Evaluating Historical and New Potential DJFMP Beach Seine Sites

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Acknowledgement: Funding was provided by the US Bureau of Reclamation and the CA Department of Water Resources.
Thank you to all past and present LFWO technicians for data collection efforts.

Introduction

The Delta Juvenile Fish Monitoring Program (DJFMP) has used fixed-site beach seines to sample juvenile Chinook Salmon in the Sacramento-San Joaquin Delta (Delta) since 1976 (Figure 1). The IEP-SAG Report (2013) reevaluated DJFMP objectives and determined that it is unlikely that fixed-site sampling is representative of the different habitats found throughout the Delta. In addition, numerous historical sites are unable to be consistently sampled for a variety of reasons. To address these issues DJFMP aims to incorporate a hybrid stratified random sampling design.

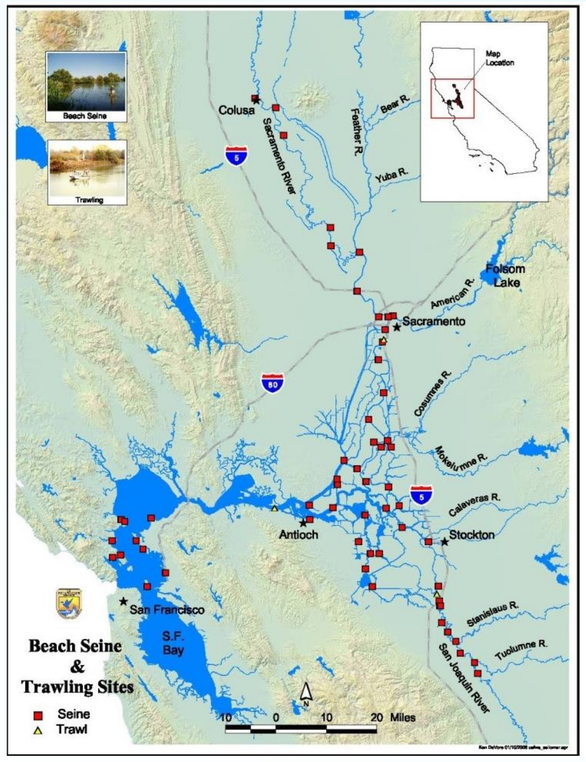

Figure 1. Current DJFMP beach seine and trawling sites.

Objectives

The objectives of this study are to:

1) Calculate the frequency of Code 4's and quantifying the reasons that lead to Code 4's at historical sites

2) Identify new seine sites for a pool of randomly selected sites

Methods

Objective 1: Each beach seine sample was assigned a numerical code based on the quality of the seine conducted: Code 1 (normal) indicates no twists or snags (Figure 2), Code 2 (fair) indicates partial twists or snags, Code 3 (poor) indicates complete twists, snags, large tears, seine not pulled in steadily; or Code 4 (unable to sample) (Figure 3). Seine sites are divided into runs by location. We calculated the frequency of Code 4's at each site from 2005-2019; identified the top sites with the highest frequency of Code 4's from each seine run and used the recorded comments to categorize the reason(s) for not sampling.

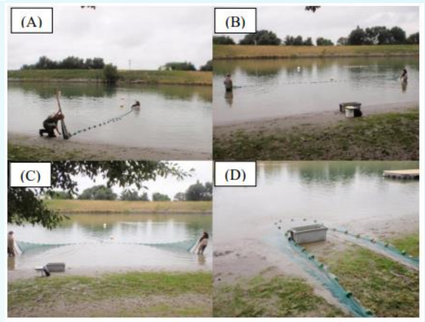

Figure 2. Example of a Code 1 seine sample.

Figure 3. Example of a Code 4. (Rio Vista seine site)

Objective 2: Potential sites were identified using Google Earth and then evaluated in-person. Sites were selected based on the following criteria: vehicle or boat accessibility, sandy substrate, gradual bank gradient, and minimal riparian vegetation. We then conducted a seine to further assess in-water site conditions for snags and drop-offs. If the site was considered suitable it will be incorporated into the pool of randomly selected sites.

Results – Objective 1

The South Delta seine run had the highest frequency of Code 4's, with 5 out of the 9 sites greater than 50%, while the Bay East and West runs have the lowest frequency (Table 1). The Union Island site had the highest frequency at 75.3%.

Table 1. Frequency of Code 4's for the two sites with the highest frequency from each seine run. *indicates seine runs that are boat access only.

Seine Run	Station Code	Site Name	Total Samples (N)	Frequency of Code 4's
Lower Sac	SR130E	South Meridian	764	66.6%
Lower Sac	SR094E	Reels Beach	752	54.5%
North Delta	XC001N	Delta Cross Channel	752	67.6%
North Delta	GS010E	Georgiana Slough	759	34.4%
Central Delta	TM001N	Brannan Island	773	49.3%
Central Delta	MS001N	Sherman Island	772	26.7%
South Delta*	OR019E	Old River	750	69.9%
South Delta*	OR023E	Union Island	761	75.3%
San Joaquin*	SJ083W	N. of Toul. River	556	54.7%
San Joaquin*	SJ068W	Durham Site	552	73.2%
Bay West	SA004W	Tiburon	392	37.5%
Bay East	SP003E	Pt. Pinole East	392	30.9%

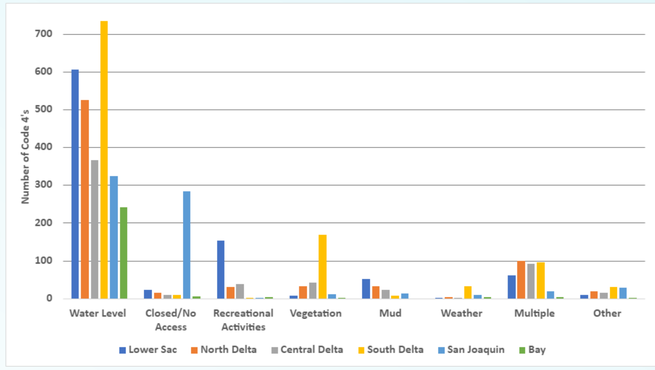

Figure 4. Code 4 Reasons by seine run 2005 -2019.

Water level is the primary reason for not sampling, followed by multiple categories, closed/no access, vegetation, recreational activities, mud, other, and weather (Figure 4). The following sites are primarily limited for these reasons:

- North and Central Delta - water level, vegetation, and mud
- South Delta - vegetation (hyacinth or overgrown sites)
- San Joaquin - low flows that restrict boat access
- Bay East & West - low water levels

Results – Objective 2

New sites were identified using Google Earth and categorized by accessibility (Figure 5). The Lower Sacramento River was the first subregion to be evaluated. An initial site scouting trip via truck evaluated 85 potential sites. Of these, 71 sites were restricted by private property, 13 needed further evaluation at lower water levels, and one site was deemed unsuitable. A second scouting trip reevaluated 30 sites, of which 24 were unsuitable, 5 potentially suitable, and one deemed suitable.

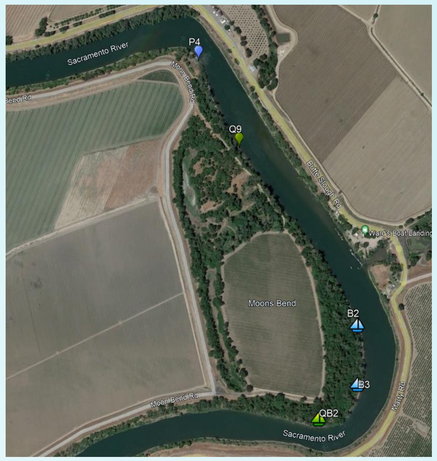

Figure 5. Google Earth image highlighting potential new seine sites. P = potential site, Q = questionable site, B = boat access, QB = questionable boat access

Conclusion

This study begins to address concerns regarding the DJFMP beach seine program, while also highlighting difficulties in improving upon those concerns. To reduce Code 4's due to water level, river stage and tide should be incorporated into the hybrid stratified random sampling design to maximize Code 1 samples. Historical sites that are rarely able to be sampled should be removed, and alternate sites need to be established.

Finding new sites is challenging as most potential beach sites are located on privately-owned land, or otherwise inaccessible. The Lower Sacramento River will be further scouted via boat soon and efforts to find new sites throughout other regions of the Delta are ongoing. Alternative sampling methods, such as boat electrofishing, may be needed to expand sampling efforts in regions that cannot be seined.

References:
Interagency Ecological Program Scientific Advisory Committee (IEP-SAG). 2013. Review of the IEP Delta Juvenile Fish Monitoring Program and Delta Juvenile Salmonids survival studies. Interagency Ecological Program report. 27 p. https://water.ca.gov/LegacyFiles/iep/docs/Final_IEP_SAG_DJFMP-SJSSS_program_review_report_revised.pdf. Accessed 1/12/2022.