



empowering the lasting conservation of fish and wildlife and citizen enjoyment of our natural resources

## Grant Application Cover Sheet

Please complete the following coversheet. See the grant application guidelines on our website [www.myowf.org/grants](http://www.myowf.org/grants) to complete your application. Volunteer organizations without nonprofit status must have a tax-exempt fiscal sponsor. You may scan and email this cover sheet and your application.

### About You

- 1 Project Title: Drone-Based Shade Monitoring of Willamette Tributaries for Salmonid restoration
- 2 Organization: North Clackamas Watersheds Council
- 3 volunteer organizations without nonprofit status, list your fiscal sponsor:NA
- 4 Tax id number (not required for governmental applicants): 27-1160027
- 5 Project Manager Name:Neil Schulamn Title: Executive Director
- 6 City: Milwaukie Address: 2416 SE Lake Rd Zip Code: 97222
- 7 Phone (office): (503)-550-9282 Phone (mobile): (503)-550-9282 email: neil@ncwatersheds.org
- 8 Tell us about yourself (brief biographical statement): The Council's mission is The North Clackamas Watersheds Council protects and enhances our watersheds' water quality, fish, and wildlife habitat. We focus on the Lower Willamette, Kellogg/Mt. Scott, Rinearson, River Forest and Boardman watersheds.
- 9 Have you applied for a grant from Oregon Wildlife Foundation before? Yes  No
- 10 If "yes", what was the name of the project?

### About Your Proposed Project

- 11 What type of project are you proposing? Fish  Wildlife  Other
- 12 Will it address an Oregon Conservation Strategy habitat or species? Yes  No   
If "yes", please name the habitat and/or species addressed:Lower Willamette-Clackamas Salmonid Population
- 13 Proposed start date: June 2020 Anticipated end date: January 2021
- 14 Project Location (attach map): Lower Willamette Tributaries Nearest town or city: Milwaukie, OR  
County: Clackamas
- 15 Has a local, state, or federal biologist reviewed this project? Yes  No   
If "yes", what is their name? Ben Walczak Phone: (971)-673-6013 email: Ben.Walczak@state.or.us
- 16 If "no", what is your plan for an external review of the project? N/A.
- 17 Estimated project cost: \$13,317 Funding you are requesting: \$5,000  
How will you use the requested funds? Completion of remote sensing shade analysis of Willamette River tributaries (professional services)The North Clackamas Watershed Council (The
- 18 Council) seeks assistance from the Oregon Wildlife Foundation to complete a drone-based shade analysis of three tributaries to the Lower Willamette River that are critical rearing and resting habitat for Lower Willamette Valley salmonid populations
- 19 What will you accomplish (ex.,stream miles enhanced, acres planted? Analysis of shade provided to 43 miles of watershed, and targeting of key properties to maximize shade creation value
- 20 Check the following box to be added to our email distribution list:

### Project Abstract/Summary

- 21 Limited to 750 characters. *Do not begin your narrative here or link to other pages:* The North Clackamas Watershed Council (The Council) seeks assistance from the Oregon Wildlife Foundation to complete a drone-based shade analysis of three tributaries to the Lower



empowering the lasting conservation of fish and wildlife and citizen enjoyment of our natural resources Willamette River that are critical rearing and resting habitat for Lower Willamette Valley salmonid populations. We will complete aerial analysis of Rinearson, River Forest, and Boardman watersheds to assess development of shade, prioritize areas for future shade, and educate the public about fish and wildlife science.

**Certifications**

- 22  Check here to certify that you have already or will obtain necessary permits from all requisite agencies *as applicable to the proposed project*.
- 23  I have included pre-project pictures or video as well as a picture or video entry of myself.
- 24  I understand that I'm required to submit a Project Completion Report, copies of any publications or social media posts crediting the Foundation's support, and post-project pictures at the completion of my project.
- 25  I warrant that I am the legal owner of all pictures and video submitted in application and grant permission for the Foundation to reproduce, exhibit, or publish them for all general purposes in relation to Oregon Wildlife Foundation's work.
- 26 Signature of Applicant or Authorizing Official: Ben Schuman

**Project Narrative Oregon Wildlife Foundation Grant**  
**Project: Drone-Based Shade Monitoring of Willamette Tributaries**  
**Applicant: North Clackamas Watersheds Council**

**Project Title:** Drone-Based Shade Monitoring of Willamette Tributaries for Salmonid restoration

**River Miles Impacted:** 43

**Other measures of impact:** (e.g., acres): 12,443 acres

**Approximate Location:** (Lat, Long): 45°26'39" x 122°38'14"w and surrounding region

**Summary**

The North Clackamas Watershed Council (The Council) seeks assistance from the Oregon Wildlife Foundation to complete a drone-based shade analysis of three tributaries to the Lower Willamette River that are critical rearing and resting habitat for Lower Willamette Valley salmonid populations. The shade analysis, the first phase of which was completed in winter 2020, will:

- Identify shade-deficient areas, that the Council will use to target future planting projects;
- Using DEQ TMDL modeling, identify how shade and future plantings will impact temperature in these streams.
- Identify how shade in these watersheds' riparian zones has changed since most recent study (2013)
- Capture aerial imagery for future comparisons, as well as for use in other studies
- Oregon Wildlife Foundation funds will be used for support remote sensing flights and data analysis services.

The Council oversees four tributaries of the Lower Willamette and a stretch of the Willamette River north of the Clackamas River and South of Johnson Creek, including River Forest, Boardman and Rinearson watersheds. With the support of Oak Lodge Water Services, Clackamas WES has been restoring riparian areas along these creeks and their tributaries since 2012, restoring 88 sites, 26.21 acres, and 9,027 linear feet of streambank. We restore riparian tree-shrub communities, creating future shade, lowering water temperature, reducing fine sediment erosion, and providing future sources of woody debris, as well terrestrial and riparian habitat and reducing the spread of invasives, and building community-based stewardship. The last shade analysis was completed in 2013, at the end of the program's first year. We now seek to repeat this shade analysis, as the first sites restored have seen plant growth, and several other factors in the watershed have changed.

The first phase of the 2020 drone analysis was completed in January-February 2020 (flights with bare trees) with support from OLWS. Support from the Foundation will make the second set of

flights in Summer 2020, with full-leafout, and the full data analysis, shade mapping, and identification of future planting targets for maximum fish habitat restoration possible.

### Location and Ecological Significance

The Rinearson, River Forest, Boardman and Lower Willamette rivers are critical habitat for the Clackamas fish population's geographic area. . These tributaries to the Lower Willamette River provide vital rearing habitat and cold-water refugia for ESA-listed salmonid populations, including the Clackamas River Fish Populations and stocks migrating to and from the Upper Willamette and its tributaries. This area has been prioritized by the Clackamas Partnership (of which the Council is a Core Members) because of these watersheds' importance for rearing habitat and off-channel cold-water refugia (USGS, 2018) to both the Clackamas and upper Willamette anadromous fish populations. The 2020 Cold Water Refugia study (DEQ, 2020) identified the Rinearson drainage as particularly valuable cold-water refugia due to being in the cold-water plume of the Clackamas River, and the investment made into the Lower Rinearson Creek in 2017 with the removal of an earthen dam and the restoration of the lower river.

### Project Goals, Objectives, and Future Use

With the support of the Oregon Wildlife Foundation, we will:

- Complete the second set of drone flights (Summer 2020) after full leaf-out with both color and infrared imaging. (Each flight is flown twice, on 90-degree intersecting flight paths for 3-D shade modeling based on aspect and sun position).
- Conduct data analysis from winter and summer flights to calculate:
  - Existing shade coverage
  - Change in shade coverage on restored sites
  - Change in shade coverage in riparian zones overall
  - Targeted areas for future restoration (based on site aspect, contiguous with shaded properties and properties under restoration, and areas of valuable habitat and cold water impacts)
  - As coverage/visibility allows, identify instream complexity (large woody debris, etc. and other habitat considerations)
  - Progress toward shade targets set for Rinearson drainage and being set for River Forest and Boardman Creek for TMDL Stream Shading goals (DEQ, City of Gladstone, Oak Lodge Water Services)
  - Provide data for future comparisons in coming years
  - Provide data to other ongoing science projects: the North Clackamas Watershed Bio-Assessment and Watershed Action Plan
- Produce a summary report of findings
- This project also has significant opportunities to educate residents, landowners, and others about how wildlife science occurs in the field, and how the actions of individuals

and landowners can have great impact cumulatively. We will do the following to share the project and its results, including the Foundation's support:

- Facebook and other social media posts
  - Web posting
  - Emails to NCWC riparian landowners and broader audience (1,100, 29% open rate)
  - Landowner contact before, during and after drone flights
  - Website article summarizing process and results
  - News release when analysis is complete
  - The Council is independently planning public workshops in summer/fall 2020 (either in-person, online, or both depending on COVID-19 restrictions). This shade analysis will be part of the content of this workshop and will allow landowners to understand the science behind how we approach restoration and where their property fits in the larger watershed science and restoration context.
- The analysis will also be a tool for the relevant jurisdictions (OLWS, City of Gladstone, Clackamas County DTD to target future restoration and studies. As of this writing, the City of Gladstone is planning on a long-term water temperature study of the Rinearson drainage to track changes due to climate impacts and development, as well as restoration. This study will inform locations for monitoring stations (i.e., above/below areas of shade, etc.)

### **Project Approach**

#### *Objective 1: Complete second drone series (Summer 2020)*

The Council has retained Mosaic Ecology, LCC, to conduct the drone flights and analysis. Flights will occur on days of moderate sun and light wind; notification will be sent to program participants/landowners via email in the weeks prior. Each stream will be flown twice, on intersecting angles.

*Deliverables: Flight Footage*

#### *Objective 2: Shade Analysis, (Summer-Fall 2020)*

Mosaic will conduct analysis of the winter and summer 2020 flights to create a 3D modeled view that will identify both amounts of shade coverage, and anticipated amounts of shade provided to streams (i.e. based on aspect, movement of the sun at different times of year, etc.). This data will also be compared to 2013 data to ascertain changes in shade, both on a watershed level and a site level, assessing shade provided by past restoration sites, targeting high-value properties for future shade, and comparing to TMDL shade targets

*Deliverables: Analysis and Report Draft and Final*

#### *Objective 3: Disseminate Results (Fall-Winter 2020-1)*

Mosaic will produce maps, presentation materials, and raw and aggregated that will be developed into a report and presentation that will be presented, in person and/or virtually (based on timing and COVID-19 restrictions) to:

- Oak Lodge Water Services staff and Board
- City of Gladstone Board
- City of Milwaukie, WES and City of Happy Valley for replication in other jurisdictions
- DEQ, ODF&W, Columbia Restoration Group, NOAA Fisheries and other stakeholders in the Rinearson project
- Abstracts submitted to UERC & other appropriate venues,
- Clackamas Partnership and Council of Councils (gathering of Watershed Councils)

*Deliverables: Presentation and report, meetings with local, regional and state jurisdictions*

*Objective 4: Communicate Project to the Public (Throughout)*

The Council will communicate the value of the project to the 163,000 watershed residents, property owners in the watershed, social media followers, email subscribers, workshop participants, and others. Messaging will articulate the nature and importance of the study, how wildlife science occurs, the results and next steps, and will reassure any landowners who have concerns about drones.

- Social media and website postings
- Emails to landowners, active restoration partners, and our email as a whole (29% open rate)
- Incorporation of results into Council public workshops
- At conclusion of study, news release & contact with local paper (Clackamas Review, Oregonian Clackamas section)

*Deliverables: Social media postings, photo, email content, web content, news release*

**Project Timeline\***

<b>Time Period</b>	<b>Tasks</b>
<b>Winter 2020</b> <i>(completed)</i>	Drone Flights (winter) Community Awareness
<b>Summer 2020</b>	Drone Flights (Summer) Data analysis Community awareness
<b>Summer-Fall 2020</b>	Final Data analysis Draft Report and Summary Final Report and Summary Community awareness
<b>Fall-Winter 2020-21</b>	Results Dissemination and Presentations* Incorporation into restoration plans

\*As of this writing, the future of COVID-19 is uncertain. Social distancing guidelines will affect the method of any presentations and workshops. Depending on how the pandemic evolves, it may have other unforeseen impacts on timing or other project components.

### **Significance for Anadromous Fish Recovery**

The Rinearson, Boardman and River Forest watersheds provide salmonid rearing habitat (Friesen, 2007) to threatened and endangered salmonids and other priority species including winter steelhead, Coho salmon, Pacific lamprey, resident cutthroat trout, and fall and spring Chinook salmon. (Clackamas Partnership, 2018). Furthermore, these streams provide both current and potential off-channel and cold-water refugia in a stretch of the Willamette where geological features largely prevent alcoves and significant side channel refugia in the Willamette mainstem (USGS, 2018, DEQ, 2020). The Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead (LCR Plan) identifies limiting factors for the ESA-listed Clackamas populations (Coho, winter steelhead, spring Chinook, fall Chinook, and chum salmon, collectively referred to as the Clackamas Fish Population). One limiting factor is the lack of cold-water refugia at tributary junctions, which constitute essential habitat for the Clackamas Population (Clackamas Partnership, 2018, ODFW, 2018). The lower Willamette also provides critical migratory and rearing habitat for several evolutionary significant units of ESA-listed anadromous fish, including Upper Willamette River Spring Chinook and winter steelhead. (ODFW, 2010).

### **Role of Shade and Riparian Conditions in Restoring Native Fish Habitat**

Limiting factors for Rinearson, Boardman and River Forest watersheds and the Lower Willamette have been identified by ODFW and other partners. They include: degraded channel structure and complexity including lack of large wood; elevated water temperature; and excessive fine sediment. (DEQ, 2020, Oak Lodge Water Services, 2019, City of Gladstone, 2019). The Council's year of riparian restoration in these watersheds have been designed to 1) provide future shade to lower water temperature, 2) provide a source of future instream wood, 3) control erosion of fine sediment, and 4) educate landowners and residents about the importance of these actions for salmonid populations and overall watershed health. Climate change impacts anticipated will magnify the importance of these actions. (City of Milwaukie, 2019).

The Council's Executive Director, Neil Schulman, will oversee the project. He will be the primary point of contact for new landowners and manages the overall riparian restoration project and, in conjunction with, the Council's Restoration Committee shapes program strategy. He administers landowner agreements and ensures financial management, project reporting, and achievement of the program's overall outcomes. He has 25 years' experience

in urban conservation, with Metro, SOLVE, Northwest Service Academy, Portland Audubon, as a private consultant, and as the co-founder of Confluence Environmental Center. A former outreach manager and conservation educator, he is well positioned to work with private landowners and partners, and to guide the public communication components of the project.

Mosaic Ecology, LLC will implement the technical aspects of this project, including drone flights and spatial and data analysis. Because Mosaic also manages the Council's riparian revegetation work and weed management, they also have face-to-face experience and relationships with the landowners engaged, who are accustomed to seeing them in the neighborhood. Jason Dumont, owner, has decades of restoration experience with Mosaic and the Nature Conservancy. Project Manager Lauren Cary will work directly with landowners; she has been managing projects in these watersheds for years. Nicholas Bilz, Remote Sensing Specialist, will be the drone pilot and will lead the analysis.

Alexis Barton conducts outreach and landowner education. She will incorporate shade study information into educational curriculum, workshop and tour content, and logistics, assist presentations, educational materials, and other activities. In addition to this role, she is the Program Coordinator for the Tryon Creek Watershed Council, an Environmental Educator at Columbia Springs, a former Community Outreach Coordinator with Johnson Creek Watershed Council, and a watershed resident.







May 4, 2020

Tim Greseth  
Oregon Wildlife Foundation  
901 SE Oak St., # 103  
Portland, OR 97214

RE: North Clackamas Watershed Council Proposal to Oregon Wildlife Foundation

Dear Tim, and the OWF Grant Review Team,

I am writing to express Oak Lodge Water Services District's request that OWF fund the North Clackamas Watershed Council's application to complete a drone-based shade analysis of three streams critical to rearing and resting habitat for lower Willamette Valley salmonids. We have contributed financial resources to this project, and it is vital that it be completed.

For six years, the District has funded the Council's Streamside Stewards Program, which engages 188 landowners in restoration of the riparian zones on their property – to increase shade, lower water temperature, reduce erosion, and add woody debris and complexity to the stream. This work is vital in watersheds for fish habitat, water quality, terrestrial wildlife, and human contact with healthy ecosystems. The program has a long history of success.

However, this program cannot reach the next level of effectiveness without more use of science to assess current shade in the Rinearson, Boardman, and River Forest watersheds. Among other items, we need to model the shade impacts on temperature, and identify properties in need of greater shade based on local, aspect, contiguous reaches, and other key factors. This will help with the assigned OLWS Total Maximin Daily Load for temperature in the lower Willamette River. This is also a vital step to protect the value of the Lower Rinearson Project, a 2017 NRDA project completed to remove a dam and create fish habitat at the Confluence of the Willamette and Rinearson Creek, important rearing habitat for Coho salmon. Ability to direct cooler water into this project will preserve its value for years to come and extend the life of this project.

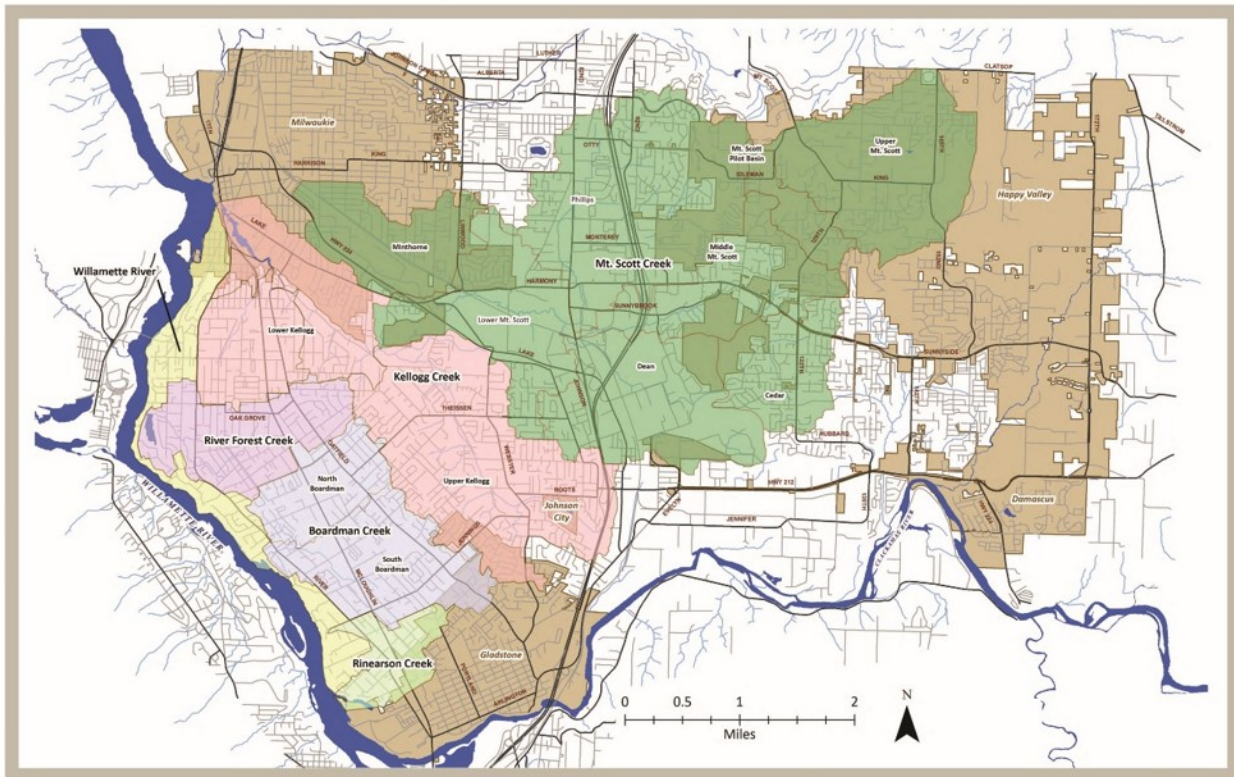
The first flights of this drone analysis have already been completed with OLWS funding. Please help us and the Council to complete the job.

Sincerely,

A handwritten signature in black ink that reads "Lara Christensen".

Lara Christensen  
Outreach Program Specialist

# NORTH CLACKAMAS URBAN WATERSHEDS COUNCIL WATERSHED MAP



Where do you live in the watershed?

partner support by:





## Photos



Clockwise from left:  
Executive Director Neil  
Schulman (Center) with  
staff of Friends of Trees  
and Clackamas Water  
Environment Services;  
volunteers revegetating a  
riparian zone at Olson  
Wetlands in the Rinearson  
Creek watershed; Mosaic  
Ecology Project Manager  
Lauren Cary





Clockwise from top left: revegetation project in Rineason Creek; volunteers placing cuttings to stabilize bank; volunteers from Warn Industries and Northwest Housing Associates.

