Wednesday, March 12, 2025

Contact Information

2025 Upper Columbia Regional Project Pre-Application

* Pre-applications (SRFB & Monitoring) due March 12, 2025 (COB)

*Complete SRFB applications due in PRISM April 18, 2025 (COB)

*Complete Monitoring applications due in PRISM May 1, 2025 (COB)

*Revised SRFB proposals due in PRISM May 27, 2025 (COB)

*Final revised SRFB & Monitoring applications due in PRISM June 23, 2025 (noon)

Project Title	Wenatchee and Okanogan Comprehensive Thermal IR Surveys for Cold Water Species
Sponsor	Cascadia Conservation District
Primary Contact	Mark Ingman
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Project Summary

Please provide a description or summary of the proposed project, including project goals. The goal of the project should be to solve identified problems by addressing the root causes. Then clearly state the desired future condition.

For each the Wenatchee and Okanogan watersheds: provide 1) a highly-detailed geospatial thermal infrared mosaic map that is GIS ready for use by project sponsors, 2) identify and map all cold and warm water features (“significant thermal features,” STFs), and 3) identify and map the mainstem river longitudinal thermal profile (LTP) along centerlines, and 4) high resolution RGB imagery co-acquired for thermal evaluation and project sponsor use. All deliverables will be GIS ready to import into GIS programs and application for us by project sponsors, the UCSRB, all agencies, scientists, researchers, and the public at large to have access to these important data about their watersheds.

Recovery of cold-water species, steelhead, spring chinook, and bull trout, requires thermal geospatial data that can inform where projects are most needed, will have the most benefit, where unique cold water refugia exists, where warm water is being introduced into the stream, and also to ensure proposed projects do not inadvertently increase mixing of critical cold water habitat. None of these essential considerations for cold water species can influence proposal development nor proposal technical review without a thermal infrared map that is done comprehensively and is up to date for each watershed.

What are the project objectives? Objectives support and refine biological goals, breaking them down into small steps. Objectives are specific, quantifiable actions the project will complete to achieve the stated goal. Each objective should be SMART (Specific, Measurable, Achievable, Relevant, and Time-bound). Note: This exact question is included in the PRISM application. Example format: The project seeks to address [specify limiting factor(s)] for [limiting life stage(s)] by [specific actions proposed] to create an estimated [include specific target metrics, as described below] upon implementation in [estimated year].

This project will fill a primary data gap to collect critical cold water habitat data for 227 miles of the Wenatchee River sub-basin and 197 miles of Okanogan sub-basin. Both sub-basin dataset are now well out of date (2005 and 2001-3; respectively), taken with legacy sensors, do not include the current set of thermal data deliverables, are missing primary fish bearing reaches, and restoration actions in the watershed have caused significant changes to how cold water moves within many of the reaches.

These thermal datasets are recommended for collection to influence the future prioritization in the Upper Columbia—potentially as part of, or in support of the "climate change" component that is currently being considered. Identification of cold water patches will be discretely identified with precise locations using 18 inch pixel resolution and 0.1 C degree accuracy. These data will be evaluated per the QA/QC protocols developed by NV5 Geospatial, the statewide thermal IR contractor in Washington. The contractor will use automated and semi-automated computing algorithms to analyze the point cloud data, render the mosaics, compute LTPs, and finally evaluate and identify all thermal anomalies (STFs) through a handpicked process based upon multiple factors per the training of a certified Level III thermographer. The data will be obtained through the contractor's most recent thermal IR sensor on a helicopter (summer flights) and/or fixed wing aircraft (winter flights). RGB imagery is automatically co-acquired and will be a GIS-ready deliverable available for project sponsor and public use.

Budget Request

Values MAY be duplicative and do not have to equal TOTAL anticipated budget in pre-application.

Anticipated Request - SRFB (standard round) 200,000

Anticipated TOTAL Budget 458,000

Other Funding Source(s), please note if funding is anticipated or actual.

WA Conservation Commission $8,000 (anticipated) ; PRCC - $250, (anticipated)

Project Location

Briefly describe the location of the project The assessment project will comprehensively include most fish bearing reaches of the Wenatchee and Okanogan sub-basins.

Latitude (decimal degrees) 47.528782

Longitude (decimal degrees) -120.495681

Project subbasin Multiple Subbasins

Please explain why there are multiple subbasins

This is a comprehensive thermal infrared survey of the Wenatchee and Okanogan sub-basins.

Does the proposed project span multiple assessment units? Yes

List the additional assessment units directly impacted by this proposal.

Okanogan AUs: Ellemeham Draw-Similkameen River US, Silkameen River, Ninemile Creek DS, Okanogan-Haynes Creek South, Okanogan-Haynes Creek North, Okanogan-Mosquito Creek, Whitestone Creek, Antoine Creek-Lower, Okanogan-Whitestone Coulee, Lower Tunk Creek US, Okanogan-Alkali Lake, Okanogan-Swipkin Canyon, Okanogan-Talant Creek, Okanogan-Davis Canyon, Chiliwist Creek, Lower Loup Loup Creek US, Salmon Creek-Lower, Johnson Creek, Omak Creek-Lower US, Wanacut Creek US, Aeneas Creek-DS Wenatchee - AUs within these survey areas: Chikamin Creek, Upper Chiwawa Creek, Lower Chiwiwa Creek, Big Meadow Creek, White River, Nason Creek, Wenatchee River, Chumstick Creek, Peshastin Creek, Mill Creek - Peshastin Creek, Mission Creek, Icicle Creek, Upper Icicle Creek, Little Wenatchee River

Reach(es) Name

Many.

Identify the reach(es) priority/ reach ranking. Note: If the project involves work in multiple reaches, select "Multiple" and include details in the text box that will appear below. Please reference the Prioritization Web Map: https://prioritization.ucsrb.org/.

Rank 1 | Rank 2 | Rank 3

Unranked (not a priority or missing data)

Multiple reaches (provide details below)

Please detail the reach-ranking of the reaches below

This survey is comprehensive and includes two sub-basins. The sponsor has worked with both the Wenatchee and Okanogan WATs, and over 10 project sponsors to identify all potential reaches of interest for salmon recovery efforts within the anadromous range of ESA listed and other native cold water fish species. The survey includes all rank 1 reaches, all rank 2, and most rank 3 rankings for both the Wenatchee and Okanogan sub-basins. Additionally, the survey reaches all are within the anadromous range and rarely include reaches above full barriers unless the barrier removal is in an advanced stages of being corrected.

Project Information

1. What species will the project benefit?

Spring Chinook | Steelhead | Bull Trout

Summer Chinook | Coho

2. Select the project's objectives and the associated tracking metrics

Design, Monitoring or Assessment

4. Does this project already exist in Salmon Recovery Portal or PRISM?

No

5. Has this project been submitted previously for funding through the SRFB and/or other process(es)?

No

6. What category is the project?

Assessment

If applicable, what is the secondary project category?

N/A

Is the project eligible for Riparian Funding?	No

Design and Restoration Proposals

Assessment Proposals

7. What type of assessment are you proposing?	This is a comprehensive thermal infrared survey for the Wenatchee and Okanogan sub-basins that reveal thermal anomolies (STFs), thermal mosaics, and longitudinal temperature profiles for 424 miles of streams,
8. Is the assessment identified on the MaDMC monitoring and data gaps list?	Yes

9. Describe how the assessment fills a regional priority and where that priority is identified.

The comprehensive thermal infrared surveys in the Wenatchee and Okanogan provide a never before provided access to thermal habitat data that compliments and strengthen the traditional assessment of habitat conditions that are observable with the human eye in the field as temperature is largely excluded from Level II surveys and reach assessments. All of the Level 2 and Reach Assessments in the Prioritization list are gapped for truly "seeing" cold water habitat the way cold water species are extremely sensitive to cold water. We know fish can move considerable distances on a daily or sub-daily intervals in response to temperature. The proposed thermal IR surveys would sizably strengthen two of the four sub-basins for having comprehensive thermal refugia habitat datasets (Entiat was comprehensively collected in 2023).

10. Methods - What methods will you use in your assessment and how will they achieve your stated objective(s)?

The methods are nearly identical to the comprehensive thermal infrared dataset that was collected in 2023 for 66 miles of the Entiat and Mad Rivers. The state contractor will mobilize their team and install in-water temperature loggers for QA/QC. They will fly their aircraft at approximately 1,000-1,500 feet altitude to passively collect the return infrared signal for all survey areas. Some areas need multiple flight passes is sufficiently wide/complex in nature (oxbows, side channels, wide rivers). The Thermal IR data will be co-collected with high resolution RGB imagery. The flight will occur in the warmest 3 hours of the afternoon (summer/baseflow conditions; different if late fall/winter flight reaches). The point cloud Thermal IR data will be processed by the contractor to produce principally the following deliverables: 1) high resolution thermal IR mosaics, 2) STFs (significant thermal features = cold/warm patches, anomalies), 3) Longitudinal Temperature Profile of all reaches (LTP), 4) plotted STFs along LTP in an X,Y graph plot, 5) Centerlines of streams, and 6) Technical Report. Items 1, 2, and 3 will all be GIS software ready. Cascadia CD will work with the UCSRB and all UC region partners to make Thermal IR deliverables readily available and sharable. The access to these comprehensive thermal datasets, along with outreach Cascadia CD has already started with the WAT groups, will make these data accessible to all project partners. To date, five UC region thermal IR meetings have been presented, covering at least one meeting for each WAT group, and two meetings with the RTT. Project sponsors will be able to readily and increasingly use these data, in particular the STFs with respect to the LTPs, to target thermal enhancement projects in our region.

11. Will a design result from the project?	No
12. If yes, what level of design (e.g. conceptual, preliminary, final)? What proportion of your budget will support design?	N/A

13. Briefly describe why SRFB funds are necessary, rather than other sources of funding.

The sponsor requested RCO Riparian funding, but RCO stated it would not be eligible. It does appear these data will lead to 1) new thermal enhancement projects, 2) become part of the Climate Change prioritization for reviewing projects, and 3) provides valuable context for designing in-stream projects (reduce and prevent mixing of cold water habitat). The sponsor is applying for additional funding in order to complete the surveys of both the Wenatchee and Okanogan sub-basins.

Protection Proposals

Monitoring Proposals

7. Does this project address a Tier 1 data gap in the MaDMC Regional Data Gaps List?

Don't Know

8. To what extent does your project address a regional data gap?

Yes. Data Gap IDs is included below, including data gap notes and sponsor comments of how they integrate.

2.16 - "Temperature and its changes within specific reaches or AU of the UC." Specifically the note: “Need more data at a finer scale.” This is precisely what the thermal IR data provides: 18” pixel values with 0.1 C accuracy of water temperature comprehensively for over 400 miles of the Wenatchee and Okanogan sub-basins.

2.17 – "Temperature effect on fish distribution, movement, stress, and survival within specific reaches or AU of the UC." Assessment will compliment limitations of data logger-based temperature data with more detailed and comprehensive “snapshot” capture of thermal refugia down to the 18 inch pixel size level with 0.1 C accuracy for over 400 miles of the Wenatchee and Okanogan sub-basins. Fills thermal gaps not being monitored by data logger network. Safeguards against loss of logger-based funding (NorthWest). Thermal IR data is QA/QC per in water loggers, akin to ground control points.

2.18 – "Location and characteristics of thermal refuge areas." This proposed assessment increase the Data Gap note that “some” of Wenatchee to “all of” Wenatchee covered for thermal refugia. The Wenatchee thermal IR data is now legacy, to include the 2018 re-analysis done by 2018 since it used the 2001-2003 data. This asessment would increase the originally flown areas in the 2001-2003 source data, using modern thermal IR sensor, and update the thermal IR data deliverables to current day deliverables (new thermal IR mosaic, thermal anomolies evaluated and idnetified, longitudinal temperature profiles, and other now standard deliverables).

2.14 – “Evaluation of riparian forest structure and function.” High resolution RGB imagery is co-acquired for all surveyed areas, which is necessary for evaluating cold water patches (STFs/anomalies), but also directly helpful as a data source to evaluating riparian canopy coverage.

9. What is the scale of inference?

Site Scale

Project Risk and Economic Benefits

1. What is the landownership?

N/A, aircraft collected above 1,000 feet

2. Have you secured landowner participation in or acceptance for this project?

No

Please explain

The ground control temperature loggers are usually done at public access points or with partnered

landowners as needed. The project sponsor will let the public know the general time of year when the flight is happening and that its only looking at data relating to surface waters and not terrestrial areas. There has not been sensitives to the survey work in the past as they are not intrusive.

3. Describe any land owner requirements (e.g., design elements, right-of-ways, access agreements, liability waivers, etc.) and if/how they could affect the project

N/A. This is a remote sensor based project, so landowner participation and requirements are NA. If a in-water sensor is needed to be installed at a non-public location, we will ensure proper landowner access and willingness is received, but this is not expected or necessary.

4. Will the project raise potential concerns for interest groups (e.g., recreational users) or the community at large (including upstream/ downstream/ adjacent landowners)?

N/A. This is a remote sensing based project and will not directly have any physical change to the waterway. Changes to the waterways will be a result of the thermal enhancement projects it helps start—the consequent projects thermal IR data ushers forward.

5. Who will have the responsibility to manage and maintain the project? What is the responsibility of current or future landowners?

Cascadia CD will work with the UCSRB data management team to make the datasets for the Wenatchee and Okanogan watersheds publically available. This could be as simple as it being made available in the UCSRB data library, or a note on the UCSRB website that the data can be obtained from the UCSRB and/or Cascadia CD. The project sponsor has factored in the cost of USB thumb drives that can be loaned out to project sponsors that want the data for project development. Uploading to an FTP site is also an option for data sharing, however given the large size of the datasets, the project sponsor has used USB drives to share the prior existing (prior project) Entiat Thermal IR dataset (preferred method to date).

6. Are other projects being proposed immediately upstream or downstream of worksite?

No

7. Please describe the risk of failure associated with this project.

There is a low risk of failure. The Okanogan thermal infrared survey needs have identified a late fall/winter survey implementation time window, which can be fairly narrow. If this window is precluded by severe weather, the survey for the Okanogan sub-basin may be delayed by one season, but is not a major issue. The contractor has been give the state (WA DNR) contract for thermal IR and LiDAR collection. The contractor is very experienced and vetted to successfully accomplish this survey. The same state awarded contractor successfully completed a very similar comprehensive thermal infrared survey effort for the Entiat and Mad Rivers in 2023.

8. Is there any public outreach planned during and/or after implementation? Does the project build community support for salmon recovery efforts?

This project provides excellent visual examples of how the stream “looks” to salmon and steelhead with the multiple colors representing thermal habitat conditions (mosaics). These mosaics can be used as a visual aid to show the public the warm water conditions as well as cold water, and the role riparian/reforestation plays, how salmon recovery projects benefit essential cold water for cold water species. The project sponsor will work with the UCSRB, in the same way as the project sponsor’s previous project with the Entiat Watershed thermal IR survey, the data from the Okanogan and Wenatchee thermal IR surveys online to the public in an appropriate format. The project sponsor will also present the thermal IR survey to the Entiat Watershed Planning Unit and also the WATs.

9. Does the project represent an opportunity for economic benefit? How much benefit does the project create for the dollars invested?

This assessment project type is not meant to have direct or immediate economic benefit, however it will have considerable indirect economic benefit in the volume of thermal enhancement projects it supports coming forward into the future that will have economic benefits. The intrinsic climate forward nature of this thermal assessment translates to a greater assurance our salmon recovery projects going forward will fully "hit the mark" with benefit afforded to target species, and we know salmon and steelhead are a

sizable economic and cultural value to the region for many reasons. We have a strong belief these thermal data will benefit the climate change portion of the UC's prioritization framework, sizably increase our understanding of how fish use habitat features, and increase project effectiveness on many levels.

10. Describe any partnerships, their experience, and types of contributions supporting the project.

Cascadia CD has worked extensively at the multi-WAT level to gather input from the following list of project sponsors: Okanogan WAT – Okanogan CD, CCT, Methow Okanogan Beaver Project, Trout Unlimited, Okanogan Highland Alliance; Wenatchee WAT – Cascade Fisheries, Cascadia CD, Trout Unlimited, Chelan County NRD, CCT, YNF, CDLT, and others. Cascadia CD has also worked with the WA DNR and their contractor to obtain estimates, and is actively working with WA Ecology to explore data portal/data hosting potential (see Ecology TIR data portal https://apps.ecology.wa.gov/shorephotoviewer/Map/ThermalImageViewer). The project sponsor has also presented 2023 Entiat Watershed thermal infared project at the River Restoration NW Conference to heighten understanding and awareness of new thermal IR data collection capabilities. The project sponsor has presented the Entiat thermal IR project to the Entiat and Wenatchee WATs, and facilitated thermal IR presentation from NV5 (state contractor) to the Wenatchee, Okanogan, and Entiat WATs all in the past two months.

Optional Section - Preparation for PRISM (SRFB applications only)

The following questions are identical to the questions RCO requires in the PRISM application for SRFB projects. If desired, sponsors can complete associated questions early and copy responses into PRISM during the "Complete Application" phase due on April 18, 2025.
*please note, this section is not applicable for Monitoring proposals

Do you want to review and/or pre-populate PRISM questions?	No

Supporting Documents

Upper Columbia Process Guide 2025

SRFB Manual 18 (2025)

RCO Application Resources (2025)