California Department of
Fish and Wildlife, Bay-Delta
Region
Summer Townet Survey
1959-2021
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Purpose	The following metadata describes content found in “STN_CatchPerTow.csv” and the "CatchPerTow" Excel sheet within "STN_Data1959-2021.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 2020	Additional terms have been added to the species list to distinguish types of UNIDS (damaged, invertebrate, and Tridentiger/Striped Bass). Vessel name has been added. Start and End Longitude coordinates have been added using 6 additional columns for degrees, minutes, seconds for both start and end positions.

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)
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). A full list of species common names, taxonomy, STN code, and year first recorded is provided in a new csv file "STN_Species.csv" and within the "STN_Data1959-2021.xlsx"

	file as 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.