

Juvenile Spring Chinook Habitat ca. 2010

Technical Details

Overview

There are two attributes in the SLICES GIS attribute table and corresponding Excel spreadsheet associated with juvenile Spring Chinook habitat. The attribute *jcres_2010* (in GIS)/ *2010 Juvenile Chinook Habitat Restore* (in Excel) reports the number of acres in each 100m slice identified for restoration. The attribute *jccon_2010* (in GIS)/ *2010 Juvenile Chinook Habitat Conserve* (in Excel) reports the number of acres in each 100m slice identified for conservation. The representation of juvenile spring Chinook habitat in the PDF maps shows the suitable restoration habitat only; conservation habitat is not represented in the PDF maps. Juvenile spring Chinook habitat is not present in all 20 PDF maps and, as a result, does not appear on the corresponding list of map layers on all 20 PDFs when viewed in Adobe Acrobat.

We worked with a group of fish ecologists (expert group) to develop a set of criteria for mapping high quality juvenile Spring Chinook habitat. The expert group developed separate criteria for Winter habitat and Summer habitat; the data presented here identify locations that provide suitable juvenile Chinook habitat in both Winter and Summer (i.e. overall high quality habitat). Locations that meet *all* criteria for overall high quality juvenile Chinook habitat are identified as areas to conserve (*jccon_2010/ Juvenile Chinook Habitat Conserve 2010*). Locations that meet all criteria except suitable vegetation are identified as areas to restore (*jcres_2010/ Juvenile Chinook Habitat Restore*). Restoring native floodplain forest vegetation is clearly not the only option for restoring juvenile Chinook habitat and the science concerning the contribution to habitat quality of floodplain forests is less settled. It is, however, an expedient and cost effective option to increase the number of acres that help meet the year-round habitat needs of juvenile Chinook.

The Expert Group

The fish ecologists were lead by Professor Emeritus Stan Gregory (OSU), other members of the group were: Kirk Schroeder (ODFW retired), Luke Whitman (ODFW), Tom Friesen (ODFW), Randy Wildman (OSU retired), Josh Williams (OSU) and Pete Gruendike (River Design Group). The group developed criteria for juvenile Chinook habitat in meetings and follow-up correspondence in the summer and fall of 2013.

Spatial Extent of Juvenile Chinook Habitat Data

The availability of bare earth and highest hit LiDAR limited the territory over which some of the criteria could be mapped. Juvenile Chinook habitat was mapped in 100m Slices 7907 – 22907 but not in Slices 101 – 7906.

Habitat Criteria

The criteria for mapping suitable habitat were limited to those for which GIS data were available or could be created. The expert group provided separate sets of criteria for high quality Winter habitat and high quality Summer habitat. As noted above, the data incorporated into the SLICES framework identifies locations that meet both the Summer and Winter needs of juvenile Chinook.

Winter Habitat Criteria

1. Lateral inundated slope angle 0 – 5%
2. Water Depth greater than zero and less than 3 feet during a 2-year flood event
3. Nearshore: within 1,000 meters of the active low flow river channel
4. Non-agricultural vegetation > 2.5 feet in height (i.e. floodplain forest)

Summer Habitat Criteria

1. Located on the inside bend of the mainstem Willamette River
2. Low flow river bank composed of exposed gravel for more than one-third of the distance of the inside bend

Overall High Quality Habitat

Locations that meet the criteria for Winter habitat and are adjacent to locations that meet Summer habitat criteria are identified as overall high quality habitat. Locations that meet all four of the Winter habitat criteria and are adjacent to good Summer habitat are identified as locations to conserve. Locations that meet all Winter criteria except suitable vegetation (criterion 4) are identified as locations to restore.

Data and Processing

GIS raster data layers were created to represent the high quality habitat criteria and GIS processing identified locations of high quality Winter, Summer and overall juvenile Chinook habitat. Details of the data and processing are provided in the following text. Maps with an overview of the data and processing are provided in the final pages of this document.

High Quality Winter Habitat

A) Lateral Inundated Slope Angle

Lateral inundated slope angle was created from the Willamette delivery LiDAR (ftp://ftp.csc.noaa.gov/pub/crs/beachmap/qa_docs/or/willamette_valley/WV_Data_Report_Delivery_Area_15_16_17_FINAL.pdf) with GIS processing in ArcMap. Based on the expert group's guidance, we created a single class of suitable slope that includes slopes from zero to 5%.

B) Water Depth

Water depth was determined from the 2-year flood inundation mapping done by River Design Group, Inc. Information about this mapping can be found in the Technical Details section (<http://ise.uoregon.edu/slices/main>). Based on the expert group's guidance, we created a single class of suitable water depth that included depths greater than zero and less than or equal to 3 feet.

C) Nearshore

Nearshore was defined as the territory within 1,000 meters of the Willamette River low flow active channel. The representation of the mainstem came from a circa 2010 polygonal representation (a GIS coverage) of the active channel. The extent of nearshore was determined by creating a 1,000 meter buffer from the mainstem using GIS.

D) Non-Agricultural Vegetation > 2.5 feet in height

Bare earth and highest hit LiDAR data

(ftp://ftp.csc.noaa.gov/pub/crs/beachmap/qa_docs/or/willamette_valley/WV_Data_Report_Delivery_Area_15_16_17_FINAL.pdf) were used to identify features in the landscape greater than 2.5 feet in height. The resultant feature height data layer was overlaid onto 2011 National Agriculture Imagery Program (NAIP) aerial photographs to identify and classify non-agricultural vegetation.

Territory was determined to be non-agricultural vegetation if, on the NAIP air photo, it: 1) did not exhibit a regular geometry (of the boundaries and/or internally), and 2) was not uniform in color and/or texture. Additionally, large depressed areas in agricultural fields that visually varied (in color and texture) from the surrounding field and/or were different than the internal geometry of surrounding fields were classified as non-agricultural vegetation.

The 4 criteria for good Winter habitat were combined using ArcMap's Spatial Analyst to identify locations that meet all 4 criteria (areas to conserve) and those that meet all criteria except suitable vegetation (areas to restore).

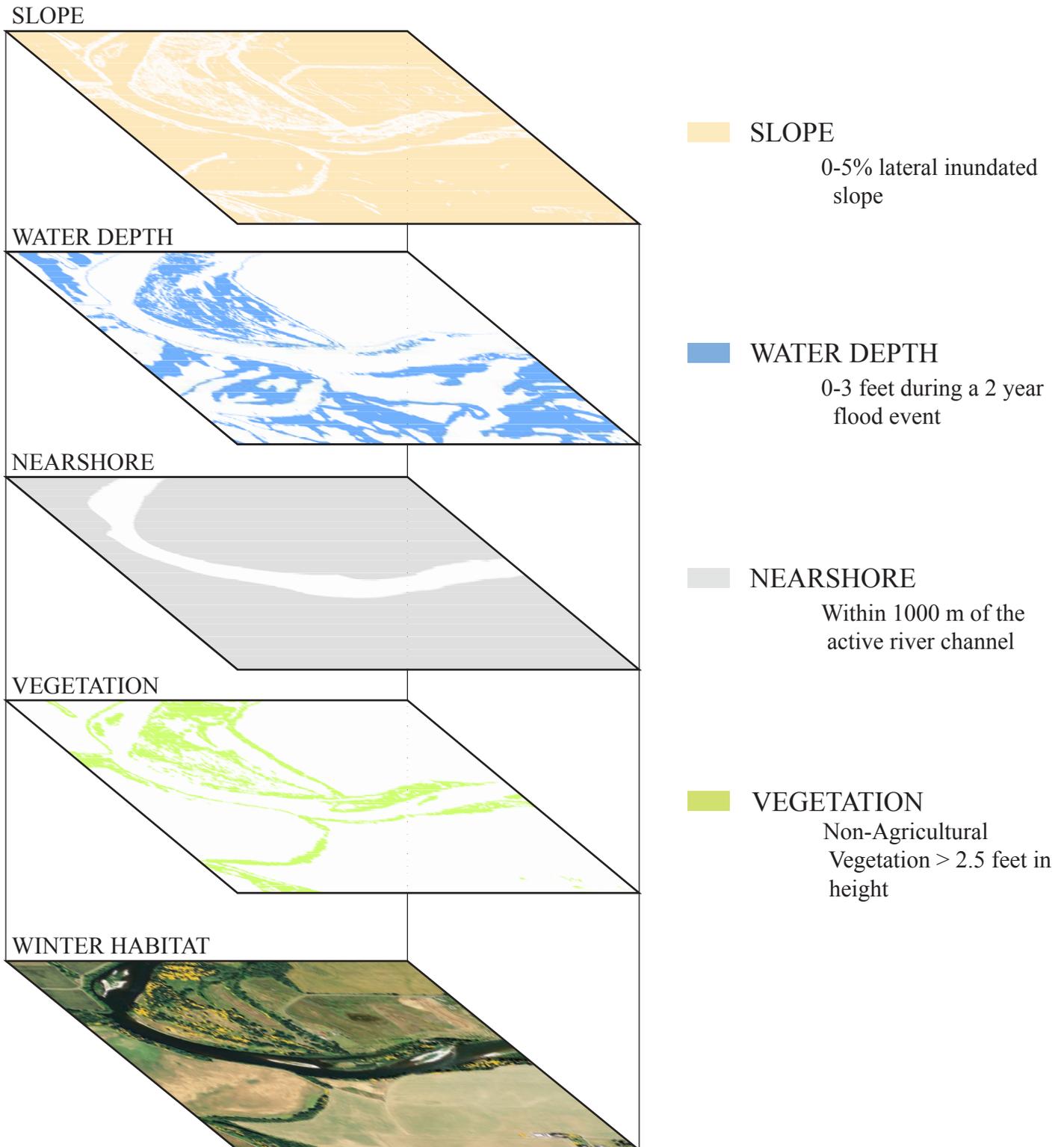
High Quality Summer Habitat

The 2011 NAIP aerial images were used to visually identify gravel bars on the inside bend of the mainstem of the Willamette River. These were represented as polylines in ArcGIS to create a first draft. The expert group reviewed the first draft and revisions were made based on their field sampling data and direct field observations.

Overall High Quality Habitat

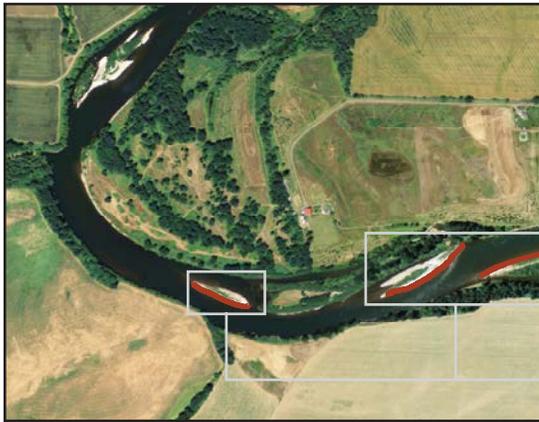
Based on guidance from the expert group we identified overall high quality habitat as locations that meet criteria for high quality Winter habitat and are within 500 meters of high quality Summer habitat. To do this we used ArcGIS to create a 500 meter buffer around each of the polylines identifying high quality Summer habitat and found the high quality Winter habitat within that buffer zone.

Criteria for High Quality Winter Juvenile Spring Chinook Habitat



Locations that meet all 4 criteria and are within 500 meters of high quality summer habitat are identified for conservation. Locations that meet criteria for slope, water depth and nearshore but not vegetation and are within 500 meters of high quality summer habitat are identified for restoration.

Identifying High Quality Juvenile Spring Chinook Summer Habitat

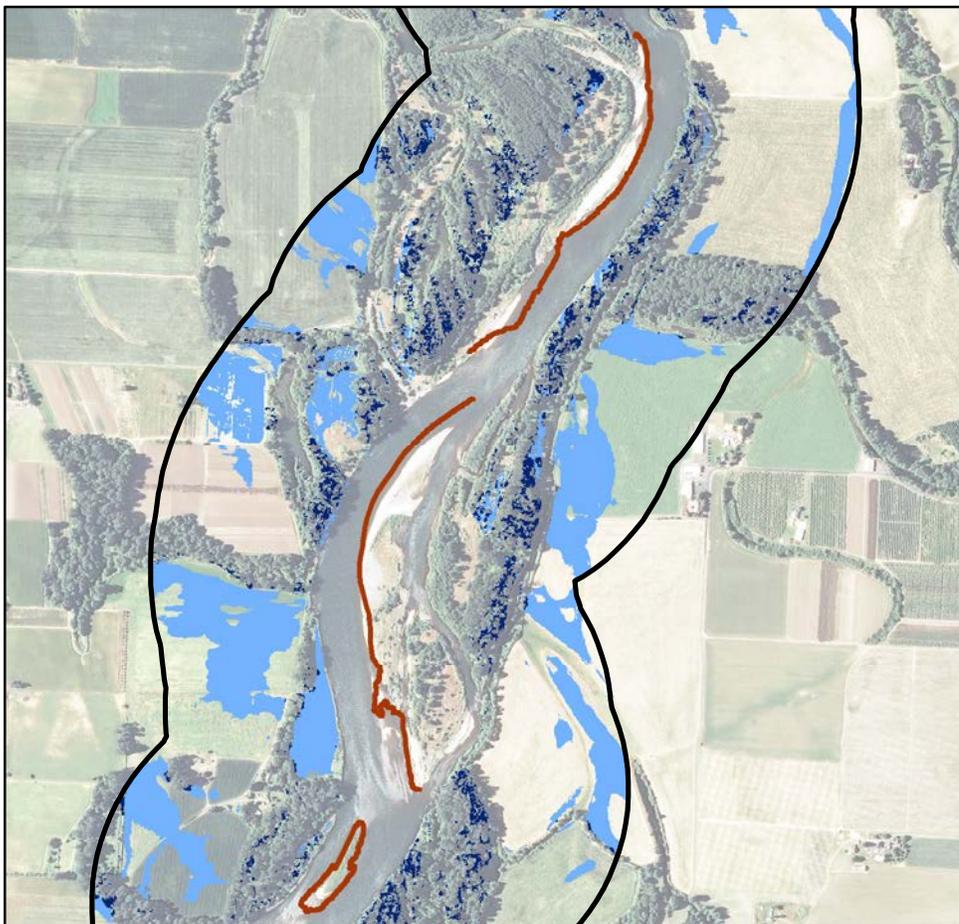


The expert group defined good summer habitat for juvenile Spring Chinook salmon as those areas that:

- 1) are located on the inside bend of the mainstem of the Willamette River, and
- 2) are composed of exposed gravel for more than one-third of the distance of the inside bend.

High quality summer habitat shown in brown lines

Overall High Quality Juvenile Spring Chinook Habitat - Restoration and Conservation



-  Suitable Summer Habitat
-  Within 500 meters of suitable Summer Habitat
-  Areas for Restoration
These areas can be restored by planting suitable vegetation (they meet all criteria for high quality juvenile Spring Chinook habitat except suitable vegetation)
-  Areas for Conservation
These areas meet all criteria for high quality juvenile Chinook habitat.

The high quality Winter habitat data are combined with the high quality Summer habitat to identify locations that provide high quality habitat in both Winter and Summer. Locations that meet all Winter criteria and are within 500 meters of good Summer habitat are identified for conservation. Locations that meet all Winter criteria except suitable vegetation and are within 500 meters of good Summer habitat are identified for restoration.