Zooplankton Integrated Dataset

Metadata Report

Outline May 2019

# Background

1. Problem statement and goals for integrating data and metadata
2. Overview of IEP Monitoring programs that collect zooplankton
3. Synopsis of different methodologies used in the field, laboratory, and calculations
4. Aspirational goal: build tools that facilitate integration of data from special studies (past and future) with the monitoring integrated dataset

# Discussion of major metrics that vary between datasets (see [Combining Datasets](https://drive.google.com/open?id=14tpDRCxfvmFGYvzouwZsiBwUcO-7eLBU) for notes)

1. Mesh size
2. Tow duration and tow type
3. Measurement of environmental variables
   1. Time of day
   2. Tidal stage
   3. Salinity measurements
4. Sampling stations (lat/long)
5. Habitat types (river channels, shoals, submerged vegetation, marsh channels)
6. Target organisms counted
7. Sub-sampling/counting methodologies in the lab

# Tables Comparing Monitoring Programs

1. Definitions of each field
2. Basic Info
   1. Study Name
   2. contact person
   3. contact email
   4. link to data
   5. Link to info on study
   6. Monitoring or special study
   7. Start year
   8. End year
   9. Frequency
   10. Time of year
3. Field Methodology
   1. Geographic scope (i.e. regions sampled)
   2. Tidal stage
   3. Sampling scheme
   4. Net versus pump
   5. Sample duration
   6. Tow method (horizontal, oblique, vertical)
   7. Length of net
   8. Mesh size
   9. Habitat sampled
4. Lab Methodology
   1. Taxa identified - broad (with reference to taxonomy crosswalk table)
   2. Subsampling method
   3. Magnification
   4. Preservative
5. Data Presentation
   1. Density estimate/CPUE calculation
   2. Biovolume
   3. Biomass
   4. Lengths
   5. Samples archived (y/n)

# Detailed methods by survey? Or does the table suffice?

Survey I:

1. Basic Info
2. Field methodology
3. Laboratory methodology
4. Data presentation

Survey II:

1. Basic Info
2. Field methodology
3. Laboratory methodology
4. Data presentation

Etc.

# Detailed descriptions of common methods employed

1. Major tow types
   1. Oblique
   2. Vertical
   3. Horizontal surface
2. Sample preservation techniques
   1. Formalin vs. ethanol
   2. Stained vs. unstained
3. Sub-sampling techniques
   1. Divider trays
   2. Aliquots
4. Counting techniques
   1. Microscopes and magnification
   2. Target volumes (% of sample)
   3. Target counts (overall or by taxa)

# Integrated Dataset Documentation

1. Problem statement
2. Process for combining datasets
   1. Inputs
      1. Working with different file formats and presentations (e.g. flat files vs. access databases)
      2. Obtaining raw data to present along with calculated CPUE
      3. Cross-walking station IDs to latitude and longitude
   2. Creating documented R code
   3. Creating Shiny app for querying?
   4. Taxonomy lookup table development, and lowest-common-denominator procedure for lumping data
3. Caveats to consider when using the integrated dataset
   1. Differences in mesh size
      1. Consideration of suggested conversion factors (i.e. Kimmerer’s 70% capture efficiency for 53um vs. 150um nets)
   2. Differences in tow methodology
      1. Citations to literature that compares surface vs. oblique vs. vertical tows
   3. Differences in measuring environmental variables
   4. Habitat types sampled

# Parking Lot ([some ideas](https://dataoneorg.github.io/Education/bestpractices/document-the-integration))

Map of sampling locations, color-coded for each survey (FRP did this for fish, also for zoop?)

Conceptual model diagram of relationship between datasets

## Table 1. Definitions of metadata parameters

|  |  |  |
| --- | --- | --- |
| **Tables** | **Column Name** | **Description** |
| **2. Basic information** | Contact person | PI or contact person for the survey or study |
|  | Link to data | Link to the data, if online, or other way to get the data |
|  | Link to info on study | Link to project website, if available |
|  | Is data public? | yes/no |
|  | Monitoring or special study | Was this a special study, or a regular monitoring survey? |
|  | start year | Year program started |
|  | end year | Year program ended, or "current" for ongoing studies |
|  | frequency | How frequently samples are collected |
|  | time of year | Months in which sampling occur |
| **3. Field Methodology** | **Geographic scope** | Regions of estuary where sampling occurs |
|  | Tidal stage | When on the tidal stage sampling occur, if relevant |
|  | Sampling scheme | Are stations randomly selected, or fixed stations? |
|  | Sample duration | How long were the tows? |
|  | net versus pump | Were samples collected with a net, or a pump? |
|  | tow method (horizontal, oblique, vertical) | Where in the water column are the samples collected? |
|  | Length of net | net specifications, if relevant |
|  | Net mouth area | net specifications, if relevant |
|  | Mesh size | net specifications, if relevant |
|  | Habitat sampled | Habitat where samples are collected (channels, shoals, shallow water, deep water, wetlands, etc.) |
| **4. Lab methodology** | **Taxa identified** | Broad categories of taxa that are targeted/identified by the study |
|  | Subsampling method | How are samples divided for counting? What parameters are used to decide how much of the sample to count? |
|  | Magnification | Microscope settings |
|  | Preservative | How are samples preserved? Usually either Formalin or Ethanol |
| **5. Data presentation** | Density estimate/CPUE calculation | How is CPUE calculated? |
|  | Biovolume | Is biovolume estimated? By what method? |
|  | Biomass | Is biomass estimated? By what method? |
|  | Lengths | Are lengths measured? yes/no |
|  | Sample archive | Are the samples kept after processing? yes/no |

## Table 2. Basic information on each monitoring program or special study

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study Name** | **contact person** | **contact email** | **link to data** | **Link to info on study** | **Monitoring or special study** | **Data public** | **start year** | **end year** | **frequency** | **time of year** |
| EMP Mysid Net | April Hennessy | april.hennessy@wildlife.ca.gov | <ftp://ftp.wildlife.ca.gov/IEP_Zooplankton/> | <https://www.wildlife.ca.gov/Conservation/Delta/Zooplankton-Study> | Monitoring | yes | 1968 | current | monthly | year round |
| EMP Clark-Bumpus | April Hennessy | april.hennessy@wildlife.ca.gov | <ftp://ftp.wildlife.ca.gov/IEP_Zooplankton/> | <https://www.wildlife.ca.gov/Conservation/Delta/Zooplankton-Study> | Monitoring | yes | 1972 | current | monthly | year round |
| EMP Pump | April Hennessy | april.hennessy@wildlife.ca.gov | <ftp://ftp.wildlife.ca.gov/IEP_Zooplankton/> | <https://www.wildlife.ca.gov/Conservation/Delta/Zooplankton-Study> | Monitoring | yes | 1972 | current | monthly | year round |
| 20mm survey | Trishelle Tempel | trishelle.tempel@wildlife.ca.gov | <ftp://ftp.wildlife.ca.gov/Delta%20Smelt/> | <https://www.wildlife.ca.gov/Conservation/Delta/20mm-Survey> | Monitoring | yes | 1995 | current | bimonthly | March-July |
| FMWT Mysid | Christina Burdi | Christina.Burdi@wildlife.ca.gov | <ftp://ftp.wildlife.ca.gov/TownetFallMidwaterTrawl/FMWT%20Data/> | <https://www.wildlife.ca.gov/Conservation/Delta/Fall-Midwater-Trawl> | Monitoring | Yes | 2007 | current | monthly | Sept-Dec |
| FMWT Clark-Bumpus | Christina Burdi | Christina.Burdi@wildlife.ca.gov | <ftp://ftp.wildlife.ca.gov/TownetFallMidwaterTrawl/FMWT%20Data/> | <https://www.wildlife.ca.gov/Conservation/Delta/Fall-Midwater-Trawl> | Monitoring | Yes | 2005 | current | monthly | Sept-Dec |
| Summer townet Clarke-Bumpus | Christina Burdi | Christina.Burdi@wildlife.ca.gov | <ftp://ftp.wildlife.ca.gov/TownetFallMidwaterTrawl/> | <https://www.wildlife.ca.gov/Conservation/Delta/Townet-Survey> | Monitoring | Yes | 2005 | current | bimonthly | June-Aug |
| Suisun Marsh Salinity Control Gate CB | Christina Burdi | Christina.Burdi@wildlife.ca.gov |  |  | Special Study (IEP Funded) | Not Yet | 2018 | current? | bimonthly | July- Oct |
| Suisun Marsh Salinity Control Gate Mysid | Christina Burdi | Christina.Burdi@wildlife.ca.gov |  |  | Special Study (IEP Funded) | Not Yet | 2018 | current? | bimonthly | July- Oct |
| FRP - zooplankton | Rosemary Hartman | rosemary.hartman@wildlife.ca.gov | doi:10.6073/pasta/ab6a5e42df9a3bbc0dba13c1a4f9bd74 | <https://water.ca.gov/Programs/Environmental-Services/Restoration-Mitigation-Compliance> | Monitoring | YES! | 2015 | current | monthly | March-Dec |
| FRP - mysids/macroinverts | Rosemary Hartman | rosemary.hartman@wildlife.ca.gov | doi:10.6073/pasta/ab6a5e42df9a3bbc0dba13c1a4f9bd74 | <https://water.ca.gov/Programs/Environmental-Services/Restoration-Mitigation-Compliance> | Monitoring | YES! | 2015 | current | monthly | March-Dec |
| Fall Habitat | Anne Slaughter | aslaught@sfsu.edu | none |  | Special Study (IEP Funded) | no | 2011 | 2013 | biweekly | Sept-Oct |
| Aquatic Vegetation | Louise Conrad | louise.conrad@deltacouncil.ca.gov | none yet- dataset still not complete. Contact person is Nick Rasmussen, Nicholas.Rasmussen@water.ca.gov | Study reports, Study Plan, and SOP available at: <https://drive.google.com/drive/folders/1xoUe7KjYt9XuTGSWIdYqZNveAdLMgTQr?usp=sharing> | Special Study | after QA/QC | 2017 | 2018, possibly some sampling in 2019 | monthly | Jan - Dec |

## Table 3. Field methodology

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study Name** | **San Pablo Bay** | **Suisun** | **Sac River** | **SJ River** | **Cache Slough Complex** | **Tidal stage** | **Sampling scheme** | **net versus pump** | **Sample duration** | **tow method** | **length of net** | **mesh size** | **habitat** |
| EMP Mysid Net | X | X | X | X |  | high slack | Fixed Stations | Net | 10 minute | oblique tow | 124 cm | 505 µm | open-water channels |
| EMP Clark-Bumpus | X | X | X | X |  | high slack | Fixed Stations | Net | 10 minute | oblique tow | 73 cm | 160 µm | open-water channels |
| EMP Pump | X | X | X | X |  | high slack | Fixed Stations | Pump | NA | Vertical pump sample ~19.8 gallons |  | 43 µm | open-water channels |
| 20mm survey | X | X | X | X | X |  | Fixed Stations | Net | 10 minute | oblique tow |  | 160 µm | open-water channels |
| FMWT Mysid | X | X | X | X | X |  | Fixed Stations | Net | 10 minute | oblique tow | 124 cm | 505 µm | open-water channels |
| FMWT Clark-Bumpus | X | X | X | X | X |  | Fixed Stations | Net | 10 minute | oblique tow | 73 cm | 160 µm | open-water channels |
| Summer townet Clarke-Bumpus | X | X | X | X | X |  | Fixed Stations | Net | 10 minute | oblique tow | 73 cm | 160 µm | open-water channels |
| Suisun Marsh Salinity Control Gate CB |  | X |  |  |  |  | Fixed Stations | Net | 10 minute | oblique tow | 73 cm | 160 µm | open-water channels |
| Suisun Marsh Salinity Control Gate Mysid |  | X |  |  |  |  | Fixed Stations | Net | 10 minute | oblique tow | 124 cm | 505 µm | open-water channels |
| FRP - zooplankton |  | X | X | X | X |  | Haphazardly selected within fixed sites | Net | 5 minute | horizontal tow | 1 m | 150 µm | Wetlands |
| FRP - mysids/macroinverts |  | X | X | X | X |  | Haphazardly selected within fixed sites | Net | 5 minute | horizontal tow | 2 m | 500 um | Wetlands |
| Fall Habitat |  |  | X | X |  |  | Fixed stations | Net |  | vertical tow |  | 53 um | Channel |
| Aquatic Vegetation |  |  | X | X | X | High or ebbing | Fixed Stations | Net | none- hand tosses @ 5 m each (4 tosses/station) | horizontal | 5 m | 53 um | shallow water, heavy SAV |