



Oregon Dept. of Fish & Wildlife
Aquatic Inventories Project
Habitat and Reach Data Coverages Metadata
Date: February 2011

General Dataset Documentation:

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Geo Dataset Revision: 1.2

Description of Location or Extent: Corresponds with the distribution area as defined by the HUC coverage.

Scale: 1:100,000

Contents of Coverage:

Reach dataset
 < basin >rch.aat
 < basin >rch.bnd
 < basin >rch.tic
Habitat dataset
 < basin >hab.aat
 < basin >hab.bnd
 < basin >hab.tic

Coordinate System Description:

Projection	LAMBERT		
Datum	NAD83		
Units	3.28084	Spheroid	GRS1980
Parameters:			
1st standard parallel		43 0 0.000	
2nd standard parallel		45 30 0.000	
central meridian		-120 30 0.00	
latitude of projection's origin		41 45 0.000	
false easting (meters)		400000.00000	

false northing (meters)

0.00000

Progress or Status: Incomplete. Not all of the streams on the base HUC (hydrologic unit code) coverages have been surveyed. Surveys are an ongoing process and streams are added to the coverage as they are completed.

Related Spatial and Tabular Data Sets: There are a variety of coverages which may be used in conjunction with this dataset. For example, available through the Oregon State Service Center for Geographic Information Systems are: county roads; highways and HUC (hydrologic unit code coverages). The HUC coverages are the PNW River Reach File Project coverages that were completed by the USGS. The ODFW Aquatic Inventories Project has multiple datasets for drainages throughout Oregon which are compatible.

Maintenance and Update Frequency: The coverages are updated when new streams are surveyed. Surveys occur annually, however, new surveys do not occur within every huc drainage annually. Therefore, updates of our coverages does not necessarily occur on an annual basis.

Access Constraints: Data collected by state agencies becomes part of the public domain. As such, anyone may access the stream datasets. The Aquatic Inventories Project coverages may be obtained through contact with Kim Jones (listed previously) and downloaded from the ODFW State FTP site (<ftp.dfw.state.or.us>).

Narrative section:

Abstract

The Oregon Department of Fish & Wildlife has been actively acquiring stream habitat inventory information for the purpose of habitat assessment since 1990. This information is collected during the summer months by stream survey crews using methods described in Moore et al. (2007). The field data focuses on channel and valley morphology (stream and reach data), riparian characteristics and condition (reach data), and instream habitat (habitat unit data).

The survey data is compiled into a comprehensive database that is used in fish management and planning activities. The data are dynamically segmented in a geographic information system (ArcInfo) onto a 1:100,000 scale digitized stream layer to display habitat features and combinations of habitat features relative to location of streams, reaches, and habitat units in the watershed. The 1:100,000 scale digitized stream layer was originally digitized by the USGS in their PNW River Routes Project. It was later modified by ODFW's GIS Division to include a complete stream routing system. This modified route system provides the basis for our reach and habitat coverages.

The stream habitat distribution coverages provide a means for accessing stream data in an electronic medium. It increases the ease of data dispersal and allows for the assessment of basin wide characteristics. It also allows for stream and basin analysis to occur from a spatial scale and perspective.

Limitations of Data

The data for the two datasets are collected using the methodology as described by Moore et al. (2007). The purpose of this survey method is to inventory the applicable aspects of the riparian environment as they relate to fish habitat. This data is meant to be used as a means of determining habitat distribution and quality. It has been used successfully in the preparation of restoration plans, assessment of fish production and survival potential, and the determination of management priorities.

It is important to remember that the data contained in this dataset reflects the condition of the stream at the time of the survey. Streams are dynamic systems that change with every high or low flow event. Substrate and woody debris move through the system, trees fall into the stream causing changes in flow and habitat type. Pools are formed and filled in annually. It is the purpose of the survey to document the condition of the stream at the time of the survey. This data may be used later for comparison and management planning work.

The **reach dataset** generalizes the habitat units that are surveyed by the crew. It gives an overview of the conditions within the reach or section of stream. It should be a reference point for later comparative work or for the analysis of stream conditions.

The **habitat dataset** includes all of the unit data for the entire survey. It is within this dataset that the most noticeable annual change will occur. There will be changes in the distribution, size and location of habitat types annually. This dataset is not intended to be a map of the absolute distribution of habitat types. Rather, it indicates the condition of the stream at the time of the survey.

Procedures Used

The source coverages were acquired from the Oregon Department of Fish & Wildlife's GIS Division. The coverages were originally digitized by the USGS as part of the PNW River Reach File project which digitally entered stream basins based on their Hydrologic Unit Code (HUC) which had been previously defined by the Environmental Protection Agency (EPA). These HUC coverages were completed at a scale of 1:100,000. They were altered by ODFW in order to add unique stream identification numbers (LLID), as well as the addition of two separate route systems. The route systems were created using dynamic segmentation tools and have resulted in one route system composed of streams and another for stream reaches. They were developed to assist in the quantification and enumeration of fish distribution data.

In this project, we have taken the routed HUC coverages and dynamically segmented the appropriate streams in order to append our stream habitat data. The process that we use is summarized below:

1. Edit HUC cover routes to reflect the end point of the stream habitat survey.
2. Remeasure the route to the length (in meters) of the survey as determined by the survey crew and the analysis of the data.
3. Create a calibration coverage based on the HUC coverage.
4. Add calibration points which are identified as locations on each streams where we can be certain of the location of the crew. Points include bridge crossings, tributaries or reach changes.
5. Each calibration point is given a distance measure that corresponds to the distance from the start of the survey to that point on the stream.
6. Calibrate the routes on the huc coverage based on the calibration coverage.
7. Import the dbase file that contains the database information for the the reach or habitat datasets.
8. Create an eventsource with the dbase file.
9. Link the eventsource to the routed HUC cover based on the lrid field. (The lrid is the longitude and latitude of the starting arc of the stream. It was calculated and assigned using an aml by the ODFW GIS Division.)
10. Build the new coverage and create an export file.

Reviews Applied to Data: The data is reviewed before dissemination to the public. The dimensions of the arc attribute files are reviewed to assure that the necessary variables are present and have the correct field values. The reach and habitat datasets are reviewed in ArcView in order to determine that the dynamic segmentation and calibration process have placed certain landmarks in the correct location.

Coverage Contents Discussion/Explanation:

Reach Dataset

Contents:

< basin >rch.aat	(Arc Attribute Table)
< basin >rch.bnd	(Boundary - Coverage extent.)
< basin >rch.tic	(Contains tic information. Tics are a registration point for a coverage.)

Arc Attribute Item Description:

File: < basin >rch.aat

Summary: The reach dataset provides information within the context of specific stream reaches identified by the stream habitat survey crew and

supported at the time of stream analysis. Reaches vary in length from 1/2 kilometer to more than 8 kilometers and are defined by channel and valley geomorphology, gradient, land use, land ownership, riparian characteristics, and stream flow. The survey describes the reaches in terms of hillslope constrained, terrace constrained, and unconstrained stream channels. Within each reach, the stream is described as a series of habitat units. The information present in this dataset summarizes the unit by unit data collected at the time of the survey. There are multiple calculated fields present that provide important and useful statistics which give insight into the condition of the reach. The reach information is distributed on the coverage based on the distance of the reach from the start point of the stream.

<i>Attribute name</i>	<i>width</i>	<i>output</i>	<i>type</i>	<i>#decimals</i>	<i>Description</i>
LENGTH	4	12	F	3	Length of arc in meters.
<BASIN>RCH#	4	5	B	-	Computer generated identification number for arc.
<BASIN>RCH-ID	4	5	B	-	User generated identification number for arc.
GROUP	6	6	C	-	Funding or Sponsor Group (blanks acceptable)
LLID	13	13	C	-	Unique identification number which equals the longitude and latitude of the starting arc of the stream.
STREAM	32	32	C	-	Stream Name.
REGION	3	3	C	-	ODFW Fish Management Region.
ECOREGION	32	32	C	-	EPA Ecoregion and Subregion.
BASIN	32	32	C	-	Major basin or watershed associated with the stream.
HUC	8	8	F	0	USGS/EPA Hydrologic Unit (8 digits).
NEXT_STRM	32	32	C	-	Stream that survey stream flows into.
OWNERSHIP	32	32	C	-	Name of individual, company or agency that owns reach (blanks acceptable). By agreement, no ownerships are given for most Umpqua reaches.
REACH	4	6	B	-	Stream Reach #. It may be defined by geomorphic characteristics such as changes in valley and channel form or an area between named tributaries or by major changes in vegetation type, land use or ownership.
RCHCOM	6	6	C	-	Reach comments that provide additional information used for some data sorts.
NODATA	12	12	C	-	Explanation code for some blank variable fields (riparian survey, wood survey, calculated fields).
SURV_DATE	8	10	D	-	Survey date.
STREAMORD	4	3	B	-	Stream order from 7.5 min topo (blanks acceptable).
WATERSHED	8	9	F	1	Watershed area from 7.5 min topo (blanks acceptable).
PRICHNLL	8	10	F	0	Length of primary channel. This is defined as the mainstem of the stream and does not include secondary channel units, backwater, alcove or tributary unit lengths surveyed.
FROMDIST	8	10	F	0	From distance (m). Measures the distance from the start of the stream to the beginning of the unit.
TODIST	8	10	F	0	To distance (m). Measures the distance from the start of the stream to the end of the unit.

SECCHNLL	4	6	B	-	Length (m) of secondary channels (secondary channels are coded separately from the primary channel of the stream).
PRICHNAREA	4	7	B	-	Area of primary channel (m ²).
SECCHNAREA	4	7	B	-	Area of secondary channels (m ²).
PCTSCCHNLA	4	7	F	1	Percent of the total area of the stream in the reach that is associated with secondary channels.
LUSE1	2	2	C	-	Primary land use as determined from observation of the terrace and hillslopes beyond the riparian zone of the stream within the reach.
LUSE2	2	2	C	-	Secondary land use, blanks acceptable.
RIPV1	3	3	C	-	Primary riparian vegetation within approximately one active channel width of the main stem of the stream.
RIPV2	3	3	C	-	Secondary riparian vegetation.
GRADIENT	4	4	F	1	Average of unit gradients (percent slope) for reach, weighted by unit length.
VWI	4	4	F	1	Valley Width Index. The ratio of active channel to valley floor.
VALLEYTYP	2	2	C	-	Valley form or type. Describes the configuration of the valley floor.
CHANNELFO	2	2	C	-	Channel form, describes the morphology of the active channel, hillslopes, terraces and floodplains.
WIDTH	4	5	F	1	Average Channel Width (m). Width of the wetted portion of the channel.
ACW	4	5	F	1	Active or bankfull channel width (m). The horizontal distance across the channel at the "bank full" or annual high flow line.
ACH	4	5	F	1	Active channel height (m). The vertical distance from the streambed to the top of the active channel.
TERR_WIDTH	4	6	F	1	Inter-terrace width (m). Width across stream from terrace edge to terrace edge.
TERR_HT	4	4	F	1	Height of terrace above the streambed (m)
FLOOD_WID	4	5	F	1	The floodprone width is the width of the valley floor inundated during a flood which occurs approximately every 50 years. The floodprone width is determined as the channel width measured on a level line at the level of the floodprone height. (Info not collected prior to 1998.)
FLOOD_HT	4	5	F	1	Floodprone height is determined by doubling the active channel height. It is the maximum depth in the channel during a flood with an occurrence of approximately 50 years. (Info not collected prior to 1998.)
ENTRENCH	4	5	F	1	The entrenchment value is the ratio between the floodprone width and the active channel width. (Info not calculated prior to 1998.)
UNITS100	4	5	F	2	Number of habitat units/100 m stream survey. An index of stream habitat complexity.
NOPOOLS	4	4	B	-	Combined count of scour and dammed pools in reach.
PCTPOOL	4	5	F	1	Combined percentage (by area) of scour and dammed pools in reach.
SCRPOOLD	4	5	F	2	Average depth of scour pools.
PCTDBPOOL	4	5	F	2	Percent of habitat units in the reach that are backwaters or dammed pools.
RIFFLEDEP	4	6	F	2	Average depth of riffles.

LRGBLDR	8	8	F	0	Number of boulders ≥ 0.5 m diameter in reach.
PCTSNDOR	4	5	F	1	Average percent of sand, silt, and organics in surface substrate of all units.
PCTGRAVEL	4	5	F	1	Average percent of gravel in surface substrate of all units.
RIFSNDOR	4	5	F	1	Average percent of sand, silt, and organics in surface substrate of riffle units only. No value is given for reach without riffles.
PCTBEDROCK	4	5	F	1	Average percent of bedrock in surfact substrate of all units. (Info not in the reach database prior to 1999.)
RIFGRAV	4	5	F	1	Average percent of gravel in surface substrate of riffle units only. No value is given for reaches without riffles.
POOLS_KMTL	4	5	F	1	Number pools per kilometer of total stream length.
POOLS_KMPL	4	5	F	1	Number of pools per kilometer of primary channel length.
POOL1P_KM	4	5	F	1	Number of pools deeper than 1.0 meter/kilometer of total stream length.
COMPOOL_KM	4	5	F	1	Number of pools with ≥ 3 pieces of LWD /kilometer of total reach length.
CWPOOL	4	6	F	1	Channel widths/pool. A pool frequency measure calculated by dividing the number of pools by the number of active channel width equivalents in the reach.
SHADE	4	5	F	1	Amount of shade provided to stream by riparian vegetation and topography (percentage of 180 degrees).
BANKEROSI	4	5	F	1	Percent reach length of channel units with banks classified as actively eroding.
PCTUNDERC	4	5	F	1	Undercut bank unit average as percent of unit length.
PIECESLWD	4	5	B	-	Pieces of large woody debris (≥ 0.15 m diameter and ≥ 3 m long) in reach.
VOLUMELWD	4	7	F	1	Volume of large woody debris (m ³) in reach.
LWDPIECE1	4	6	F	1	Pieces of large woody debris/100meters of primary stream length.
LWDVOL1	4	6	F	1	Volume of large woody debris/100meters of primary stream length.
KEYLWD	4	6	B	-	Key pieces of large woody debris (≥ 0.60 m diameter and ≥ 12 m long) in reach.
KEYLWD1	4	5	F	2	Key pieces of large woody debris/100m of primary stream length.
MAXTEMP	4	4	F	1	Maximum temperate in °C measured during survey.
MINTEMP	4	4	F	1	Minimum temperate in °C measured during survey.
POOLS100	4	6	F	2	Number of pools/100m total stream length.
RESIDPD	4	4	F	1	Average residual depth of pool.
WDRATIO	4	5	F	1	Width to Depth ratio (calculated as active channel width to active channel depth).
LRGBLDR1	4	7	F	2	Large boulders (≥ 0.5 m dia)/100m total channel length.
THARDWOOD	8	8	F	1	Total number of riparian hardwood trees in a 100ft zone /1000ft of stream length (30m X 305m).
TCONIFERS	8	8	F	1	Total number of riparian conifer trees in a 100ft zone/1000ft of stream length (30m X 305m).

CON_20PLUS	4	6	F	1	Conifers \geq 50cm dbh/1000ft (305m) of stream length.
CON_20TO35	4	6	F	1	Conifers \geq 50cm and <90cm dbh/1000ft (305m) of stream length.
CON_36PLUS	4	6	F	1	Conifers \geq 90cm dbh/1000ft (305m) of stream length.
FISH1	5	5	C	-	Code of primary fish species observed (blanks frequent and acceptable).
FISH2	5	5	C	-	Code of 2 nd fish species.
FISH3	5	5	C	-	Code of 3 rd fish species.
FISH4	5	5	C	-	Code of 4 th fish species.
BVR_DAM	4	4	C	-	Beaver dams. If present, give code and number of occurrences, eg. BD04.
BVR_ACTIV	4	4	C	-	Beaver activity. If present, give code and number of occurrences.
CULVERT	4	4	C	-	Culvert. If present, give code and number of occurrences.
MASS_FAIL	4	4	C	-	Mass failures. If present, give code and number of occurrences.
DEBRIS_JAM	4	4	C	-	Debris jams. If present, give code and number of occurrences.
HAB_STRUCT	4	4	C	-	Habitat structures. If present, give code and number of occurrences.
HABRCH	8	15	F	0	Unique identification number for reach which equals the LLID number with reach number appended. eg: reach 1 of stream with llid # which equals 1230144425933 would have a habrch value of 123014442593301.

Acceptable Codes and Definitions Aquatic Inventory Reach Dataset

<i>Name</i>	<i>Codes</i>	<i>Definition</i>
GROUP	BLM	Bureau of Land Management
	BPA	Bonneville Power Administration
	ODF	Oregon Dept. of Forestry
	FED	Other Federal
	ODFW	Oregon Dept. Fish and Wildlife
	OFIC	Oregon Forest Industry Council
	R&E	Restoration and Enhancement Program
	REFOG	Reference old growth reach
	UBFRI	Umpqua Basin Fisheries Restoration Initiative
REGION		ODFW Fish Management Regions
	C	Central
	CO	Columbia
	NE	NorthEast
	NW	NorthWest
	SE	SouthEast
RCHCOM		Reach Comment
	(W)	Winter survey also done
	LQ	Low Quality field work, use with caution

	DRY	DRY channel in this reach
	SS	Small Stream survey methods used
	UNS	UNSurveyed because access denied, most data missing
	RSVR	reach was a lake or ReSerVoiR.
NODATA		Explanation code for some types of missing data. Code combinations acceptable
	KP	no Key Pieces, not calculated prior to 1993
	P1	Pools >1.0 m in depth, Not calculated for this reach
	RP	RiParian transects missing (no riparians done prior to 1993)
	RI	Riffle units not present in reach
	WD	Wood Debris summary data missing. No wood survey prior to 1991
LUSE1		Primary Land Use
	AG	AGricultural crop or dairy land.
	TH	Timber Harvest. Active timber management including tree felling, logging, etc. Not yet replanted.
	YT	Young forest Trees. Can range from recently planted harvest units to stands with trees up to 15 cm dbh.
	ST	Second growth Timber. Trees 15-30 cm dbh in generally dense, rapidly growing, uniform stands.
	LT	Large Timber (30-50 cm dbh).
	MT	Mature Timber (50-90 cm dbh).
	OG	Old Growth forest. Many trees with 90+ cm dbh and plant community with old growth characteristics.
	PT	Partial cut Timber. Selection cut or shelterwood cut with partial removal of large trees. Combination of stumps and standing timber. If there are only a few live trees or snags in the unit, describe in note column.
	FF	Forest Fire. Evidence of recent charring and tree mortality.
	BK	Bug Kill. Eastside forests with > 60% mortality from pests and diseases. Enter bug kill as a comment on the unit sheet when it is observed in small patches.
	LG	Light Grazing pressure. Grasses, forbs and shrubs present, banks not broken down, animal presence obvious only at limited points such as water crossings. Cow pies present.
	HG	Heavy Grazing pressure. Broken banks, well established cow paths. Primarily bare earth or early successional stages of grasses and forbs present.
	EX	EXclosure. Fenced area that excludes cattle from a portion of range land
	UR	URban.
	RR	Rural Residential.
	IN	INdustrial.
	MI	MIning.
	WL	WetLand.
	NU	No Use identified.
LUSE2		Codes same as LUSE1.
RIPV1		Primary Riparian Vegetation
	N	No Vegetation (bare soil, rock).
	B	SageBrush (sagebrush, greasewood, rabbit brush, etc.).
	G	annual Grasses, herbs, and forbs.
	P	Perennial grasses, sedges and rushes.

S Shrubs (willow, salmonberry, some alder).
 D Deciduous dominated (canopy more than 70% alder, cottonwood, big leaf maple, or other deciduous sp.).
 M Mixed conifer/deciduous (approx. 50:50 distribution).
 C Coniferous dominated (canopy more than 70% conifer).

Second part of code for size class. Only the first number of the sequence shown in the reach file

1- 3 Seedlings and new plantings.
 3-15 Young established trees or saplings.
 15-30 Typical sizes for second growth stands. West side communities may have fully closed canopy at this stage.
 30-50 Large trees in established stands.
 50-90 Mature timber. Developing understory of trees and shrubs.
 90+ Old growth. Very large trees, nearly always conifers. Plant community likely to include a combination of big trees, snags, downed woody debris, and a multi-layered canopy.

RIPV2 Secondary Riparian Vegetation. Same coding as RIPV1.

VALLEYTYP Valley form or type.

SV Steep V-Shaped valley or bedrock gorge.
 MV Moderate V-Shaped valley (side slopes > 30%).
 OV Open V-Shaped valley (side slopes <30%).
 CT Constraining Terraces.
 MT Multiple Terraces.
 WF Wide-active Floodplain.

CHANNELFO Geomorphic Channel Form.

CB Constrained by Bedrock (bedrock dominated gorge).
 CH Constrained by Hillslope
 CF Constrained by alluvial Fan.
 CL Constrained by Land use (road, dike, landfill).
 US Unconstrained-predominantly Single channel.
 UA Unconstrained-Anastomosing.
 UB Unconstrained-Braided channel.
 TC Terrace Constrained.
 CA Constrained by Alternating terraces and hillslope.

FISH 1,2,3,4 Blanks are acceptable for these fields. Blanks do not mean that fish are absent in the reach.

Standard Abbreviations

BG	bluegill	CSU	largescale sucker
BLB	black bullhead	CT	cutthroat trout
BR	brown trout	D	dace
BRB	brown bullhead	LAM	lamprey
BSU	bridgelip sucker	MSU	mountain sucker
BT	brook trout	OC	Oregon chub
BUT	bull trout	PK	pumpkinseed
CC	channel catfish	PM	peamouth
CH	chinook salmon	PS	pink salmon
CLM	chiselmouth	RB	rainbow trout
CO	coho salmon	RSS	redside shiner
CS	chum salmon	RT	redband trout

SB	smallmouth bass	SU	sucker
SS	sockeye salmon	WF	mountain whitefish
ST	steelhead		

Non-Standard Abbreviations:

AM	lamprey ammocoetes	RTS	reticulate sculpin
AS	atlantic salmon	RO	roach
ATF	adult tailed frog	RSN	rough skin newt
BD	black dace	SH	shiner spp.
BTH	brook/bull hybrid	SKB	stickleback
C	crappie	SR	sandroller
CF	crayfish	SP	speckled dace
COT	sculpin	SQ	northern squawfish
CP	carp	SNF	sunfish
CTH	cutthroat hybrid	SF	salmonid fry (age 0+)
FRG	frog (species unknown)	SAL	salamander
JSU	jenny lake sucker	TC	tui chub
LB	largemouth bass	TF	trout fry (age 0+)
LND	longnose dace	TFT	tailed frog tadpole
MF	western mosquitofish	UT	unknown trout
MMS	Malheur mottled sculpin	US	unknown salmonid
MS	mottled sculpin	X	no fish found
PGS	pacific giant salamander	YP	yellow perch

BVR_DAM	BD	Beaver Dam code. Two part code BD which indicates beaver dam activity and a two digit number indicating number of occurrences in the reach. Blank fields are acceptable.
BVR_ACTIV	BV	Beaver Activity observed within reach. Beaver Activity codes have two parts the type of activity and the number of occurrences in the reach. Blank fields are acceptable.
CULVERT	CC CE CCCE	Culvert Crossing. Primary channel goes through culvert. Culvert Entry. Tributary stream enters primary channel through culvert. A two part code indicating type and number of occurrences in the reach. Indicates both types of culvert entry within reach. Blank fields are acceptable.
MASS_FAIL		Mass Failure code for streamside earth movements. It includes code for type and a number of occurrences in reach. A comment on reach, not a useful sorting variable. Blank fields are acceptable.
	A E L	Debris Avalanche Earthflow Landslide
DEBRIS_JAM	DD	Large woody debris jam or dam code for type and number of occurrences in reach. Includes both debris jams (3-4 pieces) and full channel damming features. Count is an index of frequency and is not appropriate for strict comparison due to the variable sizes of jams. Blank fields are acceptable.

HAB_STRUCT	HS	Stream habitat structure. Man made structure intended to improve stream habitat conditions. Number of occurrences in reach given. Blank fields are acceptable.
ECOREGION		Not a code. Short description of EPA ecoregion or subregion name. Useful or sorting to large grouping within the state. Wild card grouping and sorts i.e. "COAST" particularly useful.
OWNERSHP		Ownership. Not a code. Short explanation of ownership as noted in field. Useful for grouping data for some reports but does not reflect all ownerships or changes in ownership.

Habitat Unit Dataset

Contents:

< basin >hab.aat	(Arc Attribute Table)
< basin >hab.bnd	(Boundary - Coverage extent.)
< basin >hab.tic	(Contains tic information. Tics are a registration point for a coverage.)

Arc Attribute Item Description:

File: <basin>hab.aat

Summary: The habitat unit dataset provides all of the information collected at the unit level by the stream survey crew. Habitat units are the building blocks of reaches. Each unit is longer than one active channel width and is an area of relatively homogeneous slope, depth, and flow pattern representing different channel forming processes. The channel is classified into 22 hierarchically organized types of pools, glides, riffles, rapids, steps, and cascades. The crews estimate the length and width of every habitat unit. At every unit, attributes are estimated or measured to describe gradient, substrate, woody debris, shade, features of instream cover, and bank stability. The habitat information is distributed along the length of the stream route in relation to the distance of the habitat unit from the start point of the stream.

<i>Attribute name</i>	<i>width</i>	<i>output</i>	<i>type</i>	<i>#decimals</i>	<i>Description</i>
LENGTH	4	12	F	3	Length of arc in meters.
<BASIN>#	4	5	B	-	Computer generated identification number for arc.
<BASIN>-ID	4	5	B	-	User generated identification number for arc.
BASIN	30	30	C	-	Major basin or watershed associated with the stream.
STREAM	30	30	C	-	Stream Name.
SAMPL_DATE	8	10	D	-	Date unit of stream surveyed.
LOCATION	15	15	C	-	Legal description of reach location. It includes the township-range-section as identified on USGS 1:24000 topographic maps.

REACH_NUMB	4	4	B	-	Number of reach in which habitat unit is contained. Original reach number as identified by field survey crew.
REACH_NEW	4	4	B	-	Reach number in which habitat unit is contained. Modified reach number determined during data analysis.
CHAN FORM	2	2	C	-	Channel form. It describes the morphology of the active channel, hillslopes, terraces and flood plains.
VALLEY_FM	2	2	C	-	Valley form or type. It describes the configuration of the valley floor.
VEG_CL_DOM	2	2	C	-	Vegetation classification. Identifies the dominant vegetation located within the riparian zone of the stream based on canopy density and height.
VEG_CL_SUB	2	2	C	-	Subdominant vegetation in the riparian zone.
LAND_DOM	5	5	C	-	Dominant land use. Determined from observations of the hillslopes and terraces beyond the riparian zone of the stream.
LAND_SUB	5	5	C	-	Subdominant land use. Determined from observations of the hillslopes and terraces beyond the riparian zone of the stream.
WATER_TEMP	4	4	F	1	Water temperature. Measured at each reach by the stream survey crew.
UNIT_NUMB	4	7	B	-	Unit number. Units numbers are assigned sequentially from the start to end of the survey.
UNIT_TYPE	2	2	C	-	Unit type. The two letter code which identifies one of the 33 habitat types identified by the ODFW Aquatic Inventories Project Methods for Stream Habitat Surveys.
UNIT_NAME	20	20	C	-	Unit name. The decoded name of the habitat unit type.
CHANL_TYPE	2	2	C	-	Channel type. The two number code identifying the unit as part of the primary channel (00 or 01), a secondary channel (02-09), a backwater (10), alcove (10), isolated pool (10) or tributary (11-19).
PER_FLOW	4	3	B	-	Percent flow. A visual estimate of the amount of flow in the channel relative to secondary channels or tributaries. eg. flow of primary channel without tributaries/secondary channels = 100. Flow of primary and secondary channels with an equal distribution of wate.
COR_LENGTH	4	6	F	1	Corrected length (m) is the length of the unit identified by the field crew which has been adjusted to reflect bias identified by field and map calibrations.
COR_WIDTH	4	4	F	1	Corrected width (m). The width of the unit measured by the field crew and adjusted based on field and map calibrations.
COR_AREA	8	8	F	1	Corrected area. Unit area calculated by using the corrected length and corrected width values.
FROMDIST	8	10	F	1	From Distance (m). Measures the distance from the start of the stream to the beginning of the unit.
TODIST	8	10	F	1	To Distance (m). Measures the distance from the start of the stream to the end of the unit.
SLOPE	4	5	F	1	Slope. The gradient of the water surface for the unit. It is measured as percent change in elevation over the length of the unit and is measured with a climometer.

SHADE	4	4	F	1	Shade. Measures the amount of shade provided to the habitat unit from vegetation and topography.
AC_WIDTH	4	4	F	1	Active or bankfull channel width (m). The horizontal distance across the channel at the "bank full" or annual high flow line.
AC_HEIGHT	4	4	F	1	Active channel height (m). The vertical distance from the streambed to the top of the active channel.
FP_WIDTH	4	5	F	1	The floodprone width is the width of the valley floor inundated during a flood which occurs approximately every 50 years. The floodprone width is determined as the channel width measured on a level line at the level of the floodprone height. (Info not collected prior to 1998.)
FP_HEIGHT	4	5	F	1	Floodprone height is determined by doubling the active channel height. It is the maximum depth in the channel during a flood with an occurrence of 50 years. (Info not collected prior to 1998.)
TERR_WIDTH	4	5	F	1	Inter-terrace width (m). Width across stream from terrace edge to terrace edge.
TERR_HEIGHT	4	4	F	1	Height of terrace above streambed to the active channel (m)
VWI	4	5	F	1	Valley Width Index. Ratio of active channel to valley floor.
DEPTH	4	4	F	2	Depth of unit (m). Measured as modal depth in fast water units (glides, riffles, rapids, cascades) and maximum depth in slow water units (pools).
SO_ADJ	4	5	F	1	Silt and organics adjusted. Measures the percent of substrate within the unit which is composed of silt and organics.
SND_ADJ	4	5	F	1	Sand adjusted. Measures the percent substrate of sand size class.
GRV_ADJ	4	5	F	1	Gravel adjusted. Measures the percent substrate of gravel size class. Gravel is defined as particles of between 2 and 64 mm in size.
CBL_ADJ	4	5	F	1	Cobble adjusted. Measures the percent substrate of the cobble size class. Cobble is defined as material between 64 and 256 mm in size.
BLD_ADJ	4	5	F	1	Boulder adjusted. Measures the percent substrate of the boulder size class. Boulder is defined as material 256 mm in size and larger.
BRK_ADJ	4	5	F	1	Bedrock adjusted. Measures the percent of substrate identified as bedrock.
BLDR_COUNT	4	4	B	-	Boulder count. The number of boulders ≥ 0.5 m in diameter within the unit that are exposed but touching the water.
AE_EROSION	2	2	C	-	The percent of the lineal distance of both sides of the stream that is actively eroding at the active channel height.
UNDERCUT	4	3	B	-	Undercut bank. Percent of bank along perimeter of unit that is undercut and providing cover habitat.
WOOD_CLASS	4	1	B	-	Wood Class. Measures the complexity of habitat provided by woody debris within the unit. (not collected after 1997)
NPIECES	4	5	B	-	Number of pieces of countable wood. Countable wood must be at least 15 cm in diameter and 3 meters long.

WVOLUME	8	10	F	2	Wood Volume (m ³). Volume of countable wood contained within the unit.
KEYPIECES	4	3	B	-	Number of keypieces of wood. This includes all pieces that are at least 0.6 meters in diameter and 12 meters long.
COMM_CODE	10	10	C	-	Comment code. Specific codes which identify important features are noted here. eg. BC = bridge crossing or TJ = tributary junction.
NOTE_1	30	30	C	-	Notes taken by the crew member completing the "Unit 1" sheet.
NOTE_2	30	30	C	-	Notes taken by the crew member completing the "Unit 2" sheet.
CANOPY_CL	4	4	B	-	Canopy closure. Measures the density of canopy cover in the riparian zone of the stream. This measure is taken at riparian transects which occur at least every 30 units during the habitat survey.
SMALLCON	8	19	F	2	Small conifers. This field contains the number of conifers counted in the riparian transect with a dbh of less than 50 cm.
C_50	4	3	B	-	Conifers of size class 50 - 90 cm. This field tallies the total number of conifers counted in the riparian transect of between 50 and 90 cm dbh.
C_90	4	3	B	-	Conifers of size class 90 cm and larger. This field tallies the number of conifers counted in the riparian transect with a dbh of at least 90 cm.
TOTHWOOD	8	19	F	2	Total hardwoods. This field contains the total number of hardwoods counted in the riparian transect taken at this unit number.
LLID	13	13	C	-	Unique identification number which equals the longitude and latitude of the starting arc of the stream.
HABRCH	8	15	F	0	Unique identification number for the reach which equals the LLID number with reach number appended. eg. reach 1 of stream with llid # of 1230144425933 would have a habrch value of 123014442593301
HABUNT	8	19	F	0	Unique identification number for the unit which equals the habrch # with the unit number appended. eg. unit number 125 with habrch # of 123014442593301 would result in a habunt value of 1230144425933010125

Acceptable Codes and Definitions Aquatic Inventory Habitat Dataset

Variable Name Codes Definition

CHAN_FORM

- CB Constrained by Bedrock (bedrock dominated gorge).
- CH Constrained by Hill slope.
- CF Constrained by alluvial Fan.
- US Unconstrained-predominantly Single channel.
- UA Unconstrained-Anastomosing (several complex, interconnecting channels).

- UB Unconstrained-Braided channel (numerous, small channels often flowing over alluvial deposits).
- CT Constraining Terraces. (terrace height > 10% active channel width and terrace to terrace width < 2X active channel width).
- CA Constrained by Alternating terraces and hill slope.
- CL Constrained by Land use (road, dike, landfill).

VALLEY_FM

- SV Steep V-Shaped valley or bedrock gorge (side slopes >60%).
- MV Moderate V-Shaped valley (side slopes > 30%).
- OV Open V-Shaped valley (side slopes <30%).
- CT Constraining Terraces. Terraces typically high and close to the active channel. Terrace surface is unlikely to receive flood flows.
- MT Multiple Terraces. Surfaces with varying height and distance from the channel. High terraces may be present but they are a sufficient distance from the channel that they have little impact.
- WF Wide-Active Flood plain. Significant portion of valley floor influenced by annual floods. Any terraces present do not impinge on the lateral movement and expansion of the channel.

VEG_CL_DOM

VEG_CL_SUB

- N No Vegetation (bare soil, rock).
- B SageBrush (sagebrush, greasewood, rabbit brush, etc.).
- G Annual Grasses, herbs, and forbs.
- P Perennial grasses, sedges and rushes.
- S Shrubs (willow, salmonberry, some alder).
- D Deciduous Dominated (canopy more than 70% alder, cottonwood, big leaf maple, or other deciduous spp.).
- M Mixed conifer/deciduous (approx. a 50:50 distribution).
- C Coniferous Dominated (canopy more than 70% conifer).
- 1- 3 Seedlings and new plantings.
- 3-15 Young established trees or saplings.
- 15-30 Typical sizes for second growth stands. West side communities may have fully closed canopy at this stage.
- 30-50 Large trees in established stands.
- 50-90 Mature timber. Developing understory of trees and shrubs.
- 90+ Old growth. Very large trees, nearly always conifers. Plant community likely to include a combination of big trees, snags, down woody debris, and a multi-layered canopy.

LAND_DOM

LAND_SUB

- AG AGricultural crop or dairy land.
- TH Timber Harvest. Active timber management including tree felling, logging, etc. Not yet replanted.
- YT Young forest Trees. Can range from recently planted harvest units to stands with trees up to 15 cm dbh.
- ST Second growth Timber. Trees 15-30 cm dbh in generally dense, rapidly growing, uniform stands.).
- LT Large Timber (30-50 cm dbh).
- MT Mature Timber (50-90 cm dbh).
- OG Old Growth forest. Many trees with 90+ cm dbh and plant community with old growth characteristics.

PT	Partial cut Timber. Selection cut or shelterwood cut with partial removal of large trees. Combination of stumps and standing timber. If only a few live trees or snags in the unit, describe in note column.
FF	Forest Fire. Evidence of recent charring and tree mortality.
BK	Bug Kill. Eastside forests with > 60% mortality from pests and diseases. Enter bug kill as a comment on the unit sheet when it is observed in small patches.
LG	Light Grazing pressure. Grasses, forbs and shrubs present, banks not broken down, animal presence obvious only at limited points such as water crossings. Cow pies present.
HG	Heavy Grazing pressure. Broken banks, well established cow paths. Primarily bare earth or early successional stages of grasses and forbs present.
EX	EXclosure. Fenced area that excludes cattle from a portion of range land.
GN	GreeNway. Designated Green Way areas, Parks (city, county, state).
UR	URban.
RR	Rural Residential.
IN	INdustrial.
CR	Conservation area or wildlife Refuge
MI	MIning.
WL	WetLand.
NU	No Use identified.
WA	Designated Wilderness Area

UNIT_TYPE

PP	Plunge Pool. Formed by scour below a complete or nearly complete channel obstruction (logs, boulders, or bedrock). Substrate is highly variable. Frequently, but not always, shorter than the active channel width.
SP	Straight scour Pool. Formed by mid-channel scour. Generally with a broad scour hole and symmetrical cross section.
LP	Lateral scour Pool. Formed by flow impinging against one stream bank or partial obstruction (logs, root wad, or bedrock). Asymmetrical cross section. Includes corner pools in meandering lowland or valley bottom streams.
TP	Trench Pool. Slow flow with U or V-shaped cross section typically flanked by bedrock walls. Often very long and narrow with at least half of the substrate comprised of bedrock.
DP	Dammed Pool. Water impounded upstream of channel blockage (debris jams, rock landslides).
BP	Beaver dam Pool. Dammed pool formed by beaver activity.
AL	ALcove. Most protected type of subunit pool. Alcoves are laterally displaced from the general bounds of the active channel. Substrate is typically sand and organic matter. Formed during extreme flow events or by beaver activity; not scoured during typical high flows.
BW	BackWater pool. Found along channel margins; created by eddies around obstructions such as boulders, root wads, or woody debris
IP	Isolated Pool. Pools formed outside the primary wetted channel, but within the active channel. Isolated pools are usually associated with gravel bars and may dry up or be dependent on inter-gravel flow during late summer.

GL GLide. An area with generally uniform depth and flow with no surface turbulence. Glides may have some small scour areas but are distinguished from pools by their overall homogeneity and lack of structure.

RI Riffle. Fast, turbulent, shallow flow over submerged or partially submerged gravel and cobble substrates.

RP Riffle with Pockets. Same flow and gradient as Riffle but with numerous sub-unit sized pools or pocket water.

RB Rapid with protruding Boulders. Swift, turbulent flow including chutes and some hydraulic jumps swirling around boulders.

RR Rapid over bedRock. Swift, turbulent, "sheeting" flow over smooth bedrock.

CB Cascade over Boulders. Much of the exposed substrate composed of boulders organized into clusters, partial bars, or step-pool sequences.

CR Cascade over bedRock. Same flow characteristics as Cascade over Boulders but structure is derived from sequence of bedrock steps. Slope 3.5% or greater.

SR Step over BedRock (include hardpan and clay steps).

SB Step over Boulders.

SC Step over face of Cobble bar.

SL Step over Log(s), branches.

SS Step created by Structure (culvert, weir, artificial dams).

SD Step created by Beaver Dam.

DU Dry Unit. Dry section of stream separating wetted channel units.

PD PuDdled. Nearly dry channel but with sequence of small isolated pools less than one channel width in length or width.

DC Dry Channel. Section of the main channel or side channel that is completely dry at time of survey.

CC Culvert Crossing. Stream flowing through a culvert.

MT Meadow Trench. Low gradient, low energy system with meandering channel flowing through meadow soils and peat.

BR BRaided. Multiple channels with poorly defined riffles and few pools.

PR Pool-Riffle. Low to moderate gradient. Sequence of full channel width pools and riffles; may include glides.

PS Pool-Step-pool Moderate to high gradient. Full channel width pools separated by steps, riffles, rapids, or cascades.

CA CAscade. High gradient. Rapids, boulder strewn chutes, falls, and very small pools.

CD Colluvial Debris. Channel filled with unsorted material from the adjacent hillslopes (boulders, smaller sediments, and/or large wood).

BD BeDrock. Channel bottom more that 50 percent bedrock.

CHANL_TYPE

00 No Multiple Channels (all flow in one channel)

01 Primary Channel (of multiple channel reach or in the unit where a tributary enters the channel)

02 Secondary Channel (of multiple channel reach)

03 Tertiary Channel (of multiple channel reach)

10 Isolated Pools, Alcoves, or Backwater Pools.

11 Primary channel of valley floor tributary.

12 Secondary channel of valley floor tributary.

WOOD_CLASS

- 1 Woody debris absent or in very low abundance. No habitat complexity or cover created.
- 2 Wood present, but contributes little to habitat complexity. Mostly small, single pieces, creating little cover or complex flow patterns. Ineffective at moderate to high discharge.
- 3 Wood present as combinations of single pieces and small accumulations. Providing cover and some complex habitat at low to moderate discharge, less effective at high discharge.
- 4 Wood present with medium and large pieces comprising accumulations and debris jams that incorporate smaller root wads and branches. Good hiding cover for fish. Woody debris providing cover and complex habitat that persists over most stream discharge levels.
- 5 Wood present as large single pieces, accumulations, and jams that trap large amounts of additional material and create a *variety* of cover and refuge habitats. Woody debris providing excellent persistent and complex habitat. Complex flow patterns will exist at all discharge levels.

COMM_CODE

- BC Bridge Crossing.
- BD Beaver Dam.
- BK Bug Kill. Patches of insect or disease tree mortality.
- BV BeaVer Activity (beaver den, cut trees, etc).
- CC Culvert Crossing.
- CE Culvert Entry. Tributary entering through culvert.
- CS Channelized Streambanks. Rip-rap or other artificial bank stabilization and stream control.
- DJ Debris Jam. Accumulation of large woody debris that fills the stream channel and traps additional debris and sediment.
- FC Fence Crossing.
- GS Gaging Station.
- HS Artificial Habitat Structure. Describe type: gabion, log weir, cabled or uncabled LWD, etc. in note.
- MI Mining
- PA Potential Artificial Barrier. Potential artificial or human created barrier to upstream or downstream migration of fish.
- PN Potential Natural Barrier. Potential natural barrier to upstream or downstream migration of fish.
- RF Road Ford.
- SD Screened Diversion (pump or canal).
- SS Spring or Seep.
- TJ Tributary Junction with named and unnamed tributaries.
- UD Unscreened Diversion (pump or canal).
- WL WildLife use of stream or riparian zone.

Mass Movement: A two-part code. The first letter identifies the type of mass movement failure. The second letter evaluates the apparent activity of the failure. (Example: AI = inactive debris avalanche.)

Type:

- E Earthflow: general movement and encroachment of hillslope upon the channel.
- L Landslide: failure of locally adjacent hillslope. Usually steep, broad, often shaped like a half oval, with exposed soils.
- A Avalanche: failure of small, high gradient tributary. Often appear “spoon shaped” looking upslope.

Condition:

- A Active: contributing material now.
- I Inactive: evidence of contribution of material during previous winter or high flows.
- S Stabilized: vegetated scars, no evidence of recent activity.

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Hupperts, Keith. 1997. *River Information Coverages*. Geographic Information Systems Division, Oregon Department of Fish & Wildlife, Portland, OR.

USGS Pacific Northwest River Reach Files.

Other Source Citations

Moore, K. M. S., K. K. Jones and J. M. Dambacher. 2007. *Methods for Stream Habitat Surveys*. Information Report 2007-01. Version 3. Oregon Department of Fish & Wildlife, Corvallis.
