# Peak Flows and Chinook Survival in the Stillaguamish Watershed:
## Spatial Prioritization for Conservation and Restoration Action

# Spatial Data Dictionary

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July 22, 2014

This document provides detailed description of all fields and their constituent classes within the datasets representing the final results of the four project components: Watershed Land Use, Ownership and Management Characterization, Mature Forest Cover Retention Priority, Floodplain Restoration Priority and Floodplain Conservation Priority.

The results datasets are provided both as three feature classes within an ArcGIS 10.1 file geodatabase and three independent ESRI shapefiles.

For a detailed discussion of how this content was generated, please refer to the detailed spatial analysis methodology for this project, which exists both as an appendix to the final project report and as a separate document.

## Land Base Characterization

**Geodatabase feature class**
LandbaseCharacterization

**Shapefile**
StillaguamishWtrshd_ LandbaseCharacterization

**Fields and constituent classes**
Attribute fields listed below refer first to the field name within the geodatabase feature class followed by the corresponding field name within the shapefile in parentheses. If appropriate, the range of possible classes within that field will be listed.

**RecordID (RecordID)** - A unique code assigned to each individual tax parcel for this project.

**County (County)** – The name of the county (Skagit or Snohomish) in which this parcel is located.

**TaxParcel (TaxParcel)** - Tax parcel identification code assigned by the county assessor.

**Owner_Name (Owner_Name)** - Tax parcel owner of record as reported by the county assessor.

**Owner_Name2 (Owner_Na_1)** - Tax parcel owner of record as reported by the county assessor (continued).

**Owner_Address1 (Owner_Addr)** - Mailing address for owner of record as reported by the county assessor.

**Owner_Address2 (Owner_Ad_1)** - Mailing address for owner of record as reported by the county assessor (continued).

**Owner_Address3 (Owner_Ad_2)** - Mailing address for owner of record as reported by the county assessor (continued).

**Owner_Address4 (Owner_Ad_3)** - Mailing address city, state and zip code for owner of record as reported by the county assessor.

**SITUS_Address1 (SITUS_Addr)** - Street and number address corresponding to the location of each parcel as reported by the county assessor.

**SITUS_Address2 (SITUS_Ad_1)** - City, state and zip code address corresponding to the location of each parcel as reported by the county assessor.

**District_City (District_C)** - Name of the incorporated municipality or unincorporated county in which the parcel is located.

**District_Fire (District_F)** - County fire district in which this parcel is located.

**District_School (District_S)** - School District in which this parcel is located.

**USPLSS_Township (USPLSS_Tow)** - U.S. Public Land Survey System Township corresponding to the location of this parcel.

**USPLSS_Range (USPLSS_Ran)** - U.S. Public Land Survey System Range corresponding to the location of this parcel.

**USPLSS_Section (USPLSS_Sec)** - U.S. Public Land Survey System Section corresponding to the location of this parcel.

**USPLSS_QuarterSec (USPLSS_Qua)** - U.S. Public Land Survey System Quarter-section corresponding to the location of this parcel.

**LandUse_Assessed (LandUse_As)** - Predominant land use of the parcel as determined by the county assessor.

**LandUse_Normalized (LandUse_No)** - Predominant land use of the parcel based on what is determined by the county assessor, but as recoded for this project to standardize differences between similar category names used by each county.

| | |
|---|---|
| Agriculture | Mobile Home Park |
| Automobile Parking | Multiple Family Residential |
| Charitable Services | Other Recreational Activities |
| Commercial | Other Transportation, Communication or Utilities |

| | |
|---|---|
| Commercial Lodging | Park or Designated Open Space |
| Commercial Services | Parks |
| Common Area | Public Assembly |
| Communication | Religious Activities |
| CU Agriculture | Resorts and Group Camps |
| CU Designated Forest Land | Retail or Wholesale Sales |
| CU Open Space | Shipping or Freight |
| CU Open Space Timber | Single Family Residential |
| CU Open Space Timberlands | State Forest Land |
| Duplex, Triplex, Townhome, Condominium | Trails |
| Educational Services | Transportation |
| Entertainment | Undeveloped Land - Natural |
| Federal Forest Land | Undeveloped Land - Other |
| Fish Hatchery | Undeveloped Land - Residential or Commercial |
| Government Services | unknown |
| Manufacturing or Processing | Utilities |
| Manufactured Housing | Vacation Cabin |
| Mining | Water Area |

**LandUse_Group (LandUse_Gr)** - Predominant land use of this parcel based on what is determined by the county assessor, but generalized into a small set of categories for this project.

| | |
|---|---|
| Agriculture | Recreation |
| Commercial or Industrial | Residential |
| Forestry | Social, Governmental or Cultural Uses |
| Infrastructure | Undeveloped or Vacant Land |
| Mining | unknown |
| Park or Designated Open Space | Water Area |

**Acres_GIS (Acres_GIS)** - Area of the polygon feature representing this tax parcel, in units of acres, calculated for this project using GIS.

**Acres_Recorded (Acres_Reco)** - Area of the actual tax parcel this feature represents, as reported by the county assessor.

**TaxYear (TaxYear)** - Tax year to which the property assessment valuations correspond.

**TaxExemption (TaxExempti)** - Real property tax exemption code, if any, applied to this parcel by the county assessor.

**Value_Market_Improvements (Value_Mark)** - Market value of all improvements to this parcel as determined by the county assessor.

**Value_Market_Land (Value_Ma_1)** - Market value of the land, excluding improvements, as determined by the county assessor.

**Value_Market_Total (Value_Ma_2)** - Total market value of this property, as determined by the county assessor.

**Value_Assessed_Total (Value_Asse)** - Total assessed value of this property, as determined by the county assessor.

**Value_Taxable_Total (Value_Taxa)** - Total taxable value of this property, as determined by the county assessor.

**OwnershipType (OwnershipT)** - Classification of the owner of record according to the type of entity they represent, as defined for this project.

| private | county | municipal | state | tribal | federal |

**PublicLand (PublicLand)** - Identifies whether or not ('1' = yes, '0' = no) this parcel is owned by a public agency, as determined for this project.

**ProtectedLand (ProtectedL)** - Identifies whether or not ('1' = yes, '0' = no) this parcel is afforded permanent, legal protection for the recreational or natural resource values it supports, as determined for this project.

**LandDesignation (LandDesign)** - Identifies the administrative or legal designation of this parcel, reflecting its intended purpose, use and management as public, tribal or protected private land.

| | |
| --- | --- |
| Cemetery | Postal Services |
| Conservation Easement | Public Administration |
| Ecological Research Natural Area | Public Utility |
| Economic Development | Public Water Access |
| Education Services | Social Services |
| Emergency Services | State Fish Hatchery |
| Health Services | State Natural Resource Conservation Area |
| Indian Reservation | State Other Conservation Area |
| Land Trust Fee Land | State Park |
| Local Ecological Conservation Area | State Trust Aquatic Land |
| Local Open Space | State Trust Forest Land |
| Local Park or Recreation Area | State Wildlife Area |
| Military Installation | Transportation Infrastructure |
| National Forest | Tribal Land |
| National Wilderness Area | unknown |

**ProtectionLevel (Protection)** - Estimates the level of protection, if any, afforded to the ecological resources on this parcel by virtue of how it is managed, as determined through this project. Note that categories 1 – 4 are defined by the U.S. National Gap Analysis Program.

(0) No ecological protection

(1) An area with an active management plan in operation that maintains natural conditions and within which natural disturbance events are generally allowed to proceed without interference. The management objective has legal standing and cannot be altered at the discretion of the administering agency, organization, or individual.

(2) An area managed generally in a non-extractive way for its natural values, but which may receive uses that degrade the quality of the natural communities that are present. Management objectives are not legally mandated for biodiversity conservation, and such objectives may be subject to administrative discretion.

(3)     An area for which legal mandates prevent permanent conversion, but which is subject to extractive uses.

(4)     Lands managed in ways that may preclude the holistic maintenance of native plant and animal assemblages.

(99)    Privately protected or public lands managed for purposes other than natural resource conservation or ecological protection.

**ControllingEntity (Controllin)** – Name chosen to represent the entity that owns or controls all parcels within the watershed that are held by evidently related owners of record as reported by the county assessor.

**NumParcelsControlled (NumParcels)** – The number of parcels within the watershed that are believed to be held by the controlling entity for this parcel.

**AcresControlled_GIS (AcresContr)** – The total aggregate area, in acres, of all polygon features representing tax parcels believed to be held by the controlling entity for this parcel, as calculated using GIS

**AcresControlled_Recorded (AcresCon_1)** -  The total aggregate area, in acres, of all actual tax parcels believed to be held by the controlling entity for this parcel, as reported by the county assessor.

**NWFP_Designation (NWFP_Desig)** - For National Forest lands, the management designation that applies to the majority of this parcel as defined by the U.S. Forest Service.

| | |
|---|---|
| Adaptive Management Area | Inventoried Roadless Area |
| Administratively Withdrawn | Late-Successional Reserve |
| Available | |

# Floodplain Conservation or Restoration Priority

**Geodatabase feature class**
Floodplain_Priorities

**Shapefile**
StillaguamishWtrshd_Floodplain_Priorities

**Fields and constituent classes**
Attribute fields listed below refer first to the field name within the geodatabase feature class followed by the corresponding field name within the shapefile in parentheses. If appropriate, the range of possible classes within that field will be listed.

**FPU_ID (FPU_ID)** – A unique code assigned to each individual floodplain unit for this project. Each code begins with either an "N" or an "S" to denote whether the floodplain unit is located on either the North or South forks of the River, respectively. The codes end with a series of numbers that, for each fork begin at the confluence of the North and South Forks and increase sequentially upstream,

with even numbers for floodplain units bordering the river's right bank (facing downstream) and odd numbers for those bordering the left bank.

**Fork (Fork)** – This field documents the location of each floodplain unit as being located along either the North or South fork of the Stillaguamish River.

**FPU_Acres (FPU_Acres)** – The area of each floodplain unit boundary represented as a feature in the data layer, in acres.

**BANK (BANK)** – This field documents the side or 'bank' of the river along which the floodplain unit is located, defined in relation to the flow of water in the channel from the perspective of one facing downstream.

**Miles_Up (Miles_Up)** – The measurement of distance along the course of the channel centerline, in feet, from the confluence of the North and South Forks to the midpoint of the floodplain unit river shoreline frontage.

**From_Miles_UP (From_Miles)** – The measurement of distance along the course of the channel centerline, in feet, from the confluence of the North and South Forks to the downstream end of the floodplain unit river shoreline frontage.

**To_Miles_Up (To_Miles_U)** – The measurement of distance along the course of the channel centerline, in feet, from the confluence of the North and South Forks to the upstream end of the floodplain unit river shoreline frontage.

**RiverFrontage_Ft (RiverFront)** – The measurement of the length of the floodplain unit river shoreline frontage, in feet.

**Armor_NearBank_Ft (Armor_Near)** – The measurement of the length of armoring along the floodplain unit river shoreline frontage, in feet.

**Armor_OppositeBank_Ft (Armor_Oppo)** – The measurement of the length of river shoreline frontage armoring along the opposite river bank, in feet.

**Armor_NearBank_Percent (Armor_Ne_1)** – The measurement of the percentage, by length, of armoring along the floodplain unit river shoreline frontage.

**Armor_SCORE_Conservation (Armor_SCOR)** – The numeric rating of how favorable each floodplain unit is for conservation relative to all others within the watershed, based on the percentage of armored river shoreline frontage. This score was calculated such that higher numbers reflect a lower relative percentage of armoring and, hence, more favorable candidate for conservation.

**Armor_SCORE_Restoration (Armor_SC_1)** – The numeric rating of how favorable each floodplain unit is for restoration relative to all others within the watershed, based on the percentage of armored river shoreline frontage. This score was calculated such that higher numbers reflect a higher relative percentage of armoring and, hence, more favorable candidate for restoration.

**Sinuosity_Average (Sinuosity_)** – An estimate of the sinuosity of the floodplain unit river shoreline frontage. This metric was calculated as the average, measured along the length of the river channel adjacent to the floodplain unit, of the ratios of the distances between a series of point pairings along the centerline of the river channel divided by the Euclidean or straight-line distance between those same pairs. Sinuosity values range from approximately 1 to 1.57; with lower values indicating less sinuous or straighter stretches of river.

**Sinuosity_SCORE_Conservation (Sinuosity1)** – The numeric rating of how favorable each floodplain unit is for conservation relative to all others within the watershed, based on the average sinuosity of the river shoreline frontage. This score was calculated such that higher numbers reflect a higher average relative sinuosity and, hence, more favorable candidate for conservation.

**Sinuosity_SCORE_Restoration (Sinuosit_1)** – The numeric rating of how favorable each floodplain unit is for restoration relative to all others within the watershed, based on the average sinuosity of the river shoreline frontage. This score was calculated such that higher numbers reflect a lower average relative sinuosity and, hence, more favorable candidate for restoration.

**ChannelConstriction (ChannelCon)** – An estimate of the average degree of constriction of the river channel along the floodplain unit shoreline frontage. This metric was calculated as the average, of the ratios of the actual bank-full width divided by the "expected" bank-full width for a series of points along the length of the river channel adjacent to the floodplain unit. For each measurement, the "expected" bank-full width of the river was estimated using an equation, derived using regression analysis, which establishes an exponential relationship between the area drained and the bank-full width of the river at select, unconstrained locations along the appropriate Fork of the river. Constriction values range from approximately 0.59 to 1.79, with lower values indicating more constricted channels.

**ChannelConstriction_SCORE_Conservation (ChannelC_1)** – The numeric rating of how favorable each floodplain unit is for conservation relative to all others within the watershed, based on the average degree of constriction of the river channel along the floodplain unit shoreline frontage. This score was calculated such that higher numbers reflect a lower degree of constriction and, hence, more favorable candidate for conservation.

**ChannelConstriction_SCORE_Restoration (ChannelC_2)** – The numeric rating of how favorable each floodplain unit is for restoration relative to all others within the watershed, based on the average degree of constriction of the river channel along the floodplain unit shoreline frontage. This score was calculated such that higher numbers reflect a higher degree of constriction and, hence, more favorable candidate for restoration.

**ElevRelatieTo100yrFlood_Average (ElevRelati)** – The measurement of the average elevation of the floodplain unit, in feet, relative to the 100-year flood elevation. Relative elevation values range from approximately 8.28 ft. below the flood elevation to 3.06 ft. above.

**FloodplainElevation_SCORE (Foodplain)** – The numeric rating of how favorable each floodplain unit is for either conservation or restoration relative to all others within the watershed, based on the average elevation of the floodplain unit relative to the 100-year flood elevation. This score was calculated such that higher numbers reflect a greater average floodplain depth and, hence, more favorable candidate for either conservation or restoration.

**NumOwners_ParcelsOver1pctOfFPU (NumOwners_)** – The number of unrelated landowners holding land that comprises at least 1% of the floodplain unit by area.

**NumOwners_Over25pctParcelInFPU (NumOwners1)** – The number of unrelated landowners holding land that comprises at least 1% of the floodplain unit by area, and whose holdings are at least 25% within the floodplain unit boundary.

**NumOwners_SCORE (NumOwners_1)** – The numeric rating of how favorable each floodplain unit is for either conservation or restoration relative to all others within the watershed, based on the number of unrelated landowners and the proportion of their holdings within the floodplain unit. This score was calculated such that higher numbers reflect floodplain units with a fewer number of landowners overall as well as favoring floodplain units with landowners whose holdings are less than 25% within the floodplain and, hence, are a more favorable candidate for either conservation or restoration.

**LandUse_SCORE (LandUse_SC)** – The numeric rating of how favorable each floodplain unit is for either conservation or restoration relative to all others within the watershed, based on the types of land uses found within the floodplain unit and their relative proportion by area. This score was calculated such that higher numbers reflect a greater proportion of land uses that are more favorable for either conservation or restoration, making the floodplain unit itself a more favorable candidate.

**Conservation_WeightedSum_SCORE (Conservati)** –
Final numeric rating of how favorable each floodplain unit is for conservation relative to all others within the watershed, based on the combined and weighted scores for armoring, sinuosity, channel constriction, floodplain elevation, number of landowners and types of land uses. The final score was calculated such that higher numbers indicate floodplain units that are more favorable candidates for conservation.

**Restoration_WeightedSum_SCORE (Restoratio)** –
Final numeric rating of how favorable each floodplain unit is for restoration relative to all others within the watershed, based on the combined and weighted scores for armoring, sinuosity, channel constriction, floodplain elevation, number of landowners and types of land uses. The final score was calculated such that higher numbers indicate floodplain units that are more favorable candidates for restoration.

## Mature Forest Cover Retention Priority

**Geodatabase feature class**
ForestMaturity_Priority

**Shapefile**
StillaguamishWtrshd_ForestMaturity_Priority

**Fields and constituent classes**
Attribute fields listed below refer first to the field name within the geodatabase feature class followed by the corresponding field name within the shapefile in parentheses. If appropriate, the range of possible classes within that field will be listed.

The following attribute fields within Mature Forest Cover Retention Priority dataset are defined in detail within Watershed Land Use, Management and Ownership Characterization section of this data dictionary, above:

> **RecordID (RecordID)**
> **County (County)**
> **TaxParcel (TaxParcel)**
> **Owner_Name (Owner_Name)**
> **Owner_Name2 (Owner_Na_1)**
> **Owner_Address1 (Owner_Addr)**
> **Owner_Address2 (Owner_Ad_1)**
> **Owner_Address3 (Owner_Ad_2)**
> **Owner_Address4 (Owner_Ad_3)**
> **SITUS_Address1 (SITUS_Addr)**
> **SITUS_Address2 (SITUS_Ad_1)**
> **District_City (District_C)**
> **District_Fire (District_F)**
> **District_School (District_S)**
> **USPLSS_Township (USPLSS_Tow)**
> **USPLSS_Range (USPLSS_Ran)**
> **USPLSS_Section (USPLSS_Sec)**
> **USPLSS_QuarterSec (USPLSS_Qua)**
> **LandUse_Assessed (LandUse_As)**
> **LandUse_Normalized (LandUse_No)**
> **LandUse_Group (LandUse_Gr)**
> **Acres_GIS (Acres_GIS)**
> **Acres_Recorded (Acres_Reco)**
> **TaxYear (TaxYear)**
> **TaxExemption (TaxExempti)**

**Value_Market_Improvements (Value_Mark)**

**Value_Market_Land (Value_Ma_1)**

**Value_Market_Total (Value_Ma_2)**

**Value_Assessed_Total (Value_Asse)**

**Value_Taxable_Total (Value_Taxa)**

**OwnershipType (OwnershipT)**

**PublicLand (PublicLand)**

**ProtectedLand (ProtectedL)**

**LandDesignation (LandDesign)**

**ProtectionLevel (Protection)**

**ControllingEntity (Controllin)**

**NumParcelsControlled (NumParcels)**

**AcresControlled_GIS (AcresContr)**

**AcresControlled_Recorded (AcresCon_1)**

**NWFP_Designation (NWFP_Desig)**

The following are fields were created during the Forest Cover Retention Priority analysis portion of this project, and are therefore defined here as follows:

**Management_Type (Management)** – The general management type assigned to each working forest parcel in the watershed, upon which the harvest intensity metrics are based. Management types for National Forest lands were assigned based on the USFS Land Resources Management Plan management type. Management types for tribal, state and private lands were assigned based on ownership type and landowner name.

| | |
|---|---|
| Commercial or Industrial Forest | USFS Adaptive Management Area |
| Family Forest | USFS Available |
| State Forest | USFS Late-Successional Reserve |
| Tribal Forest | |

**MEAN_Slope_SCORE (MEAN_Slope)** – The mean value of the slope measurements across the land area of this parcel, calculated from raster data representing the slope of the land surface in degrees, normalized to a scale of 1-100.

**STD_Slope_SCORE (STD_Slope_)** – The standard deviation of the slope measurements across the land area of this parcel, calculated from raster data representing the slope of the land surface in degrees, normalized to a scale of 1-100.

**SUM_Slope_SCORE (SUM_Slope_)** – The sum of the slope measurements across the land area of this parcel, calculated from raster data representing the slope of the land surface in degrees, normalized to a scale of 1-100.

**MEAN_Precip_SCORE (MEAN_Preci)** – The mean value of the precipitation measurements across the land area of this parcel, calculated from raster data representing the mean annual precipitation of the land surface measured in hundredths of an inch of rain fall, normalized to a scale of 1-100.

**STD_Precip_SCORE (STD_Precip)** – The standard deviation of the precipitation measurements across the land area of this parcel, calculated from raster data representing the mean annual precipitation of the land surface measured in hundredths of an inch of rain fall, normalized to a scale of 1-100.

**SUM_Precip_SCORE (SUM_Precip)** – The sum of the precipitation measurements across the land area of this parcel, calculated from raster data representing the mean annual precipitation of the land surface measured in hundredths of an inch of rain fall, normalized to a scale of 1-100.

**MEAN_Maturity_SCORE (MEAN_Matur)** – The mean value of the hydrological maturity classifications of land cover types across the land area of this parcel, calculated from raster data representing classes of hydrological maturity assigned to 2011 land cover type data. Classes were assigned such that higher numbers reflect a higher degree of hydrological maturity and, hence, a more favorable candidate for forest retention.

**STD_Maturity_SCORE (STD_Maturi)** – The standard deviation of the hydrological maturity classifications across the land area of this parcel, calculated from raster data representing classes of hydrological maturity assigned to 2011 land cover type data.

**SUM_Maturity_SCORE (SUM_Maturi)** – The sum of the hydrological maturity classifications of land cover types across the land area of this parcel, calculated from raster data representing classes of hydrological maturity assigned to 2011 land cover type data. Classes were assigned such that higher numbers reflect both a larger amount and higher degree of hydrological maturity

**MEAN_ROS_SCORE (MEAN_ROS_S)** – The mean value of the elevation-related seasonal precipitation metric calculations across the land area of this parcel, calculated from raster data representing classes based on a combination of the relative probability and potential for hydrological impact of rain-on-snow events. Classes were assigned such that higher numbers reflect the potential for a greater hydrological impact and, hence, a more favorable candidate for forest retention.

**STD_ROS_SCORE (STD_ROS_SC)** – The standard deviation of the elevation-related seasonal precipitation metric calculations across the land area of this parcel, calculated from raster data representing classes based on a combination of the relative probability and potential for hydrological impact of rain-on-snow events.

**SUM_ROS_SCORE (SUM_ROS_SC)** – The sum of the elevation-related seasonal precipitation metric calculations across the land area of this parcel, calculated from raster data representing classes based on a combination of the relative probability and potential for hydrological impact of rain-on-snow events. Classes were assigned such that higher numbers reflect both a larger area and the potential for a greater hydrological impact.

**HarvestIntnsty_SCORE (HarvestInt)** – A rating of the harvest intensity to which each parcel is subject based on the general management type assigned to each working forest parcel within the watershed recorded in the Management_Type (Management) field in this dataset. Harvest intensity ratings are based on a rough assessment that considers the relative timber stand rotation schedules and harvest techniques employed most commonly under each management type

**MEAN_WeightedSum_SCORE (MEAN_Weigh)** – The final numeric rating of how favorable parcel is for conservation relative to all others within the watershed, based on the mean of the combined and weighted values for the slope, precipitation, hydrological maturity, elevation-related seasonal precipitation pattern and harvest intensity metrics. The final score was calculated such that higher numbers indicate parcels that are more favorable candidates for mature forest retention.

**STD_WeightedSum_SCORE (STD_Weight)** – The standard deviation of the combined and weighted values for the slope, precipitation, hydrological maturity, elevation-related seasonal precipitation pattern and harvest intensity metrics for each parcel.

**SUM_WeightedSum_SCORE (SUM_Weight)** - The sum of the combined and weighted values for the slope, precipitation, hydrological maturity, elevation-related seasonal precipitation pattern and harvest intensity metrics for each parcel.