|  |  |
| --- | --- |
| California Department of Fish and Wildlife, Bay-Delta Region |  |
| Summer Townet Survey |  |
| 1959-2024 |  |
| Created: 3/14/2025 | |
| By Margaret W. Johnson | |
| Phone: (209) 693-1419 | |
| Email: margaret.johnson@wildlife.ca.gov | |
|  |  |
| Purpose | The following metadata describes content found in “STN\_CatchPerTow1959-2024.csv” and the "CatchPerTow" Excel sheet within "STN\_Data1959-2024.xlsx as reported by the CDFW Summer Townet Survey.  Data is subject to correction and updates.  Please contact the study lead with any questions. |
| Updates since 2021 | The column TowRowID has been added. |
|  |  |
| Column Header | Description |
| Year | Four digit calendar year. |
| Survey | ID value for each series of field-sampling days required to sample the entire station list. Surveys are numbered in sequence each year (1-6). The number of surveys conducted each year varies prior to 2003. After 2003, six surveys were conducted each year. |
| Vessel | This is the ID value for the vessel used to sample STN stations. Blank values occur during historical tows when boat ID was not recorded. |
| Station Code | ID value representing the physical location of the individual sampling site, specific to the Summer Townet (STN) Survey. |
| Sample Date | Date on which sampling occurred, formatted as mm/dd/yyyy. |
| Tow Number | Tow Number = Grouping variable for each sampling event (i.e. tow) conducted at each station within a survey. (1-4) |
| TowRowID | This ID column can be used to link this table with the STN fish fork length and length frequency dataset. |
| Index | Numeric code indicating if a station is included when calculating annual Delta Smelt and Age-0 Striped Bass abundance indices. 1 = index station, 0 = non-index station |
| Temperature Top | Temperature of surface water measured using a Yellow Springs Instrument (YSI) 30 and recorded to the nearest 0.1°C. Water is collected from the surface by bucket at the beginning of the first tow at a station within a survey. |
| Temperature Bottom | Temperature of benthos water measured using a YSI 30 and recorded to the nearest 0.1°C. Water is collected within 1 meter of the benthos by Van Dorn at the beginning of the first tow at a station within a survey. |
| Secchi | Depth at which 20 cm diameter black and white Secchi disk is no longer visible. Measured in shadow of research vessel to the nearest cm. |
| Conductivity Top | Specific conductance (25°C) reported in µS/cm and measured by a YSI 30. Water is collected from the surface by bucket at the beginning of the first tow at a station within a survey. |
| Conductivity Bottom | Specific conductance (25°C) reported in µS/cm and measured by a YSI 30. Water is collected within 1 meter of the benthos by Van Dorn at the beginning of the first tow at a station within a survey. |
| Tide Code | Numeric variable indicating the tidal direction observed prior to the first tow at a station. 1 = High Slack, 2 = Ebb, 3 = Low Slack, 4 = Flood |
| Depth Bottom | Depth (ft) at the beginning of the first tow conducted during a survey. Measured by depth sounder on the boat. |
| Cable Out | Length of line (ft) deployed in 25 ft intervals. Distance is measured from main block on the A-frame on the research vessel to the bridle attached to the sled. Amount of line is determined by depth being sampled. |
| Tow Direction | Numeric code used to indicate direction research vessel is traveling in relation to the current while sampling. 1 indicates that the net is being towed with the current (with the tide), 2 indicates that the net is being towed against the current (against the tide), 3 indicates tow direction with respect to the current cannot be determined (e.g., slack tide) or is crosswise to the current. |
| Wind Direction | Direction of prevailing wind. Determined just prior to beginning of first tow at a station. |
| Microcystis | Numeric rank indicating absence or density of single-celled blue green alga, Microcystis aeruginosa. Rank is determined based on visual inspection of surface water upon arrival at a station. 1 = Absent; 2 = Low, widely scattered colonies; 3 = Medium, adjacent colonies; 4 = High, contiguous colonies; 5 Very High, concentration of contiguous colonies forming mats/scum. |
| Turbidity Top | Turbidity of surface water reported in Nephelometric Turbidity Units (NTU). Sample is retrieved from the surface of the water column, by bucket, at the beginning of the first tow at a station and measured using a Hach 2100Q portable turbidimeter. Measurements began during the first survey of 2010 and continue to the present. |
| Weather | Numeric rank indicating weather conditions at time of sampling. Observations are made just prior to first tow at a station. 1 = 0 – 33% cloud cover; 2 = 33 – 66 % cloud cover; 3 = 66 – 100% cloud cover; 4 = rain. |
| Waves | Numeric ranking indicating severity of waves. Observations are made just prior to the first tow at a station. 1 = Calm; 2 = Waves without white caps; 3 = Waves with whitecaps |
| Tow Start Time | Time of day (24hrs, hh:mm) when tow was started. |
| Meter Serial | This is the serial number associated to the specific flowmeter used in a tow. It has an associated k factor (see Tow Volume below). |
| Meter In | The flowmeter value when towing begins. |
| Meter Out | The flowmeter value when towing ends. |
| Meter Difference | The difference (ΔM) calculated between Meter Out and Meter In. Note: Flowmeter counters range from 0-999999, therefore when ΔM is equal to a negative value add 1000000 to the difference. |
| k factor | A constant specific to each flowmeter and is used to calculate distance in meters. |
| Tow Volume | Volume of water passing through the townet during a sampling event reported in m3. NOTE: A generic tow volume of 735 m3 is reported for years prior to 2003. Beginning in 2003, volume sampled was calculated using a General Oceanics flowmeter that was suspended in the center of the townet opening. The following equation is used to calculate Tow Volume: Volume (m3) = (ΔM\*k\*1.49), where ΔM is the final flowmeter count (Meter Out) minus the initial flowmeter (Meter In) count (Note: Flowmeter counters range from 0-999999, therefore when ΔM is equal to a negative value add 1000000 to the difference. This value is provided in column 'Meter Difference'), k is a constant specific (k factor) to each flowmeter that is determined during annual flowmeter calibration, and 1.49 is the area of the townet mouth opening in m2. |
| StartLatDegrees | Tow start latitude degrees. WGS 1984 |
| StartLatMinutes | Tow start latitude minutes. WGS 1984 |
| StartLatSeconds | Tow start latitude seconds. WGS 1984 |
| StartLongDegrees | Tow start longitude degrees. WGS 1984 |
| StartLongMinutes | Tow start longitude minutes. WGS 1984 |
| StartLongSeconds | Tow start longitude seconds. WGS 1984 |
| EndLatDegrees | Tow end latitude degrees. WGS 1984 |
| EndLatMinutes | Tow end latitude minutes. WGS 1984 |
| EndLatSeconds | Tow end latitude seconds. WGS 1984 |
| EndLongDegrees | Tow end longitude degrees. WGS 1984 |
| EndLongMinutes | Tow end longitude minutes. WGS 1984 |
| EndLongSeconds | Tow end longitude seconds. WGS 1984 |
| Notes on species names | Common names of species enumerated are used as column headers. Striped Bass catch are listed in 4 age specific columns: age-0 Striped Bass, age-1 Striped Bass, age-2 Striped Bass and Striped Bass adult. Lowest taxonomic known level is reported for organisms that were not identified to species. Invertebrates (crab, gelatinous zooplankton, and shrimp) were enumerated starting in 2007 with several species added since then. Two species were added in 2015 that did not previously appear in the Summer Townet Survey flat file. Those species are Blue Catfish (Ictalurus furcatus) and California Tonguefish (Symphurus atricaudus). In 2024, two additional groups were added: Macrobrachium spp. and Crab (UnID). A full list of species common names, taxonomy, STN code, and year first recorded is provided in csv file "STN\_Species.csv" and within the "STN\_Data1959-2024.xlsx" file as the sheet labeled 'Species'. Note that the year first recorded only marks when the species was first counted by STN, not when the species may have been first present in the San Francisco Bay-Delta. A blank in this column indicates that no representative of this organism has been caught by STN. |