

Walla Walla County Voluntary Stewardship Program

Monitoring Plan 2024

**Monitoring Plan
For the Walla Walla County Voluntary Stewardship Program
Current as of April 15, 2024**

**Prepared by:
Grant Traynor
Walla Walla County Conservation District
325 N 13th Avenue
Walla Walla, Washington, 99362**

**On behalf of the
Walla Walla County Board of County Commissioners**

**For review by the
Washington State Conservation Commission and Washington
State VSP Technical Panel**

Description of the Monitoring Plan

This monitoring plan was written to fulfill the Voluntary Stewardship Program Fiscal Year 23-25 requirement for counties in accordance with RCW 36.70A.720 i, j, and k. This working document will be updated and changed as monitoring methods and goals change.

List of Acronyms

BMP – Best Management Practice
CARA – Critical Aquifer Recharge Areas
CREP – Conservation Reserve Enhancement Program
CRP – Conservation Reserve Program
CTUIR – Confederated Tribe of the Umatilla Indian Reservation
Ecology – Washington State Department of Ecology
GEE – Google Earth Engine
GMA – Growth Management Act
NWI – National Wetlands Inventory
PHS – Priority Habitat Species
RCW – Revised Code of Washington
USFWS – United States Fish and Wildlife Service
WSU – Washington State University
WSDA – Washington State Department of Agriculture
WDFW – Washington Department of Fish and Wildlife
WWCCD – Walla Walla County Conservation District
VSP – Voluntary Stewardship Program

Partner Outreach

A list of partners for VSP monitoring outreach can be found in **Appendix B** of this monitoring plan.

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Brian Burns – Tri-State Steelheaders
Phil Neumann – Mainstem Malt
Randal Bright – Agricultural Producer
Ryan Rea – Agricultural Producer
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Introduction: VSP Background

In 1990, the Washington State Legislature passed the Growth Management Act (GMA). The GMA was passed to address growth in Washington State. The law required local governments to identify and protect critical areas while designating urban growth areas for development.

Critical Areas required for protection under the GMA are:

- Fish and Wildlife Habitat
- Wetlands
- Frequently Flooded Areas
- Critical Aquifer Recharge Areas
- Geologically Hazardous Areas

Implementation of the GMA was succeeded by legal proceedings, particularly around the area of regulation of agricultural activities. This was because agricultural activities were exempt from GMA regulation but overlap protected critical areas. Agricultural activities are very important to the economy of Washington State. In 2023, according to the Washington State Department of Agriculture, the market value of all crops and livestock in the state was about \$12.8 Billion dollars (USDA 2024). In 2007, a lawsuit reached the Washington State Supreme Court, which decided that agriculture is not exempt from critical area protections required by the GMA (Court No. 76339-9). In response to the conflicts, the Washington State Legislature tasked the William D. Ruckelshaus Center in 2011 to provide solutions for local governments to meet requirements of protecting critical areas while protecting agriculture. The Ruckelshaus Center is a collaborative advisory board of Washington State University and University of Washington faculty, staff, and students that develop solutions to complex policy issues.

Based on recommendations by the Ruckelshaus Center, the Washington State Legislature created a framework for the Voluntary Stewardship Program (VSP) in 2011 in statute RCW 36.70A.700. VSP is a voluntary alternative for counties to protect critical areas and agriculture through incentive-based approaches instead of regulation. Walla Walla County voted to enroll in the Voluntary Stewardship Program in 2012 and selected the Walla Walla County Conservation District to direct the program. VSP was fully funded by the Washington State Legislature in 2015. VSP was started in 2016 with the Walla Walla County Conservation District, the Walla Walla County Board of County Commissioners, and the Walla Walla County Community Development Dept. collaborated with partners, community members, and Anderson Perry, LLC and created the Walla Walla County VSP Work Plan (Walla Walla County 2017).

Walla Walla County VSP: Work Plan, Watershed Reporting, and Monitoring

The Walla Walla County VSP Work Plan (2017) outlines project development, monitoring goals, and monitoring benchmarks for Walla Walla County and the Walla Walla County Conservation District. These are summarized in Table 5-1 of the 2017 Work Plan. Through VSP, Walla Walla County is required to monitor conservation efforts in the county to prove that they are adequately protecting critical areas. Monitoring efforts are compiled into reports and sent to the state to confirm compliance with VSP. Monitoring benchmarks use the year 2011 as a

baseline for comparison, though some benchmarks use more recent years when there is no data available from 2011. VSP monitoring and reporting is done on a watershed scale (RCW 36.70A.710). There are 3 watersheds present in Walla Walla County: the Lower Snake Watershed, the Rock Glade Watershed, and the Walla Walla Watershed. The Rock Glade Watershed is small and has one farm/ranch. Monitoring and reporting for the Rock Glade Watershed in Walla Walla County is included in the Walla Walla Watershed reporting to avoid skewing results (see **Appendix A**).

Counties enrolled in VSP submitted their 5-year program reports to the State Conservation Commission and partners for review in 2021. Conservation Commission staff and review partners requested more specific information on monitoring data and methods. For the 2023-2025 biennium the State Conservation Commission required counties enrolled in VSP to submit their own monitoring plan by July 1, 2024.

This monitoring plan was created based on the goals and benchmarks outlined in the Walla Walla County VSP Work Plan, Table 5-1. The guide is meant to detail methods for Walla Walla County Conservation District staff to follow and conduct monitoring activities. This guide helps to standardize monitoring practices and ensures consistency when reporting critical area protection. The Walla Walla County VSP Work Plan is directed by the VSP Work Group, which is a voluntary advisory panel consisting of local producers, tribal, agency, non-profit, and academic partners.

Fish and Wildlife Habitat

Walla Walla County is known for the many waterways that pass through to converge with the Columbia River. These waterways, along with Walla Walla County's varying landscape, provide important fish and wildlife habitat. The county is home to many important species, including ESA-listed as 'threatened' Mid-Columbia Summer Steelhead and Bull trout. Also included is Washington State 'Species of Greatest Conservation Need' -classified Ferruginous Hawks. The foothills of the Blue Mountains are located in the southeastern portion of the county and provide habitat to mule deer and elk. While a patchwork of CRP and riparian areas in the rest of the county provide migration corridors and habitat for species like migratory birds, beavers, upland birds, and many others. Fish passage and streamflow have become important focuses in the county in recent years, with efforts by the Confederated Tribes of the Umatilla Indian



Figure 1: Butterfly observed in riparian area in Walla Walla County

Reservation (CTUIR) to reintroduce previously extirpated Spring Chinook into the region. To protect and monitor Fish and Wildlife Habitat in Walla Walla County, the VSP Work Group identified riparian acres, fish screens, fish passage, fish habitat, Ferruginous Hawk zones, Mule Deer habitat as work plan goals.

The following pages detail Fish and Wildlife Habitat monitoring methods and requirements to meet the goals and benchmarks outlined in Walla Walla County's VSP Work Plan.

Work Plan Protection Goal: Maintain riparian buffers by monitoring changes (no decrease by 10% of 3174 contract acres) every 2 years.

Baseline Details: Prior to 2011, WWCCD tallied 3174 acres in riparian forest contracts within the county. More details on those contract acres and the baseline can be found on pages 23-26 of the 2017 Walla Walla County VSP Work Plan.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: Once every 2 years

Walla Walla County has over 400 miles of waterways, making riparian areas one of the most numerous to monitor. The county has many riparian acres in conservation contracts, with over 2500 acres in CREP alone. The Walla Walla County Conservation District also helps implement its own riparian projects. Monitoring for this critical area is limited by staff time and resources, so WWCCD will use multiple approaches to track acreage of riparian areas within the county.

Outreach is an important part of monitoring, as other partners in the county implement their own riparian projects. Outreach will be tallied **every 2 years**. Staff will only ask about total acreage of riparian contracts within the Walla Walla Watershed (in Walla Walla County) to preserve landowner privacy. The following BMPs will count towards contracted riparian acres:

342 – Critical Area Planting
391 – Riparian Forest Buffer
395 – Stream Habitat Improvement
644 – Wetland Wildlife Habitat Management (on or adjacent to rivers, which is common in Walla Walla County)

Data from each partner agency will be added and tallied in the VSP folder on the Walla Walla County Conservation District server. The Walla Walla County Conservation District also implements its own riparian projects. Details on WWCCD riparian project acres are saved on internal WWCCD documents.



Figure 2: Crew planting trees along the Touchet River

The Walla Walla Watershed has many riparian acres that are not in contract and may undergo changes without WWCCD or partner knowledge. To account for this and track general acreage trends of riparian forests, WWCCD staff will use Google Earth Engine and Sentinel-2 Satellite imagery to run a vegetation change analysis for riparian areas in the Walla Walla Watershed. This analysis will be run **once every 3-4 years**, which will give WWCCD staff time to address any riparian concerns and adaptively manage the Voluntary Stewardship Program work plan as needed.

Methods for the analysis are based off Dr. Amanda Stahl's (WSU) 2021 research publication titled "Cloud-Based Environmental Monitoring to Streamline Remote Sensing Analysis for Biologists" (Stahl et al, 2021). An annotated copy of Dr. Amanda Stahl's code used for Google Earth Engine that explains how the code functions can be found in **Appendix C**. Methods for creating "masks" to restrict the vegetation analysis metrics to certain geographical areas (e.g. riparian corridors in Walla Walla County) can be found in **Appendix D**. To ensure accurate training and analysis of the machine learning model beyond Google Earth Engine verification, staff will select a sample of 30 areas they are familiar with or with adequate aerial imagery to audit the accuracy of the analysis. The breakdown of areas selected will be:

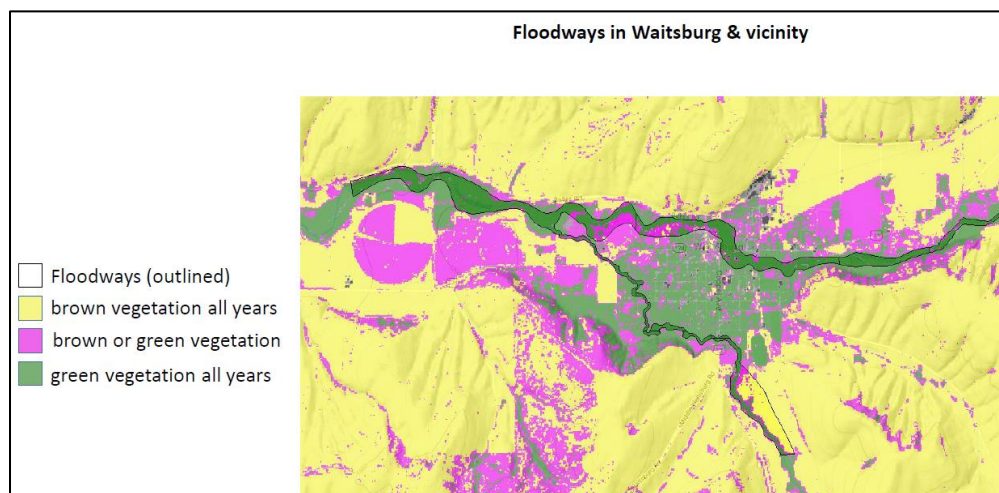


Figure 3: Example of Vegetation Analysis using Google Earth Engine

- 10 areas the model says had brown vegetation every year
- 10 areas the model says had green vegetation every year
- 10 areas the model says showed vegetation change



Figure 4: Example of riparian area in the Lower Snake Watershed

Much of the riparian area along the Columbia and Snake Rivers in Walla Walla County are small and bounded by railroad tracks or basalt cliffs. If Sentinel-2 imagery or other aerial imagery produce images with adequate resolution to see changes in the Lower Snake Watershed riparian area, then WWCCD will use the same vegetation change analysis as the Walla Walla Watershed.

If the analysis is unable to perceive changes in the Lower Snake riparian area, WWCCD staff will conduct outreach to

landowners in the Lower Snake Watershed seeking permission to take photo points of the riparian area and/or take them from public rights-of-way. Staff will return to take photo points as resources and time allow for riparian project development and/or adaptive management. See the Wetland monitoring section of this guide for methods of photo point monitoring, and see **Appendix E** for an example of a geotagged photo point. Finally, WWCCD will incorporate

advances in vegetation change analysis when possible for more accurate acreage calculations, including use of NAIP imagery.

Work Plan Protection Goal: Maintain existing fish screens (less than 15% of 343 fish screens maintained) every 2 years.

Baseline Details: WWCCD has an internal excel document that details the fish screens and flow meters it helped install between 2001 and 2018.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: Every 2 years

In 2001, the Walla Walla County Conservation District, landowners, and agency partners came together to develop a program to provide irrigators with fish screens and flow meters necessary to protect salmonids in the region. To ensure that fish-safe irrigation equipment continues to function and identify problems early, WWCCD staff will solicit responses on fish screen functionality from at least 30 irrigators every 2 years. Specific methods for data processing and outreach can be found in **Appendix F**. Staff will inquire about the status of the original fish screen that WWCCD



Figure 5: An old fish screen that WWCCD helped to replace using VSP funds

helped install and categorize the current screen into one of the following categories:

- Unknown status of fish screen
- Original screen still functioning
- Original screen stopped functioning but was replaced
 - If screen replaced, try to get details on screen model and install year
- Original fish screen is broken
 - Broken due to flooding?
 - Broken due to time or mechanical failure?

The goal is for at least 85% of responding landowners to have a functional fish screen. Outreach will first be conducted by phone as records and public data allow, with at least 1 round of mailers sent out to those landowners who WWCCD is unable to reach by phone. Mailers sent out will include a letter explaining the effort to irrigators and a pre-stamped post-card detailing

fish screen status for irrigators to fill out and send back to the conservation district (see **Appendix G** for mailer example).

Irrigators in the Lower Snake Watershed divert flows from the Snake River. Screens used in this river are typically much larger and more complex. It would be difficult for staff to field-verify if they are working while irrigation occurs without risk to employee safety. The Columbia-Snake River Irrigators Association requires members to screen water diversions consistent with WDFW standards. In order to monitor fish screen functionality in the Lower Snake Watershed, WWCCD staff will reach out to the Columbia Snake Rivers Irrigator Association **every 2 years**. Staff will request any available data and cooperation from the association demonstrating irrigators are compliant with WDFW standards in the Lower Snake Watershed.

Work Plan Enhancement Goal: Educate 30 people every 2 years about maintenance of flow corridors as related to fish passage barriers.

Baseline Details: WWCCD doesn't have a baseline for number of people educated prior to 2011 for Fish Passage Barriers. This goal is an outreach goal and only focuses on number of people reached per year regardless of outreach prior to 2011.

Watersheds: All

Frequency of Monitoring Regime: every 2 years



Figure 6: Touchet River in Walla Walla County

The Walla Walla County Conservation District tracks technical assistance and outreach annually in its internal spreadsheet. In order to account for partner outreach on flow corridors and fish passage barriers, WWCCD will reach out to partners **every 2 years** to inquire about outreach or implementation of the following BMPs:

396 – Aquatic Organism Passage

Work Plan Enhancement Goal: Increase fish habitat restoration

Subgoal: Design and install stream restoration projects

Subgoal: Develop fish mapping strategy for incorporation into Walla Walla County on Comprehensive Plan

Baseline Details: Details on fish habitat restoration during the current 2021-2026 VSP reporting period

Watersheds: Walla Walla Watershed. Lower Snake Watershed is monopolized by hydropower dams and railroads, which limit restoration activities.

Frequency of Monitoring Regime: once every 5 years

The first subgoal of this enhancement goal tracks stream restoration projects. Fish habitat restoration metrics can be found in the original 2017 VSP work plan for Walla Walla County on pages 23-26. WWCCD will internally count metrics for stream restoration projects implemented within the current VSP reporting period. Staff will conduct outreach to partners requesting general information on stream restoration projects **at least 6 months before** the end of the current 5-year reporting period. Staff will also seek specific information on smaller BMPs that contribute to fish habitat restoration, including:

342 – Critical Area Plantings
(Floodplain planted)

348 – Dam, Diversion (Barrier
Removed)

391 – Riparian Forest Buffer

393 – Grass Filter Strip

395 – Stream Habitat
Improvement and Management

580 – Streambank and Shoreline
Protection

584 – Channel Bed Stabilization

644 – Wetland Wildlife Habitat
Management



Figure 7: Stream restoration structures on the Walla Walla River

The second subgoal of this enhancement goal involves developing a fish mapping strategy for the Walla Walla County Comprehensive Plan. The intent behind this subgoal was to increase fish mapping efforts in the county. Fish mapping is currently done by partner agencies in Walla Walla County.

Work Plan Protection Goal: Catalog up to 30 “unknown” physical fish passage barriers in the Walla Walla Watershed every 2 years, prioritizing Yellowhawk Creek and barriers with right-of-way access (approved Dec. 5 2023).

Baseline Details: WWCCD will use the Snake River Salmon Recovery Board Barrier Prioritization map (Aspect Consulting 2023).

Watersheds: Walla Walla Watershed – the only barrier mapped in the Lower Snake Watershed for Walla Walla County is the Lower Monumental Dam.

Frequency of monitoring regime: Once every 2 years



Figure 8: Steelhead seen swimming up Yellowhawk Creek in Walla Walla County

Washington Department of Fish and Wildlife (WDFW) has a Fish Passage Barrier database for the state of Washington. The local lead entity in Walla Walla County, the Snake River Salmon Recovery Board (SRSRB), processed that data in 2023 to prioritize barriers in the county based on waterway and steelhead use. There are many fish passage barriers mapped that lack data in the prioritization, including an assessment, to determine whether they are actually barriers or not.

WWCCD staff will focus their efforts on assessing the barriers on the SRSRB Barrier Prioritization map that lack data. Staff will use WDFW’s barrier assessment methods to conduct a Level A assessment of up to 30 “unknown” barriers **every 2 years**. Information and methods for a Level A assessment can be found on the WDFW Fish Passage Barrier Prioritization webpage (WDFW 2024a). Current forms for a Level A assessment are included in **Appendix H**.

Barrier assessments will occur in 4 steps:

Site Evaluation: WWCCD staff will take photo points of both the upstream and downstream-end of the mapped barrier (see wetland section for photo point methods). Photos will be used to determine whether a barrier site requires clearing of vegetation before an assessment occurs.

Mailers: WWCCD staff will use Walla Walla County tax parcel data to obtain property ownership information and mailing addresses of the properties at both the upstream and downstream-end of the barrier. In most cases this will be two landowners per barrier, but in some cases, it could be more if a barrier shares a property line with multiple landowners. Tax parcel data can be viewed online through the Walla Walla County website (Walla Walla County 2023). Staff will request it through a Walla Walla County Public Records request to use this information in GIS. Staff will send mailers out to landowners informing them of the site prep and barrier assessment efforts at least 2 weeks before any work starts. Mailers will include contact information for WWCCD staff. See



Figure 9: Culvert assessed by WWCCD staff

Appendix I example of a barrier assessment mailer.

Site Prep: Staff will visit any barriers that need weed removal one week before the assessment occurs. Vegetation will be taken to the city dump and tarped during transport.

Barrier Assessment: WWCCD staff will follow WDFW’s Level A assessment protocol to determine whether a culvert or other infrastructure is a fish passage barrier. Staff will use an auto-levelling rotary laser to determine barrier slope to ensure accuracy. Staff will wear high-visibility clothing during all assessments. If a landowner approaches staff and rescinds permission for staff to assess the barrier, staff will immediately cease activities and provide contact information for WWCCD management.

After the assessment, WWCCD staff will send the Level A assessment forms to WDFW staff for determination of barrier status. If a barrier needs a more comprehensive assessment (Level B) to determine barrier status, WWCCD staff will make note and perform that assessment if there are time/funds available.

Work Plan Enhancement Goal: Conservation acres in mapped Ferruginous Hawk zones will not drop below 35,000 acres (approved Dec. 5 2023).

Baseline Details: This goal relies on datasets with two different baselines. The mapped Ferruginous Hawk Zone is from 2017 Walla Walla County Critical Area maps for Fish and Wildlife Habitat, as new WDFW Priority Habitat Species data doesn’t include shape polygons for

Ferruginous Hawks (it only includes point occurrence data). The record of conservation acreage is from WSDA Agricultural Land Use Data. As of 2021, there were 37,982 conservation acres in the mapped Ferruginous Hawk Zones.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: once every 5 years



Figure 10: WWCCD staff conduct review of CRP acres

The Washington Department of Fish and Wildlife deems conservation acreage, including CRP, crucial for Ferruginous Hawk survival. Walla Walla County has many acres of agricultural land enrolled in conservation programs. The conservation district cannot influence these contracts, but it can track changes in conservation acreage and adjust its own outreach and programs based on information gathered. In order to accurately track conservation acres in mapped Ferruginous Hawk zones, staff

should follow the steps listed below. A more detailed explanation of data processing for this VSP goal can be found in **Appendix J**.

Data Acquisition: WWCCD staff will reach out to WSDA staff to request a shapefile or geodatabase with more specific conservation cover data, or it can be downloaded from the WSDA website. Currently, Joel Demory with WSDA is the contact to request such data. Staff will work with WSDA counterparts to ensure there are clear guidelines on how the data is used and published.

Data Preparation: According to Walla Walla County, the Ferruginous Hawk Zone data has not changed since 2017. The WSDA Agricultural Land Use Data has different land uses updated every time WSDA is able to do surveys, but the extent of the land use data have also changed. In 2011, WSDA staff surveyed fewer acres and had less land use data than in previous years. This means that comparing 2011 WSDA Agricultural Land Use acres is not a straight comparison to future years, as future datasets add more agricultural acreage. Staff will need to process the WSDA datasets to restrict analysis to compare to the baseline.

Data Analysis: After WSDA datasets have been processed, staff will select only conservation acres from 2011 and the comparison year (most recent year for reporting) that are within the mapped 2017 Ferruginous Hawk Zones. Staff will also separate these conservation acres into the Walla Walla Watershed and the Lower Snake Watershed to better track which watersheds are gaining/losing conservation acreage.

[Work Plan Enhancement Goal: Ferruginous Hawk nest occupancy](#) in Walla Walla County will not drop below 40% of known nesting locations for 2 years in a row (approved Dec. 5 2023).

Baseline Details: The baseline for this dataset was determined using Ferruginous Hawk Nest Occupancy data shared by Mark Vekasy (WDFW) with the Walla Walla County Conservation District. WWCCD staff took the number of occupied nests each year, divided it by the number of nests surveyed that year, and multiplied that number by 100 to get the percent occupancy for the year. Initially when staff calculated the occupancy rate, they accidentally included nests where pairs had abandoned one mid-year and moved to another being surveyed. This double-counted some nests occupied for certain years and showed occupancy greater than 40% for all years between 2016 and 2023. However, this didn't greatly impact the baseline of 40% occupancy 2 years in a row, even with the correction only one year (2020) showed occupancy lower than 40% (about 38%). Additionally, that lower occupancy was likely due to new platform installations that year, which increased the number of total nests but not the number of hawks occupying them.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: once every year

WWCCD staff will reach out to WDFW staff to request an update on nest occupancy by Ferruginous Hawks once each year. Staff will calculate the occupancy rate based on occupied nests from the total number of nests surveyed that year, making sure to avoid any double-counts of pairs that left one nest to move into a separate surveyed nest. This goal may need to be adaptively managed if the percentage of occupied nests goes down due to more nest installations of factors that are outside of WWCCD control. WDFW

recently received funding to install more perches in the county as mitigation for a highway project that was completed recently (2023).



*Figure 11: Ferruginous Hawk tagged by WDFW
Photo Credit: Staci Lehman*

[Work Plan Enhancement Goal: Catalog agricultural activity](#) on approximately up to 5,000 acres of mapped foothills [mule deer habitat](#) every 2 years (approved Dec. 5 2023).

Baseline Details: Much of the agricultural activity in the foothills is undocumented, as it is not included in the WSDA Agricultural Land Use dataset. This is a large portion of mapped Mule

Deer Habitat in the county, with 35,291 acres of unknown land-use in mapped PHS 2023 Mule Deer habitat.

Watersheds: The foothills of the Blue Mountains are within the Walla Walla Watershed. Outreach for mapped PHS 2023 Mule Deer habitat in the Lower Snake Watershed is proposed to supplement WWCCD monitoring efforts.

Frequency of monitoring regime: Once every 2 years

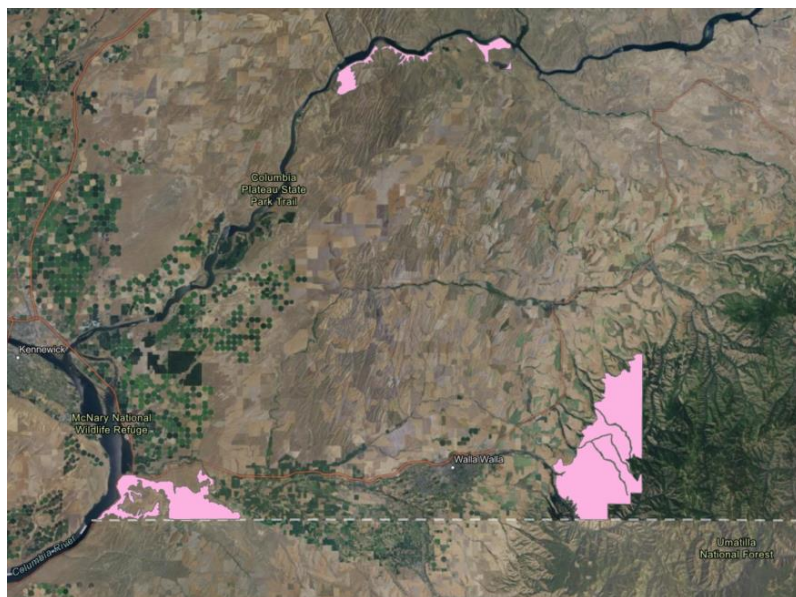


Figure 12: Mapped 2023 PHS Mule Deer Habitat in Walla Walla County

Walla Walla County and partner agencies lack information about agricultural activities in the foothills of the Blue Mountains. The foothills are mapped as crucial habitat for Mule Deer according to the WDFW PHS 2023 maps. Mule Deer are one of several ungulates in the Walla Walla County that use the Blue Mountains for habitat and have become a WDFW focus for conservation in Walla Walla County in recent years. Other ungulates include elk and white tail deer. WWCCD staff will use the following methods to begin auditing up to 5,000 acres (by

parcel) of land use related to agriculture in the mapped Mule Deer habitat in the foothills:

Data Acquisition: Obtaining shapefiles for Mule Deer habitat from the WDFW PHS 2023 maps requires an official request to the Washington Department of Fish and Wildlife (WDFW 2024b). In areas where no agricultural activity takes place, information will be requested through partner outreach. Finally, there is some limited, publicly-available WSDA data for agricultural acres in the foothills (WSDA 2024a).

Data Preparation: Staff used GIS processing when creating this goal to determine which areas of Mule Deer habitat in the foothills have no publicly available data. This includes areas that are outside the most recent WSDA Agricultural Land Use surveys, as well as areas under partner jurisdiction where no agricultural activities are allowed. Details on methods to process data PHS 2023 Mule Deer data to obtain areas without any available data can be found in **Appendix K**.

Outreach Preparation: Using the shapefile of acres in the foothills without available land use data, staff will overlay publicly-available parcel data on the shapefile to determine ownership of parcels with unknown land use. Parcel data will be exported to an excel spreadsheet and organized for outreach.

Outreach and Surveying: WWCCD staff will employ multiple methods to determine land use of acres with no publicly-available data:

WSDA Staff: The WSDA updates their Agricultural Land Use data once every 3-4 years. WWCCD staff will reach out to WSDA partners to incorporate any new survey acres.

Phone Outreach: some parcels in the foothills are owned by timber companies or other corporations with readily-available contact numbers. Staff will call to confirm the activity occurring on a parcel and the approximate acreage.

Right-of-Way surveys: If parcels are readily visible from a public road, staff will record agricultural activity on select parcels.

Aerial Imagery and Parcel Data: Right-of-way surveys can help determine presence of agricultural activities, but they cannot give an accurate estimate of acreage. Staff will use aerial imagery and publicly-available parcel data to estimate acreage of activities after right-of-way surveys.

Mailers: Staff will send out one round of mailers to landowners if other outreach methods fail. Mailers will be pre-stamped for return to the conservation district and numbered to keep track of recipients.

At a minimum, surveys and other outreach methods will seek to obtain the following information:

- Type of agriculture based on the WSDA Agricultural Land Use Data categories, with the exception that anything in conservation cover will be categorized as “conservation cover”, and acres grown for timber harvest will be classified as “timber”.
- Approximate acres
- Irrigation: yes or no, and type if possible. It’s likely many areas in the foothills do not have irrigation.
- Date Surveyed
- Landowner Contact Information

Right-of-way surveys will be conducted when snowmelt allows for travel in the foothills in late spring through early fall. Outreach through mailers and phone will happen outside of the wheat harvest months (July and August). Aerial imagery analysis will be dependent on availability of imagery and timing of release. The foothills of the Blue Mountains are entirely within the Walla Walla Watershed in Walla Walla County. The Lower Snake River has limited mapped PHS 2023 Mule Deer habitat in the very



Figure 13: Picture of Blue Mountains, Mule Deer Habitat, in Walla Walla County

north of the county hugging the Lower Snake River. Most of the land is within the ownership of 2 entities, but some of the land does have data available through the WSDA. Staff will attempt outreach, right of way surveys, and/or use new WSDA data within 2 years in that area to determine land use.

Work Plan Enhancement Goal: Known conservation acres in mapped Mule Deer Habitat will not drop below 800 acres (approved Dec. 5, 2023).

Baseline Details: This goal relies on datasets with two different baselines. The mapped Mule Deer Habitat is from WDFW Priority Habitat Species Maps for 2023, as these maps have been updated more recently than Walla Walla County Critical Area Maps for Fish and Wildlife Habitat. The record of conservation acreage is from WSDA Agricultural Land Use Data. As of 2021, there were 1243 conservation acres mapped within 2023 PHS Mule Deer habitat.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: once every 5 years



Figure 14: WDFW photo of Mule Deer. Photo Credit: Susan Jensen

The Walla Walla County Conservation District wants to ensure it is tracking conservation acres within mapped Mule Deer Habitat. Knowing the trends of conservation acres will help staff adjust outreach, project development, along with monitoring to benefit Mule Deer in the county. There is limited data for conservation acres within PHS 2023 Mule Deer habitat because most of the Mule Deer Habitat in Walla Walla County is within the foothills for the Blue Mountains. The WSDA does not have land use data for

much of that area. Processing and analyzing the conservation acreage data for Mule Deer requires the following steps:

Data Acquisition: WWCCD staff will reach out to WSDA staff to request a shapefile or geodatabase with more specific conservation cover data, or it can be downloaded from the WSDA website. Currently, Joel Demory with WSDA is the contact to request such data. Staff will work with WSDA counterparts to ensure there are clear guidelines on how the data is used.

Data Preparation: WDFW PHS data is updated yearly or every other year, but staff should use best judgement to determine whether new data needs to be brought in. The WSDA Agricultural Land Use Data has different land uses updated every time WSDA is able to

do surveys, but the extent of the land use data have also changed. In 2011 WSDA staff surveyed fewer acres and had less land use data than more recent years. Staff will process the WSDA datasets to restrict data from more recent years to overlap with the original 2011 dataset. A detailed description of GIS methods for this goal can be found in **Appendix L**.

Data Analysis: After WSDA datasets have been processed, staff will select only conservation acres from 2011 and the comparison year (most recent year for reporting) that are within the mapped WDFW PHS Mule Deer habitat. Staff will also separate these conservation acres into the Walla Walla Watershed and the Lower Snake Watershed to better track which watersheds are gaining/losing conservation acreage.

Wetlands

The portion of Walla Walla County in the Lower Snake Watershed is primarily dryland agriculture and rangeland, as well as large orchards irrigated from the Snake River. The alteration of the hydrology of the Snake River due to dams, along with the lack of surface water, means there are very little mapped or verified wetlands in this part of the county. The portion of Walla Walla County in the Walla Walla Watershed contains the foothills of the Blue Mountains and surface water flows from major rivers. These areas have more wetlands, though most of them are located in riparian areas around major waterbodies.

Wetlands provide key ecological functions for wildlife in Walla Walla County, including flood storage, water quality improvement, and habitat for species like migratory birds. Challenges of monitoring wetlands in Walla Walla County are their size and scarcity. Though many wetlands are mapped in Walla Walla County using the National Wetlands Inventory (NWI), recent efforts by Walla Walla County Conservation District staff have shown these maps to be inaccurate. Many wetlands mapped in the county follow the contours of major waterways and are mapped in the middle of river channels, while others may be remnants of historical agricultural practices.



Figure 15: Picture of a mapped wetland in Walla Walla County according to NWI maps.

To protect and monitor Wetlands in Walla Walla County, the VSP Work Group identified restoration through buffers and improved mapping as priorities. The following pages detail Wetland monitoring methods and requirements to meet the goals and benchmarks outlined in Walla Walla County's VSP Work Plan.

Work Plan Protection Goal: Monitor acres and function of known wetlands (21.74 acres through 2016) through existing programs (BLMT, Private, Wetland Reserve Program) every two years.

Baseline Details: WWCCD conducted outreach to partners to prepare its 2017 VSP County Work Plan. Through its outreach efforts, WWCCD identified 21.74 acres in wetland contracts. Baseline details can be found on page 23 of the Walla Walla County 2017 VSP Work Plan.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: Once every 2 years



Figure 16: Picture of a wetland in Walla Walla County

To assess the status of known wetland acres in Walla Walla County, WWCCD staff will conduct outreach to partners. Staff will request any data, methods, and reports associated with monitoring those wetlands. However, staff may be unable to obtain data, as many partners are unable to share specific wetland monitoring data with the Walla Walla County Conservation District. In these cases, staff should take note in outreach records of when they contacted partners and whether any data is made available from

them. Partner wetland data and outreach records will be stored in the VSP folder on the Walla Walla County Conservation District files.

Work Plan Enhancement Goal: Restore wetlands and/or establish buffers

Baseline Details: This is an enhancement goal to restore wetlands and establish new buffers. Metrics for previous wetland restoration can be found on page 23 of the 2017 Walla Walla County Voluntary Stewardship Work Plan.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency: once every 5 years

Staff track current and new in-house projects in an excel spreadsheet on the local server. Staff will request an acreage count of new wetland conservation projects in both watersheds outside of the known 21.74 acres under partner contract, as well as any data associated with monitoring those wetlands. Staff should document new acres of wetland restoration, and they should also use the outreach opportunity to request any data, methods, and reports associated with monitoring the new wetlands.

Staff will reach out to partners to request information on the following BMPs for wetland restoration reporting:

- 382** – Fence
- 391** – Riparian Forest Buffer
- 644** – Wetland Habitat Wildlife Management
- 656** – Wetland Restoration

Work Plan Protection Goal: Audit up to 100 wetland shapes in Walla Walla County every 2 years (approved Dec. 5 2023).

Baseline Details: WWCCD is using Walla Walla County’s Critical Areas Wetland map (2017), which is based off of data provided by the US Fish and Wildlife Service’s National Wetland Inventory (NWI).

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: every 2 years

Walla Walla County’s current wetland maps are based off of the National Wetlands Inventory (USFWS 2024). The NWI maps most of the river corridors or drops in topography in Walla Walla County as wetlands, leading to inaccurate maps with many wetlands mapped in places where none currently exist. As an example, the NWI mapped manmade waste ponds as wetlands in Walla Walla County. A good monitoring regime requires accurate critical area maps. WWCCD staff will conduct an audit of wetland maps every 2 years to verify accuracy Walla Walla County Wetland maps for monitoring in the future. Specifics on the



Figure 17: Picture of an area staff visited for the Wetland Audit on the Touchet River

Wetland Accuracy Audit methods can be found in **Appendix M**. Monitoring to meet this VSP Work Plan goal will include these general steps:

Outreach Preparation: WWCCD staff randomly select 100 wetland shapes to audit. Walla Walla County Wetland maps on file at the conservation district have wetlands split by parcel boundary, so a wetland shape is defined as any individual shape on the wetland map on file. For example, a wetland that crosses a parcel line and is located in two parcels counts as two wetland shapes.

Outreach: Staff will use Walla Walla County Parcel Data to determine property ownership of the parcels containing wetlands. Staff will call and/or send mailers to landowners in advance of work.

Wetland Site Visit Scheduling: Staff will note the landowner has agreed to a visit, include their contact information, and notify them of anticipated field dates.

Wetland Site Visits: WWCCD staff will visit selected sites in March and April once the soil temperature 6" below the surface is at or above 52 °F. Staff will take a vertical photo point of



Figure 18: Picture of an area staff visited for the Wetland Audit on the Touchet River

each individually mapped wetland shape using the GPSMapCamera app. This application adds location, direction, and time information to photos. Photos should be taken from safe areas with identifiable landmarks in case staff need to return for future monitoring (see **Appendix E** for photo point example). Staff will try to take pictures of every wetland shape on the property (with landowner permission), including those that were not in the initial random selection. This is meant to make the most of property access, while also

respecting landowner privacy and time.

Photo point Evaluation: Photo points of wetland shapes will be saved on the WWCCD server in the GIS folder. Photos will be labelled using the following nomenclature: (FID_Nation)_(FWS_Code). Photos will exclude any landowner name or identifying information. Photos will be reviewed by staff trained in wetland delineation, and wetland shapes will be categorized based on likely presence/absence.

Frequently Flooded Areas

Due to its many waterways, Walla Walla County has large areas mapped as Frequently Flooded Areas. However, these areas are located in the Walla Walla Watershed, as only the Snake River in the Lower Snake Watershed provides surface flow in Walla Walla County. Flooding in the Lower Snake River Watershed is restricted due to the presence of dams along the Columbia and Snake Rivers. Frequently flooded areas are included in the GMA and critical area ordinance as a tool for moderating development. The overlap between frequently flooded areas and agricultural activities is generally passive.

Seasonal flows in waterways in the Walla Walla Watershed vary greatly depending on weather and snowpack. Frequently flooded areas are important in the county to reduce erosion and sedimentation, promote groundwater recharge, and provide habitat for fish and wildlife. Over 400 miles of waterways in Walla Walla County create large frequently flooded areas across the county. The Walla Walla County VSP Work Group has prioritized education and flood planning to inform the community of the importance of Frequently



Figure 19: Flood damage caused to a house along Mill Creek in 2020

Flooded Areas and fulfill its protection requirements. The following pages break down Frequently Flooded Area monitoring methods and requirements to meet the goals and benchmarks outlined in Walla Walla County's VSP Work Plan.

Work Plan Protection Goal: Maintain existing floodplains by educating 30 people annually.

Baseline Details: WWCCD doesn't have a baseline for number of people educated prior to 2011 for floodplains. This goal is an outreach goal and only focuses on number of people reached per year regardless of outreach prior to 2011.

Watersheds: Walla Walla Watershed (WRIA 32). The Snake River hydropower dams control flooding in the Lower Snake Watershed.

Frequency of Monitoring Regime: Once every 5 years



Figure 20: 2020 flooding on the Touchet River in Walla Walla County

Monitoring beyond education and outreach metrics would involve more publicly-available data (e.g. Lidar), technical assistance on using that data, and increased funding to analyze floodplain acreage in the county. The Walla Walla County Conservation District tracks technical assistance and outreach annually in its internal spreadsheet.

Work Plan Enhancement Goal: Increase use of flood planning tools regarding development.

Baseline Details: There is no 2011 baseline for this goal. It is a goal to increase flood planning tool use and not a goal to increase project metrics or monitoring.

Frequency: Once every 5 years

WWCCD staff participate in water forums and help landowners mitigate flood damage through stream restoration projects. Staff will continue to participate in those forums and provide constructive feedback to county development in regards to Frequently Flooded Areas, but Walla Walla County Community Development and permitting agencies have the final say on where development occurs and what tools are used. As of 2024, FEMA Zone 10 is 2 years into the 9-year process of updating flood zone maps.

Critical Aquifer Recharge Areas

The Walla Walla Watershed has a shallow aquifer. About two-thirds of the aquifer is located in Walla Walla County, while one-third is located across the Oregon-Washington border in Umatilla County. The shallow aquifer in Walla Walla is a crucial source of drinking water and irrigation in the county. Beyond the benefits for the producers and residents of Walla Walla County, the shallow aquifer is hydrologically connected to surface waterways in the county. It's generally accepted that the aquifer helps provide surface water flows in the summer months when water levels get low. This benefits resident fish in the watershed. The hydrologic connection and groundwater maps are currently being studied by the United States Geological Survey.

The Walla Walla County VSP Work Group identified water pollutants, aquifer recharge, and efficient water use as priorities to focus on for Critical Aquifer Recharge Area protection. The Walla Walla County Conservation District is working with the Washington State Department of Agriculture and Washington State University to construct a framework to test the shallow aquifer for pollutants. Water-testing rules that were changed in 2021 may make the continuation of aquifer recharge projects possible in the Walla Walla Watershed, and efficient water use is verified through irrigation flow meter functionality and reporting to ecology. The following pages break down Critical Aquifer Recharge Area monitoring methods and requirements to meet the goals and benchmarks outlined in Walla Walla County's VSP Work Plan



Figure 21: Image of the mapped shallow aquifer in Walla Walla County

Work Plan Protection Goal: Reduce use of consumable water source by maintaining (20% of 387) meter use

Baseline Details: WWCCD has an internal excel document that details the fish screens and flow meters it has helped install between 2001 and 2018.

Watersheds: Walla Walla Watershed. The Lower Snake Watershed doesn't have a mapped Critical Aquifer Recharge Area in Walla Walla County.

Frequency of monitoring regime: Once every 2 years

In 2001, the Walla Walla County Conservation District, landowners, and agency partners provided irrigators with fish screens and flow meters necessary to protect salmonids in the region. To ensure that irrigators can accurately measure how much water they are pulling from waterways and away from aquifer recharge, WWCCD staff will solicit responses on flow meter functionality from up to 30 irrigators in the Walla Walla Watershed every 2 years. Staff will inquire about the status of the original flow meter that WWCCD helped install and categorize the current meter into one of the following categories:

- Unknown status of flow meter
- Original meter still functioning
- Original meter stopped functioning but was replaced

- If meter replaced, try to get details on screen model and install year
- Original meter is broken
 - Broken due to flooding?
 - Broken due to time or mechanical failure?



Figure 22: New irrigation flow meter that WWCCD helped a landowner obtain with VSP funds

The goal is for at least 80% of responding landowners to have a functional original or replaced flow meter. Outreach will first be conducted by phone as records and public data allow, with one round of mailers sent out to those landowners who WWCCD is unable to reach by phone (see **Appendix G for a mailer example**). Mailers will include a letter explaining the effort to irrigators. Mailers will also include a pre-stamped post-card detailing flow meter status for irrigators to fill out and send back to the conservation district. Flow meter functionality will be

audited at the same time as fish screen functionality.

The mapped Critical Aquifer Recharge area in Walla Walla County is only within the Walla Walla Watershed. This means that there isn't a mapped Critical Aquifer Recharge Area in the Lower Snake Watershed. However, WWCCD will already be sending mailers to the Lower Snake Watershed to gather information on fish screen functionality. If staff time and resources allow, WWCCD staff will send out flow meter mailers to the same irrigators they are requesting fish screen information from in the Lower Snake Watershed. Since WWCCD doesn't have a list of flow meters used in the Lower Snake Watershed, mailers will include the following sections to be filled out voluntarily by operators to fill in data gaps:

- Flow Meter Model
- Approximate install year
- Approximate acres irrigated
- Updated contact information
- Information on financial assistance to repair/replace flow meters

Conducting this effort in tandem with the fish screen outreach will increase WWCCD data sources while also capitalizing on staff and landowner time.

Work Plan Enhancement Goal: Maintain existing aquifer recharge projects as determined by amount of acre feet annually & promote irrigation efficiency BMPs

Baseline Details: Two recharge sites but recharge halted in 2017 due to lack of funding

Watersheds: Walla Walla Watershed only, as the Lower Snake Watershed doesn't have a mapped Critical Aquifer Recharge Area in Walla Walla County

Frequency of monitoring regime: once every 5 years

There were four critical aquifer recharge sites planned but two installed in the Walla Walla Watershed in Walla Walla County. One site ceased operation due to the prohibitive cost of water testing for recharge, and the other site stopped recharge after it was discovered that there was limited surface to groundwater connection. Ecology's rules for testing aquifer recharge water for these two sites were reduced in 2021. Resuming aquifer recharge will be contingent on landowner willingness and reasonable monitoring costs.



Figure 23: View of the Critical Aquifer Recharge Area in Walla Walla County

Promotion of irrigation efficiency BMPs are tracked annually in WWCCD technical assistance and outreach, which can be found in the internal excel spreadsheet. Staff will also conduct outreach to partners inquiring about the following BMPs to accurately track outreach in the county:

430 – Irrigation Pipeline

449 – Irrigation Water Management

646 – Shallow Water Development and Management

Work Plan Enhancement Goal: Educate community of pollutant levels and promote nutrient management BMPs to 10 people annually

Baseline Details: WWCCD doesn't have a baseline for number of people educated prior to 2011 for pollutant and nutrient management. This goal is an outreach goal and only focuses on number of people reached per year regardless of outreach prior to 2011.

Watersheds: Walla Walla Watershed. The Lower Snake Watershed doesn't have a mapped Critical Aquifer Recharge Area in Walla Walla County.

Frequency of monitoring regime: Every 2 years

The Walla Walla County Conservation District tracks technical assistance and outreach annually. Records of this outreach can be found in an internal excel spreadsheet. WWCCD staff will also make sure to reach out to partners to inquire about the following BMPs to track nutrient management assistance for VSP reporting:

590 – Nutrient management

595 – Pest management conservation system (Integrated Pest Management)

The WWCCD is currently partnering (2024) with the Washington State Department of Agriculture (WSDA) and Washington State University (WSU) to start a pilot project for well testing in aquifer recharge areas. This will give WWCCD metrics for pollutant levels in the aquifer. WSU and the WSDA are working together to build a sampling regime and outreach list. The WWCCD will assist both partners with outreach and sampling as resources allow.

Geologically Hazardous Areas

Walla Walla County is located just east of the Columbia River Gorge and has a varying landscape that includes large areas of dryland farming with rolling hills, urban centers, and the Blue



Figure 24: A wheat field overlooking steep slopes in Walla Walla County, WA

Mountains. The county receives winds blowing off of the Columbia River Gorge, and annual rainfall in the county ranges from 5 to 45 inches per year. These unique geological and climatic changes mean that Walla Walla County has large areas mapped as Geologically Hazardous Areas. In fact, the GHA: Wind and Water Erosion Areas encompass more than 90% of the county. Walla Walla County has many areas mapped for Landslide-Steep slope risk (greater than 30% slope). There are liquefaction areas mapped due to the numerous waterways.

Many Geologically Hazardous Areas in Walla Walla County are susceptible to erosion. Some of these areas are in conservation cover and provide critical habitat for upland wildlife. Some high risk of liquefaction areas are in irrigated agricultural areas. The Walla Walla County Work Group prioritized maintaining vegetative cover, educating the community about conservation practices on rangeland, and tracking irrigation efficiency upgrades to meet its goals and benchmarks for

Geologically Hazardous Areas. The following sections detail how WWCCD will meet the goals and benchmarks outlined in Walla Walla County VSP Work Plan.

GHA: Wind and Water Erosion

Work Plan Protection Goal: Maintain vegetative cover compared to baseline (to be determined) annually using aerial imagery

Baseline Details: According to Walla Walla Critical Area maps used in creating the 2017 Walla Walla County Voluntary Stewardship Plan, total wind erosion acres (moderate to very high susceptibility) are 780,670, and total water erosion acres (moderate to very high susceptibility) are 753,553. In 2018, Walla Walla County updated their Comprehensive plan and removed potential erosion from wind or water as there was no regulatory backstop. These areas are included in Walla Walla County VSP as they pertain to the viability of agriculture and fish and wildlife habitat.

A vegetation change analysis was conducted with the help of Dr. Amanda Stahl for the Walla Walla County Conservation District in 2021. Results showed that there was no significant change in vegetative cover for the county as a whole. This was a very useful analysis. However, this analysis didn't split the results by watershed, nor did it exclude non-agricultural areas. WWCCD will establish a vegetative cover baseline using Sentinel-2 Satellite data and processing from the Google Earth Engine. The year of the



Figure 25: Example of Wind erosion in Walla Walla County

baseline will depend on imagery availability. WWCCD will use these baselines in future analyses.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of monitoring regime: Every 5 years

Both the Walla Walla and Lower Snake Watersheds have large amounts of area susceptible to wind and water erosion. WWCCD staff will primarily rely on aerial imagery analysis and publicly-available data to assess vegetative cover. Vegetative cover for these areas is defined as:

Annual or perennial cover remaining in wind and water erosion areas during time of analysis (September-October, after wheat harvest)

WWCCD staff will use Google Earth Engine and Sentinel-2 Satellite imagery to run a vegetation change analysis for wind and water erosion areas in the Walla Walla and Lower Snake Watershed. Methods on running this analysis using Dr. Stahl's code can be found in **Appendix C**, and masking methods to get metrics for specific critical areas can be found in **Appendix D**.

WWCCD will supplement aerial imagery analysis with data from several other sources. Staff will use WSDA Agricultural Land Use data to collect the types of crops previously planted in fields and potential reasons for a change in vegetation cover. Staff will account for in-house projects and conduct outreach to partner organizations to determine acres of new conservation projects in areas susceptible to wind and water erosion. Staff will inquire about the following BMPs:

- 327** – Conservation Cover
- 328** – Conservation Crop rotation
- 329** – Residue and Tillage Management, No-till
- 340** – Cover Crop
- 342** – Critical Area Planting
- 345** – Residue and Tillage Management, Reduced Till
- 380** – Windbreak/Shelterbelt Establishment and Renovation
- 391** – Riparian Forest Buffer
- 393** – Grass Filter Strip
- 645** – Upland Wildlife Habitat Management

WWCCD will incorporate remote sensing to follow trends in residue cover on fields in wind and water erosion areas once partners determine how to do so more accurately.

Work Plan Enhancement Goal: Increase vegetative cover

Baseline Details: see previous GHA: Wind and Water Erosion protection goal for baseline details



Figure 26: Conservation acres in Walla Walla County

Watersheds: Walla Walla and Lower Snake Watersheds
Frequency of Monitoring Regime: Every 5 years

As with the previous Wind and Water erosion protection goal, WWCCD staff will use the analysis methods outlined in “Cloud-Based Environmental Monitoring to Streamline Remote Sensing Analysis for Biologists” to monitor vegetation loss in areas susceptible to wind and water erosion (Stahl et al, 2021). They

will also use the verification methods from the previous GHA: Wind and Water Erosion protection goal to ensure the program is working. To further gather information on increases in vegetative cover, WWCCD staff will account for in-house projects and conduct outreach to partner organizations to determine acres of new conservation projects in areas susceptible to wind and water erosion. See previous GHA: Wind and Water Erosion goal for a list of potential BMPs.

If the vegetation analysis conducted for the GHA: Wind and Water Erosion areas shows a significant increase in vegetative cover (outside the margin of error), WWCCD staff will verify increased vegetation through aerial imagery and/or site visits to ensure acres are accurately counted. Some of this verification may be limited by WWCCD resources, availability of aerial imagery, and/or landowner permission to access sites. Staff will also make use of publicly-available data, like the WSDA Agricultural Land Use Data, to provide context to any changes in vegetative cover on agricultural fields (WSDA 2024).

GHA: Landslides-Steep Slopes

Work Plan Enhancement Goal: Encourage adoption of BMPs for pasture and rangeland management through education to 3 ranchers annually.

Baseline Details: WWCCD doesn't have a baseline for number of people educated prior to 2011 for rangeland management. This outreach goal focuses on number of people reached per year regardless of outreach prior to 2011. The original 2017 Walla Walla County VSP Work Plan has the baseline acreage for steep slopes (greater than 30% slope) at 177,111 acres. This may have clipped out some acres in steep slopes outside of agricultural parcels. The total amount of steep slope acres in the county, based off of GIS analysis in 2024, is 179,119 acres.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency of Monitoring

Regime: Once every 5 years

Walla Walla County has a large amount of steep slope and landslide risk areas. The Walla Walla County Conservation District tracks technical assistance and outreach annually. Records of this outreach can be found on the internal WWCCD excel spreadsheet. Staff will also



Figure 27: Example of some of the steep slopes along the Columbia River, just south of Wallula Gap

conduct outreach to partners listed in Appendix B to inquire about the following BMP metrics to catalog outreach for rangeland management:

382 – Fence

528 – Prescribed Grazing

550 – Range Planting

GHA: Liquefaction

Work Plan Enhancement Goal: Encourage adoption of BMPs for irrigation water management to 20 people annually

Baseline Details: WWCCD doesn't have a baseline for number of people educated prior to 2011 for rangeland management. This goal is an outreach goal and only focuses on number of people reached per year regardless of outreach prior to 2011.

Watersheds: Walla Walla and Lower Snake Watersheds

Frequency: Annually

Due to the high number of waterways in the region, Walla Walla County has a large liquefaction zone. Staff often receive inquiries and request for assistance for irrigation water management and efficiencies upgrades. The Walla Walla County Conservation District tracks technical assistance, project metrics, and outreach annually in internal excel spreadsheets. Staff will conduct outreach to partners listed to catalog their outreach and implementation of irrigation efficiencies. See the CARA irrigation efficiency BMP enhancement goal for a list of BMPs to track for this GHA goal.

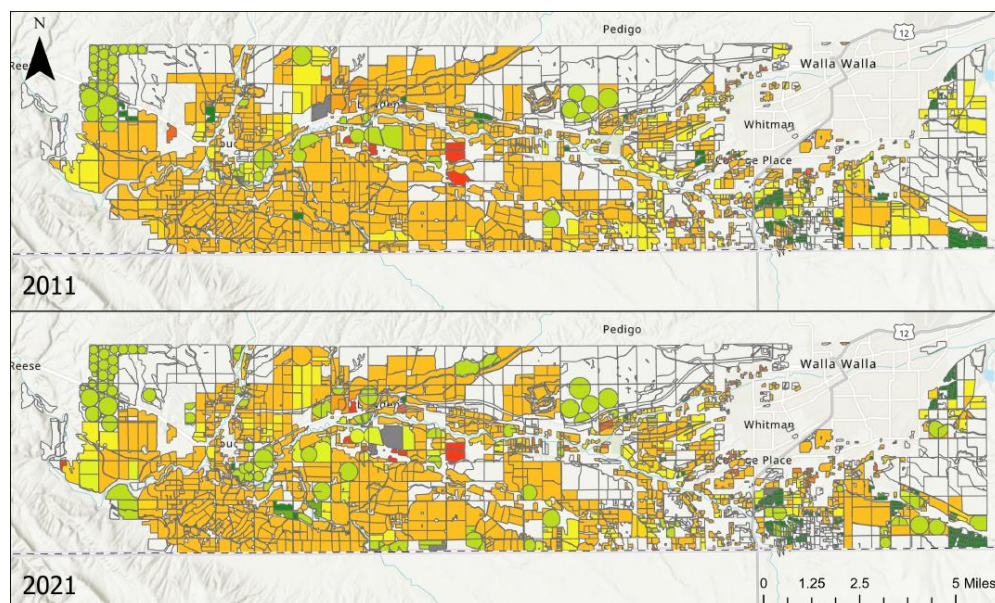


Figure 28: Irrigation types in Walla Walla County displayed in different colors

Work Plan Protection Goal: Efficient irrigation practices will not fall by more than 500 acres in mapped Liquefaction Zones every 5 years (approved Dec. 5 2023).

Baseline Details: The baseline acres for the analysis use the 2011 data and clip it to the Walla Walla County Liquefaction Critical Area map that WWCCD has on file. The original baseline in the 2017 Walla Walla County VSP Work Plan was 190,644 acres, but this included liquefaction zones mapped for “low to moderate” risk. There are only about 77,208 acres of mapped liquefaction areas of “medium to high” risk in the county. Of these acres, the WSDA survey from 2011 had 55,844 acres in common with later surveys (acres that could be compared to a baseline for irrigation changes). This is the acreage of liquefaction risk zone to be analyzed that WWCCD has data for.

Frequency of monitoring regime: once every 5 years because WSDA Agricultural Land Use Data comes out about once every 3-4 years



Figure 29: Historical photo of a landowner in Walla Walla County checking their wheel line

The Walla Walla County Conservation District will rely primarily on WSDA Agricultural Land Use data to meet its irrigation monitoring goal, while also incorporating newer or more comprehensive irrigation information in the future as data availability allows (WSDA 2024). Analysis for irrigation efficiency will be restricted to mapped liquefaction zones in the county of medium to high risk. Almost all this area is within the Walla Walla Watershed, but there is a small amount of acreage (about 603 acres) with public data

available in the Lower Snake Watershed. To fulfill this VSP Work Plan goal will use the following methods:

Data acquisition: WWCCD staff will reach out to WSDA staff once every 3-4 years to inquire about updates to the Agricultural Land Use Data. Currently (2024), Joel Demory with WSDA is the point of contact for the dataset. Staff will request WSDA to send relevant updates from the last time of reporting. The irrigation data is publicly-available online, so if staff are unable to secure the data through WSDA staff they can download it from the WSDA Agricultural Land Use data portal.

Data Preparation: In 2011 WSDA staff surveyed fewer acres and had less land use data than more recent years. This means that comparing 2011 Land Use acres with WSDA data is not a straight comparison. Staff will process the WSDA datasets and analyze the data from more recent years to compare with the original 2011 dataset. A more detailed

breakdown of processing the WSDA data and liquefaction analysis can be found in **Appendix N**.

Data Analysis: WWCCD staff should keep in mind data analysis completed by WSDA did not separate out sprinklers and micro sprinklers in their datasets until 2013. As such, the 2011 dataset only has the category of “sprinklers” for all types of sprinkler irrigation, whereas after 2013 it has both “sprinklers” and “micro sprinklers”. Micro sprinkler and sprinkler metrics comparisons should only be made with datasets after the 2013 change. Ranking of different types of irrigation for efficiency is based off of a document provided by Jack Myrick at the State Conservation Commission. A copy of the document can be found in **Appendix O**.

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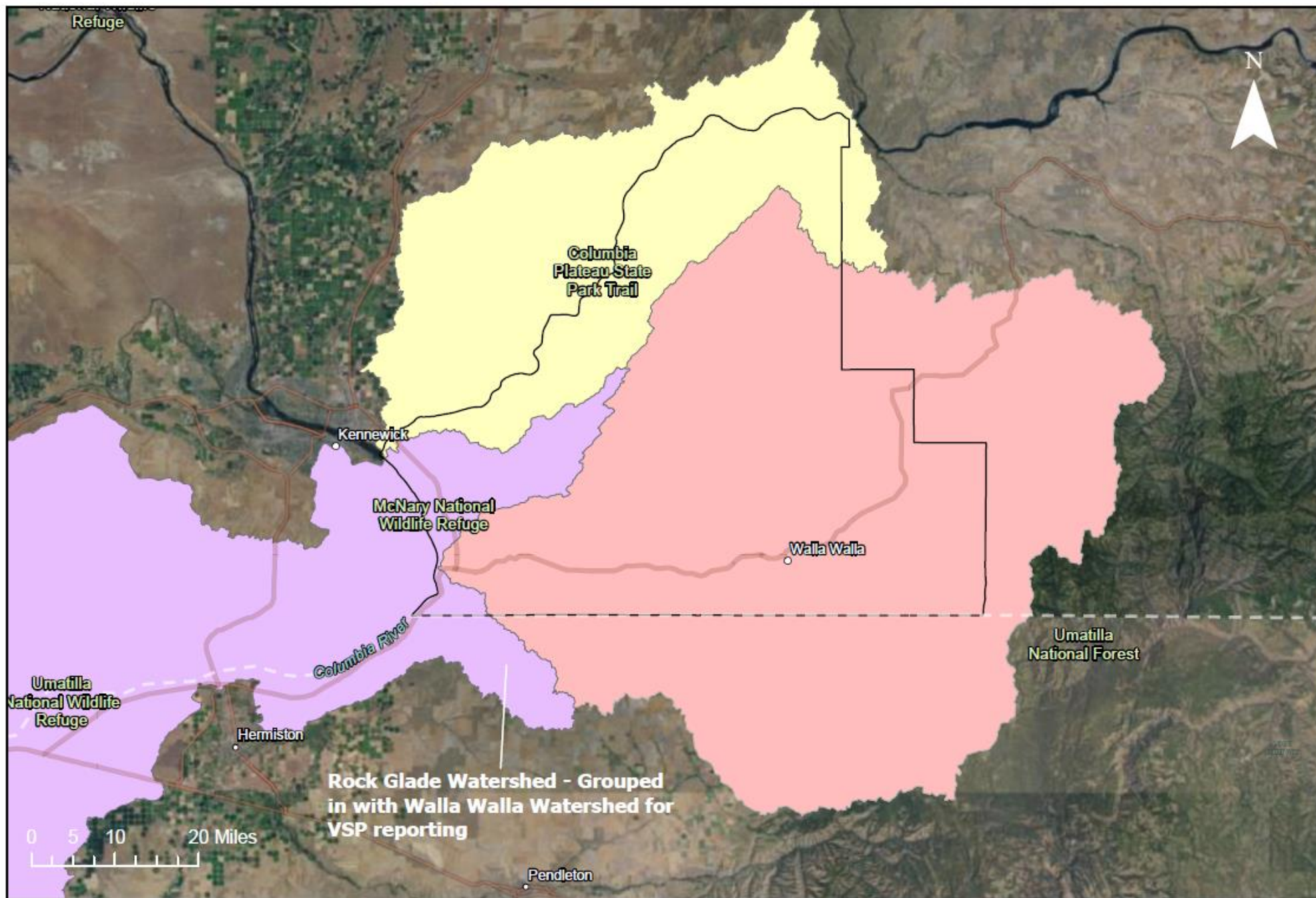
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Appendices

Appendix A: Walla Walla County Watersheds for VSP Reporting



Legend

- WW County Bounds
- Rock Glade Watershed
- Walla Walla Watershed
- Lower Snake Watershed

Walla Walla County VSP Watersheds

DISCLAIMER: While every precaution was taken in preparing this map, the publisher disclaims any warranty of fitness or accuracy of the data. The map is approximate in nature, based on compilation of data from multiple sources, and should not be relied upon or referenced in legal documents, including property deeds, title reports, and contract documents, nor substituted for appropriate survey and/or engineering analysis. The user of the map acknowledges its limitations, assumes all responsibility for its use, and agrees to hold the publisher harmless for any damages that may result from the use of this map. This map is subject to change without notice.



Appendix B: Partner Outreach List

- USDA Farm Service Agency (FSA)
- USDA Natural Resources Conservation Service (NRCS)
- Washington Department of Fish and Wildlife (WDFW)
- Blue Mountain Audubon Society
- Walla Walla Watershed Management Partnership
- Snake River Salmon Recovery Board (SRSRB)
- United States Fish and Wildlife Service (USFWS - McNary Refuge)
- Confederated Tribes of the Umatilla Indian Reservation (CTUIR)
- Blue Mountain Land Trust (BMLT)
- Kooskooskie Commons (Judith Johnson)
- Washington Department of Ecology (Ecology)
- Tri-State Steelheaders (TSS)
- Walla Walla Basin Watershed Council (WWBWC)
- Dept. of Natural Resources (DNR)
- Walla Walla County Emergency Management
- Walla Walla County Fire Departments
- Walla Walla County Board of County Commissioners

Appendix C: Dr. Stahl Methods/Annotated Code

Vegetation change analysis using Google Earth Engine used the methods and code outline in:

Cloud-Based Environmental Monitoring to Streamline Remote Sensing Analysis for Biologists
Stahl et al. (2021) *BioScience*

An annotated code detailing how the analysis work is stored on the WWCCD server and can be made available upon request. Annotations are meant to help WWCCD staff and partners understand what the code is doing to perform the vegetation analysis. Links and subsequent updates to the code can be found on github at: <https://github.com/ATStahl/CBEM>

Appendix D: Google Earth Engine Masking methods

The following is a guide that details how to create polygon “masks” to use in Google Earth Engine for Vegetation Analysis.

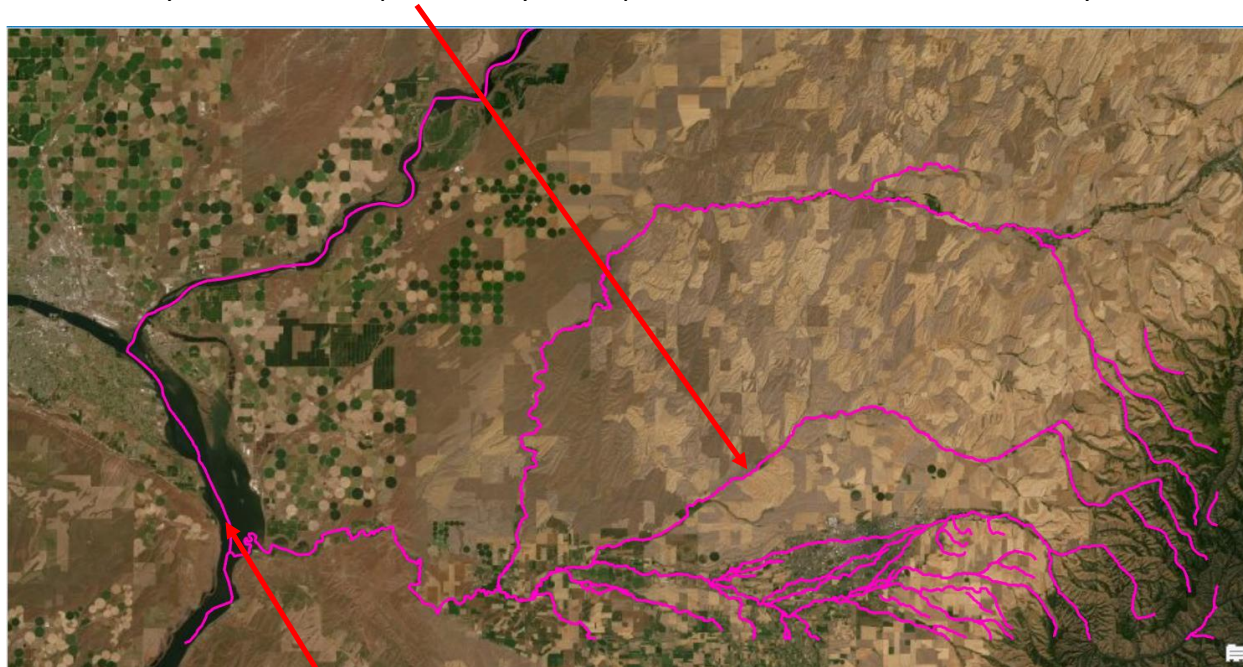
Vegetation Analysis: Making Riparian Masks for GEE

You may wish to do some Riparian Analysis/Calculation in Google Earth Engine (GEE). This document will help guide you step-by-step on how to create simple and complex riparian masks to import into GEE using ArcPro, though the process is similar in ArcMap.

1. Getting the shapefile of your county's streams/river banks

The first thing you need to do is get a shapefile that somehow denotes the streams or river banks in your region of interest. Depending on the size of your streams/rivers, you may need to use different datasets to accomplish this (see example below).

Here, you see the downloaded/imported shapefile for WDFW Fish Distribution Data in Walla Walla County. Notice the shapefile nicely overlaps most of the streams in the county.



However, along the Snake River, it doesn't follow riparian zones closely at all, with large gaps between the shapefile and shoreline. For smaller streams, there are several useful datasets to obtain shapefiles in your Region of Interest. These include but are not limited to...

- a. WDFW Fish Distribution
- b. Department of Ecology 303(d) data
- c. National Hydrography Data

If you only have smaller streams, skip to page 6. If you have some large streams, continue on to the next page.

You will need a custom shapefile for the riparian zone of larger streams...follow these steps...

Download the [NHD Dataset \(USGS Data\)](#) for your state or region of interest

Note: You can download specific areas by using the USGS app, or you can simply download the data for your entire state. Click “search products” to see your options.

Data

☐ Boundaries - National Boundary Dataset

☐ Elevation Products (3DEP)

☐ Elevation Source Data (3DEP) - Lidar, IfSAR

☒ Hydrography (NHDPlus HR, NHD, WBD)

Subcategories

☐ Select All

☐ NHDPlus High Resolution (NHDPlus HR)☒ National Hydrography Dataset (NHD)[Show](#)☐ Watershed Boundary Dataset (WBD)[Show](#)

Data Extent

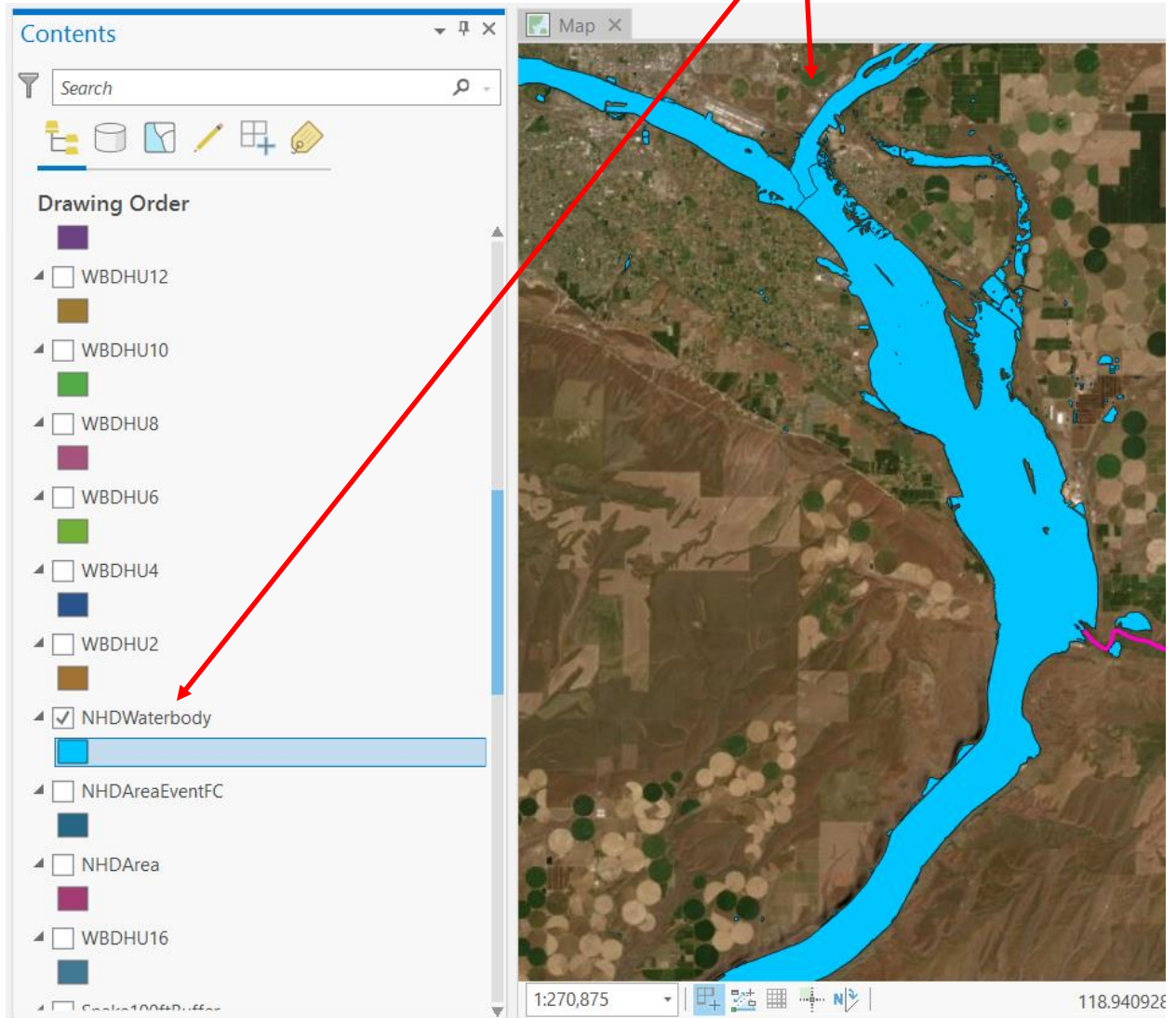
☐ HU-4 Subregion☐ HU-8 Subbasin☒ State☐ National☐ HU-2 Region

File Formats

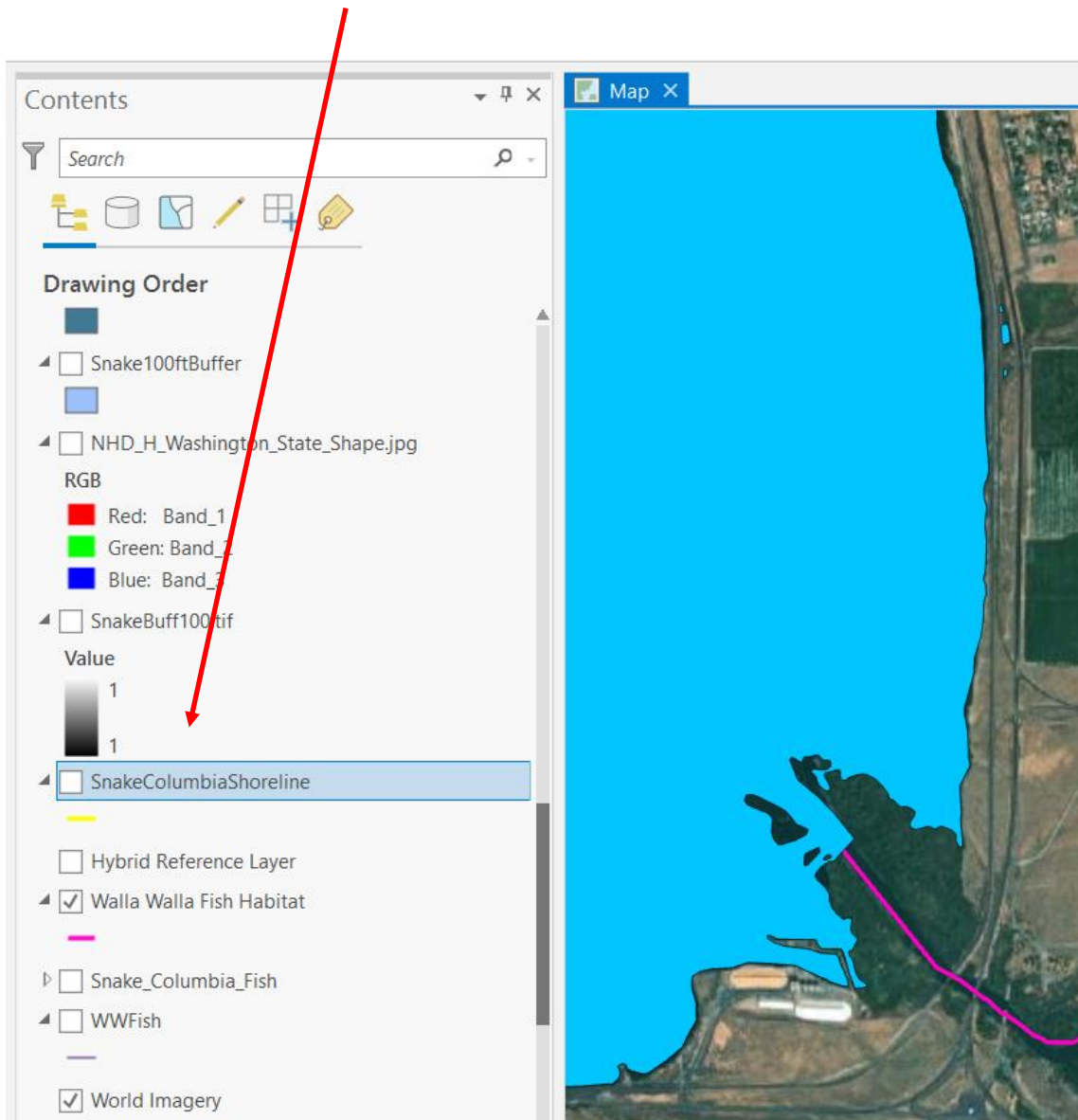
☒ Shapefile☐ FileGDB☐ All

45

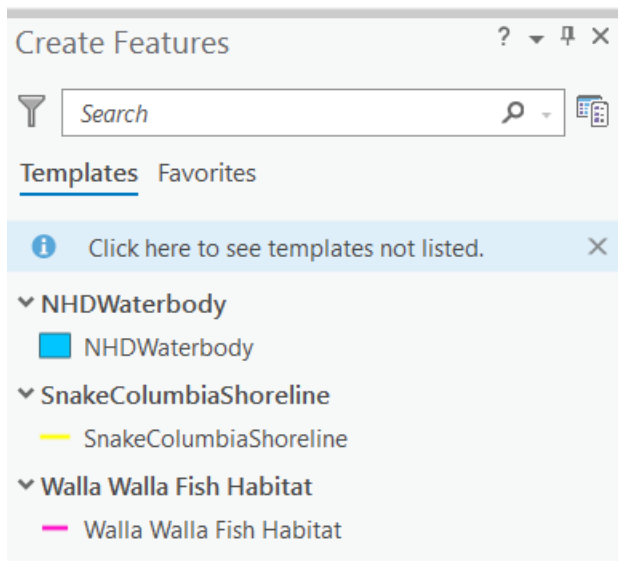
The layer you will need from the NHD Dataset is called “NHD Waterbody” and shows the full shape of large bodies of water. You can delete other layers.



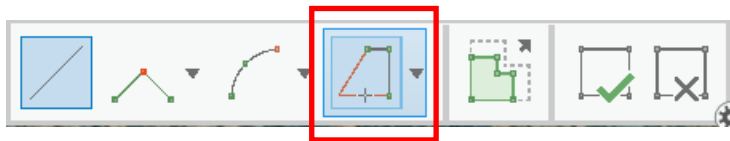
Now create a new Feature Class to in ArcPro (right click on your GDB or just rename a different line layer) to denote the shoreline of the large river. In my example, I have created a new Line Feature Class named “SnakeColumbiaShoreline”.



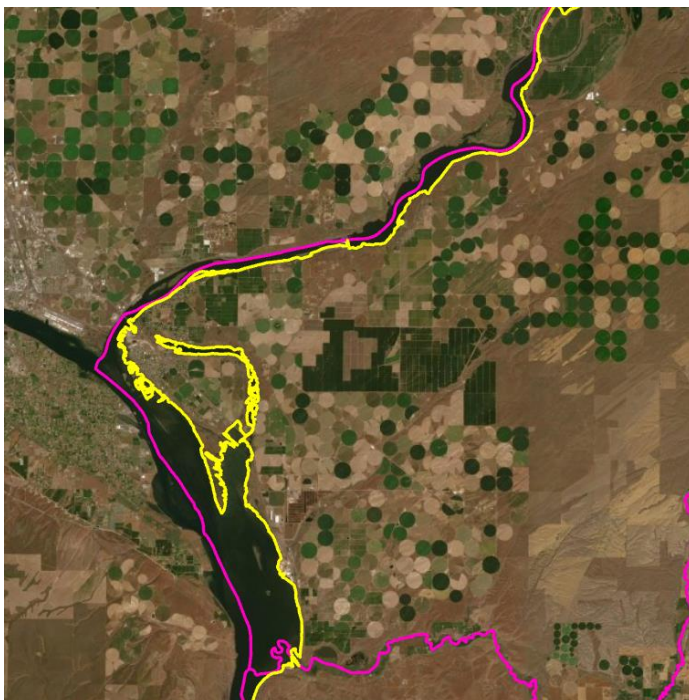
Use the “Create” tab to create a shape for the new Feature Class.



Make sure you are creating a line, and select the “Trace” tool.

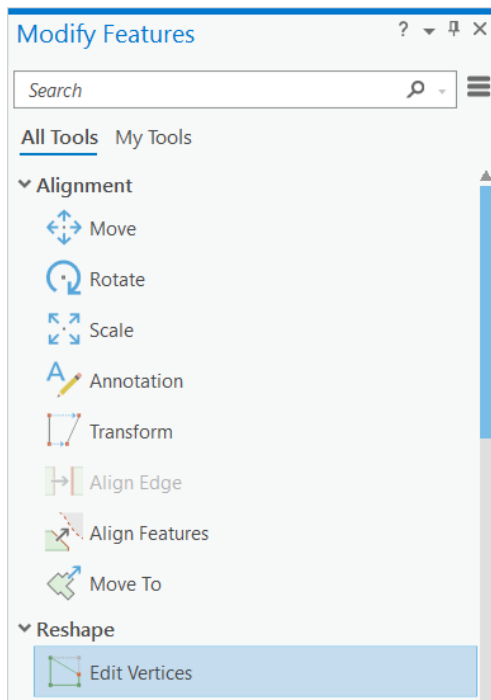


With the NHD Waterbody Layer on, drag your cursor and trace the shoreline of the body or



water whose riparian zone you want to analyze. This may take several tries and can be frustrating with a slow computer, but just have patience! The resulting line will come out looking something like this.

You can see the yellow line much more closely follows the shoreline of the river than the purple line and will provide a more accurate riparian zone mask.



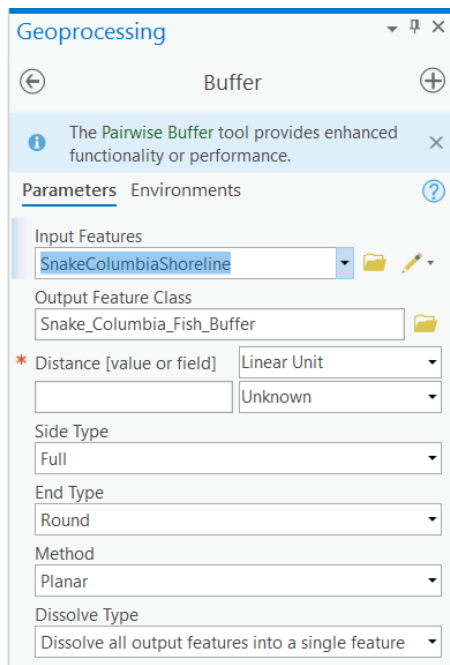
This process isn't 100% perfect and may leave some gaps, so use the "Modify" tab and select "edit vertices" to manually close up any large gaps between the created line and actual shoreline.

MAKE SURE TO SAVE EVERYTHING BEFORE TRYING TO EDIT ANY VERTICES.

2. Buffering the shapefile

Now that you have the appropriate stream shapefile, you will create a buffer to serve as the riparian shapefile. Go to the "analysis" tab and select "Buffer".

Your input layer should be the shapefile you are going to buffer for riparian zones. If I wanted to buffer



the smaller streams in Walla Walla County, I would use the WDFW Fish Distribution shapefile. For the larger river, I am using the shoreline shapefile I created and traced.

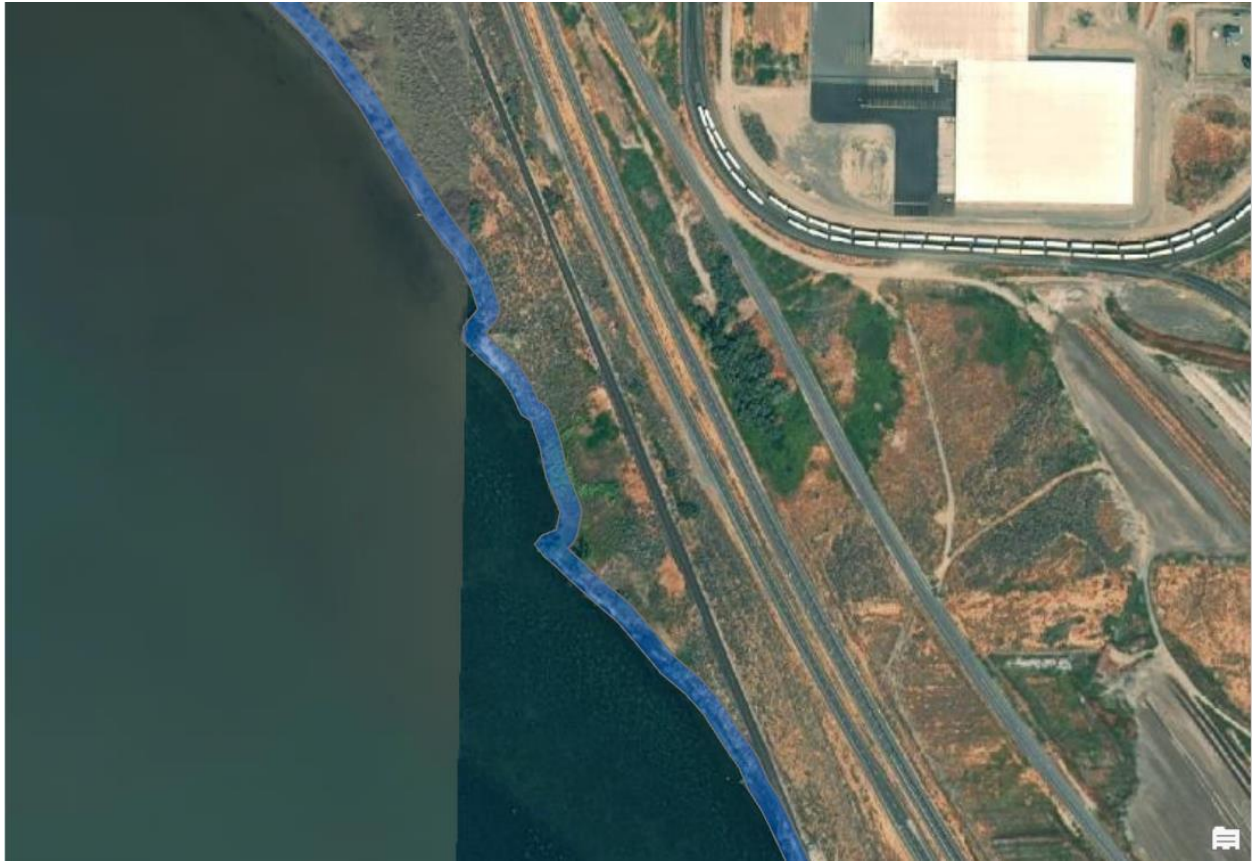
Designate Output Feature name and file destination

Select how large you want the buffer to be and what units to use.

If you are buffering both sides of a stream, use "Full" for "Side Type". If you are buffering only one side of a stream (like the large shoreline of the Snake River) use "Right" or "Left" to select a one-sided buffer.

If you want one continuous buffer, select "Dissolve all output features into a single feature".

What should come out is a custom buffer shapefile. In this example, I chose 100ft (blue buffer) along the snake river.

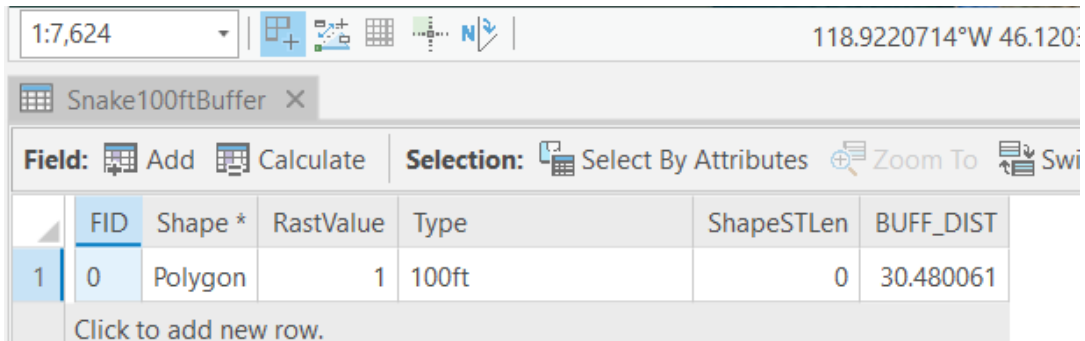


3. Formatting the buffer for Google Earth Engine

The last step is to format this buffer to be used as a riparian mask in Google Earth Engine.

Before you do this, make sure your buffer is one continuous shape and not multiple polygons (can use the merge tool to fix this).

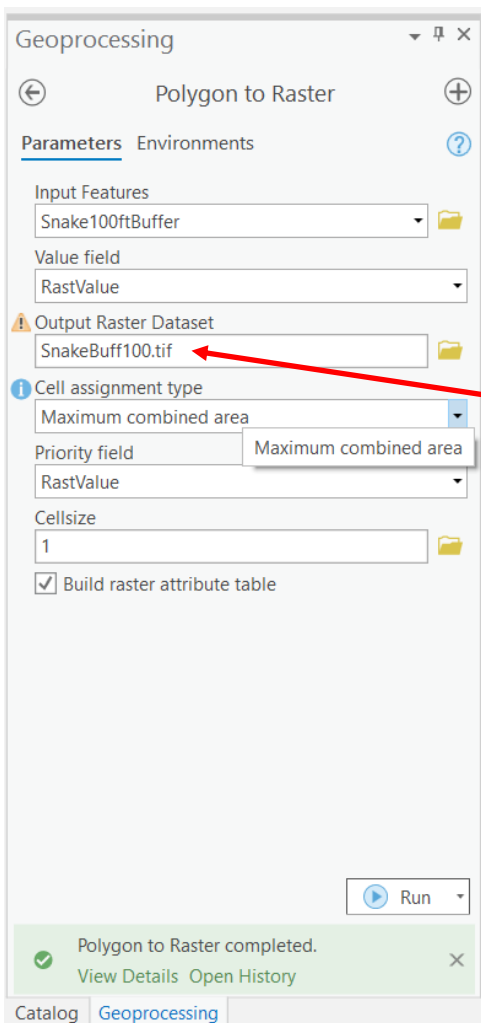
Open the attribute table for your buffer and format it as follows, making sure to create a column with a RasterValue (RastVal) of 1.



	FID	Shape *	RastValue	Type	ShapeSTLen	BUFF_DIST
1	0	Polygon	1	100ft	0	30.480061

Click to add new row.

Save and close the attribute table. Open the “Polygon to Raster” tool and follow the steps below...



Geoprocessing

Polygon to Raster

Parameters Environments

Input Features
Snake100ftBuffer

Value field
RastValue

Output Raster Dataset
SnakeBuff100.tif

Cell assignment type
Maximum combined area

Priority field
RastValue

Cellsize
1

☒ Build raster attribute table

Run

Polygon to Raster completed.
View Details Open History

Make sure your buffer is the input feature, and that “RastValue” is the Value Field.

For the Output Feature, if you are getting errors when exporting, you can export to a file instead of a GDB. **MAKE SURE** to type “.TIF” after the output feature name to save it as a TIFF file type.

In Cell Assignment Type, choose “Maximum Combined area”.

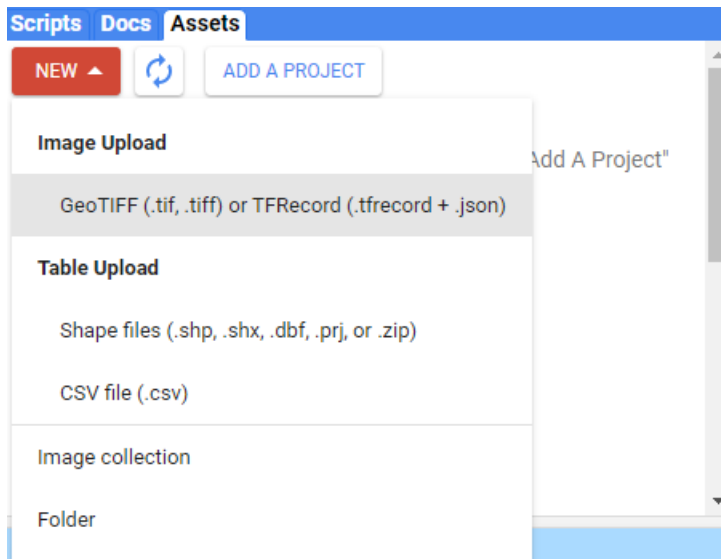
In the Priority Field, choose “RastValue”.

For Cellsize, choose 1 if you want a very detailed riparian mask (gives a very continuous and fine mask). If you are ok with a blockier mask, you can change the Cellsize to be bigger.

Hit “Run”!

4. Upload buffer mask to Google Earth Engine

Now you have a TIF riparian mask for your Region of Interest. The last step is to upload the mask to your GEE assets. Click “New” and select “GeoTIFF”



Select the file(s) from your computer with the appropriate extensions and click “upload”. You are all done! You now have a GEE asset to mask your riparian zones.

Upload a new image asset

Source files

SELECT

Please drag and drop or select files for this asset.
Allowed extensions: tiff, tif, json, tfrecord or tfrecord.gz.

Asset ID

users/granttraynor/

Properties

Metadata properties about the asset which can be edited during asset upload and after ingestion. The "system:time_start" property is used as the primary date of the asset.

Add start time

Add end time

Add property

Advanced options

Pyramiding policy
MEAN

Masking mode
None

[Learn more](#) about how uploaded files are processed.

CANCEL

UPLOAD

Appendix E: Photopoint example



Appendix F: Fish Screen and Flow Meter Accuracy Audit Methods

1. The original complete list of fish screens and flow meters installed by the WWCCD can be found here on the local WWCCD server, though other files in the “FishScreenAudit” folder have more recent files that show which screens and meters have been audited.
2. For both the screen and meter list: a column was created titled “Random ID”
3. In this column, staff used the “=rand()” function to generate unique random identification numbers for each screen and meter that WWCCD helped install
4. Screens and meters were sorted by Random ID from smallest to largest
5. Staff selected the first 50 screens and meters from each list to conduct landowner outreach for and audit
6. WWCCD requested updated tax parcel information from Walla Walla County using their public records request.
7. Staff compared the original fish screen and flow meter installation records with updated tax records. There are 2 ways to do this:
 - a. Visualize the location of the fish screen or flow meter in GIS using the “XY table to point” tool to grab coordinates of screens and meters from the lists and place them as points in GIS. Once staff are able to see which parcel the screen or meter is currently on, they can click the parcel to see updated ownership and mailing addresses. Note: be careful when doing this and verify ownership history, as some of the coordinates in the original lists may be slightly off from the original install site.
 - b. Compare the billing address listed for each screen/meter with ownership of the parcel of the same address. Staff can do this in GIS or search the parcel with Walla Walla County’s public search service.
8. After ownership has been verified, staff can reach out to the correct landowner in 2 ways:
 - a. Phone book/Online research: often checking through the phone book or searching online for a company or landowner name can give staff a phone number or email that is publicly-available to contact landowners
 - b. Mailers: Even if a landowner can’t be reached through phone or email, public parcel data contains mailing addresses for landowners. Staff can send a letter and pre-stamped postcard to landowners inquiring about the status of their fish screen and/or flow meter

Appendix G: Example of Screen Mailer Postcard



PLEASE RETURN TO:

Walla Walla County Conservation
District
c/o Grant Traynor
325 N 13th Ave
Walla Walla, WA, 99362

Put number or other ID on a
corner of the mailer so staff
know who is mailing it back

NOTES:

If screen broken, please select option:

Broken due to **time/mechanical**
Broken due to **flooding**

☐ I don't know about
that fish screen

☐ That fish screen is
still working

☐ That fish screen broke
but was replaced

☐ That fish screen
is broken

UPDATED CONTACT INFO:

Appendix H: Barrier Assessment Level A Worksheet

LEVEL A CULVERT ASSESSMENT FIELD FORM (5/22/2018)	
¹ Site ID _____ ² Culvert Number _____	³ Crew _____ ⁴ Date _____
CULVERT DESCRIPTION	
⁵ Material ☐ PCC ☐ CPC ☐ CST ☐ SST ☐ CAL ☐ SPS ☐ SPA ☐ PVC ☐ TMB ☐ MRY ☐ OTH	
⁶ Span _____ ⁷ Rise _____ ⁸ Water Depth in Culvert _____	
⁹ Shape ☐ RND ☐ BOX ☐ ARCH ☐ SQSH ☐ ELL ☐ OTH	
¹⁰ WS Drop _____ ¹¹ Drop Location ☐ Outlet ☐ Inlet ☐ Interior	
¹² Apron ☐ None ☐ US ☐ DS ☐ Both ¹³ Total Length _____	
¹⁴ Culvert Slope _____ ¹⁵ Road Fill Depth _____	
¹⁶ Countersunk ☐ Yes ☐ No ¹⁷ Backwatered ☐ Yes ☐ No ☐ Unk	
¹⁸ Gate ☐ Yes ☐ No ¹⁹ Rack ☐ Yes ☐ No ²⁰ Fishway ☐ Yes ☐ No	
CHANNEL DESCRIPTION	
²¹ Bankfull Width _____ ²² Span/Bankfull Width _____	
²³ Tidal Influence ☐ Yes ☐ No ☐ Unk	
PLUNGE POOL DESCRIPTION	
²⁴ Pool Length _____ ²⁵ Pool Maximum Depth _____	
²⁶ Pool Scour Line Width _____	
BARRIER STATUS	
²⁷ Barrier ☐ Yes ☐ No ☐ Unk	
²⁸ Method ☐ LA ☐ LB ☐ Fishway ☐ Other	
²⁹ % Passability ☐ 0 ☐ 33 ☐ 67 ☐ 100 ☐ Unk	
³⁰ Significant Reach ☐ Yes ☐ No ☐ Unk	
³¹ Comments _____ _____ _____ _____	

Appendix I: Barrier mailer example

Walla Walla County Conservation District

325 North 13th Avenue
Walla Walla, WA 99362-9526
(509) 956-3777
Wwccd.net



February 12, 2024

Dear Mr and Mrs. Jones,

This letter is to inform you that Walla Walla County Conservation District Staff will soon be assessing a road culvert near your property at 1234 Grant Way, College Place, WA 99324. You may see staff out near the culvert crossing on Grant Way between February 26, 2024 and March 8, 2024.

What are staff doing?

Staff will be out the week of February 26th to make sure the culvert is accessible on both sides. This could include a brief period of powertool use to clear vegetation from the culvert if present. Staff will be out the week of March 4th with survey equipment to assess the upstream and downstream portions of the culvert.

Why are staff doing this?

This is a part of Walla Walla County Conservation District's efforts to improve environmental monitoring in the county. Staff want to make sure water and other aquatic organisms can get through culverts around the county.

Will staff enter my property?

District staff are only interested in the culvert and road crossing. Staff will only be on or near the culvert itself for brief periods in the public right-of-way.

What do I need to do?

No action is necessary on the part of landowners. If you have questions or concerns about property access or assessments efforts, please contact Grant Traynor at grant.traynor@wwccd.net or 509-956-3767 by Friday February 23, 2024.

Thank you for your time,

Grant Traynor
Walla Walla County Conservation District
Voluntary Stewardship Program Coordinator

Appendix J: Ferruginous Hawk Conservation Acres GIS Methods

Preparing the WSDA Agricultural Land Use Data

1. Staff reached out to Joel Demory (WSDA) to get WSDA Agricultural Land Use data between 2011 and 2021 for Walla Walla County
2. The ArcPro tool “Symmetrical Difference” was run on the original WSDA Agricultural Land Use layers. Staff selected the 2011 and 2021 layers process. The “Symmetrical Difference” tool overlaps 2 datasets and only produces the shapes that are not common between them. This gave staff the WSDA Data surveyed between 2011 and 2021 that was not consistent between years. The output layer was saved as **WSDACrop_2021_2011_SymDiff**
3. Staff used the “Erase” tool to erase the WSDACrop_2021_2011_SymDiff layer from the original WSDA 2011 and 2021 crop layers. This was done to make sure that acres compared between 2011 and 2021 were all the same, as WSDA has added survey acres to its data since 2011. The outputs were saved as **WSDACrop_2011_WWCounty_Normalized_SD** and **WSDACrop_2021_WWCounty_Normalized_SD**

Processing and Analyzing Data for Conservation Acres in Ferruginous Hawk Zones

1. Staff used “Select By Attribute” on layer **WSDACrop_2011_WWCounty_Normalized_SD** for Crop Type: CRP
2. The selection was exported and saved as **WSDACrop_2011_WWCounty_SDN_CRP**
3. The step was repeated for **WSDACrop_2021_WWCounty_Normalized_SD**, and the selection was saved as **WSDACrop_2021_WWCounty_SDN_CRP**
4. Staff used “Select By Attribute” on the 2017 VSP Fish and Wildlife Habitat layer (WW County GIS staff said they couldn’t find any updated GIS layers from 2019 for VSP) and selected for Ferruginous Hawks.
5. The selection was exported and saved as a new layer titled **FWH_FEHA_2017**
6. **FWH_FEHA_2017** was projected into a new coordinate system (NAD 1983 HARN StatePlane Washington South FIPS 4602 (Meters)) to be consistent with WSDA analysis, and projected layer was saved as **FWH_FEHA_2017_Project**
7. Staff clipped the **WSDACrop_2011__SDN_CRP** layer to to **FWH_FEHA_2017_Project** in order to get conservation acres in mapped FEHA zones in 2011. The clipped layer was saved as **WSDACrop_2011__SDN_CRP_FEHA**.
8. **WSDACrop_2011__SDN_CRP_FEHA** was clipped to the Walla Walla Watershed and the Lower Snake Watershed, with those clipped layers saved as **WSDACrop_2011__SDNCRP_FEHA_WWW** and **WSDACrop_2011__SDNCRP_FEHA_LSW**
9. Steps 7 and 8 were repeated with **WSDACrop_2021__SDN_CRP**, with processed layers saved as the same name but different years than the 2011 layers.
10. All processed layers had new acreage calculated and tables exported.

Appendix K: Mule Deer Foothills Survey Analysis

Preparing the WSDA Agricultural Land Use Data

1. Staff reached out to Joel Demory (WSDA) to get WSDA Agricultural Land Use data between 2011 and 2021 for Walla Walla County
2. The ArcPro tool “Symmetrical Difference” was run on the original WSDA Agricultural Land Use layers. Staff selected 2011 and 2021 layers process. The “Symmetrical Difference” tool overlaps 2 datasets and only produces the shapes that are not common between them. This gave staff the WSDA Data surveyed between 2011 and 2021 that was not consistent between years. The output layer was saved as **WSDACrop_2021_2011_SymDiff**
3. Staff used the “Erase” tool to erase the WSDACrop_2021_2011_SymDiff layer from the original WSDA 2011 and 2021 crop layers. This was done to make sure that acres compared between 2011 and 2021 were all the same, as WSDA has added survey acres to its data since 2011. The outputs were saved as **WSDACrop_2011_WWCounty_Normalized_SD** and **WSDACrop_2021_WWCounty_Normalized_SD**

Processing and Analyzing Data for Land Use in Mapped Mule Deer Habitat (Primarily Foothills of the Blues)

Staff requested Priority Habitats and Species data from Department of Fish and Wildlife in 2023.

The data is considered sensitive and can be used for VSP purposes but should not be shared or sent outside the office.

The geodatabase contains a shapefile named **PHS_DFW_2023** that shows polygons for mapped habitats and priority species in Walla Walla County.

1. Staff used “Select by Attribute” tool for **PHS_DFW_2023** to find polygons of mapped Mule Deer habitat.
2. The selection was exported and saved as **PHS_MuleDeer2023**
3. **PHS_MuleDeer2023** was clipped to Walla Walla County extents and saved as **PHS_MuleDeer2023_WWC**

Staff wanted to determine which fields or portions of the county lacked land use/agricultural data for PHS 2023 Mule Deer habitat to determine ways to fill in data gaps.

1. Staff imported Walla Walla County Parcel Data from 2022 and selected by attribute: Py_Owner = Whitman Board of Trustees. Whitman has a lot of agricultural ground out near Wallula Gap, but much of the outground is not farmed. Staff then manually selected only those parcels out in Wallula Gap (Whitman also owns some parcels in town and other places, but Wallula Gap is their largest ownership of agricultural ground in the county)
2. The selection was exported as **Whitman_BOT_Parcels**
3. Staff used the Erase tool to erase the original WSDA 2021 Agricultural Land Use data layer from **Whitman_Bot_Parcels**. This produced a layer that was the unfarmed outground that Whitman owns in the Wallula Gap area. This layer was saved as **Whitman_BOT_NoAg_Wallula**
4. Using parcel data, communications with partner organizations, and the processed **Whitman_BOT_NoAg_Wallula** layer, the following were erased from **PHS_MuleDeer2023_WWC** to see areas of Mule Deer habitat unaccounted for (those that may have ag activity, only erasing areas we know don’t have ag activity from the Mule Deer polygon so we can focus on areas we don’t know about)
 - a. City of Walla Walla Land (restricted watershed area)
 - b. USFS Land (timber activities are allowed but regulated through other means)

- c. Whitman_BOT_NoAg_Wallula (land with no ag activities that Whitman owns out by Wallula Gap)
 - d. USACE land (Army Corps of Engineers generally does not allow ag activities on their land in Walla Walla County. See notes of conversations for more details)
- 5. After erasing, the output layer was saved as **PHS_MuleDeer2021_NoAgErase**. This layer shows the Walla Walla County 2023 PHS Mule Deer Habitat with areas removed that we know do not have agricultural activity.
- 6. Fields that Whitman owns out by Wallula Gap WITH agricultural activity were saved as **WSDACrop_2011__SDN_WhitWallulaAg** and **WSDACrop_2021__SDN_WhitWallulaAg**
- 7. To determine what parts of PHS 2023 Mule Deer Habitat in Walla Walla County have NO DATA (staff can't tell from public data whether agricultural activity takes place or not), staff used the Erase function to erase **WSDACrop_2011_WWCounty_Normalized_SD** from **PHS_MuleDeer2021_NoAgErase**. This process took the areas of PHS 2023 Mule Deer Habitat that already had areas of "no agriculture" removed and also removed areas of "known agriculture" by taking out WSDA 2011 baseline fields from public data. This left staff with polygons showing areas of uncertain agricultural activity, and the output was saved as **PHS_MuleDeer2023_UnknownAg**.
- 8. To get the most recent areas of 2023 PHS Mule Deer habitat not surveyed by WSDA, staff erased **WSDACrop_2021_WWCounty** from **PHS_MuleDeer2023_UnknownAg**. This erased the original WSDA Agricultural Land Use 2021 data from the layer. That 2021 data contains more field data than the 2011 baseline because WSDA staff expanded their field surveys throughout the years. Staff saved the out put layer as **PHS_MuleDeer2023_NoData** to denote that this area of Mule Deer Habitat has no publicly available data to confirm or deny agricultural activities are taking place.
- 9. WSDA Agricultural Land Use Data within 2023 PHS Mule Deer habitat was saved for future efforts and baselines. Staff clipped **PHS_MuleDeer2023_WWC** to **WSDACrop_2011_WWCounty_Normalized_SD** and saved the output as **PHS_MuleDeer2023_WSDA2011**. The same was done for 2021 WSDA data and saved as **PHS_MuleDeer2023_WSDA2021**.

Appendix L: Mule Deer Conservation Acres in Walla Walla County

Methods

1. From the methods in Appendix K, staff took the **PHS_MuleDeer2023_WSDA2011** and **PHS_MuleDeer2023_WSDA2021** layers and used the “select by attribute” feature in ArcPro.
2. Staff selected “crop type” = “CRP” to get only the conservation acres common to both 2011 and 2021 WSDA Agricultural Land Use Data that were within mapped Mule Deer Habitat.
3. Staff exported each CRP selection as **PHS_MuleDeer2023_WSDA2011_CRP** and **PHS_MuleDeer2023_WSDA2021_CRP** respectively
4. There were only a few CRP acres in the northern-most part of the county that were in mapped Mule Deer Habitat. Staff selected those acres (only those common to both 2011 and 2021 WSDA datasets so they could be compared for changes over the years) and calculated CRP acres in mapped Mule Deer Habitat for both the Lower Snake and Walla Walla Watersheds in an excel spreadsheet.

Appendix M: Wetland Accuracy Audit Methods

Methods (example from 2023 audit, note that in 2024 staff switched to auditing all wetlands on a property once given permission to access, which helps save staff and landowner time)

The geodatabase named “Wetland_layers_edits.gdb” (located in the GIS2 on the server in the VSP section) contains wetland layers previously edited and finalized by Lisa Stearns. Based on the [critical area maps](#) on file at the county, the layer named “Wetland_Layer_Final_Aerial_edits” in the geodatabase correlates to official county maps. This layer contains 1136 mapped wetland shapes. That does not mean the map contains 1136 mapped whole wetlands, as some wetlands are split by tax parcel, and create multiple mapped shapes for 1 wetland.

Staff ran this layer through the “Table to Excel” tool in ArcPro to export an excel spreadsheet of the wetland data. This spreadsheet was saved as “Wetland_AccuracyAuditTable”. A blank column was inserted into “Column A” to the left of all data and titled “Random Numbers”. Staff highlighted all blank cells in Column A to the left of any wetland data. In cell A2, staff typed “=RAND()”, held the CTRL key, and pressed enter. This generated random values in Column A for every mapped wetland shape. Staff copied and pasted the random values as “values only”, ensuring no random no values changed if cells were shifted around.

Staff sorted the random values from least to greatest and chose the first 100 wetland shapes in the list to check for mapped accuracy. Wetlands with a corresponding number in the FID_Nation (a unique NHD Identifying Number) in the Walla Walla County Wetland map were selected in ArcPro and exported into a new layer. That layer was then converted to a shapefile and saved on an iPad for field visits.

WWCCD undertook intensive outreach and reached 59 different landowners to inform them of the effort. These landowners owned property for 83 of the mapped wetland areas selected to be audited. WWCCD got permission to visit 69 of those. Staff went out between April 10th and June 21st 2023 to take photopoints of these 69 areas. The wetlands that staff gained permission to take photopoints of were saved as “WetlandAudit2023_AllVisited”. Several factors, including landowner permission and staff time prevented some mapped wetland shapes selected for audit from being photographed. These shaped were saved in a layer titled “WetlandAudit2023_NoVisits”.

Photopoints were taken at each mapped area to determine wetland status. Staff used an application to add photo coordinates, direction, and date/time details to each photo. Staff also tried to take pictures of surrounding mapped wetland areas, when possible, to get as much information about the surrounding area and other potential wetland shapes related to the ones being audited. After collection, Renee Hadley (WWCCD Manager) and district staff went over the photos and their location to determine likelihood of wetland presence. Wetlands were separated into 3 categories:

- Likely Wetland
- Unlikely Wetland
- Unknown (more information needed)

All photopoint locations were saved in a GIS layer as “PhotopointsWetlands2023”, and geolocated photos corresponding with photopoints were saved in another layer titled “PhotopointsWetlands2023_VSP”.

Appendix N: Liquefaction Irrigation Efficiency Analysis Methods

Preparing WSDA Agricultural Land Use Data

1. Staff reached out to Joel Demory (WSDA) to get WSDA Agricultural Land Use data between 2011 and 2021 for Walla Walla County
2. The ArcPro tool “Symmetrical Difference” was run on the original WSDA Agricultural Land Use layers. Staff selected 2011 and 2021 layers process. The “Symmetrical Difference” tool overlaps 2 datasets and only produces the shapes that are not common between them. This gave staff the WSDA Data surveyed between 2011 and 2021 that was not consistent between years. The output layer was saved as **WSDACrop_2021_2011_SymDiff**
3. Staff used the “Erase” tool to erase the WSDACrop_2021_2011_SymDiff layer from the original WSDA 2011 and 2021 crop layers. This was done to make sure that acres compared between 2011 and 2021 were all the same, as WSDA has added survey acres to its data since 2011. The outputs were saved as **WSDACrop_2011_WWCounty_Normalized_SD** and **WSDACrop_2021_WWCounty_Normalized_SD**
4. In 2013, WSDA began detailing more specific types of irrigation in their datasets (ie micro-sprinkler clearly outlined, where in 2011 data micro-sprinklers were categorized under sprinklers). To make sure staff took this into account and see how those specific irrigation types changed over the years, staff used “Clip” tool to clip the original 2016 WSDA Agricultural Land Use layer to the extents of the WSDACrop_2021_WWCounty_Normalized_SD. This was done to ensure staff weren’t bringing in new acres in the 2016 data not common to the 2011 or 2021 data being analyzed. The clipped output was saved as **WSDACrop_2016_WWCounty_Normlized_SD**
 - a. Note: Since the 2016 layer was clipped and did not use symmetrical difference, the total acres in the WSDACrop_2016_WWCounty_Normlized_SD layer differ slightly from its 2011 and 2021 counterparts. This layer has a total acreage that is about 700 acres less than the other 2 layers. This is because there are likely some acres within the 2011 and 2021 extents that were not surveyed in 2016. This difference is negligible, as 700 acres only represents about 1.2% of the dataset’s total acreage (total acreage is about 55,000 acres)

Processing and Analyzing Data for Irrigation Changes in WW County as a Whole

1. Staff exported **WSDACrop_2011_WWCounty_Normalized_SD**, **WSDACrop_2016_WWCounty_Normlized_SD** and **WSDACrop_2021_WWCounty_Normalized_SD** and saved new layers as **WSDACrop_2011_WWCounty_SD_Irrigation**, **WSDACrop_2016_WWCounty_SD_Irrigation**, and **WSDACrop_2021_WWCounty_SD_Irrigation** to have working copies to analyze irrigation changes in the county. Staff set symbology for these layers to reflect irrigation efficiency, with green used for more efficient irrigation and red for less.
2. Staff added an “acreage” field to all new layer outputs. Staff right clicked on the acreage field and used “calculate geometry” to get new acreage counts for processed layers. Acres were calculated in the NAD 1983 HARN StatePlane Washington South FIPS 4602 (Meters) coordinate system, which is the original coordinate system of the WSDA data.
3. Acres of different irrigation types were process and exported using the “Summarize” function. To use this function, the attribute table for a layer was opened. Staff right-clicked the “Irrigation Type” field and clicked “summarize”. In the “field to calculate” section, staff selected “Acreage” and “sum” to get total acres of different irrigation types.

Methods for Liquefaction Analysis for WW County Liquefaction Zones and Watersheds

1. Staff clipped the **WSDACrop_2011_WWCounty_Normalized_SD**, **WSDACrop_2016_WWCounty_Normlized_SD**, and **WSDACrop_2021_WWCounty_Normalized_SD** to:
 - a. Original VSP WW County 2017 Liquefaction Layer (moderate to high-risk areas only)
 - b. Original VSP mapped Walla Walla Watershed
 - c. Original VSP mapped Lower Snake Watershed
2. Liquefaction layers were saved as:
 - a. **WSDACrop_2011_WWCounty__SD_LiqOriginal**, **WSDACrop_2016_WWCounty__SD_LiqOriginal**, and **WSDACrop_2021_WWCounty__SD_LiqOriginal**
3. Watershed layers were saved as:
 - a. **WSDACrop_2011_WWCounty_Liq_WWW**, **WSDACrop_2016_WWCounty_Liq_WWW**, and **WSDACrop_2011_WWCounty_Liq_WWW** for the Walla Walla Watershed
 - b. **WSDACrop_2011_WWCounty_Liq_LSW**, **WSDACrop_2016_WWCounty_Liq_LSW**, and **WSDACrop_2021_WWCounty_Liq_LSW** for the Lower Snake Watershed

Staff added “acreage” fields to attribute tables for all these layers and exported the tables with irrigation type and acre counts to tables the same as previously described. After all metrics were transferred to excel, staff tallied different irrigation types and calculated changes between 2011 and 2021 in excel.

Methods for Liquefaction Analysis Focused on CRP and Developed Acres

Staff also wanted to see how many acres in the Moderate-High Liquefaction Zone in the County changed from Conservation Cover to another land use...

1. Staff used “Select by Attribute” function in the ArcPro Map tab
 - a. Selected by attribute **WSDACrop_2011_WWCounty_Liq_WWW** for Crop type: CRP to see how any acres in the Liquefaction Zone were in conservation cover in 2011 (note: the Liq_WWW layer was used because almost all of Walla Walla County’s Liquefaction zone is in the Walla Walla Watershed). This selection was exported and saved as **WSDACrop_2011_WWC_LiqCRP_WWW**
 - b. Step was repeated for the **WSDACrop_2021_WWCounty_Liq_WWW** layer and exported layer was saved as **WSDACrop_2021_WWC_LiqCRP_WWW**
2. New acreage counts were calculated for new layers, and tables were exported as described in previous steps.

Staff also wanted to see how non-irrigated ground in liquefaction zones changed between 2011 and 2021. For example, was all the non-irrigated ground new development? Or were there some agricultural fields that stopped irrigating?

1. Staff used “Select by Attribute” on the **WSDACrop_2011_WWCounty_Liq_WWW** layer for “Irrigation Type: None”. The selection was exported and saved as **WSDACrop_2011_WWC_LiqWWW_None**.
2. This step was repeated for the **WSDACrop_2021_WWCounty_Liq_WWW** layer and saved as **WSDACrop_2021_WWC_LiqWWW_None**
3. New acreage counts were calculated, and tables were exported as described in previous steps.

- *Gross Irrigation Requirement (GIR):* To find the gross amount of water needed to grow a crop the Net Irrigation Requirement needs to be divided by the Water Application Efficiency.

$$\text{GIR} = \text{NIR} / \text{Efficiency}$$

*Tack myrtle
sic irrig efficiencies*

Summary of Application Efficiency Ranges, Consumptive Use, and Return Flows

Method	Application Efficiency, Ea (%)		% Total Evaporated	% Total Use Consumed	Return Flow
	Range	Average, E _{avg}	%Evap	%CU, Average	%RF, Average
Surface:	Graded Furrow	50 – 80	5	70	30
	w/ tailwater reuse	60 – 90	5	80	20
	Level Furrow	65 – 95	5	85	15
	Graded Border	50 – 80	5	70	30
	Level Basins	80 – 95	5	90	10
Flood		35 – 60	5	55	45
	Periodic Move (Hand line)	60 – 85	10	85	15
	Side Roll (Wheel line)	60 – 85	10	85	15
	Moving Big Gun	55 – 75	10	75	25
	Solid-Set—Overtree	55 – 80	15	85	15
Center-Pivot	Solid Set—Undertree	60 – 85	10	85	15
	Pop-Up Impact	60 – 85	10	85	15
	Impact heads w/end gun	75 – 90	15	95	5
	Spray heads w/o end gun	75 – 95	10	100	0
	LEPA w/o end gun	80 – 98	5	97	3
Lateral-Move	Spray heads w/hose feed	75 – 95	10	100	0
	Spray heads w/canal feed	70 – 95	10	95	5
Micro irrigation:	Trickle/Drip	70 – 95	5	93	7
	Subsurface Drip	75 – 95	0	90	10
Microspray		70 – 95	10	95	5

Appendix O: Irrigation Efficiency List

Appendix P: Monitoring Calendar 2021-2026 Reporting Period

Summer 2024

FWH

FEHA Nest Occupancy Rates – Reach out to Mark Vekasy

Mule Deer and Ag Land Use – WW County Foothill Acres AND Lower Snake Entities if possible

FPB Assessments – 17 more to do

Educate community about flow corridors – tally projects/outreach at WWCCD and note if we need to do outreach to partners

Wetlands

Known Acres of Wetlands – ask partners about their monitoring/status

CARA

Educate community on pollutant levels – wait for WSU and WSDA to get back to us about well testing

GHA: Wind/Water

Increase vegetative cover – start logging projects internally and reach out to partners

GHA: Liquefaction

Encourage adoption of irr BMPs – start logging projects and reach out to partners

Winter 2024

FWH

Known FEHA Conservation Acres – Wait until WSDA finishes their surveys in dryland summer 2024

Known Mule Deer Conservation Acres – Wait until WSDA finishes their surveys in dryland summer 2024

Number of riparian contract acres – wait until end of 2024 because WWCCD still has projects this year and CREP acres may change with FSA audit

GHA: Wind/Water

Maintain vegetative cover – late 2024 after sentinel satellite imagery has come in

GHA: Liquefaction

Efficient irrigation practices will not fall – wait until end of 2024 when WSDA surveys are complete

2025

FWH

Increase fish habitat restoration and develop mapping strategy – reach out to partners for restoration metrics and catalog in-house projects

Lower Snake Riparian Acres – if running sentinel GEE analysis for the lower snake doesn't work, begin photopoint efforts this year

Possible: Lower snake fish screen and flow meter outreach – technically the fish screen one could be done in 2026, but we likely want the data for our reporting that year so may do it this year to be on time

Wetlands

Restore Wetlands/establish buffers – reach out to partners and begin gathering restoration metrics

Lower Snake Wetland Audit – begin outreach February 2025, need to complete efforts here 2027

FFA

Maintain existing floodplains by educating – outreach metrics before 10yr report

Increase use in flood planning tools – outreach metrics before 10yr report

CARA

Maintain existing aquifer recharge projects – before 10yr report

GHA: Landslides/Steep Slopes

Encourage Adoption of BMPs for pasture/rangeland – before 10yr report

2026

FWH

Fish Screen Audit (both WW and Lower Snake Watersheds) – last audit done spring 2024

Wetlands

Wetland map audit – last one done spring 2024

CARA

Flow Meter Audit (both WW and Lower Snake Watersheds) – last audit done spring 2024