

Review of the IEP Delta Juvenile Fishes Monitoring Program and Delta Juvenile Salmonid survival studies

3<sup>rd</sup> DRAFT

Brandes 4/24/11

***Introduction:***

The purpose of the review: To determine if the program is meeting its present objectives, is robust enough to answer future questions and provides information that can be integrated to inform the protection, restoration, and management of naturally produced salmonids and other native species in the Central Valley of California.

Goal and objectives of the program:

What are we trying to do and why: The goal of the programs are to document the relative abundance, distribution and survival of juvenile salmonids and relative abundance and distribution other co-occurring fishes in the lower Sacramento and San Joaquin Rivers, Delta and Bay for the protection, restoration and management of naturally produced salmonids and other native species in the Central Valley of CA.

The five objectives of the DJFMP program are to:

Document the long-term abundance and distribution of primarily fall run juvenile salmon in the Delta,

Comprehensively monitor throughout the year to

document the presence of all races of juvenile salmon

Intensively monitor during the fall months for use in managing water project operations (DCC gates and water export levels) on a real-time basis

Document the abundance and distribution of steelhead

Document the abundance and distribution of other, non-salmonid species caught in the sampling

The goal of the juvenile salmonid studies are to estimate survival through the Delta and determine the factors influencing survival

Update since last reviews

Summarized conclusions of last program reviews (2000, 2004)

How program was changed as a result of last program reviews

Decision to include salmon survival studies in the scope of this review

***Background:***

How do the IEP Delta Juvenile Fishes Monitoring Program and Delta survival studies fit in with other valley-wide salmonid monitoring.

Life-Cycle of Salmon/Steelhead with conceptual model linking life-stages with biological processes

Objectives of, and type of other salmonid sampling conducted through-out Central Valley linked to life-cycle conceptual model figure (hatchery versus naturally produced)

Escapement/Spawning (Adults)

Eggs, hatching and emergence

Upstream rearing

Juvenile abundance, production/juvenile indices,

RBDD, Knights Landing, base of tributaries, Sacramento, Mossdale,

Race Designations

Juvenile survival

Delta rearing/outmigration

Juvenile abundance

Race Designations

Efficiency

Residence time in the Delta

Fish Facility salvage, loss and take

Otoliths

Juvenile survival (fry, smolts, juveniles)

North Delta/South Delta

Ocean migration

Ocean survival

Adult production (catch+escapement) and maturation

The coordination role of IEP on system-wide salmonid monitoring

Project Work Teams – (CVSPWT)

Genetics PWT – Josh Israel

VAMP PWT – Pat Brandes

Juvenile PWT – Bill Poytress

Hatchery PWT – Kevin Neimela

Winter run PWT – Alice Low

Upper River PWT -

Steelhead PWT -

Biotelemetry PWT – Pat Brandes/Cynthia LeDoux-Bloom

Delta Salmon PWT – previous role and need to restart?/Objectives

Why does the Delta matter to salmon and steelhead— possibly do simulation of what survival has to be in Delta to obtain increasing abundance/survival and assessment of where gaps in monitoring are critical. JPE (WR), OBAN, SJ exercise

***The Programs:***

What questions are being asked and what sampling is being conducted to answer these questions?

The questions by specific objective of the DJFMP and juvenile salmon survival program are:

*Document the long-term abundance and distribution of primarily fall run juvenile salmon in the Delta,*

What are the annual abundance trends in juvenile Chinook salmon Jan- March in the beach seines and April – June in the trawls?

Identify the factors in the Delta affecting year class success/abundance

Determine the importance of the Delta as a rearing /nursery area to the adult production

How does the abundance of salmon compare to the assemblage of species in the past and now?

Gather information to inform models

*Comprehensively monitor throughout the year to document the presence of all races/runs of juvenile salmon.*

What are the annual abundance trends of all the various races of juvenile salmon and for hatchery and wild steelhead? Are long term trends increasing, decreasing or staying the same?

Identify the factors in the Delta affecting year class success of the various races

Determine the importance of the Delta as a rearing /nursery area to the adult production for all races

How does the abundance of salmon compare to the assemblage of species in the past and now?

How is the information being used in models?

*Intensively monitor during the fall months for use in managing water project operations (DCC gates and water export levels) on a real-time basis*

How is the data used in real-time to manage water operations and DCC gate closures in the Delta?

Gather information to inform management

*Document the abundance and distribution of steelhead*

What are the annual abundance trends in juvenile steelhead?

How does the abundance of steelhead (wild and hatchery) compare to the assemblage of species in the past and now?  
How is or can the information being used in models?

*Document the abundance and distribution of other, non-salmonid species caught in the sampling*

How has the abundance and distribution of frequently caught native and non-native species changed over time?

*Estimate salmonid survival through the Delta and factors influencing survival.*

What is salmonid survival through the Delta?

How does survival compare between years?

What are the factors affecting survival?

Where is mortality the highest?

How is the information being used to inform models?

What questions may we want to answer with this data in the future.

Success of “restoration” actions

Impacts of climate change

Develop metrics for determining success or failure of future management actions (RPA’s, SWRCB flow standards, BDCP)

Document invasive species effects, and other variables affecting the survival and abundance of salmon and steelhead species.

Measure status and trends of other co-occurring native and non-native species for ESA and Aquatic Nuisance Species Issues.

What additional information is needed to fit models?

Assessment of steelhead and salmon impacts and recovery actions in the Delta (Diversity, production, abundance and spatial structure).

Evidence of other stressors (unnatural predation rates)

Assessment of potential future proposed projects (BDCP)

Impacts of CVP and SWP- both direct and indirect

What are the specific elements of the monitoring and survival programs.

Why are we doing each element of the study?

What has each element of the program told us to date?

*Beach seining*

Historical sites/historical period: (Have established relationships between abundance and flow in North Delta and San Francisco Bay in the spring months). How much sampling is necessary to retain these relationships at  $p < 0.001$ ? How many sites are needed to provide the same annual indices of abundance in the North Delta/San Francisco Bay. How have sites changed over the years and should we drop sites we can’t regularly sample.

Beach seining sites on Sacramento River for winter run/late-fall detection in Oct-December:

What has sampling these additional sites during this period told us? Has the data been used for the closure of the cross channel gates? Would data from historical sites have told us the same thing?

Augmented sites in the Lower San Joaquin River and historical sites over year round period:

How many sites and how frequent is necessary to document use of salmon and other species in various areas.

Other species – what are they and what has our data shown relative to abundance and distribution in our sampling.

#### *Trawling at Sacramento (Kodiak or/ midwater or both currently)*

Historical midwater trawling sampling 2/3 days/week April – June: Inverse relationship between density and flow in February at Sacramento.

Kodiak trawling in the fall period – what have we found?

*Are we efficient for catching juvenile salmon in the fall period at Sacramento before the first storms produce turbidity in the river? Is there difference between day/night trawling in the fall months? How do we compare/combine Kodiak and midwater trawl catches to have compete annual temporal period at Sacramento?*

Summer period midwater trawling– What have we learned about salmonids and other species by trawling during the summer?

#### *Midwater trawling at Chipps Island*

Historical sampling (3 days/week between April – June). Present relationship between density and flow

Summer period (July – September) – What have we learned about salmonids by trawling during the summer?

3 days/week Oct – March: What has the data shown to date during this period? Have we been able to index winter run abundance leaving the Central Valley, other races?

How do we deal with incidental take of Delta smelt or other listed species

How did the change in net mesh size affect our comparability?

How did the change in vessels change our catch?

*Kodiak trawling at Mossdale*

3 days/week Oct-March – What have we found trawling during this period in past years?

What have we found trawling between July and October?

How does what we do compare to what Region 4 does between April and June?

*Potential trawling at Benicia –*

What has pilot efforts to date told us between the difference in catches between Chipps Island and Benicia?

*Survival studies*

Fry survival studies

Central versus North,

Upstream versus Delta,

North Delta versus Yolo Bypass

Smolt survival studies (CWT and transition to acoustic tagging)

South Delta (VAMP, 6 year study, SDTB study)

North Delta (DA8, smolt survival monitoring from releases at Sac)

What types of data are presently not collected and should be or collected and shouldn't be?

Life stage determination of all salmonids

EC at all Bay stations

Other

Efficiency data for seines

Efficiency tests for trawls for estimating abundance.

Regular DNA sampling

Turbidity

Weight (to calculate K)

What are the QA/QC procedures?

How are data managed and made accessible to others?

What has been done in the past, what is planned for the future?

How are the data integrated with data from other sources?

Meta data updates

Net change documentation

How easy is it to manipulate data?

Publish data

Analyses process

Answer relevant questions using appropriate analyses methods

Not just what but why questions

Review of methods/stats by others/Ken/statistician

Submit manuscripts of journal articles for note-worthy findings/methods

Reporting – Types, frequency, content

Weekly reporting

DAT calls

ARS articles/Highlights report

IEP Status and Trends

Annual reporting

Content

CWT recoveries, survival indices, abundance indices, absolute abundance, efficiency tests

What's meaningful in the annual reports

What's missing in the annual reports

IEP Newsletter Articles

Journal Articles

Feedback on program on semi-regular basis

Internal Review schedule

Staffing - Is the present staffing meeting the need or is there a desire to reorganize/change positions to better meet organizational goals?

More admin support to relieve biologists from admin requirements

Biologists versus Bio techs

Career ladders

Developmental opportunities/mentors

Research versus monitoring components

More statistical/modeling/analyses expertise

Training

**Summary:**

What monitoring and research is critical to meeting the objectives of the program, to answer future questions and inform modeling?

How will this monitoring be used to support adaptive management in the future.

Recommendations and justification for changes to the 2014 program.