

***Exchange Format Documentation - Version 2012.2***

***Volume II: Draft Tables***

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Pacific States Marine Fisheries Commission

**Bonneville Power Administration**

**Columbia River Inter-Tribal Fish Commission**

**Idaho Department of Fish and Game**

**Oregon Department of Fish and Wildlife**

**Montana Fish, Wildlife, and Parks**

**Pacific States Marine Fisheries Commission**

**Shoshone-Bannock Tribes**

**U.S. Fish and Wildlife Service**

**Washington Department of Fish and Wildlife**

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# I. Introduction

This document is a companion document to the StreamNet *Exchange Format Documentation - Version 2010.1*. In this document are draft tables which have not yet been accepted for inclusion in the StreamNet data exchange formats. The tables in this document may not stand on their own; that is, they make reference to tables and other information in *Exchange Format Documentation - Version 2010.1*. These draft tables and draft data categories will not necessarily be accepted for inclusion into future versions of the StreamNet *Exchange Format Documentation*.

In addition to the tables below, there are several general topics that have been discussed in relation to the DEF. These include:

* Capturing stock information in the Trend table, particularly for hatchery releases and returns. Stock information used to be captured by StreamNet, but was removed due to a lack of standardization. If standard stock names can be found this can be added back in. Related to this, ESUs may be another way we can characterize data.
* Marks and tags on fish found in the wild or at hatcheries or in fisheries.
* Irrigation diversions and diversion screens.
* Hatchery fraction (proportion of hatchery and wild fish at various sampling sites)
* Making a "sightings" data category. (High priority?)

# II. Draft Data Exchange Format Tables

See "II. Data Exchange Formats" in *Exchange Format Documentation - Version 2010.1* for an explanation of the structure of the following tables.

## A. Tables Related to Time Series Data

### Table A1. JuveAbund Table

This table contains fish abundance data. It has a many to one relationship with the Trend table. At this time, ODFW has submitted data for this table. This table, however, does not include important fields describing what the densities refer to: #/sq. m; #/100 sq. m; #/volume; #/length of stream (along with size of stream); what the StanDev field refers to; and other issues. This table needs to be updated so that it will contain more useful and defined information.

| **Field Name** | | | **Field Description** | | | **Req** | | | **Max Wid** | | | **Data Types** | | | **Codes/Convention** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TrendID | | | Refer to EscData table information. | | | Yes | | | N/A | | | Int | | | Refer to Trend table information. | | |
| BeginDate | | | Refer to EscData table information. | | | Yes | | | N/A | | | Datetime | | | mm/dd/yyyy | | |
| EndDate | | | Refer to EscData table information. | | | Yes | | | N/A | | | Datetime | | | mm/dd/yyyy | | |
| SampMethID | | | The method used to physically sample the fish | | | Yes | | | N/A | | | Smallint | | | Refer to EscData table information. | | |
| CalcMethID | | | The method by which the count was calculated. | | | Yes | | | N/A | | | Smallint | | | Refer to EscData table information. | | |
| MinSize | | | Fork length (in mm) of the smallest fish sampled. | | | No | | | N/A | | | Float | | |  | | |
| MeanSize | | | Mean size (in mm) of the fish in the count. | | | No | | | N/A | | | Float | | |  | | |
| MaxSize | | | Fork length (in mm) of the largest fish sampled. | | | No | | | N/A | | | Float | | |  | | |
| SampSize | | | Sample size | | | Yes | | | N/A | | | Smallint | | |  | | |
| StanDev | | | Density standard deviation | | | Yes | | | N/A | | | Real | | |  | | |
| PerCarryCap | | | Percent of Carrying Capacity | | | Yes | | | N/A | | | Real | | |  | | |
| CountValue | | | Value of Count Type | | | Yes | | | N/A | | | Real | | |  | | |
| RefID | | | Refer to EscData table information. | | | Yes | | | N/A | | | Int | | | Refer to Reference table information. | | |
| CountCom | | | This field is used to document unusual conditions that may affect a particular Juvenile abundance record. Provide additional data that may complement this record, and report the page number on which the number appears in a published reference, etc. | | | No | | | N/A | | | Text | | |  | | |
| DataEntry | | | Compiler's name. | | | Yes | | | 50 | | | Varchar | | | For codes refer to the StreamNet Agency table (downloadable from ftp://ftp.streamnet.org/pub/ streamnet/ASCII\_Data/Agency.txt). | | |
| AgencyID | | | Unique StreamNetID for the agency that entered the data. | | | Yes | | | N/A | | | Smallint | | | For AgencyID codes please refer to the Agency table. (Downloadable at <http://www.streamnet.org/asciitables.html>) | | |
| UpdDate | | | The date and time that the record was updated | | | Yes | | | N/A | | | Datetime | | |  | | |

### Table A2. HatchRelData Table

This table contains hatchery release information for anadromous fishes and has a many to one relationship with the Trend table via the TrendID field. [ Items of interest in relation to hatchery releases include environmental variables such as source water temperature and receiving water temperature. For anadromous fishes indexes of smoltification such as ATPase levels and other biochemical and physical characteristics are of interest for return rate analysis. Can we get such data? ]

| **Field Name** | | **Field Description** | | **Req** | | **Max Wid** | | **Data Types** | | **Codes/Convention** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TrendID | | Refer to EscData table information. | | Yes | | N/A | | Long int (Int) | | Refer to Trend table information. | |
| BeginDate | | Refer to EscData table information. | | No | | N/A | | Datetime (Datetime) | | mm/dd/yyyy | |
| EndDate | | Refer to EscData table information. | | No | | N/A | | Datetime (Datetime) | | mm/dd/yyyy | |
| TagCode | | CWT tag code | | Yes | | 12 | | Text (Char) | | Alpha-numeric code for the origin and release time of a group of fish. Untagged release groups are characterized by a TagCode beginning with ‘!’ | |
| CalcMethID | | The method by which the count was calculated. | | Yes | | N/A | | Integer (Smallint) | | Refer to EscData table information. | |
| RelAgency | | Releasing agency | | Yes | | 4 | | Text (Char) | | Abbreviation for tagging agency | |
| BroodYear | | Brood year of the release | | No | | N/A | | Integer (Smallint) | | The calendar year in which the majority of the parents of the cohort spawned. | |
| RelYear | | Year the fish were released | | No | | N/A | | Integer (Smallint) | | The year of BeginDate if filled, otherwise the year of EndDate | |
| RelTypeID | | Purpose for the release | | No | | N/A | | Integer (Smallint) | | 1 = Experimental  2 = Production  3 = Both experimental and production  4 = PSC key indicator stock  5 = Other index stream  6 = Other  99 = Unknown | |
| NoCWT | | Number released with CWT | | No | | N/A | | Long int (Int) | | Number of fish released with coded wire tags | |
| NoShedCWT | | Number of fish that shed CWT | | No | | N/A | | Long int (Int) | | Number of CWT marked fish that shed the tag | |
| NoUntag | | Number of untagged fish | | No | | N/A | | Long int (Int) | | Number of untagged fish released | |
| Weight | | Weight of fish | | No | | N/A | | Double (Float) | | Average weight of fish in grams | |
| Length | | Length of fish | | No | | N/A | | Long int (Int) | | Average fork length of fish in millimeters | |
| RefID | | Refer to EscData table information. | | Yes | | N/A | | Long int (Int) | | Refer to Reference table information. | |
| CountCom | | Comments from the CWT database | | No | | N/A | | Memo (Text) | |  | |
| DataEntry | | Compiler's name. | | Yes | | 50 | | Text (Varchar) | | The name of the person who entered the record. | |
| AgencyID | | Unique StreamNet ID for the agency that entered the record. Required for new data. | | Yes | | N/A | | Integer (Smallint) | | For AgencyID codes please refer to the Agency table. (Downloadable at <http://www.streamnet.org/online-data/asciitables.html>) | |
| NullFlag | | If true, this field indicates a null value for the defined time period. If set to true, enter in the CountCom field why data do not exist. | | Yes | | N/A | | Yes/No (Bit) | | 0 = False (default)  -1 = True | |
| UpdDate | | The date and time that the record was updated | | Yes | | N/A | | Datetime (Datetime) | |  | |

### Table A3. ResRelData Table

This table contains hatchery release data for resident fishes. Refer to the StreamNet proposal for this table's proposed structure. (Need to compare to HatchRelData table to ensure field names are consistent where appropriate.)

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| ResRelNum | Primary key. Arbitrary number assigned to each individual release of fish. (Scattered releases in the same stream are considered a single release.) | Yes |  |  |  |
| ReleaseType | Purpose for the release; need being filled | No | 1 | Char | E = Experimental  P = Production  B = Both experimental and production  K = PSC key indicator stock  I = Other index stream  O = Other  (These codes come from the CWT database for anads. What might we want for resident fishes? First guesses:  Put-and take hydro mitigation  Put-and take non-mitigation  Put-grow-and-take hydro mitigation  Put-grow-and-take non-mitigation  Brood stock housing  Establish non-native species  Reestablish native species  Enhance existing population)  (Should items such as "mitigation" be in a field separate from items like "put and take?") |
| SpecieID | Foreign key to Specie table | Yes |  |  |  |
| Subspecies |  | No |  |  | (Is this needed? Is it covered by "SpecieID?" |
| Strain | Strain or stock | No |  |  |  |
| RearType | Rearing history of the fish | Yes | 1 | Char | H = Hatchery  N = Natural  M = Mixed  U = Unknown |
| Brood source origin | What's this mean? How is it different from SourceHatch below? |  |  |  |  |
| BroodYear |  | Yes |  |  | The calendar year in which the majority of the parents of the cohort spawned. |
| GenInteg | Is a genetic integrity breeding plan followed for this group? | No | 1 | Bit | 1 = True, 0 = False |
| LengthMean | Mean length of the release group | No |  |  |  |
| LengthMin | Minimum length for the release group | No |  |  |  |
| LengthMax | Maximum length for the release group | No |  |  |  |
| LengthSD | Standard deviation for the release group | No |  |  |  |
| LengthMeas | Type of length measurement | No |  |  | TL, SL, etc. |
| LengthUnit | Length measurement unit | No |  |  | mm, inches, etc. |
| WeightMean | Mean weight of the release group | No |  |  |  |
| WeightMin | Minimum weight for the release group | No |  |  |  |
| WeightMax | Maximum weight for the release group | No |  |  |  |
| WeightSD | Standard deviation for the release group | No |  |  |  |
| WeightMeth | Weight measurement method | No |  |  | Weighed individuals, weighed group. Refer to the other tables to better define this field |
| WeightUnit | Weight measurement unit | No |  |  | g, oz, pound, etc. |
| DiseasNeg | Diseases tested for and determined negative before release. Need a one-to-many: move to a separate table | No |  |  |  |
| DiseasPos | Diseases confirmed before release. Need a one-to-many: move to a separate table | No |  |  |  |
| DiseaseMort | Percent disease mortality before release | No |  |  |  |
| TransferMethod | How the fish were transferred to the stream or lake | No |  |  | Truck, air, backpack, etc. |
| TankBegTemp | Beginning temperature in transfer tank | No |  |  |  |
| TankEndTemp | Ending temperature in transfer tank | No |  |  |  |
| WaterTemp | Temperature of receiving water body | No |  |  |  |
| TempUnits | Measured in Celcius or Fahrenheit? | No | 1 | Char | C or F |
| WaterTempZ | Depth WaterTemp was measured | No |  |  |  |
| BeginDO | Beginning dissolved oxygen concentration in transfer tank |  |  |  |  |
| EndDO | Ending dissolved oxygen concentration in transfer tank |  |  |  |  |
| HaulMort | In-transit mortality percentage |  |  |  |  |
| HaulTime | Time in transit from hatchery to stocking |  |  |  |  |
| RelNum | Number of fish released |  |  |  |  |
| RelDate | Date of release |  |  |  |  |
| RelTime | Time of day of release |  |  |  |  |
| LLID | LLID of the receiving stream | Yes | 13 | Char |  |
| BegFt | The beginning measure in FEET of the release | Yes | N/A | Int |  |
| EndFt | The ending measure in FEET of the release | Yes | N/A | Int |  |
| SourceHatch | HatchID of the egg source. |  |  |  | 98 = N/A  Codes 516-550 currently reserved for WDFW.  Codes 558-599 currently reserved for ODFW.  For a complete list of HatchID codes please refer to the Hatchery table (downloadable at <http://www.streamnet.org/asciitables.html>). |
| RearHatch | HatchID of the main rearing hatchery | Yes |  |  | Refer to Codes/Conventions for SourceHatch |
| RelHatch | HatchID of the release/planting hatchery | Yes |  |  | Refer to Codes/Conventions for SourceHatch |
| PlantProgram | The planting program, if any, that his plant is a part of | No |  |  |  |
| CompilerID | Identification of agency or group who reviewed and/or compiled trend data | Yes | N/A | Tinyint | 1 = Washington Department of Fish and Wildlife  2 = Columbia River Inter-Tribal Fish Commission  3 = U.S. Fish and Wildlife Service  4 = Idaho Department of Fish and Game  5 = Oregon Department of Fish and Wildlife  6 = Pacific States Marine Fisheries Commission  7 = California Department of Fish and Game  8 = Montana Fish, Wildlife, and Parks |
| Comments |  |  |  |  |  |
| RefID |  |  |  |  |  |

### Table A4. ResRelEval Table

Resident fish Hatchery release evaluation for resident fishes. This table has a many-to-one relationship with ResRelData table via ResRelNum field. (This table is not complete.)

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| ResRelNum | Foreign key to ResRelData table | Y |  |  |  |
| Purpose | Purpose for the release. If there were two purposes, enter separately.  (Are there two items being mixed here? Should we put items such as "mitigation" in the ResRelData table and keep items such as "put and take" in this table and related to an evaluation ID? | Y |  |  | 1 = Put and take (hydro mitigation)  2 = Put and take (mitigation, non-hydro)  3 = Put and take (non-mitigation)  4 = Put, grow, and take (hydro mitigation)  5 = Put, grow, and take (mitigation, non-hydro)  6 = Put, grow, and take (non-mitigation)  7 = Brood stock housing  8 = Establish population  9 = Supplement existing population  10 = Biological pest control (e.g., for mosquitoes)  97 = Unauthorized public introduction  98 = N/A (is this a valid concept?)  99 = Unknown (is this a valid concept?) |
| Evaluated | Was an evaluation of this release conducted? | Y | 1 | Bit | 1 = True, 0 = False |
| EvalID | Type of evaluation that was done. (Note that evaluation methods will depend on the purpose of the release. This will probably be a many-to-many relationship between purpose and evaluation methods.) |  |  |  |  |
| HarvestPercent |  |  |  |  |  |
| Method of determining harvest % |  |  |  |  | 1 = Creel census  2 = Tag returns  3 = Mail survey |
| CompilerID | Identification of agency or group who reviewed and/or compiled trend data | Yes | N/A | Tinyint | 1 = Washington Department of Fish and Wildlife  2 = Columbia River Inter-Tribal Fish Commission  3 = U.S. Fish and Wildlife Service  4 = Idaho Department of Fish and Game  5 = Oregon Department of Fish and Wildlife  6 = Pacific States Marine Fisheries Commission  7 = California Department of Fish and Game  8 = Montana Fish, Wildlife, and Parks |
| Comments |  |  |  |  |  |
| RefID |  |  |  |  |  |

### Table A5. FracData Table

This table stores information on the proportion of hatchery and natural fish represented in time series data. This table has a many-to-one relationship with Trend table via the TrendID field.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| TrendID | Refer to EscData table information. Links to Trend table. | Yes | N/A | Long int  (Int) | Refer to Trend table information. |
| BeginDate | The starting date for the count, for calendar year results, usually Jan 1st of that year. For run year, actual date is reported. | Yes | N/A | Datetime (Datetime) | mm/dd/yyyy |
| EndDate | The ending date for the count, for calendar year results, usually Dec 31st of that year. For run year, actual cut off date is reported. | Yes | N/A | Datetime (Datetime) | mm/dd/yyyy |
| NatCount | Number of natural origin fish. | Yes | N/A | Single (Real) |  |
| HatchCount | Number of hatchery origin fish. | Yes | N/A | Single (Real) |  |
| SampSize | Number of fish sampled to determine hatchery fraction. | No | N/A | Integer (Smallint) | Refer to EscData table information. |
| SampMethID | Code for the method of analysis for determing hatchery origin from naturally-spawned fish. Links to Sample table. | Yes | N/A | Integer (Smallint) | Refer to EscData table information. |
| NullFlag | If true, this field indicates a null value for the defined time period. If set to true, enter in the CountCom field why data do not exist. | Yes | N/A | Yes/No (Bit) | 0 = False (default)  -1 = True |
| CountCom | This field is used to document unusual conditions that may affect a particular record. Provide additional data that may complement this record, and report the page number on which the number appears in a published reference, etc. | No | N/A | Memo (Text) |  |
| RefID | Refer to EscData table information. | Yes | N/A | Long int (Int) | Refer to Reference table information. |
| DataEntry | Compiler's name. | Yes | 50 | Text (Varchar) | The name of the person who entered the record. |
| AgencyID | Unique StreamNet ID for the agency that entered the record. Required for new data. | Yes | N/A | Integer (Smallint) | For AgencyID codes please refer to the Agency table. (Downloadable at <http://www.streamnet.org/online-data/asciitables.html>) |
| UpdDate | The date and time that the record was updated | Yes | N/A | Datetime (Datetime) |  |

## B. Tables Related to Distribution Data.

### Table B1. FishSurvey Table

This table contains records of actual fish ***observations***, as well as records of surveys where a targeted species was not detected. Records in this table will overlap within a location/species/run/subrun/stage combination if observations occurred on multiple dates in the same location. Information in this table may have been used to develop information in the FishHabitatDistribution table, but no database link exists between the FishSurvey and FishHabitatDistribution tables.

(ODFW notes: The FishSurvey table still does not address documenting use types, but we may not want to deal with this at this time.)

MFWP note: We are at a loss to the purpose of this table in its current state; it either should not exist at all or should have more details of the survey (like trends). Either put all your surveys in trends, beef up this table so it has value, and then you will still have to query both of these tables (trends and fishsurvey) if you want an inclusive list of all survey areas. We have one table in Montana with all surveys that we have modeled after the Juvenile Abundance draft DEF; it works great. And how can you have a table of "actual fish observations" and then allow the data complier to report under "Documented" whether it was a documented or undocumented observation. My vote, beef up, or use other tables that already exist to get survey info. and with that I will try to submit again.

IDFG feels that there are a variety of problems with this table right now. If we have individual survey data then we should make it possible for people to analyze that data. Without sampling method, date, time, length and width, and other information about each survey they can’t do that. Count is of limited value at best without this information. The number of records in this table will quickly become huge. It will be a storage and management nightmare for PSMFC. It will also be considerable work for state data managers for something that is of dubious and limited use. Do we really want regional StreamNet to basically house all the state’s fish survey data? We use several different survey types to determine distribution, including: redd counts, parr monitoring, juvenile trapping, standard stream surveys, standard lakes surveys, and collecting permits. What kind of fish surveys go into this table? This table isn’t linked to the FishHabitatDistribution table, but is just another standalone table. As such it doesn’t provide any reference to the FishHabitatDistribution table (the DataQualityID and REFID do that). If the purpose is to provide some sense of relative abundance with the count field, then a better approach might be to have the states develop relative abundance datasets that can be submitted in typical StreamNet rolled up fashion. Conceptually, it is not clear to me what this table is supposed to represent and what function it is supposed to play. I think we need further discussion on the purpose and appropriateness of this table in the regional StreamNet database. I propose that we defer this table to another time. Because this table is not linked to FishHabitatDistribution we can proceed ahead with the FishHabitatDistribution table.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| SpecieID | Code for the fish species | Yes | N/A | Integer (Smallint) | Refer to the Trend table. |
| RunID | Code for the fish run | Yes | N/A | Byte (Tinyint) | Refer to the Trend table.  Recently-added or altered codes:  15 = Sea-run (use for coastal cutthroat trout)  18 = Resident  19 = Mixed sea-run and resident  (use for coastal cutthroat trout)  20 = Mixed anadromous and resident  (use for: steelhead/rainbow; sockeye/kokanee) |
| SubRunID | Code for the fish subrun | Yes | N/A | Byte (Tinyint) | Refer to the Trend table. |
| StageID | Code for the life stage of the fish | Yes | N/A | Byte (Tinyint) | Refer to the Trend table. |
| LLID | The LLID of the stream | Yes | 13 | Text (Char) | The 1:100,000 stream ID. |
| BegFt | The beginning measure in FEET of the presence of the species/run in the particular stream | Yes | N/A | Long int (Int) |  |
| EndFt | The ending measure in FEET of the presence of the species/run in the particular stream | Yes | N/A | Long int (Int) |  |
| Count | Number of fish counted in the observation. | No | N/A | Integer  (Smallint) | ODFW has suggested removing this field from this table. Bruce and Mike think keeping it is better. WDFW went first, but didn't comment on it. There is a thread named "FishSurvey.Count field" in the DEF portion of the StreamNet forum to discuss this.  Montana says keep this field. |
| Documented | Is this record based on a documented (written or recorded) sighting (as opposed to saw it, but didn't write it down)? | Yes | N/A | Yes/No (Bit) | -1 = Documented observation  0 = Undocumented observation  MT says don't include undocumented records. |
| DataQualityID | Quality of the data based on the sampler experience, technique, and environmental conditions.  This has not yet been defined. This topic has been moved to a thread named "FishSurvey.DataQualityID" in the StreamNet Tech Forum at http://forum.streamnet.org . | Yes | N/A | Byte  (Tinyint) | Mike: Montana pointed out that there are two issues being mixed up here. First is the quality of the samples taken on a particular day. This relates to conductivity, water level, water clarity, whether gear functioned correctly, etc. Second is the credibility of the record based on the source of the record -- documented, recalled from memory, etc., and that this info maybe should go in the other table. Based on this, I've made a new field to kick about, named 'Credibility.' Discussion at the tech meeting is called for to discuss which (both? either?) tables the Credibility field goes in. |
| Credibility | Credibility of the source of the record. |  |  |  | Following is a revised list of possible DataQualityID categories, along with some additional follow-up questions:  1. Fish captured and observed (or not) as part of an official survey with protocol, and recorded by a professional biologist. Can include research studies or routine monitoring by natural resources agencies, even where observed species was not targeted in the survey.  2. Casual observation of fish made by a professional biologist and documented (i.e. written down). [Mike's note: how's that different from #1?]  3. Observation and documentation of fish made by a non-professional, but someone with direct training and/or direct supervision by a professional.  4. Casual observation of fish made by a professional biologist, not documented, but recalled from memory.  5. Observation and documentation of fish made by a non-professional without supervision or training.  Some other questions:  -- Should observations from untrained/unsupervised non-professionals be accepted into this table? If no, we could drop option #5 above. If yes, should observations from untrained/unsupervised non-professionals that are recalled from memory be accepted?  -- Is this table appropriate for undocumented observations?  MT also says records in this table should be only from professional biologists. |
| Year | Year the survey took place. | Yes | 7 | Text (Char) | Enter year when possible. If exact year is not known, enter "Unknown", and make an appropriate entry in the Comment field (e.g. the approximate year). |
| Comment |  | No | N/A | Memo (Text) |  |
| RefID | Code for the reference in the StreamNet library. | Yes | N/A | Long int (Int) | Refer to Reference table information. |

### Table B2. DistGenetics Table

This table would contain genetics information, by location. Distribution information in this table is a subset of data in the Presence and Use tables. (Table will join Section B, "Distribution Information.")

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| SpecieID | Code for the fish species | Yes | N/A | Smallint | Refer to Trend table information. |
| RunID | Code for the fish run | No | N/A | Tinyint | Refer to the Trend table |
| LLID | The LLID of the stream | Yes | 13 | Char | The 1:100,000 stream ID. |
| BegFt | The beginning measure in FEET of the presence of the species/run in the particular stream | Yes | N/A | Int |  |
| EndFt | The ending measure in FEET of the presence of the species/run in the particular stream | Yes | N/A | Int |  |
| Purity | Genetic status. (Present values are from MT’s distribution database.) | No | N/A | Smallint | 1 = Genetically pure, determined by electrophoresis  2 = Genetically pure; could be invaded by contaminating species  3 = 99.0%-99.9% pure based on electrophoresis  4 = 95.0% - 98.9% pure based on electrophoresis  5 = Hybridized species based on electrophoresis  6 = Especially valuable genetically pure trout with contaminating species  7 = Genetically pure, determined visually (bull trout only)  8 = Hybridized species determined visually (bull trout only)  9 = Potentially pure with no record of contaminating species  10 = Potentially pure, contaminating species planted in drainage historically  11 = Potentially pure with contaminating species  98 = N/A  99 = Unknown |
| Year | Year of collection | Yes | N/A | Smallint | Year the fish were collected for genetic analysis. |
| RefID | Code for the reference in the StreamNet library | Yes | N/A | Int |  |

## C. Tables Related to Habitat Data (draft data category)

This data category currently includes two draft tables. These tables are templates for the habitat data compiled by the U.S. Forest Service as part of the Interior Columbia Basin Ecosystem Management Project (ICBEMP).

### Table C1. HabStrReach Table

This table contains stream habitat data for defined stream reaches that were *measured on the ground at a specified time*. It should not include data interpreted from photos or maps.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| LLID | The LLID of the stream | Yes | 13 | Char | The 1:100,000 stream ID. |
| BegFt | The beginning measure of the habitat survey in feet. | Yes | N/A | Int | Measured from 1:100,000 hydrography. |
| EndFt | The ending measure of the habitat survey in feet. | Yes | N/A | Int | Measured from 1:100,000 hydrography. |
| Date | The date of the stream survey. | Yes | N/A | Datetime | Use median date for multi-day surveys. When only the year is known for historic data, use January 1 of the year. |
| Gradient | Section gradient. | No | N/A | Real | Express as a percent. |
| Width | Mean stream width in the reach, in meters. (Date-specific wetted width? Bank-full width? Are there others?) | No | N/A | Real |  |
| WidthN | Number of observations used to determine mean stream width. | No | N/A | Tinyint |  |
| SubstrateID | Dominant substrate of the stream work location before the project began.  We need another field to define what is being measured. Wolman Pebble counts? Visual estimate of "dominant?" Highest volume or weight from a core or freeze-core sample? | No | N/A | Tinyint | 99 = Unknown  **GWEB classifications**  1 = Bedrock  2 = Boulder (>256 mm)  3 = Cobble (64‑256 mm)  4 = Gravel (2‑64 mm)  5 = Sand  6 = Silt / fines  **Rosgen classifications**  1 = Bedrock  2 = Boulder (>256 mm; >10")  3 = Cobble (64‑256 mm; 2.5"-10")  4 = Gravel (2‑64 mm; 0.1"-2.5")  15 = Sand (0.06-2 mm)  16 = Silt (0.004-0.06 mm)  17 = Clay (<0.004 mm)  **USGS standard sieve sizes**  1 = |
| SubstrParamID | Defines the units SubstrateID represents. | No | N/A | Tinyint |  |
| SubstrMethID | Method used to measure substrate. Cross reference to SampMethID in Sample table. | No | N/A | Tinyint |  |
| Pools | The number of pools in the reach. | No | N/A | Smallint |  |
| BankStable | The percent of the banks in the reach classified as "stable." | No | N/A | Tinyint | Round to nearest number from 0 to 100. |
| ResidPD | Mean residual pool depth of the reach. | No | N/A | Real | Measured in meters. |
| ResidPDN | Number of observations used to determine mean residual pool depth. | No | N/A | Tinyint |  |
| RefID | The primary reference number for the data source. | Yes | N/A | Int | Unique StreamNet reference ID number. |

### Table C2.

This table contains items that may be added to HabStrReach or another table.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| PoolFreq | Pool frequency per reach in pools per channel width (Pools \* Width / Length) | No | N/A | Real |  |
| LWD | Large Woody Debris. Number or pieces at least 24 inches in diameter at a length of 50 ft. from the large end on the West side of the Cascade mountains. At least 12 inches in diameter at a length of 50 ft. from the large end on the East side of the Cascade mountains. | No | N/A | Real |  |
| LWDFreq | LWD frequency per reach in lwd per channel width (LWD \* Width / Length) | No | N/A | Real |  |
| KeyLWD | Key Large Woody Debris. Number or pieces at least 36 inches in diameter at a length of 50 ft. from the large end on the West side of the Cascade mountains. At least 24 inches in diameter at a length of 50 ft. from the large end on the East side of the Cascade mountains. | No | N/A | Real |  |
| KeyLWDFreq | KeyLWD frequency per reach in lwd per channel width (KeyLWD \* Width / Length) | No | N/A | Real |  |
| MaxTemp | Maximum temperature of the “grab” samples per reach | No | N/A | Real |  |
| WDRatio | Average riffle width divided by average depth. | No | N/A | Real |  |

## D. Tables Related to Water Temperature Data (draft data category)

The following tables show the preferred table structure for submitting water temperature data to StreamNet, and should be followed if possible. Water temperature data, however, unlike the other data categories included in this document, may be obtained by PSMFC from a variety of sources outside the StreamNet partner agencies. For this reason, more flexibility has been included in these tables than is usual. (If you are not part of StreamNet but would like to submit water temperature data for inclusion in the StreamNet database, please contact us at 503-650-5400.)

### Table D1. WTSite Table

This table would contain information on water temperature collection sites. Though most fields are not required, the purpose of this table is to provide location information for where temperature data were collected. Either LLID and BegFt, or Longitude and Latitude must be completed with great precision.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| StreamName | Name of the stream or flat water where the water temperature data were collected.  Required if no LLID provided and is not a lake. | Varies | 100 | Varchar | This is required if LLID is not provided. |
| TribTo | Name of the water body the stream is tributary to.  Required if no LLID provided and is not a lake. | Varies | 100 | Varchar | This is required if LLID is not provided. |
| LLID | The LLID of the stream | No | 13 | Char | The 1:100,000 stream ID. LLID/BegFt is the preferred geographic reference to provide. |
| BegFt | Distance in feet from the stream mouth to the site, based on 1:100,000 scale hydrography GIS layer. | No | N/A | Int |  |
| WaterBodyID | Identifier for the unique flat water body. | No | 13 | Char | Refer to Trend table information. |
| AgencySiteCode | Code used for the location by the submitting agency. | No | 50 | Varchar | If >1 submitter have the same location, give different BegFt entries to separate them. |
| Location | Text description of the location. (e.g., "Fawn Creek, 150 m above Doe Creek.") | No | N/A | Text |  |
| Longitude | Longitude coordinate of point in decimal degrees, to at least 4 decimal places. | No | 15 | Decimal | Use decimal degrees, not degrees-minutes-seconds. Points must be very accurate. LLID is preferable over long/lat. Other GIS coordinate systems may also be possible - please contact StreamNet to discuss. |
| Latitude | Latitude coordinate of point in decimal degrees, to at least 4 decimal places. | No | 15 | Decimal |  |
| Directions | Directions to the site. | No | N/A | Text |  |
| TimeZone | Time zone for the location. | Yes | 1 | Char | M=Mountain; P=Pacific |
| Comments |  | No | N/A | Text |  |

### Table D2. WTSet Table

This table would contain information on individual water temperature data sets.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| Set | Assign a code for each data set. | No | 50 | Varchar | This is the code, if any, used by the data provider to identify a data set. |
| LLID | The LLID of the stream | No | 13 | Char | The 1:100,000 stream ID. (If true LLID was not provided in WTSite table to link here, then provide arbitrary numbers in LLID field of both tables so that the link may be made.) |
| BegFt | Distance in feet from the stream mouth to the site | Yes | N/A | Int |  |
| WaterBodyID | Identifier for the unique flat water body. | Yes | 13 | Char | Refer to Trend table information. |
| Collector | Who collected the data | Yes | 250 | Varchar |  |
| Submitter | Who submitted the data to StreamNet | Yes | 250 | Varchar |  |
| Depth | Depth, in meters, of the temperature recorder. | No | N/A | Tinyint |  |
| InstrumentID | Code for type of data logger used. Links to Sample table. | No | 50 | Varchar | Refer to SampMethID field information in EscData table. |
| OrigUnits | Temperatures units of original measures. (Always submit Celcius to StreamNet.) | No | 1 | Char | C = Celcius  F = Fahrenheit |
| Interval | Average interval between measurements, in minutes. | No | N/A | Smallint |  |
| DST | Codes for whether recorded times are standard time (S), daylight savings time (D), mixed (M), or unknown (U). | Yes | 1 | Char | S = Standard time  D = Daylight savings time  M = Mixed  U = Unknown |
| QAID | Code for quality assurance method used. Links to WTQA table. | Yes | N/A | Tinyint | 1 = Not reported  2 = ODEQ 1997  3 = IDEQ 2000 |
| Adjustments | Notes on data set corrections, if any. | No | N/A | Text |  |
| Calibrated | Was logger/probe calibrated? | Yes | 1 | Char | Y = Yes  N = No  U = Unknown |
| MeasurementType | Does each value represent single or multiple measurements? | Yes | 1 | Char | S = Single  M = Multiple |
| ValueType | If not instantaneous measures, does each value represent a maximum, mean, or minimum measurement? Over what time? | No | 100 | Varchar | Describe what each number represents. |
| RefID | The primary reference number for the source of the temperature information | Yes | N/A | Int | Unique StreamNet reference ID number |
| Comments | Notes on environmental conditions, explanations of missing data, etc. (do not include dataset adjustment information - put that in the Adjustments field.) | No | N/A | Text |  |

### Table D3. WTDataInst Table

This table would contain individual temperature measurements, either instantaneous (preferred), or maximum minimum or mean of measures as described in the ValueType field of the WTSet table.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| Set | Assign a code for each data set. | Yes | 50 | Varchar | Not needed if LLID/BegFt are provided. |
| Date |  | Yes | N/A | Datetime | If submitting text files, the referred format is yyyy/mm/dd, with leading zeroes in months and days. |
| Time |  | Yes | N/A | Timetime | If submitting text files, the preferred format is hhmm, 24-hour format, with leading zeroes, with no colon. |
| Temperature | Temperature value | Yes | N/A | Real | Must be Celcius, to nearest 0.1. |

### Table D4. WTDataDaily Table

This table would contain daily summarized temperature measurements. If data can be submitted in the WTDataInst table, do so instead of using this table.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| Set | Assign a code for each data set. | Yes | 50 | Varchar | Not needed if LLID/BegFt are provided. |
| Date |  | Yes | N/A | Datetime | If submitting text files, the referred format is yyyy/mm/dd, with leading zeroes in months and days. |
| DailyN | Number of observations this record is summarized from. | No | N/A | Smallint |  |
| Minimum | Minimum measurement for the date. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| Mean | Mean measurement for the date. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| Maximum | Maximum measurement for the date. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| Range | Maximum - minimum for the date. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| SD | Sample standard deviation for the date. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| Residuals | Residuals from the mean for the date. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MovingMMinSeven | 7-day moving mean of minimum daily measurements. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MovingMMeanSeven | 7-day moving mean of mean daily measurements. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MovingMMaxSeven | 7-day moving mean of maximum daily measurements. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MovingMRangeSeven | 7-day moving mean of daily ranges. | No | N/A | Real | Must be Celcius, to nearest 0.1. |

### Table D5. WTDataAnnual Table

This table would contain annual summarized temperature measurements. If data can be submitted in the WTDataInst or WTDataDaily table, do so instead of using this table.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Data Types** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| Set | Assign a code for each data set. | Yes | 50 | Varchar | Not needed if LLID/BegFt are provided. |
| Year | Year the data represent. | Yes | N/A | Smallint | Use four digits -- "1997" not "97". |
| BeginDate | Earliest date represented. | Yes | N/A | Datetime | If submitting text files, the referred format is yyyy/mm/dd, with leading zeroes in months and days. |
| EndDate | Last date represented. | Yes | N/A | Datetime | See BeginDate field. |
| Minimum | Minimum temperature for the year. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MinDate | Date the minimum temperature of the year was recorded. | No | N/A | Datetime | See BeginDate field. |
| Maximum | Maximum temperature for the year. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MaxDate | Date the maximum temperature of the year was recorded. | No | N/A | Datetime | See BeginDate field. |
| MaxSevenMMax | The highest value for the 7-day moving mean of the daily maxima. | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MaxSevenMRange | The mean of the differences between daily maximum and daily minimum temperature during the "critical period." (See MaxSevenDate below.) | No | N/A | Real | Must be Celcius, to nearest 0.1. |
| MaxSevenDate | The date associated with the MaxSevenMax field. This date, plus three days before and after, define the "critical period." | No | N/A | Datetime | See BeginDate field. |

## E. Tables Related to Water Quality Data (draft data category)

This data category is composed of information about sampling sites on streams and lakes and water quality data of samples that were taken at these sites. The information was collected from the nutrient database that was compiled by Erik Hanson while working at PSMFC on a project for EPA. The intention of his project was to collect nutrient information and other associated water quality information that could be added to the EPA Storet database. StreamNet took his database and determined specific locations for the sites where possible, either tied to the 1:100,000 scale LLID-based hydrography for stream-based sites or to the StreamNet waterbody coverage for sites on lakes and reservoirs. Approximately 2/3 of the sites in the original database could be positively tied to a geographic location (within 400 feet for accuracy for stream-based locations or positive lake/reservoir correlation for waterbodies). Sites that could not be georeferenced with this level of accuracy were not included in this StreamNet database. StreamNet then confirmed a reference document as the source of each data sample record, documented these references in the StreamNet reference table, and delivered the hard copy references to the StreamNet library. The final step was to move the data into a normalized database format, which is detailed below.



### Table E1. WQStreamSite

This table contains information on the stream sampling sites.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Type** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| StreamSiteID | This field uniquely identifies each stream sampling site. | Yes | N/A | Int | Non-intelligent code, primary key for this table. |
| StudyID | The studyID from the original PSMFC data set which detailed the study in which the data was collected. | No | 15 | Char |  |
| LLID | The longitude-latitude identifier of the stream on which this site is located. | Yes | 13 | Char | Foreign key to LLIDStream table. |
| BegFt | The measure, in feet, along the stream where this site is located. | Yes | N/A | Int |  |
| HUC | The EPA 4th code hydrologic cataloguing unit (ie. watershed) where this site is located. | Yes | N/A | Int |  |
| SiteDescription | A text description from the original PSMFC data set which describes the location of the sampling site. | No | 150 | Char |  |

### Table E2. WQLakeSite

This table contains information on the lake and reservoir sampling sites.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Type** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| LakeSiteID | This field uniquely identifies each lake or reservoir sampling site. | Yes | N/A | Int | Non-intelligent code, primary key for this table. |
| StudyID | The studyID from the original PSMFC data set which detailed the study in which the data was collected. | No | 15 | Char |  |
| WaterbodyID | The unique identifier of the lake or reservoir on which this site is located. | Yes | 13 | Char | Foreign Key to waterbody table. |
| Longitude | The longitude of the site's location on the waterbody. Not always available. Useful in pinpointing the location of sites on larger lakes. | No | N/A | Double | Decimal degrees to at least 3 decimal places. |
| Latitude | The longitude of the site's location on the waterbody. Not always available. Useful in pinpointing the location of sites on larger lakes. | No | N/A | Int | Decimal degrees to at least 3 decimal places. |
| HUC | The EPA 4th code hydrologic cataloguing unit (ie. watershed) where this site is located. | Yes | N/A | Int |  |
| SiteDescription | A text description from the original PSMFC data set which describes the location of the sampling site. | No | 150 | Char |  |

### Table E3. WQStreamData

This table contains data from water quality samples at stream sites.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Type** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| StreamSampID | Code which uniquely identifies each unique sample and parameter combination. | Yes | N/A | Int | Non-intelligent code, primary key for this table. |
| StreamSiteID | The code for the stream sampling site where this sampling data was collected. | Yes | N/A | Int | Foreign key to WQStreamSite table. |
| Date | Date on which this sampling data was taken. | Yes | N/A | Date/time | mm/dd/yy |
| Time | Time at which this sampling data was taken. | No | N/A | Int | Military format (ex: 1535) |
| ParamID | Code which identifies the parameter of this water quality sampling data. | Yes | N/A | Int | Foreign key to WQParameter table. |
| ParamValue | Value of water quality sample for this parameter. | Yes | N/A | Double |  |
| Flag | Flag for this sampling data. | No | 1 | Char | Foreign key to WQFlag table. |
| RefID | The unique StreamNet reference ID that identifies the source document or database from which the data was obtained. | Yes | N/A | Int | Refer to Reference table information. |

### Table E4. WQLakeData

This table contains data from water quality samples at lake or reservoir sites.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Type** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| LakeSampID | Code which uniquely identifies each unique sample and parameter combination. | Yes | N/A | Int | Non-intelligent code, primary key for this table. |
| LakeSiteID | The code for the lake or reservoir sampling site where this sampling data was collected. | Yes | N/A | Int | Foreign key to WQLakeSite table. |
| Date | Date on which this sampling data was taken. | Yes | N/A | Date/time | mm/dd/yy |
| Time | Time at which this sampling data was taken. | No | N/A | Int | Military format (ex: 1535) |
| ParamID | Code which identifies the parameter of this water quality sampling data. | Yes | N/A | Int | Foreign key to WQParameter table. |
| ParamValue | Value of water quality sample for this parameter. | Yes | N/A | Double |  |
| Flag | Flag for this sampling data. | No | 1 | Char | Foreign key to WQFlag table. |
| RefID | The unique StreamNet reference ID that identifies the source document or database from which the data was obtained. | Yes | N/A | Int | Refer to Reference table information. |

### Table E5. WQParameter

This table describes water quality sampling parameters.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Type** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| ParamID | Code which uniquely identifies each water quality sampling parameter. | Yes | N/A | Int | Non-intelligent code, primary key for this table. |
| Parameter | Water quality sampling parameter. | Yes | 20 | Char |  |
| Description | Description of the water quality sampling parameter. | Yes | 150 | Char |  |

### Table E6. WQFlag

This table describes flags for water quality samples.

| **Field Name** | **Field Description** | **Req** | **Max Wid** | **Type** | **Codes/Convention** |
| --- | --- | --- | --- | --- | --- |
| Flag | Code which uniquely identifies each water quality sampling flag. | Yes | 1 | Char | Primary key for this table. |
| Description | Description of the water quality sampling flag. | Yes | 150 | Char |  |

## F. Hatchery Facility Table

The table in this section already exists in the official DEF. However, when location coding was changed for DEF version 2003.1 from using LLID/SupercodeID/PointID/WaterbodyID to simply LocationID, it was decided to leave the hatchery facilities table as it was because it was unclear how it would be changed. The Hatchery table is special because it contains LLID and WaterbodyID fields that are meant to be filled in simultaneously if a hatchery is on a reservoir, so a simple switch to LocationID is not as appropriate. The tables shown here are what might occur if a change to LocationID were to procede. The biggest question in the structure shown below is the interaction between the LocationID, WaterbodyID, and OutflowTypeID fields: would we want to change what goes into the LocationID and WaterbodyID fields given a particular OutflowTypeID?