

**UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Oregon State Office
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In Reply Refer to:
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February 9, 1998

EMS TRANSMISSION 2/9/98
Instruction Memorandum No. OR-98-033
Expires: 9/30/99

To: All DMs, DSDs, Staff Chiefs

From: State Director

Subject: HYDRO Update Standards--Amendment and Clarification to Standards Distributed in
Instruction Memorandums No. OR-97-037 and No. OR-97-037, Change 1

This memorandum amends Instruction Memorandum No. OR-97-037 and Change 1 to that document. It provides specific changes to the standards and some additional clarifications to the original memoranda. To simplify the use of these changes, the updated standards document is provided as Attachment 1.

Code Changes and Clarifications:

1. STREAMS LAYER--HYDFLOW

Under the Space Classification category, the code "G" is added for a new "Groundwater" designation. This attribute should be used for portions of a stream which have subsurface flow. They connect reaches with recognized surface flow. This is an estimate of the subsurface flow location, and it is included to assist stream routing and dynamic segmentation.

Under the Time Classification, the code "U" is added for unclassified. It is used in conjunction with the "G" Space Classification. This is not intended to be a designation for surface flow duration. All continuous or interrupted classifications should receive a "P", "S", or "E" designation.

Two additional codes have been added to HYDFLOW. They are to be used in lieu of the Space and Time Classifications. These codes are intended to indicate flow modification. A "DL" (loss) code is added to indicate ditches or canals which transport water from a contributing 5th field watershed to a receiving watershed. It is a designation for all ditches or canals transporting water from a contributing watershed and represents a loss of water from that watershed. A "DG" (gain) code is used for all ditches or canals that receive water from an adjacent 5th field contributing watershed.

2. STREAMS LAYER-- PLANFLOW

A new code, "Z", is added to meet the Interior Columbia Basin Ecosystem Management Plan definition of intermittent. This attribute is intended to provide the eastside districts with a method to designate non-perennial streams for various management actions (e.g., delineation of Resource Conservation Areas).

A new code, "X", is added for streams where there is no associated management activity planned. There is a dependency between the use of this code and the use of a HYDFLOW code. An "X" here should normally correspond with the use of "GU" in HYDFLOW.

3. STREAMS LAYER--FEDDIST

This attribute is a horizontal distance expressed in meters. There needs to be recognition that slope distances must be converted to horizontal distance prior to populating this field in order to have meaningful buffer distances. For this HYDRO update process, there is no state protocol established on how slope distance is derived. It is a district/local steward's responsibility to document the process used.

4. STREAMS LAYER--Submerged channel centerlines

Where a single-line submerged channel occurs for lakes, impoundments, and double-lined rivers, that submerged channel trace will be used as the centerline for the polygonal waterbody shoreline. Where the submerged channel is represented by a double-line trace, then a centerline will be generated for the submerged channel and the resultant trace will be used as the centerline for the polygonal waterbody shoreline. This contrasts with the standard method of generating centerlines based solely on waterbody shoreline.

5. LAKES LAYER--DURATION

This is a clarification on use of the "LS" code. For "LS" lakes during some point of the year (usually the dry season), there is no land surface expression of water. Basically the lake "dries up" annually.

6. LAKES LAYER--Minimum mapping resolution

This applies to all features portrayed on the LAKES Layer. The minimum mapping resolution is limited by tolerances set within the layer. Currently, the pertinent (fuzzy) tolerance is set to .5 meters. So, theoretically, features above this range will not snap closed during update processing and can be mapped.

United States Geological Survey (USGS) has a standard convention of depicting lakes as polygons if they have a diameter of greater than 18 meters at 1:24,000 scale. They depict lakes with lesser diameters as points. It is important to note that we do not map small lakes as points in the HYDRO data model. For USGS source data, we have converted their small lakes portrayed as points to 18 meter circles in the HYDRO Lakes Layer. Because of a BLM need to map features less than the USGS minimum polygon size, no minimum mapping resolution other than the inherent Arc/Info tolerance value of .5 meters is established in this policy. In practice, 5 meters may serve as a good guideline for a minimum feature size to be mapped as polygons in the LAKES Layer.

7. LAKES LAYER--Features that should be included in this layer

All water bodies that need to be represented by a polygon should be included in the LAKES Layer. This includes heliponds and other water bodies that support fire management. Some of these features may also be found on another layer such as the Fire Water Source Theme that is currently being developed.

8. STREAMS/LAKES LAYERS--Naming convention for centerlines

Case 1-When two or more streams with different names enter a lake, impoundment, or wetland, the generated centerline for the polygon will be assigned the name of the stream "downstream" from the waterbody. This is the stream name at the outlet.

Case 2-When two or more streams with different names enter an estuary, the generated centerline for the estuary will be assigned the stream name with the highest order entering the estuary.

9. STREAMS/LAKES/HYDPTS LAYERS--SPATIALSOURCE

In determining which code to use, preference should be given to the primary method employed to derive the location and extent of the waterbody. As an example, if a combination of the Crenulation method (CRW) and an Image (IMG) are used to determine the location, then "CRW" should be selected as the SPATIALSOURCE code since it is the primary method for determining the extent of the stream.

10. STREAMS/LAKES/HYDPTS LAYERS--WTRBODYTYPE

As a point of clarification, springs (points) and streams (lines) can be coincident with wetlands (polygons). Wetlands cannot be coincident with lakes and impoundments. Wetlands are defined by Technical Reference TR 1737 - 11 - 1994 and BLM Manual 1737, USDI - 1992. This is not necessarily a jurisdictional classification. A new code "IW" has been added to indicate impoundments specifically designated for wetland development.

11. STREAMS/LAKES/HYDPTS LAYERS--Acceptance of other data sources

A validation process needs to be performed prior to inclusion of other data sources into the HYDRO theme update. For example, in many instances, it may be advantageous to contact your adjacent National Forest to determine whether they have streams data for their lands. Where available, the acquired data must meet HYDRO update standards and definitions. When this requirement is satisfied, the acquired data may be included as an update to replace Cartographic Feature File (CFF) source data that was originally merged to complete the 5th field coverages and delivered to the districts.

12. STREAMS/LAKES/HYDPTS LAYERS--Feature Names

Several NAMES fields are included in the HYDRO data model. These include the STREAMNAME and NODENAME fields in the STREAMS Theme, the LAKENAME field in the LAKES Theme, and the HYDPTSNAME field in the HYDPTS Theme. These all represent the repository for "official" HYDRO feature names. A clarification is needed for the use of these fields.

USGS maps contain a number of feature type labels for which some confusion may arise when incorporating them into the NAMES fields. Not all feature types which are labeled on USGS maps or are found in the Geographic Names Information System are appropriate for these fields. Examples of feature types that are related to waterbodies yet are excluded from use in the "official" NAMES fields include such features as valley, gulch, canyon, hollow, draw, gorge, etc.

Below is a listing which illustrates the types of feature names that may be included in these "official" NAMES fields. This list is not all-inclusive. Features types which are excluded from the "official" NAMES fields could be included as a "local" name. Fields are provided for this in each of the three HYDRO themes. Examples of acceptable feature types for the "official" NAMES fields include the following (grouped according to USGS classification of features):

STREAMS THEME--STREAMNAME

canal - manmade waterway used by watercraft or for drainage, irrigation, mining, or water power (ditch).

gut - relatively small coastal waterway connecting larger bodies of water or other waterways (creek, inlet, slough).

stream - linear body of water flowing on the Earth's surface (branch, brook, creek, distributary, fork, river, slough).

STREAMS THEME--NODENAME

dam - water barrier or embankment built across the course of a stream or into a body of water to control and (or) impound the flow of water

falls - perpendicular or very steep fall of water in the course of a stream (cascade, cataract, waterfall).

rapids - fast-flowing section of a stream, often shallow and with exposed rock or boulders.

LAKES THEME--LAKENAME

Note: These may be applied to centerlines on the STREAMS Theme.

bay - indentation of a coastline or shoreline enclosing a part of a body of water; a body of water partly surrounded by land (cove, estuary, gulf, inlet, sound).

harbor - sheltered area of water where ships or other watercraft can anchor or dock (port).

lake - natural body of inland water (lagoon, laguna, pond, pool, waterhole).

reservoir - artificially impounded body of water (lake).

sea - large body of salt water (gulf, ocean).

swamp - poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water (bog, marsh).

wetland - areas inundated or saturated by surface or ground water.

HYDPTS THEME--HYDPTSNAME

geyser - eruptive spring from which hot water and (or) steam and in some cases mud are periodically thrown.

spring - place where underground water flows naturally to the surface of the Earth (seep).

well - manmade shaft or hole in the Earth's surface used to obtain fluid or gaseous materials.

Stewardship questions regarding these code enhancements and clarifications should be addressed to Chester Novak (email *cnovak*, 503-375-5626) or Bob Ruediger (email *bruedige*, 503-375-5608) of the Salem District Office. GIS-related questions may be addressed to Dan Wickwire of OR-955 (email *dwickwir*, 503-952-6272).

Signed by
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Associate State Director

Authenticated by
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Management Asst.

1 Attachment

1 - HYDRO Themes and Attribute Standards - REVISED (33 pp)

Distribution

WO-230 (Room 204 LS) - 1

OR-955 (Dan Wickwire) - 1

OR-080 (Chester Novak, Bob Ruediger) - 2

OR-050 (Ron Wiley, National Riparian Team) - 1

OR-931 (Karl Stein) - 1

OR-933 (Janis VanWyhe) - 1

933:VANWYHE:1/23/98:x6083:2010

Additions:955:1/30/98

Additions:2/3/98

**HYDRO THEMES
(STREAMS, LAKES, HYDPTS)**

ATTRIBUTE STANDARDS

HANDBOOK

Revised January 30, 1998
BUREAU OF LAND MANAGEMENT
OREGON/WASHINGTON

HYDRO THEMES ATTRIBUTE STANDARDS

A. STREAMS THEME: REQUIRED ATTRIBUTES FOR ARCS.....	Attachment 1 -4
1. Stream Name.....	Attachment 1 -4
2. Stream Link.....	Attachment 1 -4
3. Lake Link.....	Attachment 1 -5
4. Spatial Data Source.....	Attachment 1 -5
5. Field Verification Date.....	Attachment 1 -6
6. EPA Reach Number.....	Attachment 1 -6
7. Stream Order.....	Attachment 1 -6
8. Water Body Type.....	Attachment 1 -7
9. Hyd Flow.....	Attachment 1 -9
10. Plan Flow.....	Attachment 1 -10
11. Individual Species.....	Attachment 1 -10
12. Fish Bearing.....	Attachment 1 -13
B. STREAMS THEME: RECOMMENDED ATTRIBUTES FOR ARCS.....	Attachment 1 -13
1. Spatial Data Edit Technique.....	Attachment 1 -14
2. Local Stream Name.....	Attachment 1 -14
3. FPA Buffer Distance.....	Attachment 1 -14
4. Federal Buffer Distance.....	Attachment 1 -15
5. ODF Stream Class.....	Attachment 1 -15
6. USFS Stream Class.....	Attachment 1 -15
7. Confinement.....	Attachment 1 -16
8. Gradient.....	Attachment 1 -17
9. Rosgen's Stream Class.....	Attachment 1 -17
10. Functioning Condition.....	Attachment 1 -17
11. Major Attributes Classification.....	Attachment 1 -18
C. STREAMS THEME: REQUIRED ATTRIBUTES FOR NODES.....	Attachment 1 -18
1. Node Link.....	Attachment 1 -18
2. Node Name.....	Attachment 1 -18
3. Spatial Data Source.....	Attachment 1 -19
D. STREAMS THEME: RECOMMENDED ATTRIBUTES FOR NODES.....	Attachment 1 -19
1. Local Node Name.....	Attachment 1 -19
2. Spatial Data Edit Technique.....	Attachment 1 -20
3. Major Attributes Classification.....	Attachment 1 -20
4. River Mile Marker.....	Attachment 1 -21
E. LAKES THEME: REQUIRED ATTRIBUTES FOR POLYGONS.....	Attachment 1 -21
1. Lake Name.....	Attachment 1 -21
2. Lake Link (polygon).....	Attachment 1 -21
3. Spatial Data Source.....	Attachment 1 -21

4. Water Body Type	Attachment 1 -22
5. Fish Bearing	Attachment 1 -24
6. Duration	Attachment 1 -25
7. Individual Species	Attachment 1 -25
F. LAKES THEME: RECOMMENDED ATTRIBUTES FOR POLYGONS	Attachment 1 -26
1. Spatial Data Edit Technique	Attachment 1 -26
2. Local Lake Name	Attachment 1 -26
3. Standing Water Type	Attachment 1 -27
4. Functioning Condition	Attachment 1 -28
5. Major Attributes Classification	Attachment 1 -29
G. LAKES THEME: REQUIRED ATTRIBUTES ON ARCS	Attachment 1 -29
1. Lake Link (arc)	Attachment 1 -29
H. LAKES THEME: RECOMMENDED ATTRIBUTES ON ARCS	Attachment 1 -29
1. Major Attributes Classification	Attachment 1 -29
I. HYDPTS THEME: REQUIRED ATTRIBUTES	Attachment 1 -30
1. Hydptslink	Attachment 1 -30
2. Spatial Data Source	Attachment 1 -30
3. Hydpts Name	Attachment 1 -31
4. Water Body Type	Attachment 1 -31
J. HYDPTS THEME: RECOMMENDED ATTRIBUTES	Attachment 1 -32
1. Spatial Data Edit Technique	Attachment 1 -32
2. Local Hydpts Name	Attachment 1 -32
3. Functioning Condition	Attachment 1 -33
4. Major Attributes Classification	Attachment 1 -33
H. BIBLIOGRAPHY	Attachment 1 -33

A. STREAMS THEME: REQUIRED ATTRIBUTES FOR ARCS

These attributes represent fields which are **required** to be populated in the update process. Each section provided below includes a description of the attribute as well as the actual field format. Attribute field names will be abbreviated and will follow the format shown in the field format section for each attribute. For example, for Stream Name, the attribute field name will be STREAMNAME.

1. Stream Name:

This field is intended for those names that have been approved by the Federal Geographic Names Board. The protocol for determining whether a name is approved or not is as follows: 1. determine whether name is on the appropriate USGS Quadrangle map and if not, 2. determine if the name is in the Geographic Names Information System (GNIS). A current version of the GNIS will be provided to each district. If the name is found in either of these sources, it may be placed in this field. All other names are considered to be unofficial or local and should be placed in the Local Stream Name field. Unofficial or local names should not appear on published BLM maps or other products that are or may be distributed or displayed to the public.

Populate only the main channel with the appropriate USGS name. This requires identification of one main channel from the mouth of a named stream to its headwater reach as identified on the spatial update. To the extent possible, this field will be populated from the GNIS as part of the processing effort to this new standard.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
STREAMNAME	30	Character

2. Stream Link:

This is a unique link item for relating to other databases and relate tables. This item will be generated based on a feature of the ARC/INFO data structure. Each line or arc within the GIS coverage has a FROM-NODE and a TO-NODE, one at each end of the arc. These usually occur at confluences. In our data model, TO-NODES point downstream and FROM-NODES point upstream. The longitude/latitude coordinate value for the FROM-NODE will be used as the unique link item. This approach will minimize the level of administration and coordination that is required in the creation of these link values. This unique value will not change if the spatial position of the stream changes. Once generated this code is permanent.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
STREAMLINK	15	Character

3. Lake Link:

This is a unique link item for relating a line or arc on the Streams Theme to a polygon on the Lakes Theme. The center-lining process for the Streams Theme creates transport and connector arcs through lakes, ponds, reservoirs, and double-sided rivers. The banks for these features are

maintained within the Lakes Theme. In order to relate the transport and connector arcs to the Lakes feature, the unique link items from the Lakes Theme are also incorporated within this field of the Streams Theme. This field will only be populated for these centerline and connector arcs. LPOLYLINK is derived from the longitude/latitude values of the label point for the polygon feature within the Lakes Theme.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LPOLYLINK	15	Character

4. Spatial Data Source:

This field captures information related to the original source from which the spatial data was derived. Source data can be inferred from the methods codes included in this field. This information will aid quality control and tracking of updates in the future. WODDB data is defaulted to WOD or HYX coding based on source. In determining which code to use, preference should be given to the primary method employed to derive the location and extent of the waterbody. As an example, if a combination of the Crenulation method (CRW) and an Image (IMG) are used to determine the location, then "CRW" should be selected as the SPATIALSOURCE code since its the primary method for determining the extent of the stream. Standard values include the following:

WOD	WODDB Photogrammetric
HYX	WODDB Hand drawn-Non Cartographic
CRW	Crenulation Method 1--Derived from WODDB Contours
CRU	Crenulation Method 2--Derived from USGS 1:24,000 Contours
DFT	Digitized from 1:24,000 Topographic Map
FPM	Digitized from 1:12,000 Forest Plan Map
DEM	DEM Method
IMG	Derived from Imagery (screen digitized from scanned aerial photography, SPOT, etc.)
GPS	Resource Grade GPS (differentially corrected)
CFF	Cartographic Feature Files (FS)
DLG	USGS Digital Line Graph Data
DRG	Digital Raster Graphics Files
DOQ	Digital Ortho Photos
DIQ	Digital Image Ortho Photos
SRV	From Survey Data
CTR	Derived Centerlines and Connector Arcs
EDG	Arcs generated as part of edgematch between DLG and WODDB data
DIS	Arcs generated to connect a discontinuous channel
NST	Non Stream Features (HYDZ codes in WODDB SUBJ_HYD field)
OTR	Other

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALSOURCE	3	Character

5. Field Verification Date:

Used to track the ground-truthing of stream channels. This is the date in which the stream was actually verified to exist on the ground. No entry connotes no field verification has been done.

Day:Month:Year

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
FVDATE	8	Date

6. EPA Reach Number:

Many agency databases are linked to this identifier, therefore in the interest of coordination and interagency cooperation the Reach Number will be included here. There have been concerns with QC and credibility of this number within WODDB. Therefore, the WODDB Reach Numbers will not be retained. Instead, these will be captured using a conflation process from the 1:100,000 Hydrography coverage that contains this information. Streams which are added during the update process and other existing GIS streams that do not have assigned Reach Numbers will not be given a number.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
EPAREACHNO	17	Character

7. Stream Order:

A dimensionless measure of the position of a stream in the hierarchy of tributaries. Where two n-order streams join, a segment of n+1 order is formed (Stahler, 1957).

Recognize there will be a need to update this on some districts where the spatial extent of streams will be expanded during the update. A tool (AML) will be provided to the districts to facilitate stream ordering after the spatial densification process. This tool will not produce accurate results until all gaps have been fixed in the stream coverage. WODDB values for stream order will be converted to this field as part of the conversion effort. The districts will then need to run the stream ordering AML once stream densification and correction has been completed. This AML will need to be run after each future update activity that deletes or adds stream segments.

The conversion process will drop the Alpha characters in WODDB and keep just numeric attributes for stream order. This will remove *other* water body types and put them into a new attribute group (see Waterbody Type). Lake and other polygon feature shorelines that are replaced by centerlining will be assigned a stream order by carrying the upstream order number through the new line segment which is created when the double line segments are removed. By providing an "order" to these transformed lakes and ponds it will provide a side benefit; geomorphic position of the lakes, ponds, and wetlands within a given watershed by the order of the stream entering these water bodies.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
STREAMORDER	2	Integer

8. Water Body Type:

Waterbody type refers to the descriptive label assigned to a water source such as a lake, river, guzzler etc. We will bring over the WODDB codes that existed in Stream Order and add stream and river codes. We propose to use the Name attribute as appears in the USGS Quad as the definer of whether to use stream or river code. If the channel is not identified with a name on the Quad we will consider these channels "streams."

- ST Streams. All natural channels of flowing water other than those which have been designated on USGS Quads as being a "River". This code therefore includes colloquial names such as gully, wash and creek. These include those channels that flow only intermittently or ephemerally in duration or along only part of a channel valley as defined by interrupted. If there is a double-sided stream, a code is entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.
- RI Rivers. All natural channels of flowing water which have been named as a "River" on the USGS quadrangle. All other natural flowing channels are considered to be streams. Typically these will be the channels or larger branches of a drainage system. If there is a double-sided river, a code is entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.
- DC Ditches and Canals. A constructed open channel for transporting water from a source of supply to the point of distribution. The distinction between ditches/canals and streams is the man-made construction.
- SC Side Channel. These river features are usually associated with complex stream patterns found with multiple channel stream types. This is not a main channel delineation. These are additional channels which are located adjacent to the main channel delineation and are not considered a tributary. We anticipate these channels to be located in the higher order streams particularly where the USGS quads have recorded the persistent island situations. If double-sided sidechannel, code entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.
- ES Bays, Estuaries, and Ocean. This code should be used to mark the inland extent of tidal influence. Estuaries are tidally-influenced ecological systems where rivers meet the sea and fresh water mixes with salt water. This should be the basis for assigning this code. The break between the estuary and the river will be represented by a closure line in the Lakes Layer. This code will be entered into this field within the Lakes Layer and for centerlines and connector arcs within the Streams Layer.

For DLG source data, USGS specifications state that the inland extent of the estuary is defined at the place where a double-line river or stream reaches a width of 1 nautical mile with no further constrictions, *if the conformation of the land and water do not otherwise make the division obvious*. Within the DLG data, a closure line is also placed to separate the bay, estuary, or ocean from the double line river.

- LA Lakes and Ponds. A naturally occurring body of fresh or saline water which is completely surrounded by land. This is a standing body (not flowing) of water and is treated as polygon data. At this time there is no size threshold therefore lakes and ponds are considered under the same code. Some scale dependent input methods may be problematic for input of very small features. Codes are entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.
- WT Wetlands. Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and which, under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are treated as polygon data. At this time there is no size threshold. Some scale dependent input methods may be problematic for input of very small features. There may be overlap between wetlands polygon data in the Lakes Layer and streams or river within the Streams Layer or with springs/seeps and guzzlers in the points layer .
- IM Impoundment. A waterbody created by a man-made structure, such as a dam, built to collect or store water. Reservoirs, dugouts, catchments and impoundments are all included under this category. This is a standing body (not flowing) of water and is treated as polygon data. At this time there is no size threshold. Some scale dependent input methods may be problematic for input of very small features. Codes are entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.
- IW Impounded Wetland. Impoundments specifically designated for wetlands development.
- UN Unclassified Water body. This code is used to represent water bodies that have not been classified. Some WODDB features will initially have this code. It should be replaced as soon as possible with the appropriate waterbody type code.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
WTRBODYTYPE	2	Character

9. Hyd Flow:

This was formerly known as Stream Type. It is a streamflow classification. There will be a 2 alpha character entry. The first will classify flow in relation to the expression of flow at the ground surface (space); Interrupted or Continuous. The second will classify flow in terms of the seasonal behavior of a waterbody over time in terms of surface flow (duration).

SPACE Classification:

- C = Continuous = a channel that does not have interruptions in space. It can be perennial, intermittent or ephemeral.
- I = Interrupted = a channel which contains:
- A. perennial flow with intervening intermittent or ephemeral segments
 - B. intermittent flow with intervening ephemeral segments
- G= Groundwater = reaches that represent subsurface flow. These arcs connect reaches with recognized surface flow. They represent an estimate of the subsurface flow location. This code is included to assist stream routing and dynamic segmentation.

The default setting for surface flow classification will be C.

TIME Classification:

- P = Perennial = streams which essentially flow year round. Perennial streams are generally associated with a stable water table in the localities through which they flow.
- S = Intermittent or seasonal = One that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas. During the dry season, the water table is usually below these channels.
- E = Ephemeral = One that flows only in the direct response to storm precipitation, and whose channel is at all times above the water table.
- U= Unclassified = Unclassified surface flow. This code is used in conjunction with the "G" Space Classification. It is not intended to be a designation for surface flow duration.

More complete definitions are found in Meinzer (1923).

Two additional codes have been added to HYDFLOW. These are used in lieu of the codes described above and are intended for specific ditches and canals which transport water from one watershed to another.

DL= "LOSS" ditches and canals = ditches or canals which transport water from a contributing 5th field watershed to a receiving watershed.

DG= "GAIN" ditches and canals = ditches or canals which receive water from an adjacent 5th field watershed.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
HYDFLOW	2	Character

10. Plan Flow:

One alpha character:

- P = Perennially flowing streams, that is channels which essentially flow year round. Perennial streams are generally associated with a stable water table in the localities through which they flow. Default will be P if HYD FLOW = P.
- I = Intermittent flowing streams. These are stream channels which exhibit scour and deposition resulting in a definable channel. This can include ephemeral channels (identified in HYD FLOW) if the channel meets this NWFP definition.
- Z = ICBEMP Intermittent flowing streams. This code is to be used to meet the Interior Columbia Basin Ecosystem Management Plan (ICBEMP) definition of intermittent.
- X = Streams with no associated management activity. Intended for eastern Oregon use. Intended for streams with no associated management activity. These streams will generally have “GU” HYDFLOW values.

This attribute is necessary for habitat identification, likely areas of Riparian Reserve adjustment and general modeling for Watershed Analysis. Must be separate from HYD FLOW due to mix of definitions. More complete definitions are found in the Supplemental Environmental Impact Statement

There may be additions to this dependant on feedback from the Interior Columbia Basin Ecosystem Management Plan effort.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
PLANFLOW	1	Character

11. Individual Species:

All fish species included in the database are those species identified by BLM fisheries biologists as present and important in Oregon and Washington. Each species (or subspecies) will be its own field and will be identified by a species code. The species code will consist of a 4-7 letter code using the first two letters of the genus, species, and subspecies (if used) names, e.g. SATR (*Salmo trutta*) and ONMYIR (*Onchorhynchus mykiss iridius*). All genus and species names are consistent with Robins, et al. (1991). Species codes are proposed for the item names rather than common names due to the length of the common names (e.g. Columbia Redband Steelhead). The subgroup felt that users could utilize a list to relate to the common name and would also become somewhat familiar with the codes. This listing will be included in the metadata for this theme.

The “Steelhead” name will refer to anadromous forms of *Onchorhynchus mykiss*. Coastal steelhead (*Onchorhynchus mykiss iridius*; see Behnke 1992) are in all coastal drainages and from the Columbia River downstream from The Dalles Dam (including all Columbia River tributaries between the Cowlitz and Wind Rivers in Washington and the Willamette and Hood Rivers in Oregon, inclusive). Both winter and summer runs may be present (Busby, et al. 1996). All steelhead in the Columbia River Basin upstream of The Dalles Dam are summer-run, Columbia Redband Steelhead (*Onchorhynchus mykiss gairdneri*; see Behnke 1992) (Fifteenmile Creek, Oregon are winter-run, and winter steelhead are found in the Klickitat and White Salmon Rivers, Washington). (Busby, et al. 1996).

The names “Coastal Rainbow Trout”, “Columbia Redband Trout”, and “Inland Redband Trout” will refer to all non-anadromous forms of *Onchorhynchus mykiss*. Coastal Rainbow Trout will represent resident forms of coastal *O. mykiss iridius* and all hatchery stock. “Columbia Redband Trout” will represent resident forms of *O. mykiss* subspecies found upstream of The Dalles Dam within the Columbia River Basin. Inland Redband Trout will represent resident forms of *O. mykiss* subspecies found in the Oregon desert basins, e.g., Catlow Valley, Klamath Lake and the Warner Lakes basin (Behnke 1992, Busby, et al. 1996).

Western Brook Lamprey (*Lampetra richardsoni*) will include the species commonly referred to as the Pacific brook lamprey (*L. pacifica*), which are now considered to be conspecific (Robins, et al. 1991).

Use reliable field survey information to verify species presence. Acceptable information includes survey data from federal and state agencies (i.e., Bureau of Land Management and Forest Service, Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Washington Department of Game, Tribal data, etc.), adjacent landowners and universities. Examples of acceptable data include stocking records, population surveys, spawning ground counts, and presence/absence surveys. If species presence in any reach is based on best professional estimate, those reaches should be coded as “presence not verified.”

The attribute coding will provide the following information for each species:

- AN - anadromous
- RE - resident
- FA - fall run (enter XX for resident species)
- SP - spring run (enter XX for resident species)
- WI - winter run (enter XX for resident species)
- SU - summer run (enter XX for resident species)
- SY - spawning habitat, yes
- SN - spawning habitat, no
- VY - species presence verified, yes
- VN - species presence verified, no

Field Name: Species Code (e.g. ONMYIR for Coastal Steelhead)
93 total species items

Width: 14 (12 plus 2 spaces for possible future growth)

Data Type: Character

Structure: Concatenated code 12 characters long, fully populated, if no data then filled with X's. Columns 1-4 contain anadromous vs resident population information; columns 5-8 contain fish run information; columns 9-10 contain spawning information; and columns 11-12 contain fish species verification information.

Example Codes: A few examples are provided below to demonstrate the use of the codes. Note that the occurrence of Spring and/or Fall Runs are mutually exclusive with the occurrence of Winter and/or Summer Runs. Legitimate codes for columns 5-6 are FA, SU, and XX. For columns 7-8 the legitimate codes are SP, WI, and XX.

Example Code 1: ANREFASPSYVY where, AN=Anadromous
 RE=Resident
 FA=Fall Run
 SP=Spring Run
 SY=Spawning/yes
 VY= Species Presence Verified/yes

Example Code 2: ANXXFAXXSNVN where, AN=Anadromous
 XX=Not Resident
 FA=Fall Run
 XX=Not Spring Run
 SN=Spawning/no
 VN= Species Presence Verified/no

Example Code 3: ANXXSUWISNVY where, AN=Anadromous
 XX=Not Resident
 SU=Summer Run
 WI=Winter Run
 SN=Spawning/no
 VY= Species Presence Verified/yes

Example Code 4: XXREXXXXSYVY where, XX=Not Anadromous
 RE= Resident
 XX= not applicable
 XX= not applicable
 SY=Spawning/yes
 VY= Species Presence Verified/yes

12. Fish Bearing:

Field which is coded based on actual or modeled fish presence. This attribute is useful for habitat identification, Riparian Reserve width identification, and general modeling for watershed analysis. A fish-bearing stream is defined in the NWFP by the “presence of any fish species for any duration of time.” This attribute may be used with either perennial or intermittent streams. This attribute is related to the fish-bearing nature of the stream reach. It will potentially be populated from two sources including the following: (1) from a modeling effort that uses available information (i.e. gradient, stream order, etc) to identify possible fish bearing streams and (2) from species information in the individual species fields. The population of this field is not dependent on data being present in the individual species fields. Initial default values are PNV for WODDB stream reaches with identified fish in the individual species fields and ANV for all other data.

Use reliable field survey information to verify fish-bearing reaches. Acceptable information includes survey data from federal and state agencies (i.e., Bureau of Land Management and Forest Service, Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Washington Department of Game, Tribal data, etc.), adjacent landowners and universities. Examples of acceptable data include stocking records, population surveys, spawning ground counts, and presence/absence surveys. If the fish-bearing status of any reach is based on best professional estimate, those reaches should be coded as “presence not verified.” Often, fish use can be detected using simple observation or sampling, such as angling; if fish are seen or caught, fish presence is verified. However, to verify that fish are not present, more definitive sampling, i.e., electroshocking, should be used.

PV= Presence - Verified

PNV= Presence - Not Verified

AV= Absence - Verified

ANV= Absence - Not Verified

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
FISHBEARING	3	Character

B. STREAMS THEME: RECOMMENDED ATTRIBUTES FOR ARCS

These Stream attributes represent fields in which the districts and local stewards have discretion on whether to populate. If selected, the following represent the standards for populating.

1. Spatial Data Edit Technique:

GIS Update technique used to input the spatial information to the Streams Theme.

TBD = Tablet Digitizing

SCN = Scanned

HUD = Heads Up Digitizing

CRI = Coordinate Input

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALEDIT3		Character

2. **Local Stream Name:**

User defined at the district. This field will be initially populated with WODDB names. The intent of this field is for internal BLM use only. The following quote from the U.S. Board on Geographic Names document titled "Principles, Policies, and Procedures: Domestic Geographic Names" applies to the use of this field: "Pursuant to Public Law 80-242, geographic names not in GNIS must be submitted to the Board on Geographic Names for approval before they can be used on federal maps, charts, and other publications."

This field is intended as a repository for unofficial stream names that have not been submitted to and/or approved by the Federal Geographic Names Board. Population of this field meets internal information needs only yet also aids the process of proposing these names to the Geographic Names Board. All uses of information within this field should adhere to the above cited regulation. Users of this information must ensure that it is not portrayed on maps and other products that are or may be distributed or displayed to the public. See notes for Stream Name field.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LSTREAMNAME	30	Character

3. **FPA Buffer Distance:**

This is the on-the-ground distance (in meters) of the Forest Practices Act buffer on private lands. This may be needed for modeling riparian widths on a watershed basis across ownerships. It can be obtained from the local Forest Practice Officer or modeled from ODF stream class.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
FPADIST	4	Integer

4. **Federal Buffer Distance:**

This is the actual Riparian Reserve width using the NWFP determinates (e.g. default site potential tree, 100 year floodplain, unstable/potentially unstable areas). 4 integer field. This is a slope distance expressed in meters. In GIS this must be expressed as a horizontal distance. There needs to be a recognition that slope distances must be converted to horizontal distance prior to populating this field in order to have meaningful buffer distances. For this HYDRO update process, there is no state protocol established on how slope distance is derived. This is a district/local stewards responsibility to document the process used.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
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5. ODF Stream Class:

This is recommended in order to model on a multi-ownership watershed basis the “continuous condition” and “connectivity” of the riparian vegetation and management on state and private lands. Also allows efficient agency coordination. There are nine potential categories as identified in the Forest Practices Act (1994). This may be available from Oregon Department of Forestry or can be modeled.

	FISH BEARING	DOMESTIC USE (NOT FISH BEARING)	OTHER STREAMS
Watersheds	FL	DL	NL
m Watersheds	FM	DM	NM
Watersheds	FS	DS	NS

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
ODFSTREAMCLASS	2	Character

6. USFS Stream Class:

This is recommended in order to model on a multi-ownership watershed basis. Often necessary for interagency watershed analysis efforts. Defined as: 1 = Class I, 2 = Class II, 3 = Class III, 4 = Class IV. Districts are encouraged to contact the adjoining Forest to determine if Stream Class is being used before efforts are used to populate.

BLM Attribute Character	FS Attribute Character	Description
1	I	Municipal/domestic water supply, large volume, large numbers of fish
2	II	mod-significant numbers of fish, significant volume to affect Class I

3	III	Perennial streams not meeting criteria for class I & II
4	IV	Intermittent or ephemeral flow not meeting the above.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
FSSTREAMCLASS	1	Integer

7. Confinement:

Confinement is the ratio of channel valley width (VW) to actual channel width (CW). This is provided for districts use in channel classification/fish habitat analysis. This attribute along with *gradient* and the *Rosgen's stream type* have limited application in this interim period as we will still be using the originally defined arcs in WODDB. These arcs do not necessarily conform to the geomorphic setting of the valley and channel. There is no intention at this point to update these arcs to conform to the geomorphic setting. When we migrate to the target system which includes dynamic segmentation; confinement, gradient and Rosgens classification will be defined along relatively short stream segments and therefore will have more utility and confidence. This is intended to be the average confinement for the reach.

The standard format will be a single character, showing confinement as defined by the Washington Forest Practices Board where: C = confined ($VW < 2CW$), MC= moderately confined ($2CW < VW < 4CW$), and U = unconfined ($VW > 4CW$).

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
CONFINEMENT	2	Character

8. Gradient:

Channel gradient is the change in elevation per unit of horizontal distance of channel. This is expressed as a whole number percent slope. It will not be entered in classes. This is provided for districts use in channel classification/fish habitat analysis. As explained in the confinement attribute, gradient will have limited utility as it is expressed as an average percent slope over a pre-defined arc (predominately confluence to confluence) which are not based on geomorphic slope breaks. It does provide a reasonable approximation of valley floor gradient. It will be expressed as an absolute value for the reach with a 3 value integer field with no decimals.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
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GRADIENT

3

Integer

9. Rosgen's Stream Class:

This field will provide districts opportunity to store Rosgen's stream classification information. As explained under confinement this will have limited utility at this time due attributing predetermined arcs. Overwhelming comment suggests there is need for this field. This field will consist of 3 characters; alpha, numeric, alpha corresponding to Rosgen's Level 1 & 2 characterization. The Update team suggests that the Level 1 (1st alpha character) may be the only appropriate entry until the target system and dynamic segmentation is available. For a full description of the 3 character code refer to Rosgen, 1996 (Fig 5-3 provides overview pg 5-6).

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
ROSGEN	3	Character

10. Functioning Condition:

BLM Functioning Condition Classification. Refer to the definitions for Functioning Condition and methodology contained in BLM Publication Tech Reference 1737-9 (BLM, 1993). As explained under confinement this will have limited utility at this time due to the attributing of predetermined arcs. This code is intended to characterize the lotic riparian wetland areas (adjacent to "flowing water" aquatic sites).

- PFC=Proper Functioning Condition
- FARU=Functional-at-Risk Upward Trend
- FARD=Functional-at-Risk Downward Trend
- FARN=Functional-at-Risk Trend Not Apparent
- NF=Nonfunctional
- U=Unknown

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
PFCCODE	4	Character

11. Major Attributes Classification:

This field will be initially populated for 1:24,000 scale hydrographic data produced from the cooperative Base Data Project (DLG and CFF). Codes within this field represent specific feature types such as "intermittent stream. " It will also be useful to populate this field for WODDB and other features that are added through the update process. The HY.MAT table is a standardized list of available values for this field. This table will be provided to each district.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
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LABEL

50

Character

C. STREAMS THEME: REQUIRED ATTRIBUTES FOR NODES

1. Node Link:

Values for this item are derived from the longitude/latitude values of the node. Resulting unique values may be used for linking to related tables.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
NODELINK	15	Character

2. Node Name:

This field is intended for those names that have been approved by the state and Federal Geographic Names Board. The protocol for determining whether a name is approved or not is as follows: 1. determine whether name is on the appropriate USGS Quadrangle map and if not, 2. determine if the name is in the Geographic Names Information System (GNIS). If the name is found in either of these sources, it may be placed in this field. All other names are considered to be unofficial or local and should be placed in the Local Node Name field. Unofficial or local names should not appear on published BLM products or other products that are distributed or displayed to the public.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
NODENAME	30	Character

3. Spatial Data Source:

This field captures information related to the original source from which the spatial data was derived. Source data can be inferred from the methods codes included in this field. This information will aid quality control and tracking of updates in the future. Standard values include the following:

WOD WODDB Photogrammetric
HYX WODDB Hand drawn-Non Cartographic
CRW Crenulation Method 1--Derived from WODDB Contours
CRU Crenulation Method 2--Derived from USGS 1:24,000 Contours
DFT Digitized from 1:24,000 Topographic Map
FPM Digitized from 1:12,000 Forest Plan Map
DEM DEM Method
IMG Derived from Imagery (screen digitized from scanned aerial photography, SPOT, etc.)

GPS	Resource Grade GPS (differentially corrected)
CFF	Cartographic Feature Files (FS)
DLG	USGS Digital Line Graph Data
DRG	Digital Raster Graphics Files
DOQ	Digital Ortho Photos
DIQ	Digital Image Ortho Photos
SRV	From Survey Data
EDG	Arcs generated as part of edgematch between DLG and WODDB data
DIS	Arcs generated to connect a discontinuous channel
NST	Non Lake Features (HYDZ codes in WODDB SUBJ_HYD field)
OTR	Other

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALSOURCE	3	Character

D. STREAMS THEME: RECOMMENDED ATTRIBUTES FOR NODES

1. Local Node Name:

User defined at the district. Features may include dams, fish ladders, spillways, etc. The intent of this field is for internal BLM use only. The following quote from the U.S. Board on Geographic Names document titled "Principles, Policies, and Procedures: Domestic Geographic Names" applies to the use of this field: "Pursuant to Public Law 80-242, geographic names not in GNIS must be submitted to the Board on Geographic Names for approval before they can be used on federal maps, charts, and other publications."

This field is intended as a repository for unofficial node names that have not been submitted to and/or approved by the Federal Geographic Names Board. Population of this field meets internal information needs only yet also aids the process of proposing these names to the Geographic Names Board. All uses of information within this field should adhere to the above cited regulation. Users of this information must ensure that it is not portrayed on maps and other products that are or may be distributed or displayed to the public. See notes for Nodes Name field.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LNODENAME30		Character

2. Spatial Data Edit Technique:

GIS update technique used to input the spatial information to the Streams Theme.

TBD = Tablet digitizing
SCN = Scanned
HUD = Heads Up Digitizing
CRI = Coordinate Input

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALEDIT3		Character

3. **Major Attributes Classification:**

This field will be initially populated for 1:24,000 scale hydrographic data produced from the cooperative Oregon Base Data Project (DLG and CFF). Codes within this field represent specific feature types such as "falls. " It will also be useful to populate this field for WODDB and other features that are added through the update process. The HY.MAT table is a standardized list of available values for this field. This table will be provided to each district.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LABEL	50	Character

4. **River Mile Marker:**

This field is initially populated where possible from the DLG data. Major and Minor codes are converted into this numeric field.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
RIVMILE	6	Numeric

E. **LAKES THEME: REQUIRED ATTRIBUTES FOR POLYGONS**

These attributes represent fields which are **required** to be populated in the update process.

1. **Lake Name:**

This field is intended for those names that have been approved by the state and Federal Geographic Names Board. The protocol for determining whether a name is approved or not is as follows: 1. determine whether name is on the appropriate USGS Quadrangle map and if not, 2. determine if the name is in the Geographic Names Information System (GNIS). If the name is found in either of

these sources, it may be placed in this field. All other names are considered to be unofficial or local and should be placed in the Local Lake Name field. Unofficial or local names should not appear on published BLM products or other products that are distributed or displayed to the public.

To the extent possible, this field will be populated from the GNIS as part of the processing effort to this new standard.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LAKENAME	30	Character

2. Lake Link (polygon):

Values for this item are derived from the longitude/latitude values of the label point for each polygon feature within the Lakes Theme. Resulting unique values may be used for linking to related tables. These values are unique and will not be changed if the location of the label point changes.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LPOLYLINK	15	Character

3. Spatial Data Source:

This field captures information related to the original source from which the spatial data was derived. Source data can be inferred from the methods codes included in this field. This information will aid quality control and tracking of updates in the future. Standard values include the following:

WOD	WODDB Photogrammetric
HYX	WODDB Hand drawn-Non Cartographic
CRW	Crenulation Method 1--Derived from WODDB Contours
CRU	Crenulation Method 2--Derived from USGS 1:24,000 Contours
DFT	Digitized from 1:24,000 Topographic Map
FPM	Digitized from 1:12,000 Forest Plan Map
DEM	DEM Method
IMG	Derived from Imagery (screen digitized from scanned aerial photography, SPOT, etc.)
GPS	Resource Grade GPS (differentially corrected)
CFE	Cartographic Feature Files (FS)
DLG	USGS Digital Line Graph Data
DRG	Digital Raster Graphics Files
DOQ	Digital Ortho Photos
DIQ	Digital Image Ortho Photos
SRV	From Survey Data
NST	Non Lake Features (HYDZ codes in WODDB SUBJ_HYD field)
OTR	Other

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALSOURCE	3	Character

4. Water Body Type:

Waterbody type for the Lakes Theme refers to the descriptive label assigned to the body of standing water or wetland. We will bring over the WODDB names that existed. Lacking WODDB, we propose that initially the Name attribute as appears in the USGS Quad as the definer of whether a standing water type would be defined as a impoundment or a natural lake/ pond. If not named or identified on Quad we will consider the water body type as not identified and this will need to be user defined.

- LA Lakes and Ponds. A naturally occurring body of fresh or saline water which is completely surrounded by land. This is a standing body (not flowing) of water and is treated as polygon data. At this time there is no size threshold therefore lakes and ponds are considered under the same code. Some scale dependent input methods may be problematic for input of very small features. Codes are entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.

- WT Wetlands. Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and which, under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are treated as polygon data. At this time there is no size threshold Some scale dependent input methods may be problematic for input of very small features. There may be overlap between wetlands polygon data in the Lakes Layer and streams or river within the Streams Layer or springs/seeps and guzzlers within the Points layer.

- IM Impoundment. A waterbody created by a man-made structure, such as a dam, built to collect or store water. Reservoirs, dugouts, catchments and impoundments are all included under this category. This is a standing body (not flowing) of water and is treated as polygon data. At this time there is no size threshold. Some scale dependent input methods may be problematic for input of very small features. Codes are entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.

- IW Impounded Wetland. Impoundments specifically designated for wetlands development.

- ES Bays, Estuaries, and Ocean. Estuaries are tidally-influenced ecological systems where rivers meet the sea and fresh water mixes with salt water. This should be the

basis for assigning this code. The break between the estuary and the river will be represented by a closure line in the Lakes Theme. This code will be entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.

For DLG source data, USGS specifications state that the inland extent of the estuary is defined at the place where a double-line river or stream reaches a width of 1 nautical mile with no further constrictions, *if the conformation of the land and water do not otherwise make the division obvious*. Within the DLG data, a closure line is also placed to separate the bay, estuary, or ocean from the double line river.

UN Unclassified Waterbody. This code is used to represent water bodies that have not been classified. Some WODDB features will initially have this code. It should be replaced as soon as possible with the appropriate waterbody type code.

The following codes are included for attributing linear features that were captured as double lines.

ST Streams. All natural channels of flowing water other than those which have been designated on USGS Quads as being a "River". This code therefore includes colloquial names such as gully, wash and creek. These include those channels that flow only intermittently or ephemerally in duration or along only part of a channel valley as defined by interrupted. For the double-sided stream, a code is entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.

RI Rivers. All natural channels of flowing water which have been named as a "River" on the USGS quadrangle. All other natural flowing channels are considered to be streams. Typically these will be the channels or larger branches of a drainage system. For the double-sided river, a code is entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.

DC Ditches and Canals. A constructed open channel for transporting water from a source of supply to the point of distribution. The distinction between ditches/canals and streams is the man-made construction. For the double-sided ditch or canal, a code is entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.

SC Side Channel. These river features are usually associated with complex stream patterns found with multiple channel stream types. This is not a main channel delineation. These are additional channels which are located adjacent to the main channel delineation and are not considered a tributary. We anticipate these channels to be located in the higher order streams particularly where the USGS quads have recorded the persistent island situations. For double-sided side channels, this code

is entered in this field within the Lakes Layer and for the centerline and connector arcs within the Streams Layer.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
WTRBODYTYPE	2	Character

5. **Fish Bearing:**

Field which is coded based on actual or modeled fish presence. This attribute is useful for habitat identification, Riparian Reserve width identification, and general modeling for watershed analysis. A fish-bearing stream is defined in the NWFP by the “presence of any fish species for any duration of time.” This attribute is related to the fish-bearing nature of the lake. It will potentially be populated from two sources including the following: (1) from a modeling effort that uses available information to identify possible fish bearing lakes and (2) from species information in the individual species fields. The population of this field is not dependent on data being present in the individual species fields. Initial default values are PNV for WODDB lakes with identified fish in the individual species fields and ANV for all other data.

Use reliable field survey information to verify fish-bearing lakes. Acceptable information includes survey data from federal and state agencies (i.e., Bureau of Land Management and Forest Service, Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Washington Department of Game, Tribal data, etc.), adjacent landowners and universities. Examples of acceptable data include stocking records, population surveys, spawning ground counts, and presence/absence surveys. If the fish-bearing status of any lake is based on best professional estimate, those lakes should be coded as “presence not verified.” Often, fish use can be detected using simple observation or sampling, such as angling; if fish are seen or caught, fish presence is verified. However, to verify that fish are not present, more definitive sampling, i.e., electroshocking, should be used.

PV= Presence - Verified

PNV= Presence - Not Verified

AV= Absence - Verified

ANV= Absence - Not Verified

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
FISHBEARING	3	Character

6. **Duration:**

This item provides an indication of the seasonal extent to which water is present within the waterbody (duration). During some of the year (usually the dry season), there is no surface expression of water.

LP = Perennial = water bodies which essentially contain water year round.

LS = Intermittent or Seasonal = one that contains water at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas. During the dry season, the water table is usually below these water bodies.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
DURATION	2	Character

7. **Individual Species:**

Identical **to** the Fish Species attributes discussion in the Streams Theme.

F. **LAKES THEME:** RECOMMENDED ATTRIBUTES FOR POLYGONS

These lakes attributes represent fields in which the districts and local stewards have discretion on whether to populate. If selected, the following represent the standards for populating.

1. **Spatial Data Edit Technique:**

GIS update technique used to input the spatial information to the Streams Theme.

TBD = Tablet digitizing

SCN = Scanned

HUD = Heads Up Digitizing

CRI = Coordinate Input

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALEDIT3		Character

2. **Local Lake Name:**

User defined at the district. This field will be initially populated with WODDB names. The intent of this field is for internal BLM use only. The following quote from the U.S. Board on Geographic Names document titled "Principles, Policies, and Procedures: Domestic Geographic Names" applies to the use of this field: "Pursuant to Public Law 80-242, geographic names not in GNIS must be submitted to the Board on Geographic Names for approval before they can be used on Federal maps, charts, and other publications."

This field is intended as a repository for unofficial lake names that have not been submitted to and/or approved by the Federal Geographic Names Board. Population of this field meets internal information needs only yet also aids the process of proposing these names to the Geographic Names Board. All uses of information within this field should adhere to the above cited regulation. Users of this information must ensure that it is not portrayed on maps and other products that are or may be distributed or displayed to the public

See notes for LAKENAME field.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LLAKENAME	30	Character

3. Standing Water Type:

The standing water type refers to the geomorphic origin of the water source.

1=Miscellaneous Lakes	Lakes not specifically defined in any of the other codes.
2=Reservoirs	A (manmade) body of impounded water stored for the purpose of altering the timing of flow for future use (irrigation, flow augmentation, dilution, treatment, stock rearing, power generation, etc).
3=Cirque Lake	A small body of water occupying a cirque (a deep, steep-walled recess in a mountain caused by glacial erosion) depression dammed by a rock lip, small moraine, or both.
4=Moraine Lake	A lake owing its existence to the blockade of valley or drainage courses by glacial drift, also called a drift-barrier lake.
5=Potholes/Kettles	A lake in a drift depression, made by the wasting away of a detached mass of glacier ice that had been either wholly or partly buried in the drift.
6=Oxbow Lakes	A crescent-shaped lake formed in an abandoned river bend which has become separated from the main stream by a change in the course of the river.
7=Paternoster Lakes	A chain of smaller lakes in glaciated valley formed by the corrosive action of ice. ^{N_u}
8=Thaw Lakes	Lake or pond basins, in permafrost areas, that are formed by

thawing of ground ice. A pool of water on the surface of sea ice, or, formed by accumulation of melt water on large glaciers.

9=Beaver Ponds	Impoundment made by beavers to raise the water level above the entrances to their dens.
10=Playa	Broad, shallow sheets of water which quickly gather and almost as quickly evaporate, leaving mud flats or playas to mark their sites.
11=Alkali	A lake formed in low depressions, water evaporation deposits fine sediments and dissolved minerals which form a hard surface if mechanical sediments prevail or a crumbly powdered surface if efflorescent salts are abundant.
12=Coastal	Lakes on any plain which has its margin on the shore of a large body of water, particularly the sea, and generally represents a strip of recently emerged sea bottom.
13=Gravel Pit	Lakes formed in excavations resulting from the removal sand and gravel.
14=Rift	A lake formed in depressions resulting from the intersection of a fault plane with the surface.
15=Sink	A lake formed in a depression in the land surface generally in a limestone region communicating with a subterranean passage developed by solution (afterwards becoming blocked so water is retained) or resulting from solution of gypsum and rock salt or by the collapse of a cavern roof.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
STNDWTRTYPE	2	Integer

4. Functioning Condition:

BLM Functioning Condition Classification. Refer to definitions for Functioning Condition and methodology contained in BLM Publication Tech Reference 1737-11 (BLM, 1994). This code is intended to characterize the lentic riparian-wetland areas (adjacent to "standing water" aquatic sites).

PFC=Proper Functioning Condition
FARU=Functional-at-Risk Upward Trend
FARD=Functional-at-Risk Downward Trend
FARN=Functional-at-Risk Trend Not Apparent
NF=Nonfunctional
U=Unknown

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
PFCCODE	4	Character

5. Major Attributes Classification:

This field will be initially populated for 1:24,000 scale hydrographic data produced from the cooperative Oregon Base Data Project (DLG and CFF). Codes within this field represent specific feature types such as "lake." It will also be useful to populate this field for WODDB and other features that are added through the update process. The HY.MAT table is a standardized list of available values for this field. This table will be provided to each district.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LABEL	50	Character

G. LAKES THEME: REQUIRED ATTRIBUTES ON ARCS

1. Lake Link (arc):

Values for this item are derived from the longitude/latitude values of the FNODE for each arc comprising the polygon feature. Resulting unique values may be used for linking to related tables.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LARCLINK	15	Character

H. LAKES THEME: RECOMMENDED ATTRIBUTES ON ARCS

1. Major Attributes Classification:

This field will be initially populated for 1:24,000 scale hydrographic data produced from the cooperative Oregon Base Data Project (DLG and CFF). Codes within this field represent specific feature types such as "dam. " It will also be useful to populate this field for WODDB and other features that are added through the update process. The HY.MAT table is a standardized list of available values for this field. This table will be provided to each district.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LABEL	50	Character

I. HYDPTS THEME: REQUIRED ATTRIBUTES

These attributes represent fields which are **required** to be populated in the update process.

1. Hydptslink:

This is a unique link item for relating to other databases and relate tables. This item will be generated based on the longitude/latitude coordinate value for the point. This approach will minimize the level of administration and coordination that is required in the creation of these link values. This value is unique and will not change if the spatial location of the point feature changes.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
HYDPTSLINK	15	Character

2. Spatial Data Source:

This field captures information related to the original source from which the spatial data was derived. Source data can be inferred from the methods codes included in this field. This information will aid quality control and tracking of updates in the future. Standard values include the following:

WOD	WODDB Photogrammetric
HYX	WODDB Hand drawn-Non Cartographic
CRN	Crenulation Method
DFT	Digitized from 1:24,000 Topographic Map
FPM	Digitized from 1:12,000 Forest Plan Map
DEM	DEM Method
IMG	Derived from Imagery (screen digitized from scanned aerial photography, SPOT, etc.)
GPS	Resource Grade GPS (differentially corrected)
CFE	Cartographic Feature Files (FS)
DLG	USGS Digital Line Graph Data
DRG	Digital Raster Graphics Files
DOQ	Digital Ortho Photos
DIQ	Digital Image Ortho Photos
SRV	From Survey Data
OTR	Other

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALSOURCE	3	Character

3. Hydpts Name

This field is intended for those names that have been approved by the state and Federal Geographic Names Board. The protocol for determining whether a name is approved or not is as follows: 1.

determine whether name is on the appropriate USGS Quadrangle map and if not, 2. determine if the name is in the Geographic Names Information System (GNIS). If the name is found in either of these sources, it may be placed in this field. All other names are considered to be unofficial or local and should be placed in the local Hydpoints Name field. Unofficial or local names should not appear on published BLM products or other products that are or may be distributed or displayed to the public.

To the extent possible, this field will be automatically populated from the GNIS as part of the processing effort to this new standard. If this process is not workable, this field will need to be populated in the update process. This field will not initially be populated for WODDB data.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
HYDPTSNAME	30	Character

4. Water Body Type:

Waterbody type for the Hyd Points Theme refers to the descriptive label namely; wells, springs or guzzlers. Lacking WODDB, we propose that initially the Name attribute as appears in the USGS Quad or the spot symbol (major/minor classification) as the definer of water body type in the HYDPTS Layer. USGS DLG standards allow for waterbody features that have diameter of less than .03 map inches at 1:24,000 scale to be represented as points. In our HYDRO standard, lakes, ponds, and gravel pits are converted to polygons in the Lakes Layer and are not included in the HYDPTS Layer. The polygons are created by buffering the points with a 9.14m buffer.

- WE Wells. A hole dug or drilled into the earth which accesses groundwater.
- SP Springs and Seeps. An issue of water flowing from the earth onto the land or into a body of surface water. There is no distinction made between man made/enhanced and those which are natural.
- GU Guzzler. A water entrapment or containment structure used primarily to provide water for wildlife and livestock in arid regions. This is a man-made water source which is generally very small and of limited seasonal duration.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
WTRBODYTYPE	2	Character

J. HYDPTS THEME: RECOMMENDED ATTRIBUTES

These point attributes represent fields in which the districts and local stewards have discretion on whether to populate. If selected, the following represent the standards for populating.

1. Spatial Data Edit Technique:

GIS update technique used to input the spatial information to the Streams Theme.

TBD = Tablet Digitizing

SCN = Scanned

HUD = Heads Up Digitizing

CRI = Coordinate Input

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
SPATIALEDIT3		Character

2. Local Hydpts Name:

User defined at the district. The intent of this field is for internal BLM use only. The following quote from the U.S. Board on Geographic Names document titled "Principles, Policies, and Procedures: Domestic Geographic Names" applies to the use of this field: "Pursuant to Public Law 80-242, geographic names not in GNIS must be submitted to the Board on Geographic Names for approval before they can be used on Federal maps, charts, and other publications."

This field is intended as a repository for unofficial hydrographic point names that have not been submitted to and/or approved by the Federal Geographic Names Board. Population of this field meets internal information needs only yet also aids the process of proposing these names to the Geographic Names Board. All uses of information within this field should adhere to the above cited regulation. Users of this information must ensure that it is not portrayed on maps and other products that are or may be distributed or displayed to the public.

See notes for **Hydpts Name** field.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LHYDPTSNAME	30	Character

3. Functioning Condition:

BLM Functioning Condition Classification. Refer to definitions for Functioning Condition and methodology contained in BLM Publication Tech Reference 1737-11 (BLM, 1994). This code is intended to characterize the lentic riparian-wetland areas (adjacent to "standing water" aquatic sites) that are predominately associated with the spring/seep areas and guzzlers.

PFC=Proper Functioning Condition

FARU=Functional-at-Risk Upward Trend

FARD=Functional-at-Risk Downward Trend

FARN=Functional-at-Risk Trend Not Apparent

NF=Nonfunctional

U=Unknown

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
PFCCODE	4	Character

4. Major Attributes Classification:

This field will be initially populated for 1:24,000 scale hydrographic data produced from the cooperative Oregon Base Data Project (DLG and CFF). Codes within this field represent specific feature types such as "spring. " It will also be useful to populate this field for WODDB and other features that are added through the update process. The HY.MAT table is a standardized list of available values for this field. This table will be provided to each district.

<u>Field Name</u>	<u>Width</u>	<u>Data Type</u>
LABEL	50	Character

H. BIBLIOGRAPHY

Behnke, R. J., 1992. *Native Trout of Western North America*. American Fisheries Society Monograph 6. American Fisheries Society, Bethesda, MD.

BLM. 1993. *Process for Assessing Proper Functioning Condition*. Tech Reference 1737-9. Denver, Colorado.

BLM. 1994. *Process for Assessing Proper Functioning Condition for Lentic Riparian Wetland Areas*. Tech Reference 1737-11. Denver, Colorado.

Bowden, K. L. and Wallis J. R., 1964, *Effect of Stream-Ordering Technique on Horton's Laws of Drainage Composition*, Geol. Society of America Bulletin, p.767-774.

Busby, P. J. and six co-authors. 1996. *Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California*. U.S. Department of Commerce, NOAA Tech Memo. NMFS-NWFSC-27, 261 p.

Carston, C. W., 1963 , *Drainage Density and Streamflow*, U.S. Geological Survey Prof. Paper 422-C, U.S. Geological Survey, Washington, D.C. 8 p.

FEMAT, 1993, *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment*. Report of the Forest Ecosystem Management Assessment Team, Appendix V-G, July 1993.

Forest Practices Act (FPA), 1994, Oregon Department of Forestry, Technical Note FP1, Salem, Oregon.

Jackson Creek Watershed Analysis. 1995, USFS, Umpqua National Forest. Roseburg, Oregon.

Meinzer, O.E. 1923. *Outline of Groundwater Hydrology*. U.S. Geological Survey Water-Supply Paper 494. U.S. Geological Survey, Washington, D.C. 71 p.

Morisawa, M. 1957, *Accuracy of Determination of Stream Lengths from Topographic Maps*, Trans. Amer. Geophys. Union, Vol 38. No. 1. 86-88, 1957.

Nestucca Watershed Analysis, 1995, BLM/ USFS, Salem District BLM/Siuslaw National Forest.

Robins, C. R., R. M. Bailey, C. E. Bond, J. R. Brooker, E. A. Lachner, R. N. Lea, and W. B. Scott. 1991. *Common and Scientific Names of Fishes from the United States and Canada*. American Fisheries Society Special Publication 20. Bethesda, MD. 183 pp.

Rosgen, D. L. 1996, *Applied River Morphology*, Wildland Hydrology

Strahler, A. N., 1957, Hypsometric (area-altitude) analysis of erosional topography: Geol. Soc. Am. Bull., v.63, p.1117-1142

U.S. Geological Survey, Office of Water Data Coordination. 1977, *National Handbook of Recommended Methods for Water-Data Acquisition*. p 7-15.

Washington Forest Practices Board. 1993. *Standard Methodology for Conducting Watershed Analysis*, Ver. 2.0. Olympia, Washington