CDFW Fall Midwater Trawl Database Metadata

**Updated February 8, 2024 by Taylor Rohlin and Steven B. Slater**

**The following metadata is to summarize field headers reported from the CDFW Fall Midwater Trawl database and catch flatfile.**

*SampleDate:* Date on which the station data were collected.

*SurveyNumber:* The number ascribed to each month of the survey starting in July (1) and ending in June (12). The index surveys are from September to December, surveys 3 through 6 respectively.

*StationCode:*  A three digit code ascribed to each station within a geographic series (i.e., all stations in the Sacramento River Region are in the 700s). See attached chart of sampling locations for further reference.

*MethodCode*: Coding identifying type of tow. MWTR = Fall Midwater Trawl sample, MYSIDCB= Mysid/CB sample

*Index:* A code of 1 indicates these are part of the 100 original sampled stations for index calculations. A code of 0 indicates these are more recently added stations not used for index calculations.

*WaterTemperature (˚C):* Water temperature of surface water recorded in degrees Celsius.

*BottomTemperature (˚C)*: Water temperature of bottom water in degrees Celsius.

*ConductivityTop (μs/cm):* The Specific Conductivity of the first foot of water from the surface in micro-siemens.

*ConductivityBottom (μs/cm):* The Specific Conductivity of the first foot of water from the bottom in micro-siemens.

*CableOut (ft)*: The amount of cable let out past the 100 ft bridles based on station depth.

*DepthBottom (ft)*: Station depth in feet.

*Secchi (m):* A measure of water clarity based on an observer’s ability to distinguish alternating white portions of a disk with white and black painted quarters. The depth in meters from the disk to the waters surface when the white portion of the disk is no longer visible. Disk size is 20 cm.

*Turbidity (NTU)*: A measure of the water clarity in Nephelometric Turbidity Units (began in 2009).

*SampleTimeStart:* Time at which the timer for the sample tow has been started, which corresponds to the time at which the full length of warp has been paid out to the longest length at the beginning of the tow, the brake is set in place and the gear begins fishing.

*SampleTimeEnd:* Time at which the net has been retrieved to within 25 ft of the stern of the towing vessel, corresponding to the time when the net has closed.

*MeterStart:* The flowmeter is thrown into the water once the sample tow has begun, which corresponds to the time at which the full length of warp has been paid out to the longest length at the beginning of the tow, the brake is set in place and the gear begins fishing.

*MeterEnd*: The flowmeter is taken out of the water when the net has been retrieved to within 25 ft of the stern of the towing vessel.

*MeterDiff*: Flowmeter start value subtracted from flowmeter end value. Used to calculate tow volume.

*Volume*: measured in m3, calculated by multiplying the MeterDiff by the rotor constant and 10.7 m2. Where, 0.026873 = rotor constant (converting revolutions into meters traveled), and 10.7 m2 = area of the midwater trawl mouth at 80% open based on gear evaluations (See Net and Flowmeter Descriptions that follow).

*TideCode:* 1 = High Slack, 2 = Ebb, 3 = Low Slack, 4 = Flood.

*TowDirectionCode:* A 1 indicates that the net is being towed with the current (with the tide), a 2 indicates that the net is being towed against the current (against the tide), a 3 indicates tow direction with respect to the current cannot be determined (e.g., slack tide) or is crosswise to the current.

*Organism Code:* numerical code designated to a given species.

*Fork Length (mm):* Length of the fish sampled in a given tow to the nearest millimeter measured from the tip of the snout to a point at the fork of the caudal fin. Lengths were consistently measured after 1989.

*Catch:* The total number of fish, shrimp, crabs, or jellyfish of a given species caught in a given tow.

*Area*: The area designation for each of the stations. 1-8 = San Pablo Bay, 10-11 = Carquinez Strait, 12-14 = Suisun Bay, 15 = Lower Sacramento River, 16 = Lower San Joaquin River, 17 = Eastern Delta.

*AreaWt:* The amount each area is weighted when calculating abundance indices. Units are acre-feet x 10-4.

*WeatherCode:* 1 = Cloud (0-33%), 2 = Cloud (33-66%), 3 = Cloud (66-100%), 4 = Rain

*Microcystis:* 1 = Absent, 2 = Low, 3 = Medium, 4 = High, 5 = Very High

*WaveCode:* 1 = Calm, 2 = Waves w/o whitecaps, 3 = Waves w/ whitecaps

*WindDirection*: Direction of wind origin.

StartLatDegrees: Starting GPS position of tow (DMS). All coordinates in datum WGS84.

StartLatMinutes: Starting GPS position of tow (DMS).

StartLatSeconds: Starting GPS position of tow (DMS).

StartLongDegrees: Starting GPS position of tow (DMS).

StartLongMinutes: Starting GPS position of tow (DMS).

StartLongSeconds: Starting GPS position of tow (DMS).

EndLatDegrees: Ending GPS position of tow (DMS).

EndLatMinutes: Ending GPS position of tow (DMS).

EndLatSeconds: Ending GPS position of tow (DMS).

EndLongDegrees: Ending GPS position of tow (DMS).

EndLongMinutes: Ending GPS position of tow (DMS).

EndLongSeconds: Ending GPS position of tow (DMS).

Gear: A blank field corresponds to the midwater trawl net (MethodCode:MWTR). Coding identifying flowmeter values on mysid sled, CB net = 3, Mysid net = 5, Sled = 7

*TowDuration*: Length of time for Mysid tow (minutes).

Catch per tow: Total fish catch per tow using common name to species as documented in the *Common and Scientific Names of Fishes from the United States, Canada, and Mexico* per the American Fisheries Society. Fish unable to identify to species or genus are “unid”.

**Net Description**

The midwater trawl net has been described by Von Geldern (1972). It has a maximum mouth opening of 12 ft by 12 ft (3.6576 m x 3.6576 m or 13.37 m2), but is likely to become smaller when moving through the water under tension. Mouth area opening estimate while fishing is 80% open, so a 10.70 m2 mouth area. The mesh size decreases from 8" stretched meshed in the forward panel to 1/2" knotted stretched mesh in the codend. Net efficiency has not been determined.

**Flowmeter Description**

A General Oceanics mechanical flowmeter (2030R) is used to convert flowmeter counts to distance traveled (meters) using the provided equation: Difference in counts \* (26873/999999).

**Database Queries**

**Catch0\_Catch**: Displays catch information for any species. (This is the first query step of query **Total Catch**)

**LF1SpeciesLFCatch**: Length frequencies for any species. (This is the first step of query **LF3SpeciesCorrectedLF**)

**LF2SpeciesMeasured:** Number of individuals caught at a given length frequency for use in an expansion factor in next query. (This is the second step of query **LF3SpeciesCorrectedLF**)

**LF3SpeciesCorrectedLF**: Expanded length frequencies for any species.

**Total Catch**: Total catch for any species for index stations only. Flowmeter values < 8000 or > 35000 are given a value of 0 because they fall out of the acceptable range of values. To obtain all catch data delete all restricting criteria for “SurveyNumber” (3 or 4 or 5 or 6) and “Area” (>0)

**Number of stations sampled each year**

The following table shows the number of index stations sampled (Index), as well as the total number of index and non-index stations (Total) sampled for each month and year.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Month/Year** | **Jul** | **Aug** | **Sept** | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** |
| Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total |
| 1967 |   |   |   |   | 76 | 83 | 76 | 84 | 77 | 85 | 75 | 83 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1968 |   |   | 77 | 87 | 77 | 108 | 77 | 106 | 77 | 105 | 67 | 89 | 77 | 85 | 77 | 85 | 77 | 83 |   |   |   |   |   |   |
| 1969 |   |   | 84 | 119 | 80 | 115 | 80 | 112 | 12 | 39 | 84 | 115 | 66 | 94 | 68 | 93 | 78 | 101 |   |   |   |   |   |   |
| 1970 |   |   | 56 | 65 | 64 | 89 | 70 | 95 | 77 | 106 | 74 | 102 | 79 | 89 |   |   | 77 | 88 |   |   |   |   |   |   |
| 1971 |   |   | 28 | 57 | 76 | 104 | 79 | 108 | 74 | 102 | 66 | 81 | 72 | 97 | 77 | 100 | 74 | 102 |   |   |   |   |   |   |
| 1972 | 29 | 51 | 71 | 93 | 71 | 96 | 69 | 91 | 69 | 94 | 61 | 84 | 63 | 65 | 76 | 104 | 76 | 102 |   |   |   |   |   |   |
| 1973 |   |   | 23 | 52 | 81 | 105 | 71 | 93 | 71 | 71 | 57 | 57 | 58 | 61 |   |   | 68 | 72 |   |   |   |   |   |   |
| 1974 |   |   |   |   |   |   |   |   |   |   |   |   | 60 | 60 |   |   |   |   |   |   |   |   |   |   |
| 1975 |   |   |   |   | 86 | 87 | 75 | 75 | 72 | 72 | 63 | 63 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1976 |   |   |   |   |   |   | 83 | 84 | 75 | 76 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1977 |   |   |   |   | 97 | 124 | 99 | 123 | 100 | 122 | 110 | 110 | 83 | 84 |   |   |   |   |   |   |   |   |   |   |
| 1978 |   |   |   |   | 99 | 128 | 100 | 128 | 88 | 114 | 79 | 100 | 99 | 121 |   |   | 102 | 125 |   |   |   |   |   |   |
| 1979 |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 79 | 99 |   |   |   |   |   |   |   |   |
| 1980 |   |   |   |   | 79 | 80 | 82 | 82 | 82 | 82 | 82 | 82 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1981 |   |   |   |   | 86 | 86 | 88 | 88 | 85 | 85 | 73 | 73 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1982 |   |   |   |   | 91 | 91 | 90 | 90 | 93 | 94 | 84 | 84 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1983 |   |   |   |   | 97 | 97 | 95 | 96 | 91 | 92 | 82 | 85 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1984 |   |   |   |   | 93 | 94 | 82 | 82 | 86 | 90 | 86 | 88 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1985 |   |   |   |   | 96 | 96 | 95 | 95 | 84 | 85 | 82 | 82 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1986 |   |   |   |   | 95 | 95 | 95 | 95 | 95 | 95 | 81 | 81 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1987 |   |   |   |   | 96 | 96 | 96 | 96 | 97 | 97 | 97 | 97 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1988 |   |   |   |   | 97 | 97 | 97 | 97 | 97 | 97 | 78 | 78 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1989 |   |   |   |   | 94 | 94 | 96 | 96 | 96 | 96 | 95 | 95 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1990 |   |   |   |   | 95 | 98 | 97 | 101 | 96 | 100 | 97 | 101 |   |   |   |   |   |   |   |   |   |   |   |   |
| 1991 |   |   |   |   | 100 | 111 | 100 | 111 | 100 | 111 | 100 | 111 | 69 | 82 | 69 | 83 | 67 | 82 |   |   |   |   |   |   |
| 1992 |   |   |   |   | 99 | 116 | 99 | 115 | 100 | 117 | 94 | 112 | 77 | 95 | 75 | 94 | 99 | 117 | 9 | 11 |   |   | 41 | 50 |
| 1993 |   |   | 77 | 94 | 100 | 109 | 100 | 110 | 100 | 110 | 100 | 110 | 95 | 112 | 95 | 111 | 100 | 117 | 94 | 111 | 99 | 115 |   |   |
| 1994 |   |   | 78 | 95 | 99 | 116 | 97 | 113 | 100 | 117 | 100 | 117 | 77 | 90 | 76 | 92 | 77 | 93 | 77 | 93 |   |   |   |   |
| 1995 |   |   |   |   | 100 | 124 | 100 | 123 | 100 | 123 | 100 | 122 | 76 | 91 | 78 | 94 | 78 | 89 | 77 | 93 |   |   |   |   |
| 1996 |   |   | 98 | 114 | 103 | 122 | 104 | 123 | 104 | 123 | 101 | 116 | 78 | 94 | 78 | 94 | 95 | 111 |   |   |   |   |   |   |

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| **Month/Year** | **Jul** | **Aug** | **Sept** | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** |
| Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total | Index | Total |
| 1997 |   |   | 100 | 116 | 100 | 116 | 100 | 116 | 100 | 116 | 100 | 116 |   |   | 78 | 87 | 78 | 94 |   |  |  |  |  |  |
| 1998 |   |   |   |   | 100 | 116 | 100 | 116 | 100 | 110 | 89 | 89 | 98 | 109 |   |   | 100 | 111 |   |  |  |  |  |  |
| 1999 |   |   |   |   | 100 | 108 | 100 | 116 | 100 | 116 | 100 | 110 |   |   | 100 | 116 | 78 | 94 |   |  |  |  |  |  |
| 2000 |   |   |   |   | 100 | 101 | 99 | 115 | 100 | 116 | 100 | 116 | 48 | 53 | 77 | 91 | 77 | 93 |   |   |   |   |   |   |
| 2001 |   |   |   |   | 100 | 114 | 100 | 116 | 100 | 116 | 100 | 116 | 77 | 93 | 77 | 93 | 77 | 93 |   |   |   |   |   |   |
| 2002 |   |   |   |   | 100 | 116 | 100 | 116 | 100 | 109 | 100 | 116 |   |   |   |   |   |   |   |   |   |   |   |   |
| 2003 |   |   |   |   | 99 | 115 | 100 | 116 | 100 | 116 | 100 | 116 |   |   |   |   |   |   |   |   |   |   |   |   |
| 2004 |   |   |   |   | 100 | 116 | 99 | 114 | 100 | 116 | 100 | 116 |   |   |   |   |   |   |   |   |   |   |   |   |
| 2005 |   |   |   |   | 100 | 116 | 100 | 114 | 100 | 116 | 100 | 116 |   |   |   |   |   |   |   |   |   |   |   |   |
| 2006 |   |   |   |   | 100 | 106 | 100 | 113 | 100 | 116 | 100 | 116 |   |  |  |  |  |  |  |  |  |  |  |  |
| 2007 |   |   |   |   | 100 | 116 | 100 | 116 | 100 | 116 | 100 | 116 |   |  |  |  |  |  |  |  |  |  |  |  |
| 2008 |  |  |  |  | 100 | 116 | 100 | 116 | 100 | 116 | 100 | 112 |  |   |   |   |   |   |   |   |   |   |   |   |
| 2009 |  |  |  |  | 100 | 123 | 100 | 123 | 100 | 122 | 100 | 123 |  |   |   |   |   |   |   |   |   |   |   |   |
| 2010 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 122 | 100 | 122 |  |   |   |   |   |  |  |  |  |  |  |  |
| 2011 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 122 | 100 | 122 |  |   |   |   |   |   |   |   |   |   |   |   |
| 2012 |  |  |  |  | 100 | 122 | 100 | 115 | 100 | 122 | 100 | 115 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2013 |  |  |  |  | 100 | 121 | 100 | 122 | 100 | 121 | 100 | 122 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2014 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 122 | 100 | 119 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2015 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 122 | 100 | 122 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2016 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 120 | 100 | 122 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2017 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 122 | 100 | 122 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2018 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 122 | 100 | 120 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2019 |  |  |  |  | 99 | 121 | 100 | 121 | 100 | 120 | 100 | 121 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2020 |  |  |  |  | 100 | 121 | 100 | 121 | 100 | 121 | 100 | 121 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2021 |  |  |  |  | 99 | 121 | 100 | 122 | 100 | 122 | 100 | 122 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2022 |  |  |  |  | 100 | 122 | 100 | 122 | 100 | 122 | 100 | 122 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2023 |  |  |  |  | 100 | 130 | 100 | 130 | 100 | 130 | 100 | 130 |  |  |  |  |  |  |  |  |  |  |  |  |
| 2024 |  |  |  |  | 100 | 130 | 100 | 130 | 100 | 130 | 100 | 130 |  |  |  |  |  |  |  |  |  |  |  |  |