contract to provide a resource for contract managers and to aid in transition of contracts between contract managers. See link to Contracting SOPs.

## Recommendations for improvements

- More specific SOP for all existing long-term contracts to better facilitate the contract manager and transfer of contract to new contract managers (we have done this as part of the review).
- Once shared drive is used again and re-organized, update links for budgeting spreadsheets, COCs, invoices, data, invoice checklist, new SOP and metadata document within SOP document.
    - Re-organize existing contract documents in shared drive to be more consistent for each contract (wait until everyone is using shared drive).

- Digitize Invoice checklist (created by Mallory) that is currently only in hardcopy form.
- Creation of document to record historical changes and relevant information related to contracting – contract number, contractor information, contract manager, methods (taxonomic resolution), changes to methods, important communications with contract manager, list of projects that were analyzed under the contract, summary of samples analyzed under contract (e.g. years)
    - Figure out where to put it – contracting folder?
    - Every contract manager can create their own tab to track their contract type

# Permitting

## General Description/Narrative

All permits listed here are required elements of YBFMP sampling. No sampling should be conducted outside the scope of what is covered in these permits, no sampling should be conducted on expired permits, and hard copies of all permits should be present any time sampling is being conducted.

### 1. Scientific Collecting Permit (SCP)

The California Department of Fish and Wildlife (DFW) requires that the YBFMP have a valid SCP for all field collection activities. The SCP covers all sampling activities and take of non-listed species.

### 2. NMFS Section 10(a)(1)(A)

The National Marine Fisheries Service (NMFS) requires that the YBFMP have an Endangered Species Act (ESA) permit for the take of federally listed salmonids (winter and spring run Chinook Salmon and Central Valley Steelhead) and Green Sturgeon. This permit is coordinated through the Interagency Ecological Program (IEP).

### 3. FWS Section 7

The US Fish and Wildlife Service (FWS) requires that the YBFMP have an ESA permit for the take of federally listed Delta Smelt. This permit is coordinated through IEP.

### 4. Marine Mammal Protection Act (MMPA)

NMFS requires the YBFMP to have a MMPA permit to cover the potential take or harassment of marine mammals by our sampling activities. This permit is coordinated through IEP.

### 5. California Endangered Species Act (CESA) Memorandum of Understanding (MOU)

DFW requires the YBFMP to have a CESA MOU to cover the take of state listed salmonids (winter and spring run Chinook Salmon) and osmerids (Delta and Longfin Smelt).

### 6. Other

None

## Accounting of Current Practices

### 1. Scientific Collecting Permit (SCP)

It is the sole responsibility of the YBFMP to apply for and maintain its own SCP to cover all sampling activities. The YBFMP has an entity SCP that covers all AES staff, plus ancillary DWR staff and activities that are related to YBFMP activities. SCPs are applied for online, per DFW instruction and procedures, and are good for three years from the date of issuance.

Important notes on SCPs:

- Renewal of the SCP should be submitted no later than six months before the expiration date on the SCP
- DFW limits the number of staff on a single entity SCP to eight, but will issue a waiver with justification. YBFMP has gotten waivers without issue.
- Estimated numbers of organisms to be sampled annually is required for the permit application, including invertebrates. For lower trophic organisms, estimated number of samples to be collected is used instead of number of organisms.
- Copies of draft language for all application sections are archived and available at https://cawater.sharepoint.com/:f:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Permitting/Permit_Archive/SCP?csf=1&web=1&e=YFnD8R
- Each member of AES must maintain their own SCP ID number, which requires a statement of qualifications and a CV.
- An annual report consisting of a spreadsheet of all organisms sampled must be submitted to DFW on form 1379a by December 31 of each year.
- A final report on form 1379a of all organisms sampled over the three year term of the permit must be submitted with the renewal application.

- SCP online applications require the payment of a processing fee AND a permit fee, paid at different points in the process. Historically, AES has used our Calcard to make these payments.

## 2. NMFS Section 10(a)(1)(A)

The NMFS ESA permit for YBFMP is coordinated through IEP. As such, questions about the YBFMP NMFS permit, as well as take notifications, should all be routed through the IEP take coordinator. The IEP NMFS permit covers all IEP long-term monitoring activities and lasts for four years. Renewal of this permit is handled by the IEP take coordinator and the YBFMP PI will be consulted during the renewal process for changes to sampling methodology or take numbers.

Important notes on NMFS ESA permit:

- All communication and reporting is handled through the IEP take coordinator.
- Take is reported per the Listed Species Reporting SOP (https://cawater.sharepoint.com/:w:/s/dwrdoc-aes/EXKcRozts_hEi8yyGVy8wS4B08pwipTA283ZmxCpkmxWJQ?e=ns2zBd)
    - The IEP take website must be updated bi-weekly
    - Final genetic assignments for Chinook Salmon take must be updated on the take website by Dec 1 of each year to facilitate IEP's annual reporting requirements.
- Refer to the IEP document "ESA PI responsibility and take reporting process" for more information (https://cawater.sharepoint.com/:b:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Permitting/Permit_Archive/ESA%20PI%20responsibility%20and%20take%20reporting%20process_6Jan2016.pdf?csf=1&web=1&e=xjcfis)

## 3. FWS Section 7

The FWS ESA permit for YBFMP is coordinated through IEP. As such, questions about the YBFMP FWS permit, as well as take notifications, should all be routed through the IEP take coordinator. The IEP FWS permit covers all IEP long-term monitoring activities and is updated annually. The IEP ESA permit is the sole source of Delta Smelt take in the estuary, and the take allocation for IEP is calculated based on an estimate of the total population of spawning adults in February of each year. IEP then apportions this take among all of the studies as part of

the annual workplanning process, with take allocations for the following calendar year being finalized in July. Renewal of this permit is handled by the IEP take coordinator and the YBFMP PI will be consulted during the renewal process for changes to sampling methodology.

Important notes on FWS ESA permit:

- Each year, the YBFMP is issued a Delta Smelt take letter from IEP. This letter functions as our permit documentation and should be carried with staff at all times when sampling as with other permits.
- Exceedance of our take allocation in another year means that take will need to be reapportioned to YBFMP from other IEP sampling programs. Likewise, YBFMP may be asked to transfer some of its take to other programs if they exceed their allocation.
- Refer to the IEP document "ESA PI responsibility and take reporting process" for more information (https://cawater.sharepoint.com/:b:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Permitting/Permit_Archive/ESA%20PI%20responsibility%20and%20take%20reporting%20process_6Jan2016.pdf?csf=1&web=1&e=xjcfis)
- All communication and reporting is handled through the IEP take coordinator.
- Take is reported per the Listed Species Reporting SOP (https://cawater.sharepoint.com/:w:/s/dwrdoc-aes/EXKcRozts_hEi8yyGVy8wS4B08pwipTA283ZmxCpkmxWJQ?e=ns2zBd)
- The IEP take website must be updated weekly

## 4. Marine Mammal Protection Act (MMPA)

The MMPA permit for YBFMP is coordinated through IEP. As such, questions about the YBFMP MMPA permit, as well as take notifications, should all be routed through the IEP take coordinator. The IEP MMPA permit covers all IEP long-term monitoring activities. Renewal of this permit is handled by the IEP take coordinator and the YBFMP PI will be consulted during the renewal process for changes to sampling methodology.

As of May 2020, the IEP MMPA permit is still in process though take coverage applies during this period. The sole usage of this permit for YBFMP is in the unlikely event that a sea lion gets trapped in our fyke trap.

### 5. California Endangered Species Act (CESA) Memorandum of Understanding (MOU)

It is the sole responsibility of the YBFMP to apply for and maintain its own CESA MOU to cover take of state listed species (winter and spring run Chinook Salmon, Delta and Longfin Smelt). The YBFMP has a CESA MOU that covers all AES staff, plus ancillary DWR staff and activities that are related to YBFMP activities. CESA MOUs are applied for via email to the regional office, per DFW instruction and procedures, and are good for four years from the date of issuance.

Important notes on CESA MOU:

- CESA MOU renewals should be submitted a minimum of three months prior to the expiration of the permit.
- The application should be sent to the regional manager (Gregg Erikson) and the regional permit coordinator (Jim Starr).
- The current YBFMP CESA MOU is a renewed permit that was originally applied for by Ted Sommer, so he is the DWR lead named on the MOU. For future renewals, Ted will continue to be the signatory unless a new permit is applied for.
- A bi-weekly report and an annual report must be submitted per the requirements in the CESA MOU. Take is reported per the Listed Species Reporting SOP (https://cawater.sharepoint.com/:w:/s/dwrdoc-aes/EXKcRozts_hEi8yyGVy8wS4B08pwipTA283ZmxCpkmxWJQ?e=ns2zBd).

### 6. Other - End of Year Reporting Guide

This document provides a brief checklist of what needs to be done at the end of each calendar year to meet CDFW SCP and CESA MOU/IEP take reporting requirements.

## Evaluations of Documentation

### Review Narrative for: End of Year Reporting Guide!.docx

[5/21/2020]

[Nicole Kwan]

[Yolo Bypass\Permits & Take]

#### General Description

This document provides a brief checklist of what needs to be done at the end of each calendar year to meet CDFW SCP and CESA MOU/IEP take reporting requirements.

### Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   January 2020

3. Who were the authors of the previous document?

   Nicole Kwan and Brian Schreier

4. Evaluate the quality of the document.

   This document contains all necessary end of year reporting requirements but no detail on how to complete the tasks.

5. What edits were made, if any?

   No edits were made to the original End of Year Reporting Guide! doc, however a Take Reporting SOP to take the place of, and provide more detail than, the "End of Year Reporting Guide!" was created. This task was completed by Nicole. Take_reporting_SOP_original.docx: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Permitting/Take_Reporting_SOP_original.docx?d=w8c469c72b3ed44f88bccb2195cbcc12e&csf=1&web=1&e=Wd5p91

## Recommendations for improvements

- Edit shared drive Permits folder structure and include all relevant documents. Create Archive folders to store past permits and reports more logically. See https://cawater.sharepoint.com/:f:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Permitting/Permit_Archive?csf=1&web=1&e=Z5qgKC for relevant folders.
- Put the above "general descriptions" and "accounting of current practices" in a new document to be saved in the Share Drive permitting folder for future reference.

# Database Management/Data Lifecycle

## General Description/Narrative

Field data, water samples, and biological samples are collected by Aquatic Ecology Section (AES) staff. Select biological samples are sent off to contractors for analyses and taxonomic identification, and results are sent to contract managers within AES. Field and contractor data are entered into one of two Microsoft Access databases: the fish database or the lower trophic database. The fish database contains data about fish catch, associated physical water quality, coded wire tag IDs, and genetic IDs for salmon and smelt species. The lower trophic database contains data about nutrients, zooplankton, ichthyoplankton, drift invertebrates, and associated physical water quality. Phytoplankton data are saved separately as excel spreadsheets. Data undergo quality checks in the field, when being entered, and by another staff member after data have been entered. Field datasheets and contractor data are archived physically in binders and digitally on a DWR network drive. In 2020, data from the Microsoft Access databases are being imported into a new database, WISKI, which will serve as a joint database for the branch. Traditionally, the lower trophic and fish databases are managed by separate database managers. Database managers from AES update and maintain databases as needed and respond to data requests. Recently, database managers have also begun publishing monitoring data to the Environmental Data Initiative (EDI) for increased efficiency and transparency. Data undergo further quality checks, and metadata are updated according to EDI's metadata template in preparation for data publication.

## Accounting of Current Practices

1. Metadata

   There is no metadata document for database management or the data lifecycle. Portions of the data lifecycle are described in the metadata for different sampling types (e.g. data entry, QAQC, data storage).

   There is not great documentation on changes that have been made to the database over time, or on how data entry practices have changed over time. In 2020 a significant change will be the transfer over to a new database.

   With new developments including data publication and the new database, there will be changes in data management and the data lifecycle. It would

be useful to document procedures used in the past, as well as new procedures.

2. SOP

There is no SOP for database management. It would be useful to detail the different responsibilities and expectations of the database manager, as well as everyone else in the section that is responsible for different parts of the data lifecycle.

3. Research questions

NA

4. Safety

NA

5. QA/QC

Established QAQC procedures exist for field checks and data entry (see metadata for individual sampling types). However, the role of the database manager in overseeing data QA/QC is not clearly defined. How much QAQC was done in the past when distributing data is uncertain. There are some records of changes made to the database when staff have noticed issues.
(Yolo Bypass Data/QAQC/Notes on database changes).

With the recent shift towards data publication, the database managers have been developing appropriate QC measures prior to publishing the data. These are detailed in the metadata associated with published datasets. Much of the QAQC included flags, rather than replacement of data. If data were replaced, they were for the most part changed in the published dataset, rather than the original database. There are not currently "set" procedures for QAQC, and the QC of biological data is complicated both in terms of biological identification checks, and checking trends in the data). With the new database, QC checks will likely be put in place to help flag data before it is accepted. One (or both) of the database managers will be tasked with reviewing flagged data. More information will be provided when the database has been completed.

The DUWG and internal DWR QA group provide some guidance for QA of instrumentation and documenting QAQC procedures. The DUWG has recently formed a QAQC subcommittee to work on developing guidelines for how to QAQC data. These groups are still in the initial phases of

developing guidance. Different AES staff attend these different meetings, and should communicate relevant information to the rest of the section.

6. Training

   There is currently no training available for database management/ the data lifecycle. New database managers explore the database on their own when they begin the position, and ask other staff/previous data managers if they have any questions.

   KISTERS will have training for using the new database. It is uncertain how often this will occur, and how new database managers will be transitioned in the future.

7. Sampling flowcharts?

   There are no sampling flowcharts. Could be useful to document the steps of data management.

8. SOP videos?

   There are no SOP videos.

9. Changes over time

   Changes in the database, the data lifecycle, and database management over time have not been recorded.

10. COCs

    COCs for contractor data are located in relevant contract folders (Yolo Bypass/Contracts/…COC) and evaluated in the Contracting EOR.

11. Other Documents Relevant to Current Operations

    Refer to data publication review for more information about data publication, which is one of the roles of the database manager.

## Recommendations for improvements

- Create SOP for database management that includes information on the data lifecycle. Currently tasks are completed by staff (in the field), scientific aids (data entry, QAQC), contractors, contract managers, and database managers/data publishers. It would be good to get some clarity on who does what, and the procedures that should be followed. Probably wait until some procedures have been defined for the new database.
  - Include responsibilities of a database manager in SOP:
    - Filling data requests
    - Editing the database for new/changed fields
    - QC data

        - Flags vs. changes
    - Creating database (log what we needed to do)
    - Tracking changes made (data fields, how we enter data, changes to data themselves)
        - Physical copies and digital copies
    - Working with people entering data on issues
    - Working with the contract manager to get data into database
- Come up with established QAQC procedures – see Programmatic QAQC review
- Make sure to record changes in different parts of the data lifecycle for specific databases, but in general a metadata document does not need to be created specifically for data management or data lifecycle. Changes made to steps of data management should be recorded in the SOP.
    - Specific database "metadata" should also be centralized to document finer changes made to the database (data entry changes for example)
      Changes made to procedures should be documented in the SOP and transferred to metadata when published/appropriate.

# Digitizing and Archiving Hard Copy Documents

## General Description/Narrative

Hard copy documents such as fish data sheets, lower trophic data sheets, and sometimes Chain of Custody (COC) sheets are digitized in order keep them accessible in case the hard copies are lost or compromised. The data sheets are organized by date then scanned and saved in the shared drive (Yolo Bypass Data:\Data Sheets\Scanned Data Sheets). Once fish and lower trophic data sheets have been entered in the database and QA/QC'd for completeness, they are scanned in and saved as a digitized record. These documents are organized in the shared drive by trap type for fish and location for lower trophic. They are also separated by year folders then within the year folder generally split up by month for individual PDF documents. After hard copies have been scanned and properly saved, the field data sheets are then to be archived and stored in data binders. The data binders are organized by trap effort (beach seine, fyke, screw trap, and lower trophic) and by sampling year. Digitizing hard copies is not currently done with species of interest log sheets.

## Accounting of Current Practices

1. Metadata

   NA

2. SOP

   There is currently no SOP for digitizing and archiving hard copy documents. While the actual process of digitizing hard copy documents is currently done and is well organized in the shared drive, there are no written instructions or documentation of consistently doing this over time.

3. Research questions

   NA

4. Safety

   NA

5. QA/QC

   There is currently no QA/QC process for digitizing and archiving hard copy documents. After data sheets are scanned in to a PDF or other format, the individual who is digitizing the documents reviews them to make sure all sheets, including front and back pages, were scanned. The individual should then, while logged onto a PC using their user credentials, ensure that the document is moved to the correct file location in YBFMP network folders.

   We recommend designing a method for QA/QC'ing the digitizing hard copy document process and holding the individual who scans in the documents, responsible for completing the task.

6. Training

   There is no formal training for digitizing and archiving documents. Currently, an experienced staff member shows a new staff member how to scan documents in and save them to the appropriate locations in the shared drive.

   We do not recommend there be a formal training for this process. Sufficient training can be completed through a review of the SOP and in-person training.

7. Changes over time

   NA

8. COCs

NA. Contract documents to date have been handled digitally and according to contract guidelines at the discretion of contract managers.

9. Other Documents Relevant to Current Operations

Data sheet archive (Yolo Bypass Data:\Data Sheets\Scanned Data Sheets) - exists but not all are entered.

## Evaluations of Documentation

### Review Narrative for: Digitizing Hard Copies of Data Sheets Standard Operating Procedures

[started 4.13.2020; completed 4/30/2020]

[Craig Stuart/Jesse Adams]

[No Document Pathway]

#### General Description

The SOP for digitizing hard copies of field data sheets should include a detailed step-by-step guide on how to properly scan a previously entered and QA/QC'd data sheet into the scanned data sheets folder. Scanned data sheets will then be archived and stored in the data binders. This document can be used to train an individual who has not performed digitizing hard copy documents before, this document should guide them through the process from start to finish.

#### Evaluation

1. Does this document exist?

   No.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   NA. The SOP should be updated if the process should change in any way and/or a new printer/scanner that requires different instructions is used.

3. Who were the authors of the previous document?

   NA

4. Evaluate the quality of the document.

   NA

5. What edits were made, if any?

   New SOP document being created here: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Digitizing%20Harcopies/DigitizingHardcopies_SOP_original.docx?d=wbda6be1eae0d4bfc8b4bec1ed63ea469&csf=1&web=1&e=XSfk87

# Review Narrative for: Digitizing Hard Copies of Data Sheets Scanned Data Sheet Archive

[started 4.13.2020; completed 4/30/2020]

[Craig Stuart/Jesse Adams]

Yolo Bypass Data:\Data Sheets\Scanned Data Sheets

## General Description

The YBFMP has an extensive record of scanned field data sheets dating back from 1998, the inception of the program. These data sheets are scanned as a PDF file after the data has been entered into the database and QAQC'd by another coworker. Data sheets are organized by trap effort, year, and month to ease the process when having to reference old data sheets.

## Evaluation

1. Does this document exist?

   Yes (in the form of a data file folder)

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Field data sheets should be scanned at agreed upon intervals (see recommendations)

3. Who were the authors of the previous document?

   NA

4. Evaluate the quality of the document.

   The quality of the scanned data sheet folder is fair. There is a handful of data sheets that still need to be scanned and archived.

5. What edits were made, if any?

NA

## Recommendations for improvements

- Add a step in the Yolo Fish and Lower Trophic Data Entry SOP's that references the Digitizing and Archiving Hard Copy Documents SOP.
- Design and implement a way to QA/QC the digitizing document process. Could be something like adding a line at top or bottom of data sheets that says 'Document scanned by [have a line to sign name or initial]'
- Decide on regular intervals for scanning datasheets (e.g., every 1 week, 2 weeks, month etc.). Current interval for data sheet scanning is at the end of a water year, but this is probably too long.
- Need to scan and archive any field data sheets that are not currently archived.

# Personnel Timeline

## General Description/Narrative

The personnel timeline is a collection of all personnel that has worked in the Aquatic Ecology Section, their start and end date, and their position and title.

## Accounting of Current Practices

No current practices exist for a personnel timeline.

## Evaluations of Documentation

Review Narrative for: Personnel Timeline

[completion date: 6/1/2020]

[Brian Schreier and Naoaki Ikemiyagi]

### General Description

The personnel timeline is a collection of all personnel that has worked in the Aquatic Ecology Section, their start and end date, and their position and title.

### Evaluation

1. Does this document exist?

   No.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

N/A

3. Who were the authors of the previous document?

   N/A

4. Evaluate the quality of the document.

   N/A

5. What edits were made, if any?

   Personnel was created as part of this review. List is located here: https://cawater.sharepoint.com/:x:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Personnel/Personnel%20Timeline%20-%202020.xlsx?d=wd5a40948aba544ca851e29c3b8ce897e&csf=1&web=1&e=fGUlYB

## Recommendations for improvements

- Update missing information and update list on a frequent basis.

# Equipment Purchasing and Maintenance

## General Description/Narrative

The YBFMP uses a variety of sampling equipment that needs to be maintained to ensure it continues to function and provide reliable, quality data. When new sampling equipment is needed, these must be purchased, often from specific vendors. Purchasing can either be done using the CalCard for smaller amounts or using purchase orders (POs) for larger equipment orders. Sampling maintenance should occur at intervals appropriate to the gear type and purchasing should be done far before the equipment is needed to ensure it is processed and shipped in time. The main equipment is used by the following activities:

- Lower trophic sampling:
  - Zooplankton sampling – zooplankton nets (50 micron and 150 micron)
  - Drift invertebrate sampling – drift net
  - Egg and larval fish sampling – egg and larval net
- Fish sampling:
  - Rotary screw trap
  - Fyke

    - Beach Seine
- Water Quality
    - YSI ProDSS
    - YSI Exo2
    - HOBOs
    - Li-Cor Light Meter

## Accounting of Current Practices

### 1. Metadata

**Maintenance:** Equipment is contained within the metadata documents for each gear type and reviewed as part of its associated EOR.

**Purchasing:** None

### 2. SOP

**Maintenance:**

- Sondes/ProDSSs:

  Exo2 sondes and ProDSS must be calibrated on a monthly basis. Please see the Water Quality SOP and EOR for details about calibration and maintenance

  DO caps and pH modules must be replaced every 12-18 months. Please see the Water Quality SOP and EOR for details about calibration and maintenance

- Fish sampling gear:

  The fyke needs to be maintained when cage or mesh material tear or the trap shifts out of position. Details for these are included in the Fyke SOP which is evaluated in the Fyke EOR.

  The RSTR needs annual maintenance. Details for these are included in the RSTR SOP which is evaluated in the RSTR EOR.

  The beach seine needs to be maintained when the net tears or guide poles are damaged. Details for these are included in the beach seine SOP which is evaluated in the Beach Seine EOR.

**Purchasing:** None

### 3. Research questions

**Maintenance:** N/A

**Purchasing:** N/A

4. Safety

**Maintenance:** Maintenance of equipment sometimes requires safety procedures. The Screw Trap SOP outlines annual maintenance safety guidelines and is evaluated as part of the RSTR EOR. The Fyke SOP outlines maintenance safety guidelines and is evaluated as part of the Fyke EOR. The other equipment types do not have specific safety requirements for their maintenance.

**Purchasing:** none

5. QA/QC

**Maintenance:** Incorporated into various documents for water quality and lower tropic equipment. Please see the programmatic QA/QC EOR and Water Quality EOR for details about checking and calibrating instruments:

- Exo2 Sondes
- ProDSSs
- Flow meters
- HOBOs
- Thermometer Accuracy Verification (TAV; all equipment with thermometers)

**Purchasing:** none

6. Training

**Maintenance:** Maintenance of gear requires instruction and oversight for new staff to ensure procedures outlined in the SOPs are followed correctly.

**Purchasing:** Purchasing of equipment requires oversight to ensure sampling gear is protected and purchasing follows DWR requirements.

7. Sampling flowcharts?

**Maintenance:** none

**Purchasing:** none

8. SOP videos?

**Maintenance:** none

**Purchasing:** none

9. Changes over time

**Maintenance:** Gear changes over time are tracked in the metadata documents for the different gear types (Zoop, Drift, Egg&Larval, RSTR,

Fyke, Beach Seine). These are reviewed separately as part of their respective EORs.

**Purchasing:** no changes recorded

10. COCs

**Maintenance:** N/A

**Purchasing:** N/A

11. Other Documents Relevant to Current Operations

**Maintenance:**

- AES Vehicle & Vessel folder – has mileage logs, boat binder materials, maintenance request forms and archive
- Instrument Manuals & Maintenance folder – filled with individual folders for all our WQ equipment
- (YB data drive) YSI Continuous Data folder – inventory folder, manuals

**Purchasing:**

- Purchasing folder - has requisition forms from 2002 –2008 + one 2020 file

## Evaluations of Documentation

### Review Narrative for: AES Vehicle & Vessel Folder

[review completion date: 7/27/20 ]

[author(s): Nicole Kwan]

"Yolo Bypass\YB_Vehicle & Vessel"

#### General Description

This folder contains boat binder materials and checklists, the IEP Fleet Resiliency, a maintenance request archive, monthly mileage logs, tow service information, and other miscellaneous documents relevant to the AES fleet.

#### Evaluation

1. Does this document exist?

   Yes, but this is a whole folder.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   The folder was last added to on 7/15/2020.

3. Who were the authors of the previous document?

   This folder is largely managed by Naoaki Ikemiyagi and Nicole Kwan.

4. Evaluate the quality of the document.

   This folder contains relevant maintenance archives for the AES fleet.

5. What edits were made, if any?

   No edits were made to this folder, but a new Equipment Purchasing and Maintenance SOP was created to provide, in part, procedures for monthly mileage reporting and vehicle/boat servicing timelines.

   Equipment Purchasing and Maintenance SOP:

   https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/_layouts/15/Doc.aspx?sourcedoc=%7BE1EE33E3-8F41-4E56-AC13-10A9CA212C77%7D&file=Equipment%20Maintenance%20%26%20Purchasing_SOP_original.docx&action=default&mobileredirect=true

Review Narrative for: Instrument Manuals & Maintenance Folder

review completion date: 7/27/20

author(s): Nicole Kwan

"Yolo Bypass\YB_Instrument Manuals & Maintenance"

## General Description

This folder contains subfolders for water quality and lower trophic instruments with relevant manuals and maintenance forms for these instruments.

## Evaluation

1. Does this document exist?

   Yes, but this is a whole folder.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   The folder was last added to on 7/15/2020.

3. Who were the authors of the previous document?

   This folder is largely managed by Mallory Bedwell.

4. Evaluate the quality of the document.

   This folder contains relevant maintenance materials and maintenance tracking for water quality and lower trophic instruments.

5. What edits were made, if any?

No edits were made to this folder, but a new Equipment Purchasing and Maintenance SOP was created to provide a one-stop place to figure out where different maintenance documents are located. The new SOP also includes a timeline for maintenance and information on how to purchase new equipment.

Equipment Purchasing and Maintenance SOP:

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/_layouts/15/Doc.aspx?sourcedoc=%7BE1EE33E3-8F41-4E56-AC13-10A9CA212C77%7D&file=Equipment%20Maintenance%20%26%20Purchasing_SOP_original.docx&action=default&mobileredirect=true

A new YBFMP Equipment and Consumables spreadsheet was also created to help facilitate future equipment purchases.

YBFMP Equipment and Consumables spreadsheet:
https://cawater.sharepoint.com/:x:/r/sites/dwrdoc-aes/_layouts/15/Doc.aspx?sourcedoc=%7BC796E432-A1E3-4CED-8868-CD81FAC16FB3%7D&file=YBFMP%20Equipment%20and%20Consumables%20Vendor%20List.xlsx&action=default&mobileredirect=true

Review Narrative for: YSI Continuous Data Folder

review completion date: 7/27/20

author(s): Nicole Kwan

"YOLO BYPASS DATA\YSI Continuous Data"

## General Description

This folder contains subfolders for different sites, equipment, and projects as well as “Manuals” and “EquipmentInventory” folders.

## Evaluation

1. Does this document exist?

   Yes, but this is a whole folder.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   The folder was last added to on 2/14/2020.

3. Who were the authors of the previous document?

This folder is largely managed by Mallory Bedwell and Catarina Pien.

4. Evaluate the quality of the document.

   This folder is not a good place to store manuals and inventory. The rest of the folders are largely unrelated to Equipment and Maintenance and can remain.

5. What edits were made, if any?

   No edits were made yet but will be included in recommendations for the YOLO BYPASS DATA drive pending reorganization.

Review Narrative for: Purchasing folder
[review completion date: 7/27/20]

[author(s): Nicole Kwan]

"Yolo Bypass\YB_Purchasing"

## General Description

This folder contains requisition forms mainly from 2002 –2008 plus two 2020 files regarding CalPIA purchases.

## Evaluation

1. Does this document exist?

   Yes, but this is a whole folder.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   The folder was last added to on 7/1/2020.

3. Who were the authors of the previous document?

   This folder is largely unmanaged. It is unclear who saved many of the files from 2002-2008 here. The recent 2020 files were saved here by Nicole Kwan.

4. Evaluate the quality of the document.

   This folder is a good place to keep old purchasing documents because everyone can access and see them if they need to make a similar purchase in the future.

5. What edits were made, if any?

New folders were added to organize this folder better: "CalPIA," "Sampling Equipment," "Other," and "Archive."

## Recommendations for improvements

- Continue to add to the YBFMP Equipment and Consumables spreadsheet whenever new, specialty equipment is purchased so we can improve the usefulness of the document.
- Relocate documents from the YOLO BYPASS DATA/Continuous YSI Data "Manuals" and "EquipmentInventory" folders into the Yolo Bypass drive "YB_Instrument Manuals & Maintenance" and "YB_Inventory" folders, respectively.
- Put the new Equipment Purchasing and Maintenance SOP in the "Yolo Bypass\YB_Standard Operating Procedures" folder and consider adding a shortcut of this document to the "Yolo Bypass\YB_Vehicle & Vessel" folder, "Yolo Bypass\YB_Instrument Manuals & Maintenance" folder, and "Yolo Bypass\YB_Purchasing" folder.

# Sample Transfers

## General Description/Narrative

Invertebrate drift, fish egg and larval, and zooplankton samples are collected, preserved and transferred as part of the YBFMP's lower trophic monitoring before being shipped to contractors for analysis. Each invertebrate drift and fish egg & larval sample preserved in 10% formalin in the field, will be transferred into 70% ETOH before shipment to outside contractors for taxonomic identification and enumeration. Each zooplankton sample preserved in 10% formalin in the field, will be transferred into 8% Lugol's Iodine solution before shipment to outside contractors for taxonomic identification and enumeration.

## Accounting of Current Practices

1. SOP

    - Lower Trophic Transfer SOP_Revised2018.docx
    - Lower Trophic 70% ETOH Mixture.docx
    - Lower Trophic Transfer SOP_Revised2018.docx (Lugol's SOP, pg.5)
    - Lower Trophic 10% Formalin Mixture.docx

2. QAQC

    QAQC is documented in the SOP and sample tracking flowchart.

    The labeling process could be considered QAQC since each sample gets an internal and external label and both should be checked during the

sample transfer process. These labels are also checked with the original internal label created during field collection sampling.

Jar labels are checked against sample COCs to ensure site, time, and sample type match up, prior to shipping samples to contractors.

3. Safety

- SP_Zooplankton Sample Transfer – Craig (everyone review after)
- Chemical MSDSs for 70% EtOH, Lugol's, and formalin are currently stored in Mallory's cubicle

4. Training

No formal training is organized. An individual who knows how to do the sample transfer process will show and explain how to complete the task then supervise 1-2 sample transfers before letting the new individual work on their own.

5. Research questions (No document needed, used for reference)

Not relevant. Sample Transfers are done to get zooplankton, drift, and fish egg & larval samples ready to be analyzed but there are no specific research questions related to the process.

6. Sampling flowcharts? - Sample tracking (Mallory)

None.

7. SOP videos?

None currently, but this would be a good recommendation for improvement.

8. Changes over time

Changes with contractors have occurred over the duration of the program. These changes can be found in the specific lower trophic metadata sections.

9. COCs (Mallory)

COCs are currently saved in the respective contractors folder in X:/Contracts/Lower Trophic Contracts. Each contract folder has a COC folder for each year and within that is a folder for Working COCs, where new samples are added and it is updated until sent to the contractor, and a Final folder where sent COCs are moved to.

a. A check list of the expected LT samples to be taken is printed before the field day and kept in the LT clipboard.

b. After the samples have been taken and checked off, the check list is returned to the LT sample manager.
c. The manager adds the respective samples to the corresponding tabs:
    i. "phyto taken"- phyto samples that have been processed and can be added to COC
    ii. "Zoop samples to transfer"-zoop 50 and 150 samples that are currently sitting in formalin in Nalgene bottles in the cage.
    iii. "Drift samples to transfer"- drift samples that are currently sitting in formalin in Nalgene bottles in the cage.
    iv. "E&L samples to transfer"-E&L samples that are currently sitting in formalin in Nalgene bottles in the cage.
d. Once samples have fixed in formalin for at least 2 weeks, samples are copied to the "checklist for lab" tab, which is printed and placed in the lab to indicate the sample is ready for transfer.
e. When the checklist is complete, it is returned to the LT sample manager. The manager then adds the transfer information to the "to transfer" tabs to check off the sample is transferred. The sample information is then copied to the COC tab to indicate the sample has been transferred and is ready to ship.
f. Once it is time for shipping, the LT sample manager or any designated checker will print off the COC and check that all sample jars match what is listed on the COC for shipping including:
    i. Site
    ii. Date
    iii. Sampling time
    iv. Sample type
g. If any samples are found to be mislabeled, if the COC is incorrect, or if samples are missing, the COC is updated.
h. The hard copies of the sample transfer checklists are kept with the completed COCs in the LT sample folder in the LT sample managers cube.

There was a need to create this flowchart as part of the review process in order to help explain sample tracking via COC's that was not described in the SOP. Flowchart was created on 5/4/20. Called: LT Sample Tracking Flowchart.docx. Located at:
https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/S

ample%20Transfers/LT%20Sample%20Tracking%20Flowchart.docx?d=w1e76a202018745dfa439465d95cf0608&csf=1&web=1&e=wLmHre

10. Other Documents Relevant to Current Operations
    N/A

## Evaluations of Documentation

### Review Narrative for: Sample Transfers SOP

[started: 5/6/2020, completed: 5/11/2020]

[Amanda Casby, Craig Stuart, Mallory Bedwell]

Original File Path: "Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\zoop_drift_E&L_sample transfer\Lower Trophic Transfer SOP_Rervised2018.docx"

#### General Description

The Standard Operating Procedure for Sample Transfers should thoroughly describe the step-by-step process of transferring zooplankton, invertebrate drift, and fish egg and larval samples. Steps should be detailed enough to allow a novice to perform the task with only basic training. The level of detail should be sufficient to ensure consistency in transfers regardless of the individual carrying out the task.

#### Evaluation

1. Does this document exist?

   Yes it does

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   7/18/2018

3. Who were the authors of the previous document?

   Unknown

4. Evaluate the quality of the document.

   The document has a lot of good information and the correct protocol. Methods could be elaborated on and the equipment list is missing a few essential items.

5. What edits were made, if any?
   - Changes to font size, font type, and added headings/styles.

- Small addition to equipment list
- Separate methods sections for different transfer types
- Added content and different language to methods
- Added past collaborators/editors section
- Deleted heading and added new SOP template heading
- Added MSDS  safety information

Revisions Document: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Sample%20Transfers/SampleTransfers_SOP_revisions.docx?d=w89dcf0b9f79f444b9802aaf0521aa9a7&csf=1&web=1&e=N8gI6w

# Review Narrative for: Sample Transfers SP

[started 5/4/2020; completed: 5/11/2020]

[Craig Stuart]

Original File Path: "Yolo Bypass:\Safety\Standard procedures\SP_Zooplankton Sample Transfer.pdf"

## General Description

The purpose of this safety standard procedure is to outline the potential safety hazards associated with each task of the sample transfer process. For each safety hazard presented, there are mitigations stated to lower the risk of each task while performing sample transfers. This document should be reviewed prior to being training on the sample transfer process. It includes safety measures for zooplankton, drift invertebrate, and egg and larval samples.

## Evaluation

1. Does this document exist?

   Yes.

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   7/29/2019

3. Who were the authors of the previous document?

   Craig Stuart

4. Evaluate the quality of the document.

This document was created very recently and approved by the department. There is a very detailed explanation of the tasks involved and the risks they present. There are also mitigations for each task to help lower the risk while performing the procedures.

5. What edits were made, if any?

n) Added the departments website for chemical safety information (sdsbinderworks.com) for MSDS document references.

Revisions Document: https://cawater.sharepoint.com/:b:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Sample%20Transfers/SampleTransfers_SP_revisions.pdf?csf=1&web=1&e=amNc6z

## Review Narrative for 10% Formalin SOP

[started: 5/4/2020 completed: 5/8/2020 ]

[Amanda Casby]

Original File Path: "Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\Formalin & ETOH\Lower Trophic 10% Formalin Mixture.doc"

### General Description

The Standard Operating Procedure for 10% Formalin Mixture should thoroughly describe the step-by-step process of safely creating the correct mixture. Steps should be detailed enough to allow a novice to perform the task with only basic training. The level of detail should be sufficient to ensure consistency in the mixture regardless of the individual carrying out the task.

### Evaluation

1. Does this document exist?

   Yes this document does exist

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   8/5/2019. Not sure when it was updated before that.

3. Who were the authors of the previous document?

Amanda Casby updated the document in 2019 but the original author or editors before that are unknown.

4. Evaluate the quality of the document.

   This document is very straightforward and pretty good quality. There is no mention of using this mixture for the stomach samples. Some extra notes about safety could be added as well because it is minimal.

5. What edits were made, if any?
   - Formatting changes
   - Table added for measurements
   - Content added to methods and equipment list
   - Past edits/collaborators section added
   - Safety information about MSDS was added

Revisions Document: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Sample%20Transfers/10%25%20Formalin%20Mixture%20_SOP_revisions.docx?d=w3a6de92d380b4f9ca3bfa0402147a35b&csf=1&web=1&e=UcSnf6

## Review Narrative for: EtOH SOP

[start date: 5/4/2020; completion date: 5/11/2020]

[Mallory Bedwell, Amanda Casby]

Original File Path:"Yolo Bypass:\Protocols & Instrument Manuals\Lower Trophic Sampling\Formalin & ETOH\Lower Trophic 70% EtOH Mixture.docx"

### General Description

A document that contains the list of equipment needed and steps to make 70% EtOH from 95% EtOH stock.

### Evaluation

1. Does this document exist?

   Yes

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

   Last updated in 2019. Appears to be updated infrequently.

3. Who were the authors of the previous document?

Unknown

4. Evaluate the quality of the document.

   Pretty good. Steps and formula for diluting could be clarified.

5. What edits were made, if any?
   - Put separate steps depending on amount that needs to be made. Clarified the calculation for diluting 95% EtOH.
   - Safety information about MSDS added.
   - Formatting changed to fit with SOP template

Revisions Document:

https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Sample%20Transfers/70%25%20ETOH%20Mixture_SOP_revisions.docx?d=wfc592632fac940188baffeca26e3f08b&csf=1&web=1&e=eFj3ea

## Review Narrative for: 8% Lugol's Iodine Solution SOP

[start date: 5/4/2020; Completed 5/8/2020]

[Craig Stuart, Amanda Casby]

Original File Path: Yolo Bypass(Z):\Protocols & Instrument Manuals\Lower Trophic Sampling\zoop_drift_E&L_sample transfer\Lower Trophic Transfer SOP_Rervised2018.docx

### General Description

The standard operating procedure for the 8% Lugol's Iodine Solution should provide a step-by-step guide that describes the process of preparing the solution correctly. It should be easy to follow and include enough detail that any employee can perform the task with only basic training.

### Evaluation

1. Does this document exist?

   Yes, this document exists, though it is not a separate document. This SOP is an additional part of the lower trophic transfer SOP (Lower Trophic Transfer SOP_Rervised2018.docx).

2. When was the document last updated? How frequently is it updated (e.g., annual, bi-annual, infrequently, or NA)?

7/18/2018 - This document is infrequently updated and most likely does not require frequent updates unless changes are made to the solution or its percentage for the sample transfer protocol or if safety changes occur.

3. Who were the authors of the previous document?

   Jared Frantzich

4. Evaluate the quality of the document.

   The overall quality of the 8% Lugol's Iodine Solution Mixture SOP is good. There is enough detail to correctly make the Lugol's Iodine Solution. The SOP document could use a reference to safety protocols, and it needs to be updated with current language and SOP template.

5. What edits were made, if any?
   - Changed the language of the general description of the SOP.
   - Updated list of equipment to include addition resources that have helped with making this solution.
   - Included safety detail about wearing PPE.
   - Added MSDS chemical safety document for Lugol's.

Revisions Document: https://cawater.sharepoint.com/:w:/r/sites/dwrdoc-aes/Shared%20Documents/2020%20YBFMP%20Review/YBFMP%20Review%20Working%20Folders/YBFMP%20Activities/Additional%20Activities/Sample%20Transfers/Lugol%27s%20Solution_SOP_revisions.docx?d=w7ed4c92c247447a48638a4b069210759&csf=1&web=1&e=Zea4kV

## Recommendations for improvements

- copy and place the MSDS for ethanol, formalin, and lugol's in the lab where the chemicals and waste are stored.
- Add a more formal training procedure where trainees first watch an experienced person transfer samples. Then they transfer several samples while the experience person watches them. Then they transfer a few samples on their own, which are then checked afterwards by the experienced person.
- Add a more formal training on lab safety. Although most people have some lab experience when coming in, make sure we show everyone where all the safety equipment and cleaning equipment is. NOT on their first day... but rather when being trained on transfers maybe?
  - Rename the safety standard procedure to "Lower Trophic Sample Transfer_SP" to include all sample types in the title instead of just Zooplankton.

- Add a work station set up photo to the Sample Transfers SOP.

# Appendix E: Master Recommendations List

## Priority Rankings

High Priority – These recommendations should be done first. Any recommendations involving staff safety during involvement in YBFMP are in this category as well as tasks such as creating sampling SOPs, improving data management, meeting regulatory requirements, and processes that directly contribute to quality assurance and quality control practices and documentation.

Medium Priority – These recommendations should be done in a timely manner but are not urgent. These recommendations mainly include tasks that will improve the efficiency of sampling practices and documentation of the program. Tasks that will help improve the training process for new staff are also considered medium priority.

Low Priority – These recommendations could help improve the program but are not time sensitive. These tasks do not fill any critical information gaps but clarify information that is already available and/or make it easier to access. Training and SOP videos are included in this ranking as the information already exists in written SOPs and the COVID-19 pandemic is limiting opportunities to safely create the videos.

Discussion Topics – These recommendations are tasks that involve discussion or decision making for the program. They will be discussed at the AES biweekly meetings. Some may create new recommendations or tasks that will then be placed into one of the other priority rankings.

## High Priority

- Create a YBFMP diary or log system so that we are documenting, tracking, and justifying any days where YBFMP standard sampling is not executed. For example, 'on X date YBFMP did not conduct any RSTR sampling due to safety concerns over heavy debris flows', or 'on Y date we cancelled all fieldwork due to a lack of adequate staff due to COVID-19 protocols.'
- Rewrite the YBFMP goals to make sure they fully encompass what we do. Then create one overarching study questions and monitoring goals document for the whole program. Assemble from each element's metadata but also fill in missing gaps.
- Add QA/QC protocols to the Lower Trophic SOP.
- Design and implement a way to QAQC the digitizing hard copy document process. This could be something like adding a line at top or bottom of data sheets that says 'Document scanned by [have a

line to sign name or initial]' or decide on regular intervals for scanning datasheets (e.g., every 1 week, 2 weeks, month etc.). Current interval for data sheet scanning is at the end of a water year, but this is probably too long.

- Document QA/QC information for listed species handling. (At least two staff should be present to handle listed species, with each staff observing each other and providing feedback if the other is not following proper procedures for the safety and health of themselves and the fish.)
- Check to see if MSDS information already exist in the EWQES lab space. If not, print and place the MSDS for ethanol, formalin, and lugol's in the lab where the chemicals and waste are stored. Develop plan for large spills of formalin and communicate to group.
- Rename the safety standard procedure to Zooplankton Sample Transfers to "Lower Trophic Sample Transfer SP" to include all sample types in the title instead of just Zooplankton.
- Update the new rotary screw trap metadata document with otolith procedures.
    - Future Recommendations for Otolith Storage**:** Otoliths can be stored a few recommended ways. If the otoliths are clean and completely free of fish parts, then they can be stored dry. Otoliths can be frozen (limiting the freeze/thaw action) or preserved in EtOH greater than 70%. (Naoaki's advice/input)
- Utilize the initial sample archiving inventory data sheets to direct which samples to discard and help build archiving catalog. Take the following steps to complete:
    - Discard old samples
    - Move samples to new storage areas and inventory samples present and location
    - Top off samples and check lids
- Check in with QA Outlier Detection Subcommittee and QA group towards early 2021 to guide how data are QA/QC'd prior to data publication, and where detailed QA/QC methods should be documented (within metadata, SOP or separate QA document) (timeline sensitive).
- The objectives and goals of the Egg and Larval catch need to be reassessed. If we are no longer collecting egg and larval data from the Sacramento River, then we cannot really say that we collect comparison data anymore. Once new objectives and goals have been determined, this should be added to the SOP and metadata.
    - Once goals have been established, add Lower Trophic sampling goals of all aspects of LT sampling to the combined LT SOP

- Create a document (either a QAPP or QA Metadata) listing general QA Procedures (procedures consistent across data types). This document should include:
    - links to more specific details for different QA/QC procedures
    - detailing changes in QA/QC procedures over time
    - Each document (SOP, metadata, spreadsheets) should be assigned a single document owner responsible for revising the document.
    - All documents described in the document control SOP must be updated to reflect a new naming convention: DCN prefix_document type_version number_Document title
    - Ex: DES-6-SOP-001_v1.0_rotary screw trap.pdf
    - DES-6 = AES
    - SOP-001- sequential numbering of SOPs
- Develop flowmeter calibration protocol for lower trophic sampling with guidance from CDFW.
- Create a versioning system for major and minor changes to any documents. Check first if QA group will be providing one.
- Create some consistent QC tests and code for all data types to more easily run checks.
- Create consistent guidelines on flagging data. Check first for recommendations from QA group.
- Create a comprehensive list of safety documents that need to be updated when personnel leave or are hired:
    - remote work plan
    - emergency contacts
    - float plan template
- Create a remote work plan for screw trap and beach seine sites and add to truck/cage binders.
- Add additional safety communication device for when we have no reception at field sites. Follow up about satellite communication devices (Garmin).
- Put the Programmatic Safety EOR in the SharePoint Safety folder as a reference.
- Create a staff training excel sheet that includes conditional formatting to remind the safety coordinator when someone is due for training (consult Andrew or someone look into how to create this conditional formatting).
- Add calendar events on Yolo calendar for safety checks (AED, First Aid Kit, Fire Extinguishers on boat and in truck, boat flares).
- Update the HIPP documentation/presentation to include a recommendation of bringing a buff/sarong that can be dunked into ice water and used for cooling.

- Create a "YBFMP Regulatory Documents" folder in the shared drive for permanent placement of all regulatory documents related to YBFMP and the compendium document.
- Create "Regulatory Support Compendium Document" (in progress) that contains:
    - Title of regulatory document
    - Copied verbatim text that is specifically relevant to YBFMP
    - Location of text within the document (section, page number)
    - Brief description of why the YBFMP meets this need

**Medium Priority**

- Combine all relevant Standard Operating Procedures into a SOP Book for easy uploading to EDI and other sites.
- Create a new staff training checklist (informal) that can be used to help guide AES staff on what to train new hires on and help them keep track of what they still need to learn.
- Write out the microscope use instructions in their own sub-section in the Coded Wire Tag SOP (currently these instructions are located within an image which is less accessible to all users).
- Edit the shared drive Permits folder structure and include all relevant documents. Create Archive folders to store past permits and reports more logically. See permitting archive review working folder for relevant folders.
- Scan and archive any field datasheets that are not currently archived.
- Add a workstation set up photo to the Sample Transfers SOP.
- Digitize the Invoice checklist (created by Mallory) that is currently only in hardcopy form.
- Create a document to record historical changes and relevant information related to contracting that includes: contract number, contractor information, contract manager, methods (taxonomic resolution), changes to methods, important communications with contract manager, list of projects that were analyzed under the contract, summary of samples analyzed under contract (e.g. years). Also, figure out where to put it (maybe in the contracting folder).
- Compare the newest phytoplankton data received from the contractor to historical data in order to QC for species comparisons/trends.
- Update missing information on the personnel timeline spreadsheet and determine who will update in the future and how often.
- As part of sample archiving guidance, make a complete sample inventory list that is updated yearly. Determine who will oversee updating it, disposing of samples, and topping off samples.
- Create a sampling flowchart for beach seining to help field crew decide when to sample a site under sets of different conditions.

- Create specific criteria for how we make determinations for substrate type and habitat type and add this in the beach seining SOP.
- Create a stakeholder engagement spreadsheet to document all stakeholder engagement that encompasses AES projects and collaborations. This spreadsheet should include names and affiliations, funding (if applicable), years active, citations, outcomes or product, and a short description of each plus note whether it is a YBFMP specific collaboration or a more general AES one. Include tabs for fulfilled data requests, outreach activities (with any relevant links), poster and oral presentations (pull together past poster and talks that can be found in the yolo drive); include presentations to PWTs and other working groups as well. Also include an introductory tab with a shortcut to Word publication list and a separate tab to track changes to the document.
- Create a folder with collaborative project proposals and resulting reports. The stakeholder engagement spreadsheet could live in this folder too. Also include a place to store factsheets.
- Hold an annual fish identification course/refresher for the AES section. Assign a person responsible for organizing it annually rather than on an as needed basis. This could be strategically held when new staff who will be in the field often (field leads, sci aids) join the section. It would also be good to utilize feedback from the USFWS ID test to give refreshers targeting fish that staff members commonly misidentified. Finally, coordinate a systematic effort to save fish throughout the year for these training purposes.
- Hold a juvenile focused fish ID training and/or create a document that distinguishes between some commonly mistaken species would be beneficial for those in the field.
- Create fish ID flashcards that staff can use to test their knowledge and learn about fish species found in Yolo. Have these as printable document so they can be reproduced and edited as needed.
- Complete the metadata for genetics by updating the data table section to reflect new tables in the WISKI database and determining whether salmon and fish ID be separate (timeline sensitive).
- Make the Salmon Field to Lab Decision Tree (pages 19-24 of AES_YBFMP field to lab manual) a separate document to make it easier to update and find.
- Update the boat operation SOP with Splittail-relevant information. This includes replacing some outdated trailer and boat photos and information.
- Create a metadata document with combined metadata information for discrete and continuous WQ monitoring, chlorophyll and nutrient WQ monitoring, and phytoplankton (Mallory and Cat should be involved).

- Add the HOBO sensor to a metadata document.
- Archive the Plan_Submittal Containers.xlsx document since metadata for this is covered in the QA committee WQ document. Chlorophyll Metadata.xls and YBFMP_Stations_Coordinates_Info.xlsx documents are specific to YBFMP and should be kept active.

**Low Priority**

- Create a new training tool for fish dissection such as a video training that includes details from the SOP and lab safety guidelines.
- Create a lower trophic sampling flowchart to describe our on-the-fly and more pre-planned decisions regarding sampling.
- Create a lower trophic video SOP that includes the setup of the nets, the distance from the cleat, how to check flowmeter and add water, and how we set the net and get air bubbles out.
- Add a link to COC documents in the drift metadata.
- Put the permitting EOR "general descriptions" and "accounting of current practices" in a new document to be saved in the Share Drive permitting folder for future reference.
- Add a step in the Yolo Fish and Lower Trophic Data Entry SOP's that references the Digitizing and Archiving Hard Copy Documents SOP.
- Create a COC spreadsheet for listed species handling (potentially under the Permits & Take folder). Items to include in the spreadsheet are: species, quantity, date the specimen(s) left DWR, entity receiving, purpose of transfer (ie. Project), DWR staff who transferred the specimen(s), outside entity person who received specimen(s), location/file patch of/for scanned COC (there are already relevant locations for some of these to be stored so this spreadsheet would just point people where to go).
- Create a SOP for database management that includes information on the data lifecycle. Currently tasks are completed by staff (in the field), scientific aids (data entry, QA/QC), contractors, contract managers, and database managers/data publishers. It would be good to get some clarity on who does what, and the procedures that should be followed (timeline sensitive).
    - Include responsibilities of a database manager in SOP:
        - Filling data requests
        - Editing the database for new/changed fields
        - QC data
        - Flags vs. changes
        - Creating database (log what we needed to do)
        - Tracking changes made (data fields, how we enter data, changes to data themselves)
        - Physical copies and digital copies
        - Working with people entering data on issues

        - Working with the contract manager to get data into database
- Update links for budgeting spreadsheets, COCs, invoices, data, invoice checklist, new SOP and metadata document within SOP document.
- Re-organize existing contract documents in shared drive to be more consistent for each contract.
- Use phytoplankton COCs to help update archive inventory and compare against data received and track that all samples have been analyzed.
- Add end date of COVID-19's impact on 2020 sampling to all metadata documents (timeline sensitive).
- Create rotary screw trap SOP videos. There are a lot of portions of the screw trap operation that are hard to write down in easy to understandable terms so creating a few SOP videos and referencing them in the SOP as "for more clarification see … video" could be very helpful.
- Update the rotary screw trap SOP appendix for the yearly trap maintenance done at the beginning of the trapping season. Next time this maintenance is done a crew member should thoroughly document and photograph the process.
- Keep the chest freezer locked so that random samples are not added without our knowledge. List contact information for an ES on the chest freezer so that if other groups need freezer space we are kept in the loop. Also add a spreadsheet/tracking sheet to the standing freezer with instructions on listing what is put into the freezer.
- Internal portal-publishing guidelines that were created as part of this review will need to be updated once GitHub resources are updated (timeline sensitive).
- Create guidance for publishing for Bulletin 132. This does not include YBFMP data but is relevant to section duties.
- Create a fyke sampling video SOP.
- Edit the folder structure for zooplankton contracts.
- Combine the beach seine sampling locations and coordinate excel sheets into one document that contains all beach seine location details.
- Create a beach seine video SOP (examples at different sites if seining is done different in different circumstances) and a more formal training protocol, possibly video training.
- Import all references into a combined Mendeley or Endnote file to easily cite and locate relevant articles and annual reports.
- Streamline the genetics data pipeline once the new database is complete (timeline sensitive). This includes:
    - Species of interest logs
    - Access database

    - salmon sample excel log
    - raw data files
- Update the boat operation SOP with either a lot of photos to go with each step or a SOP video.
- Create a YBFMP communication strategy. Collaboratively create an outline of what YBFMP should consistently be doing to improve/maintain communication with stakeholders.

**Discussion Topics**

- Discuss the drift CPUE calculation. Our current calculation method for CPUE for drift is not appropriate for how we sample so it needs to be reevaluated.
- Inform the entire section to make sure to record changes in different parts of the data lifecycle for specific databases. In general, a metadata document does not need to be created specifically for data management or data lifecycle but instead changes made to steps of data management should be recorded in the SOP. Specific database "metadata" should also be centralized to document finer changes made to the database (data entry changes for example). Changes made to procedures should be documented in the SOP and transferred to metadata when published/appropriate.
- Come up with unique identifier to link sample collected to lab sample to archived sample and the databases. The sample archiving group is going to continue brainstorming outside of this review element because we think this issue/recommendation reaches further than the scope of review but is still very important and relevant.
- Inform the entire section to continue to add to the YBFMP Equipment and Consumables spreadsheet whenever new, specialty equipment is purchased so we can improve the usefulness of the document.
- Determine how to keep better track of both significant and insignificant changes to any process – data collection, database, data entry, QA/QC, staff in the section, contractor language – to be able to create better metadata. One idea is to create a document that is accessible to all staff and include any significant changes in annually-updated metadata.
- Determine the standard for the egg and larval sampling name. Name needs to be consistent throughout documents. It has been referenced as "fish egg and larval", "fish larvae and egg", "ichthyoplankton", and "egg and larval."
- Update beach seine research questions to more accurately reflect results from scientific review conclusion.
- Determine what sections of the history and background EOR will be saved and how they will be used for documenting future YBFMP

references. For sure save the timeline and continue adding relevant information (COVID-19 sampling suspension).

- Discuss whether the history and background information will be incorporated in other documents or should be produced as a separate document.
- Discuss that documents will be reviewed on an annual basis and will be coordinated and overseen by the document owner. Assign tasks for this and potentially create a spreadsheet for tracking what changes are wanted.
- Reconsider how we classify small, hard to ID species and enter them into the database. For example, small minnows and bass at 25mm are extremely hard to ID and we could be identifying them incorrectly and creating inaccurate data. A more general fish ID might be appropriate for certain species when at a small size. Protocol for when to use genetic ID on any small fish that is challenging to ID.
- Discuss situational criteria for considering the times to potentially lift RSTR cone or pull fyke trap during unusual trap operation conditions.
- Inform entire section that all ES level staff be familiar with purchasing, overtime, and contracting policies and procedures to facilitate redundancy and minimize mistakes when meeting YBFMP resource needs. Discuss when/how this goal will be accomplished.
- Discuss finding a better way to maintain the fish ID data. Options include keep as raw data, create excel sheet, or enter into database (timeline sensitive).
- Assign someone to have a meeting on HIPP and Microcystis at the beginning of the summer season (and maybe mid-summer as well), to remind everyone of HIPP, Microcystis, and emergency protocols.
- Assign someone to digitize tailgate safety forms at the end of the year.
- Update research questions to reflect WQ objective for each discrete and continuous and chlorophyll and nutrients sections of the WQ element.
- Discuss renaming and moving YSI Pro DSS calibration cheat from instrument manuals and maintenance folder to SOP folder.