



OREGON WATER RESOURCE DEPARTMENT WATER CONSERVATION, REUSE AND STORAGE FEASIBILITY STUDY GRANT PROGRAM

I. Grant Information

Study Name: Upper Catherine Creek Irrigation Efficiency and Water Conservation Study

Type of Feasibility Study: Water Conservation Reuse Above-Ground Storage
 Storage Other Than Above-Ground [Including Aquifer Storage and Recovery (ASR)]

Program Funding Dollars Requested: \$ \$114,265
Note: Request may not exceed \$500,000

Total Cost of Feasibility Study: \$ \$230,120

II. Applicant Information

Applicant Name: <i>The Freshwater Trust</i>	Co-Applicant Name:
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Certification:

I certify that this application is a true and accurate representation of the proposed work for a project feasibility study and that I am authorized to sign as the Applicant or Co-Applicant. By the following signature, the Applicant certifies that they are aware of the requirements of an Oregon Water Resources Department grant, have read and agree to all conditions within the sample grant agreement and are prepared to conduct the feasibility study if awarded.

Applicant Signature: *[Signature]* Date: 1 FEB 2016
Print Name: JOE WHITWORTH Title: PRESIDENT

III. Feasibility Study Summary

Please give a brief summary of the feasibility study using no more than 150 words.

This study will assess the potential water savings, technical feasibility, and estimated costs of piping or lining irrigation ditches and upgrading on-farm irrigation methods in the upper Catherine Creek watershed to improve agricultural production and enhance instream flows for ESA-listed Chinook and steelhead. The two-pronged study proposes (1) a detailed field survey and 70% engineering designs for piping/lining and upgrading sprinklers on the Godley Ditch system, which has senior rights to 15.9 cfs of late-season streamflow, and (2) a global assessment of potential water savings from modernizing the irrigation infrastructure used to convey and apply surface water in the upper Catherine Creek watershed, yielding a prioritized roadmap for future water conservation efforts. Preliminary analyses indicate as much as 5 cfs of potential water savings through irrigation efficiency projects on Godley Ditch and 12 cfs or more in the upper Catherine Creek watershed.

IV. Grant Specifics

Section A. Common Criteria

Instructions: Please answer all questions contained in this section. It is anticipated that completed applications will result in additional pages.

1. Describe your goal and how this study helps to achieve the goal.

The goal of this study is to assess the potential water savings that could be realized through irrigation efficiency projects in the upper Catherine Creek watershed, which encompasses the alluvial valley around the City of Union upstream of Davis Dams and downstream of Catherine Creek State Park. Reducing conveyance losses through piping or lining ditches and reducing demand through conversion to wheel lines or center pivots would yield a reduction in the volume of streamflow diverted as well as improved water application on irrigated lands. To date, however, there has not been a practical assessment of conserved water opportunities to prioritize investments in irrigation infrastructure upgrades.

The Draft Northeast Oregon Snake River Spring and Summer Chinook and Steelhead Recovery Plan (October 2014) identifies a target of maintaining 10 cfs of flow in Catherine Creek from the confluence of the North and South Forks of Catherine Creek (RM 54.9) to the confluence with Little Creek (RM 35.8) through improved irrigation management. As used in the Draft Recovery Plan, irrigation management means “an integrated program of irrigation efficiency improvements, diversion point consolidations, water right leasing and water right purchase.” When implemented, these actions help to address several environmental factors limiting the recovery of anadromous fish, including low flows, high summer temperatures, low dissolved oxygen, and poor habitat access.

Before The Freshwater Trust began targeting senior water rights for instream leasing in the upper Catherine Creek watershed in 2011, flows commonly dropped below 1 cfs through the town of Union in July and August. Today, as a result of these leasing efforts, more than 3 cfs is protected instream in late summer at OWRD gage 13320300 (“Catherine Cr at Union, OR,” commonly known as the 10th St gage). Yet the process of instream leasing requires the dry-up of irrigated acres--a non-starter for many agricultural producers. In order to continue making progress toward the Draft Recovery Plan’s goal of restoring 10 cfs of flow through the City of Union to the Little Creek confluence, it is necessary to explore and utilize a broader set of irrigation management actions that can keep water instream while also keeping fields in production.

The study proponents, in partnership with U.S. Bureau of Reclamation, Grande Ronde Model Watershed, Anderson Perry & Associates, and local landowners, propose an assessment of conserved water potential in upper Catherine Creek that answers the following questions:

1. *What is the technical feasibility of piping or lining ditches in the upper Catherine Creek watershed?*
2. *Which fields have the greatest opportunity for on-farm efficiency upgrades that will reduce surface water demand in late summer?*
3. *How much water could be conserved and protected instream through irrigation efficiency improvements and diversion point consolidations?*
4. *How much would these irrigation efficiency improvements cost?*
5. *Which projects will yield the highest ecological return on investment in terms of reliable late-summer flow augmentation?*

A two-pronged approach to the feasibility study will yield complementary deliverables: (1) detailed engineering plans for a pilot water conservation project to pipe or line the two-mile-long unlined Godley Ditch, which conveys nearly half of the pre-1870 water rights in the upper Catherine Creek watershed, and to scope options for on-farm efficiency upgrades for fields supplied by the ditch; and (2) an analysis of water conservation potential across the broader upper Catherine Creek watershed, building on the field surveys completed for

Godley Ditch and providing a prioritized roadmap for ongoing irrigation-efficiency project development with willing landowners.

2. Describe the water supply need(s) that the proposed project addresses. Identify any critical local, regional, or statewide water supply needs that implementation of the project associated with the feasibility study will address. **Responses should rely upon solid water availability and needs data/analysis.** For examples of water supply needs see “Criteria and Evaluation Guidance Document.”

With nearly \$70 million in annual sales, agriculture is one of leading economic drivers of Union County (USDA Census of Agriculture, 2012). Most irrigated agriculture in Union County is irrigated from Catherine Creek, with the majority of all diversions located below river mile 45. Catherine Creek is largely over-appropriated with no surface water available at the 80% exceedance level for new allocations during most months of the year. Water availability analyses indicate water availability deficits from river mile 46.8 to the mouth during all months except December. New appropriations for instream flows at 50% exceedance in this same reach are unavailable during the months of March, April, and July-November (Oregon Water Resources Department Water Availability Analysis web application accessed January 16, 2016).

The over-appropriation of surface flows from Catherine Creek has resulted in the routine legal curtailment of water usage in July-October for water rights junior to 1870 (Personal Communication, Region 6 Water Master). Prior to streamflow restoration efforts by The Freshwater Trust, stream flows as measured at OWRD gage 13320300 at 10th Street (RM 39.6, 0.4 RM downstream from the Godley Ditch) have regularly dropped to near zero (see Figure 1, Appendix A). Lower summer flows and resulting high water temperatures have been identified as primary limiting factors for ESA-listed Chinook salmon and steelhead populations in Catherine Creek.

The October 2014 Draft ESA Recovery Plan for Northeast Oregon Snake River Spring and Summer Chinook Salmon and Snake River Steelhead Populations recommends restoring approximately 10 CFS to Catherine Creek in the reach defined by stream gage 13320300. Oregon Department of Fish and Wildlife and Oregon Department of Water Resources hold instream water rights of 80 CFS in July and 30 CFS in August (Certificate 59537) in Catherine Creek. Because of the large volume that these instream water rights represent compared to natural flows, these numbers have not been explored as viable flow targets. The current 10 CFS target stems from workgroup discussions with local biologists and restoration professionals combined with a realistic analysis of total late-summer water demand. Of the approximately 35 CFS of senior irrigation water rights valid in late summer, the target represents roughly one-third, which is assumed to be the maximum acceptable in the near-term to the local community of surface-water users. The Freshwater Trust and its partners continue to engage in habitat and temperature modeling efforts to further refine flow targets on a reach-by-reach basis. Basin irrigators are regulated by the Watermaster at 1/80th CFS per acre during the late irrigation season and only the consumptive-use portion (roughly one-half to one-third) can be protected instream through permanent transfers of irrigation rights. Based on these parameters, achieving the 10 CFS flow target during the months of July-September could require more than 1600 acres of senior water rights under restoration contract, equating to roughly half of all available acres in the upper watershed that have water rights sufficiently senior to contribute any water during the latter half of the irrigation season. While temporary leasing of water rights for instream uses has resulted in slightly more than 3 CFS of flow restored to Catherine Creek and additional incremental gains are feasible, irrigators and restoration partners acknowledge that long-term economic and ecological resilience will require an investment in irrigation infrastructure and improvement in water conveyance efficiencies.

3. Explain how the proposed project will meet the water supply need(s), and indicate what percentage of that need will be met. (For example: If your water supply need is 20,000 acre-feet of additional water and the project will supply 10,000 additional acre-feet, 50 percent of your need will be met).

The project proposes to pipe or line earthen ditches and implement on-farm efficiency upgrades in the upper Catherine Creek watershed, where surface water diversions are used primarily for the irrigation of pasture and hay.

Piping and lining of open, leaky irrigation ditches has been a successful means of securing water for both agricultural and instream purposes in basins across Oregon. To date, no thorough investigation of the conservation

potential resulting from piping, lining, or consolidating canals in the Catherine Creek system has been conducted. In many systems, as much as 50% of the water diverted for irrigation is lost to seepage and evaporation. Nearly 100 CFS of water rights are assigned to canals targeted in the study proposed here (see Table 1, Appendix A). Presuming as little as 10% in total canal losses, conserved water resulting from efficiency projects identified by the proposed feasibility study could meet the instream goal of 10 CFS, though many variables, both hydrogeological and legal, influence the amount of conserved water that can be transferred instream or to new lands.

Based on the proportion of senior water rights, the willingness of canal patrons to engage, and the likelihood of transferring conserved water instream without injury to downstream water users, The Freshwater Trust has elected to conduct a detailed pilot feasibility study on Godley Ditch and a more general scoping of conserved water potential on the remaining ditches. The Freshwater Trust believes that this study will result in the piping or lining of the Godley Ditch, increased stream flows for ESA-listed fish, and improved water reliability for irrigators through on-farm efficiency upgrades. On Godley Ditch, which has rights to divert 17 CFS in the early irrigation season and is curtailed back to approximately 8 CFS in the late summer, preliminary estimates of 15-30% seepage loss could generate 2.5 to 5.1 CFS of water savings in June and 1.2 to 2.4 CFS in July-September. Using both the general roadmap provided by this study and the Godley Ditch project as an example of how to achieve multiple benefits through efficiency projects, basin partners expect to restore target instream flows and increase economic resiliency in future years.

4. Describe the technical aspects of the feasibility study and why your approach is appropriate for accomplishing the specific study goals and objectives.

The proposed feasibility study will assess conserved water potential in the upper Catherine Creek watershed by (1) identifying the feasibility of piping/lining and/or consolidating earthen ditches used to convey water from the point of diversion to the place of use; (2) assessing opportunities for on-farm irrigation efficiency upgrades; (3) quantifying potential water savings, taking into account seepage loss, crop water consumption, return flows, and water rights regulation; and (4) developing cost and permitting estimates associated with project implementation. In order to achieve the complementary goals of fueling local interest in conserved water projects while also maximizing ecological returns on investment by proceeding systematically, we will use a two-pronged approach designed to inform implementation efforts in the short- and long-terms.

To this end, the feasibility study will yield two key deliverables: (1) 70% engineering designs for modernizing the Godley system through ditch piping/lining and on-farm irrigation efficiency upgrades; and (2) a basin-wide assessment of water conservation potential in the upper Catherine Creek watershed achievable through piping/lining, ditch consolidation, and on-farm efficiency upgrades in order to maximize water savings for instream flow augmentation while minimizing implementation costs. The first deliverable, slated for completion in Q4 2016, facilitates a seamless progression into funding, permitting, and implementation of a well-regarded pilot project, whereas the second deliverable, due in Q2 2017, will build on knowledge gained in developing the Godley Ditch pilot to prioritize future water conservation investments throughout the upper Catherine Creek watershed.

The feasibility study begins with a review of existing literature and datasets available for the upper Catherine Creek watershed. Numerous studies and assessments by Reclamation, GRMW, ODFW, OWRD, USGS, The Freshwater Trust, and others have examined various biological, hydrologic, geologic, climatic, agricultural, topographic, and legal attributes relevant to a conserved water assessment of the region, though none have undertaken an integrated assessment of irrigation efficiency potential. Seepage studies, diversion monitoring, and field surveys of Godley Ditch will be used to groundtruth existing estimates of likely water savings and to develop a range of alternatives and associated costs for improving the efficiency of conveyance and application infrastructure, including an analysis of alternative alignment to avoid residential encroachment and simplify access. These design alternatives will explore a variety of potential build-out scenarios tailored to observed ditch conditions. For example, if seepage loss is not consistent along the length of the ditch, it may be more cost effective and feasible to pipe or line only the areas of greatest ditch transmissivity to groundwater. Once the project team identifies a suitable alternative, the engineering consultant will complete 70% engineering designs on the Godley Ditch system, laying the groundwork for subsequent immediate implementation.

Meanwhile, the project team will assess conservation opportunities on ditches and fields throughout the upper watershed to identify projects with the greatest potential to improve instream flows. By leveraging water savings information from the Godley assessment and augmenting knowledge with new flow and seepage data where possible, the project team will build a prioritized action plan for pursuing new water conservation projects according to flow restoration potential and fit with individual landowner preferences and objectives. This roadmap will allow meaningful comparisons of potential projects, moving the watershed toward achievement of the 10 CFS goal without drying up significant swaths of irrigated land or changing the character of the rural economy. Finally, this prioritized roadmap for irrigation efficiency projects will help to better allocate external funding for conserved water transactions toward the ditches and fields with the greatest opportunity to positively impact instream flows, moving the Catherine Creek system closer to its salmonid recovery goals.

5. Describe how the feasibility study will be performed. Include:
 - a. General summary statement that describes the study progression.
 - b. When the feasibility study will begin.
 - c. Listing of key tasks to be accomplished with each task having:
 - i. Title
 - ii. Timeline for completion
 - iii. Description of the activities to be performed in this key task
 - iv. Description of the resources necessary for accomplishing the key task

Example:

- (i) Streamflow measurement;
- (ii) September-April;
- (iii) Weekly streamflow measurements will be performed to gather hydrographic data for the hydrologic analysis to take place in May;
- (iv) A technician will be hired to perform the streamflow measurements.

(Key tasks listed here are to be placed in Section VI. Project Feasibility Study Schedule for a quick reference “graphical” representation of the schedule.)

a. The study will begin with a literature review of existing datasets applicable to a conserved water analysis of upper Catherine Creek, followed by seepage studies and field surveys of a potential pilot project to modernize conveyance and application of irrigation water on Godley Ditch. An engineering consultant will develop a design alternatives technical memorandum summarizing potential pros and cons of feasible alternatives, from which the project team will select a preferred alternative for development of 70% engineering designs. A prioritized action plan for upgrading irrigation efficiency throughout the broader Catherine Creek watershed near Union will be developed in parallel, allowing targeted implementation of future efficiency projects for maximum benefits to instream flow.

b. The feasibility study will begin in April 2016 and will be completed in full by May 2017.

c. Key Tasks.

A. Upper Catherine Creek Literature & Data Review

(i) Review of existing studies and assessments pertaining to surface water use for irrigated agriculture on Catherine Creek upstream of Upper Davis Dam (RM 35), encompassing all of Reach 3 (RM 37.2 to RM 40.78) and Reach 4 (RM 40.78 to RM 45.8) as delineated in Bureau of Reclamation’s 2012 “Catherine Creek Tributary Assessment”;

(ii) April to June 2016;

(iii) Compile and review existing literature and datasets relevant to the assessment of conserved water and hydroelectric generation potential in upper Catherine Creek (including aerial

photography, LiDAR data, ground surveys, climate data, hydrography, water rights, geology, soils, crops/other land cover, etc.);

(iv) Research team consisting of analysts and engineers from Bureau of Reclamation, GRMW, Anderson Perry, and The Freshwater Trust will complete the literature review and develop a summary report identifying critical data gaps to address in subsequent tasks.

B. Godley Ditch Seepage Study

(i) Seepage assessment of Godley Ditch at several different diversion rates;

(ii) April 2016: install streamflow gage at diversion; May/June and July/August 2016: seepage studies to characterize early-season and late-season flow conditions on Godley ditch;

(iii) Near-simultaneous discharge measurements will be performed at regular intervals along entire length of Godley ditch to determine the volume of water lost or gained during conveyance from the point of diversion on Catherine Creek to the places of use;

(iv) Engineering consultants from Anderson Perry and/or Bureau of Reclamation will install and manage a diversion measurement station and will complete seepage runs with assistance from technicians from the Project Team.

C. Godley Ditch System Water Conservation Field Survey

(i) Detailed field survey of Godley Ditch, laterals, and fields served to develop recommendations for piping and lining alternatives and on-farm efficiency upgrades;

(ii) July 2016;

(iii) Field survey will be completed to assess Godley ditch geometry, substrate, slope, turnouts, laterals, etc., to develop design alternatives for piping/lining the ditch in place or along alternative alignment, and a current-state assessment of on-farm irrigation methods will be completed to determine potential for on-farm irrigation efficiency upgrades;

(iv) Engineering consultants from Anderson Perry and/or Bureau of Reclamation with irrigation system design experience will perform the field survey.

D. Godley Ditch Design Alternatives Technical Memorandum and 70% Engineering Designs

(i) Design alternatives technical memorandum and 70% engineering designs to pipe or line Godley Ditch and upgrade on-farm irrigation infrastructure;

(ii) September to November 2016;

(iii) Based on information gathered in Tasks A, B, and C, develop preliminary design alternatives for piping, lining, or partially lining Godley Ditch and laterals to maximize water conservation for instream flow augmentation, taking into account water rights regulation and on-farm irrigation management, while minimizing cost;

(iv) Engineering consultants from Bureau of Reclamation and/or Anderson Perry with irrigation system design experience will develop design alternatives and cost estimates in a technical memorandum. The Project Team will work with landowners to evaluate alternatives and select a preferred alternative for development of 70% engineering designs, which will form basis of proposals for implementation funding.

E. Prioritization Study of Water Conservation Opportunities in Upper Catherine Creek

(i) Analysis of consumptive use, seepage loss, return flows, and conveyance head on all major ditches and associated fields on Upper Catherine Creek and estimate of conserved water potential;

(ii) June 2016 to May 2017;

(iii) Map, validate, and summarize water rights by ditch in upper Catherine Creek. Perform seepage studies on major ditches and use other available datasets identified in Task A to

estimate conserved water potential for piping or lining major ditches and upgrading on-farm irrigation methods on fields supplied by ditches. Develop prioritized action plan for targeting ditch and sprinkler upgrades and ditch consolidation opportunities with greatest net benefit for instream flows and agricultural productivity;

(iv) Engineering consultants from Anderson Perry and Bureau of Reclamation along with other members of the Project Team will develop a summary report to inform future implementation efforts and prioritize projects with the greatest potential to improve instream flows.

F. Project Management and Local Coordination

(i) Project management and local coordination;

(ii) April 2016 to May 2017;

(iii) Manage scope of work and facilitate Project Team alignment to ensure effective and timely completion of deliverables. Coordinate local meetings with the Project Team, landowners, regulatory agencies, etc. Assist with landowner outreach and education regarding feasibility study goals, methods, and outputs. Oversee contracting and grant reporting;

(iv) Project management and local coordination duties will be completed by The Freshwater Trust and GRMW.

6. Please provide the following data and information for the proposed project and the project's sources of water supply:

a. The location of the proposed project. Include the basin, county, township, range and section. Attach a **map** that identifies the project's implementation area to this application.

Upper Grande Ronde Basin, Upper Catherine Creek Subbasin, Union County (Appendix B: Feasibility Study Location Map)

Upper Catherine Creek Watershed Assessment: T4S R39E Sections 3, 10, 11, 12, 13, 14, 15, 23, 24, 25, T4S R40E Sections 5, 6, 7, 8, 17, 18, 19, 20, 21, 22, 28, 29, 33, 34, T5S R40 Section 3

Godley Ditch Pilot Assessment: T4S R39E Sections 23, 24, T4S R40E Sections 18, 19

b. The name(s) and river mile(s) of the source water and what they are tributary to, if applicable.

Catherine Creek is a tributary to the Grande Ronde River and the study area will encompass the upper Catherine Creek watershed upstream of Upper Davis Dam (RM 35) including all of Reach 3 (RM 37.2 to RM 40.78) and Reach 4 (RM 40.78 to RM 45.8). The Godley Ditch is an existing diversion on Catherine Creek with 17.29 CFS of senior water rights and a POD located in the City of Union (RM 40.0). Water conserved from lining or piping the Godley Ditch would be protected instream for 2.8 miles from the POD (RM 40.0) to the likely point of return flows at the confluence with Pyles Creek (RM 37.2). The exact locations of additional opportunities to improve on-farm efficiencies and reduce surface diversions would be subject to the findings of the feasibility study but will all be located within the Catherine Creek watershed above RM 35 and below RM 45.8.

c. Whether the project will be off-channel or on-channel (for above-ground storage only).

N/A

- d. Water availability to meet project storage. For above-ground storage the Department typically evaluates availability using a 50 percent exceedance water availability analysis.

N/A

- e. Proposed purposes and/or uses of conserved or stored water.

Augmentation of instream flow during the irrigation season in order to reach the 10 CFS flow target identified in the October 2014 Draft Recovery Plan.

- f. Environmental flow needs and water quality requirements of supply source water bodies.

Environmental flow and water quality needs are not currently met in the Catherine Creek watershed. The "Conservation and Recovery Plan for Oregon Spring/Summer Chinook Salmon and Steelhead Populations in the Snake River Chinook Salmon Evolutionarily Significant Unit and Snake River Steelhead Population Segment" and supporting reports list limiting factors in the Catherine Creek watershed including water quality (high summer water temperatures), water quantity (low summer flow), excess fine sediment, poor habitat quantity and diversity, and poor riparian conditions. Although ODFW has set instream water rights at 80 cfs for July and 30 cfs for August, The Freshwater Trust, in consultation with local specialists and experts, is working toward an instream flow target of 10 cfs for July-September. Protecting conserved water instream will help improve low flow conditions as well as ameliorate water quality impairments that stem from those low flow conditions.

- 7. What local, state or federal project permitting requirements/issues/approvals do you anticipate in order for the feasibility study to be conducted? If approvals are required, indicate whether you have obtained them. If you have not obtained the necessary permits/governmental approval, describe the steps you have taken to obtain them. If no permits are needed, please provide explanation.

No local, state, or federal project permits will be required in order to conduct the feasibility study. Areas that will need to be accessed for the Godley Ditch seepage assessment are located on private property and owned by landowners participating in the study. Ditch access to conduct additional seepage studies will be coordinated with landowners within the study area. The feasibility study does not include any activities that require permitting and instream work will be limited to instantaneous flow measurements and monitoring of existing diversion structures.

- 8. Describe the level of involvement, interest and/or commitment of local entities associated with the feasibility study. Describe how the feasibility study and/or proposed project will benefit/impact these entities. Attach letters of support if available.

This study will assess the feasibility of improving agricultural use of surface water diverted from upper Catherine Creek for the purpose of restoring instream flow by completing field surveys and 70% engineering designs for Godley Ditch and prioritizing other potential conserved water projects. The two landowners with senior rights served by Godley Ditch have indicated their commitment to the study, and one, the Eastern Oregon Agriculture and Natural Resource Program, has provided a letter of support, attached to this application (Appendix D), highlighting the research opportunities presented by quantifying ditch diversions and seepage loss. The second landowner is working to coordinate signatures of all shareholders and we hope they will be able to submit a letter of support during public comment on the feasibility study applications.

This feasibility study requires close partnership and coordination with the Grande Ronde Model Watershed (GRMW), U.S. Bureau of Reclamation, and Oregon Department of Fish and Wildlife (ODFW). The GRMW coordinates habitat restoration in the Grande Ronde basin and supports the study's objective of improving instream aquatic habitat through flow improvements that allow agricultural land to stay in production. Similarly, ODFW's mission to protect and enhance Oregon's fish and wildlife and their habitat is closely aligned with the goals of the feasibility study. The feasibility study seeks to protect additional water instream for conservation purposes, while simultaneously improving the efficiency and resilience of the agricultural community in the Catherine Creek watershed. The Bureau of Reclamation, the agency charged to manage, develop, and protect water and related resources in an environmentally and economically sound manner, will be actively involved in the planning and execution of the study. These three organizations have also submitted letters of support, attached to this application (Appendix D).

9. Identify when matching funds will be secured, from whom, and the dates of matching funds availability.
Bureau of Reclamation: Secured in-kind match available now through September 2016, with ability to request additional funding for 2017.

Grande Ronde Model Watershed: Secured in-kind match available now through 2017.

The Freshwater Trust: Secured in-kind match available now through September 2016, with ability to request additional funding for 2017.

10. Provide a description of the relevant professional qualifications and/or experience of the person(s) that will play key roles in performing the feasibility study. If the personnel have not been decided upon, include a description of the professional qualifications and/or experience of the person(s) you anticipate will play key roles in performing the feasibility study.

The Freshwater Trust (TFT): TFT will be responsible for project coordination, landowner/partner outreach and communication, assisting with data collection and analysis, water rights due diligence, and fiscal administration of the project. TFT anticipates contracting for engineering services with Anderson Perry & Associates, a civil engineering firm based out of La Grande, Oregon, in cooperation with engineering consultants from the Bureau of Reclamation.

Caylin Barter (Director of Flow Restoration Program), Aaron Maxwell (Flow Restoration Project Manager), and Spencer Sawaske, Ph.D. (Hydrologist) will lead the feasibility study for TFT. Caylin has overseen the successful development and implementation of a wide variety of flow restoration projects across Oregon and has worked on water policy initiatives in Arizona and California. Aaron is a fisheries biologist who has managed several feasibility studies in Northeast and Central Oregon and supported implementation of conserved water projects in the Deschutes Basin. As TFT's Hydrologist, Spencer measures, analyzes, and reports quantitative data associated with existing and potential flow transactions and develops models to identify and prioritize water rights according to ecological value.

Anderson Perry & Associates: Brett Moore, Senior Engineer, and Lyle Umpleby will lead the survey and engineering design effort for the feasibility assessment from Anderson Perry & Associates. Brett Moore has 22 years of experience and is a managing partner specializing in the planning, design, construction, and administration of water resources projects. He has been involved in SB 1069 feasibility studies since the program's inception and has acted as the project manager on five of them. Lyle Umpleby has over 30 years of experience in the agricultural industry and previously acted as the District Manager of the Powder Valley Water Control District. During his time with Anderson Perry & Associates, he has worked on many irrigation and water resources-related projects in eastern Oregon.

Bureau of Reclamation: Darrell Dyke, Civil Engineer and Grande Ronde Basin Liaison for the Bureau of Reclamation, will be the primary lead on the project for Reclamation. Darrell facilitates the development of fish habitat improvement projects and links Reclamation to local partners by providing technical and design assistance or technical review. Recently, he conducted the Powder River Basin natural flow determination and developed the appraisal design report for the Westside Poley-Allen pipeline study on the Lostine River. His work centers on the Upper Grande Ronde River and Catherine Creek, directing studies, evaluating water use, and overseeing fish recovery projects.

Grande Ronde Model Watershed (GRMW): GRMW is the primary entity coordinating habitat restoration in the Grande Ronde Basin on both private and public lands. The Grande Ronde Basin was selected by the Northwest Power Planning Council as the model watershed project in Oregon in 1992 and uses local efforts to effectively protect, enhance, and restore the regional watershed. Staff from the GRMW will assist with local coordination, literature and data review, and data collection and management for the feasibility study.

11. If the project concept is ultimately deemed feasible, describe how the project will be implemented. Response should include a tentative funding plan for project implementation (e.g. other state or federally sponsored grant or loan programs) and the project proponent's track record in implementing similar projects.

Implementation of the proposed project concept will flow organically from the results of the feasibility study. The two-pronged study approach (developing 70% engineering designs for Godley Ditch and creating a prioritized action plan for pursuing subsequent conserved water projects elsewhere in the upper Catherine Creek watershed) presents an opportunity to springboard directly into implementation efforts as soon as late 2016 or early 2017. Data and local experience gained from the Godley Ditch implementation will be invaluable for guiding the long-term conserved water strategy on upper Catherine Creek and for developing and refining landowner outreach and education on irrigation efficiency projects.

Though conserved water has not yet been utilized as a flow restoration strategy in upper Catherine Creek, The Freshwater Trust (TFT) has a long track record of researching, funding, implementing, and monitoring a wide variety of flow transactions, including conserved water projects, in priority basins across the state of Oregon. TFT and its flow restoration staff bring more than two decades of experience in negotiating complex water deals to increase instream flows. This experience includes seeking out and securing diverse funding sources for programmatic support and actual water transactions, including grants from the Columbia Basin Water Transactions Program (CBWTP). TFT is one of only a dozen Qualified Local Entities authorized to submit funding proposals to CBWTP for water transactions in basins where flow restoration has been identified as a recovery strategy to address limiting factors for anadromous fish impacted by operation of the Federal Columbia

River Power System. Catherine Creek has been identified in multiple federal planning documents as a top-priority watershed for flow transactions, offering a relatively stable funding stream for innovative water transactions such as conserved water projects.

TFT has also received funding for flow restoration work through grants from the Oregon Watershed Enhancement Board, U.S. Bureau of Reclamation, and many different family foundations focused on making targeted investments in the field of environmental restoration. TFT is currently seeking SB 839 funding from OWRD for implementation of a similar conserved water project on the Lostine River. TFT is very familiar with the administrative processes involved with leasing and transferring water rights for instream use. In addition, our legal and policy group is well-versed and highly engaged in current legislative and regulatory initiatives to improve management and measurement of our limited water resources. Finally, TFT's history in Catherine Creek in particular is well-suited to successful implementation of complex conserved water projects. We count among our project managers a rancher who lives and works in Union and is a respected member of the local agricultural and restoration communities.

Equipped with engineering designs for a pilot project, a prioritized action plan for future water conservation efforts, and a high level of local engagement, TFT is poised to convert the results of this feasibility study into real projects on the ground.

Section B. Unique Criteria

Instructions: Address the set of items below that applies to the type of feasibility study that this grant will fund.

Water Conservation or **Reuse**

1. Water Conservation or Reuse projects that are identified by the Department in a statewide water assessment and inventory receive a preference in the scoring process. Contact the Department's Grant Specialist to include your project on the inventory.

Please see attached "Request to be Added to the Oregon Water Resources Department's Inventory of Potential Conservation Opportunities" (Appendix C).

2. Explain how the associated project will either: (a) mitigate the need to develop new water supplies and/or (b) use water more efficiently. Reference documentation and/or examples of the success of similar or comparable water conservation/reuse projects that would be available upon request.

Due to water diversions during the summer, flow in Catherine Creek is insufficient to sustain several aquatic species for which the stream is listed as critical habitat. The proposed feasibility study will assess the water conservation potential of piping or lining the Godley Ditch and provide a roadmap for similar conservation actions in the larger upper Catherine Creek system, including potential water savings from on-farm irrigation efficiency projects. Resulting projects will increase water reliability for agricultural producers and secure instream flows for ESA listed fish species through Oregon's Allocation of Conserved Water Program. Modernizing outdated irrigation conveyance systems will both mitigate the need to develop new water supplies and allow water to be used more efficiently.

Piping or lining of earthen ditches is a commonly used tool to save water otherwise lost to seepage and evapotranspiration during conveyance of surface water from the point of diversion to the place of use. There is no rule of thumb regarding the water conservation potential of piping or lining a particular ditch; the combined unique characteristics of each ditch will dictate whether implementation will be technically feasible, cost effective, and ecologically valuable. A thorough feasibility study that evaluates water rights, crop water use, seepage, hydrogeology, return flows, soils, slope, ditch profile, length, etc., will provide invaluable information that can be used to weigh options for materials, sizing, and alignment, all with the goal of maximizing water savings while also improving operation and maintenance of the ditch system.

A feasibility study for managed underground storage (MUS) in the upper Catherine Creek watershed was undertaken in 2010 to address the issue of low flows in the summer. The results of the study by Anderson Perry & Associates were released as a report titled "Upper Catherine Creek Storage Feasibility Study for Grande Ronde Model Watershed," which evaluated the possibility of diverting Catherine Creek streamflow during winter when stream discharge is high, storing the water by infiltration or injection into an aquifer adjacent to the stream, and discharging the water back to the stream in summer to augment low flows. The method of MUS would be accomplished using either (1) aquifer storage and recovery (ASR) that allows for the injection of water that meets drinking-water-quality standards into an aquifer for later recovery and use, or (2) artificial recharge (AR) that involves the intentional addition of water diverted from another source to a groundwater reservoir. Collection of new data was outside the scope of the MUS feasibility study, as was a thorough analysis of other alternative methods to achieve streamflow restoration during summer.

Concerns by resource managers that the actions taken to improve water availability for upper Catherine Creek be effective, cost-efficient, long-term, and based on sound analysis led the National Fish and Wildlife Foundation to request that the U.S. Geological Survey (USGS) conduct an independent review and evaluation of the feasibility study (Technical Review of Managed Underground Storage of Water Study of the Upper Catherine Creek Watershed, Union County, Northeastern Oregon, 2014). In the report, USGS cited several areas of concern regarding the MUS/ASR concept and feasibility study, including concerns that a thorough analysis of more cost-effective conservation alternatives--particularly irrigation efficiency potential and water rights leasing--had not been vetted within the basin. The USGS report encouraged completion of additional analyses to document crop consumptive use, irrigation diversions, precipitation, subirrigation, return flows, water rights, costs, and conserved water potential (in terms of volume, location, and duration) in order to fairly weigh a potential MUS implementation against the full suite of as-yet-poorly quantified flow restoration tools. The MUS/ASR may still be a viable future alternative to create new water supplies for Catherine Creek and downstream irrigators during late summer. However, natural resource managers and funding agencies have acknowledged the need to first assess all viable water conservation and efficiency projects within the basin before limited funding should be allocated to a MUS/ASR project. The conserved water feasibility study proposed here is a first and necessary step in that process.

The benefits accrued to agriculture and the environment from the piping, lining and consolidation of irrigation conveyance systems are widely documented. One has only to look to the Deschutes Basin or Hood River for examples of public investment in irrigation infrastructure resulting in restored stream flows, increased water reliability for water users and, in certain cases, the generation of clean, renewable electricity. These success stories all began with comprehensive feasibility studies that identified water efficiency projects with the best cost-to-benefit ratio. With a "roadmap" in hand, basin partners were then able to begin implementing projects having the most positive impact on the economy and environment. Each basin and, to a large extent, each individual canal has its own unique hydrogeologic attributes that dictate the water conservation potential resulting from irrigation efficiency upgrades. Catherine Creek is no different, and that is why irrigators and restoration partners are fully supportive of the concept presented here.

3. Provide a description of: (a) Local, state and/or federal permitting requirements and issues posed by the **implementation** of the project associated with the feasibility study and (b) property ownership status within the project implementation area. If permitting or other approvals are not needed please indicate and provide an explanation.

State and Federal removal or fill permits are not anticipated for implementation because irrigation ditches are non-jurisdictional, but such permits will be secured if engineering designs indicate that in-channel work would be required (for example, to retrofit diversion structure to accept pipe or to install pump station at consolidated diversion point).

Cultural resources surveys or monitoring would be completed in consultation with the State Historic Preservation Office and the Confederated Tribes of the Umatilla Indian Reservation.

Property ownership status within the feasibility study area is primarily private. Landowner access will be coordinated as the feasibility study progresses to facilitate assessments of ditches and fields for water conservation potential. While Oregon law permits ditch owners to access the ditch across others' lands in order to perform maintenance and make upgrades, significant ongoing outreach will be undertaken by the project team to engender landowner trust and interest in the feasibility study and broader implementation strategy, as water rights holders must consent to any eventual use of the allocation of conserved water program. The Godley Ditch passes through a residential area before reaching the lands of the two primary senior water rights holders, one of whom has submitted a letter of support to accompany this application and the other of whom is supportive of the concept and is working to coordinate signatures from all family members with an ownership interest in the appurtenant property.

Above-Ground Storage

Please answer the following three questions **BEFORE** proceeding:

Will the project divert more than 500 acre-feet of surface water annually? Yes No

Will the project impound surface water on a perennial stream? Yes No

Will the project divert water from a stream that supports sensitive, threatened or endangered species? Yes No

If you answered "Yes" to any of these questions, by signature on this application, you are committing to include the following required elements in your feasibility study.

Describe how you intend to address the required elements in your feasibility study:

- a) Analyses of by-pass, optimum peak, flushing and other ecological flows of the affected stream and the impact of the storage project on those flows.

- b) Comparative analyses of alternative means of supplying water, including but not limited to the costs and benefits of water conservation and efficiency alternatives and the extent to which long-term water supply needs may be met using those alternatives.
- c) Analyses of environmental harm or impacts from the proposed storage project.
- d) Evaluation of the need for and feasibility of using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life and any other ecological values.

Is the proposed storage project for municipal use?

Yes No

If “Yes,” then please describe how you intend to address the following required element in your feasibility study:

- e) For a proposed storage project that is for municipal use, analysis of local and regional water demand and the proposed storage project’s relationship to existing and planned water supply projects.

Proceed in addressing the following items:

1. Describe to what extent the project associated with the feasibility study includes provisions for using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life or other ecological values. Projects that include the above provisions receive preference in the scoring process.
2. Provide a review of: (a) Local, state and/or federal permitting requirements and issues posed by the **implementation** of the project associated with the feasibility study and (b) property ownership status within the project implementation area.

Storage Other Than Above-Ground [Including Aquifer Storage and Recovery (ASR)]

Please answer the following three questions **BEFORE** proceeding:

- Will the project divert more than 500 acre-feet of surface water annually? Yes No
- Will the project impound surface water on a perennial stream? Yes No
- Will the project divert water from a stream that supports sensitive, threatened or endangered species? Yes No

If you answered “Yes” to any of these questions, by signature on this application, you are committing to include the following required elements in your feasibility study.

Describe how you intend to address the required elements in your feasibility study:

- a) Analyses of by-pass, optimum peak, flushing and other ecological flows of the affected stream and the impact of the storage project on those flows.
- b) Comparative analyses of alternative means of supplying water, including but not limited to the costs and benefits of water conservation and efficiency alternatives and the extent to which long-term water supply

needs may be met using those alternatives.

- c) Analyses of environmental harm or impacts from the proposed storage project.
- d) Evaluation of the need for and feasibility of using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life and any other ecological values.

Is the proposed storage project for municipal use?

Yes No

If “Yes,” then please describe how you intend to address the following required element in your feasibility study:

- e) For a proposed storage project that is for municipal use, analysis of local and regional water demand and the proposed storage project’s relationship to existing and planned water supply projects.

Proceed in addressing the following items:

1. Underground storage projects that are identified by the Department in a statewide water assessment and inventory receive a preference in the scoring process. Contact the Department’s Grant Specialist to include your project on the inventory.
2. Provide a review of: (a) Local, state and/or federal permitting requirements and issues posed by the **implementation** of the project associated with the feasibility study and (b) property ownership status within the project implementation area.

V. Match Funding Information

Applicants must demonstrate a minimum dollar-for-dollar match based on the total funding request. The match may include a) secured funding commitment from other sources, b) pending funding commitment from other sources, and/or c) the value of in-kind labor, equipment rental, and materials essential to the feasibility study. For secured funding, you must attach a letter of support from the match funding source that specifically mentions the dollar amount shown in the “Amount/Dollar Value” column. For pending resources, documentation showing a request for the matching funds must accompany the application.

In the “type” column below matching funds may include:	In the “status” column below matching funds may have the following status:
<ul style="list-style-type: none"> • Cash - Cash is direct expenditures made in support of the feasibility study by the applicant or partner*. 	<ul style="list-style-type: none"> • Secured - Secured funding commitments from other sources.
<ul style="list-style-type: none"> • In-Kind - The value of in-kind labor, equipment rental and materials essential to the feasibility study provided by the applicant or partner. 	<ul style="list-style-type: none"> • Pending - Pending commitments of funding from other sources. In such instances, Department funding will not be released prior to securing a commitment of the funds from other sources. Pending commitments of the funding must be secured within 12 months from the date of the award.

*“Partner” means a non-governmental or governmental person or entity that has committed funding, expertise, materials, labor, or other assistance to a proposed project planning study. OAR 690-600-0010.

Match Funding Source (if in-kind, briefly describe the nature of the contribution)	Type (✓ One)	Status (✓ One)	Amount/ Dollar Value	Date Match Funds Available (Month/Year)
<i>U.S. Bureau of Reclamation. Technical services including GIS mapping, water measurements, calculation of crop water use, identification of irrigation sources, general engineering support.</i>	<input type="checkbox"/> cash <input checked="" type="checkbox"/> in-kind	<input checked="" type="checkbox"/> secured <input type="checkbox"/> pending	\$70,000	April 16
<i>Grande Ronde Model Watershed. Technical services including GIS mapping and field data collection and analysis. Local coordination, stakeholder outreach, project team meetings.</i>	<input type="checkbox"/> cash <input checked="" type="checkbox"/> in-kind	<input checked="" type="checkbox"/> secured <input type="checkbox"/> pending	\$37,600	April 16
<i>The Freshwater Trust. Technical services including GIS mapping, water measurements, and water rights analysis. Project management and local coordination.</i>	<input type="checkbox"/> cash <input checked="" type="checkbox"/> in-kind	<input checked="" type="checkbox"/> secured <input type="checkbox"/> pending	\$8,255	April 16
	<input type="checkbox"/> cash <input type="checkbox"/> in-kind	<input type="checkbox"/> secured <input type="checkbox"/> pending		
	<input type="checkbox"/> cash <input type="checkbox"/> in-kind	<input type="checkbox"/> secured <input type="checkbox"/> pending		
	<input type="checkbox"/> cash <input type="checkbox"/> in-kind	<input type="checkbox"/> secured <input type="checkbox"/> pending		
	<input type="checkbox"/> cash <input type="checkbox"/> in-kind	<input type="checkbox"/> secured <input type="checkbox"/> pending		
	<input type="checkbox"/> cash <input type="checkbox"/> in-kind	<input type="checkbox"/> secured <input type="checkbox"/> pending		
	<input type="checkbox"/> cash <input type="checkbox"/> in-kind	<input type="checkbox"/> secured <input type="checkbox"/> pending		

VI. Feasibility Study Schedule

Estimated Study Duration: April 15, 2016 to May 31, 2017

Place an “X” in the appropriate column to indicate when each Key Task of the project will take place.

Feasibility Study Key Tasks	2016			2017				2018 & Beyond
	2 nd Qtr	3 rd Qtr	4 th Qtr	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	
<i>A. Upper Catherine Creek Literature & Data Review</i>	X							
<i>B. Godley Ditch System Seepage Study</i>	X	X						
<i>C. Godley Ditch System Water Conservation Field Survey</i>		X						
<i>D. Godley Ditch Design Alternatives Technical Memorandum and 70% Engineering Designs</i>		X	X					
<i>E. Analysis of Water Conservation Opportunities in Upper Catherine Creek</i>	X	X	X	X	X			
<i>F. Project Management and Local Coordination</i>	X	X	X	X	X			

- **Please Note:** Successful grantees must include all invoices and identify which key tasks are associated with each invoice when requesting financial reimbursement.

VII. Feasibility Study Budget

Section A

Please provide an estimated line item budget for the proposed feasibility study. Examples would include: labor, materials, equipment, contractual services and administrative costs.

Line Items	Number of Units* (e.g. # of Hours)	Unit Cost (e.g. hourly rate)	In-Kind Match	Cash Match Funds	OWRD Grant Funds	Total Cost
Staff Salary/Benefits	758	\$40.00	\$7,580		\$22,740	\$30,320
Contractual/Consulting	Engineering Services		\$86,800		\$82,000	\$168,800
Equipment (must be approved)	Godley Diversion Measuring Device	\$3,000.00			\$3,000	\$3,000
Supplies						
Other: Travel	5000mi	\$0.54	\$675		\$2,025	\$2,700
Other: Local Meetings & Coordination			\$20,800			\$20,800
Administrative Costs**					\$4,500	\$4,500
Total for Section A			\$115,855		\$114,265	\$230,120
Percentage for Section A			50%		50%	100%

* Note: The "Unit" should be per "hour" or "day" – not per "project" or "contract." $Units \times Unit\ Costs = Total\ Cost$

** Administrative Costs may not exceed 10 percent of the total funding requested from the Department

Section B

If grant amount requested is \$50,000 or greater, you **MUST** complete Section B. Key Tasks in Section B should be the same as the Key Tasks in Section VI (Feasibility Study Schedule).

APPLICATION CHECKLIST

Instructions: Use this checklist to ensure that your application is complete. An incomplete application will jeopardize your application's review. **This form does not need to be included in your application packet.**

General

If submitting electronically, the preferred format is either a Microsoft word or Adobe pdf

- Only one application is included with the packet (other applications must be sent separately).

Paper submissions only

- The application and attachments are on 8 ½" x 11" paper.
- The application and attachments are single-sided.
- The application and attachments are not stapled or bound.

Section I – Grant Information

- All questions in this section have been answered.
- The Grant Dollars Requested and the Total Project Cost mirror the totals shown in Section VII.

Section II – Applicant Information

- All contact information for the applicant(s) and fiscal officer is complete and current.
- The certification is signed by an authorized signer.

Section III – Feasibility Study Summary

- A brief summary, of no more than 150 words, is complete.

Section IV – Grant Specifics

- All questions in Section A have been answered.
- If the type of feasibility study is water conservation, reuse or storage other than above-ground, you have contacted the Department and requested project be added to the Oregon Water Resources Department's statewide water assessment and inventory.
- All applicable questions for the type of grant requested have been answered.

Section V – Match Funding Information

- Applicant has identified that at least 50 percent match has been sought, secured or expended.
- Letters of support are included for "secured" match funding sources.
- Documentation is included for "expended" match funds.
- Documentation is included for "pending" match funds.

Section VI – Feasibility Study Schedule

- Estimated project duration dates have been supplied.
- All Key Tasks of the project are listed.

Section VII – Feasibility Study Budget

- Section A is complete.
- Administration costs do not exceed 10 percent of the requested OWRD Grant Funds.
- If grant amount requested is \$50,000 or greater, Section B has been completed.
- All Key Tasks listed in Section B mirror the Key Tasks listed in Section VI.

Appendices

- Appendix A: Supplemental Tables and Figures
- Appendix B: Feasibility Study Location Map
- Appendix C: Request to be Added to Inventory of Potential Conservation Opportunities
- Appendix D: Letters of Support
 1. Eastern Oregon Agriculture and Natural Resource Program
 2. Grande Ronde Model Watershed
 3. Oregon Department of Fish and Wildlife
 4. U.S. Bureau of Reclamation
- Appendix E: Feasibility Study Location Photos

Appendix A: Supplemental Tables and Figures

Figure 1: Catherine Creek median daily stream flows versus ODFW instream water rights for the years 2000-2015

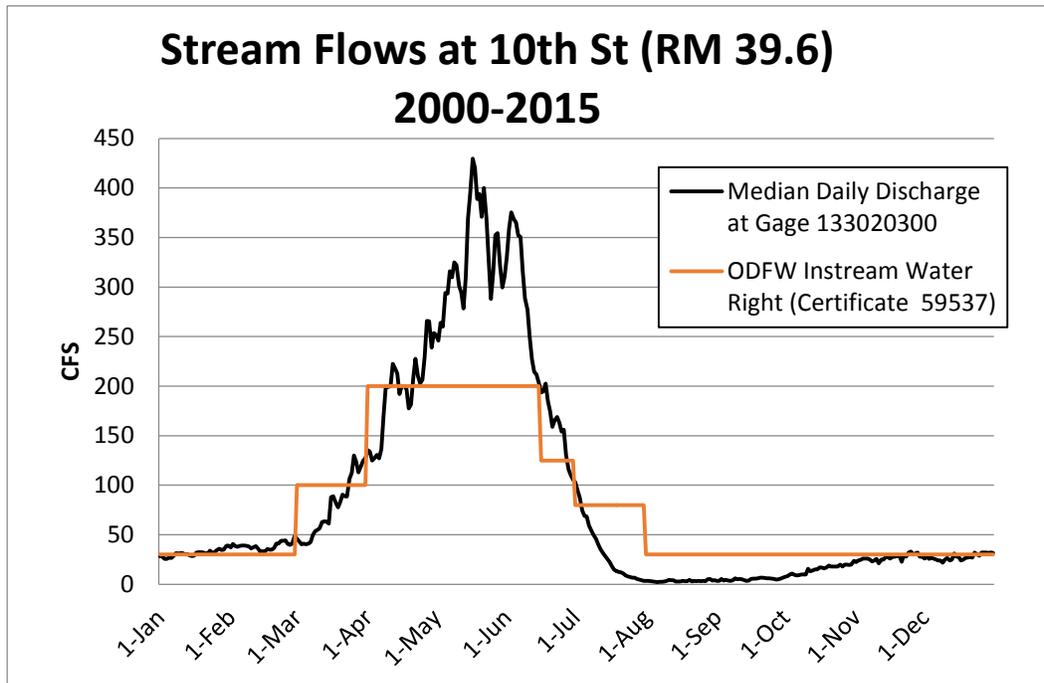


Table 1: Water Rights (cfs) by Irrigation Ditch

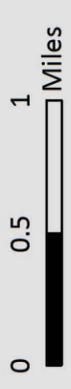
Water Rights (CFS) by Irrigation Ditch											
Priority Date	Busick	State	Godley	Red Mill	Hempy Hutchinsons	Swack-hammer	Guild	Prescott	Lewis Nodine	Total CFS	
1867-1869	1.74	4.52	15.9	3.95	4.57	0.6	0.57	0	1.07	32.92	
1870-1879	0	0.75	0.29	1.91	2.37	0.1	2.57	4.94	0.4	13.33	
1880-1889	0	8.07	1.1	1.11	2.3	0.01	0.25	0	0.23	13.07	
1890-1899	0	0	0	0	0.2	21.2	1.15	0	0.03	22.58	
1900-1909	0	0	0	0	14.97	2	0.28	0	0	17.25	
TOTAL CFS	1.74	13.34	17.29	6.97	24.41	23.91	4.82	4.94	1.73	99.15	

Appendix B: Feasibility Study Location Map

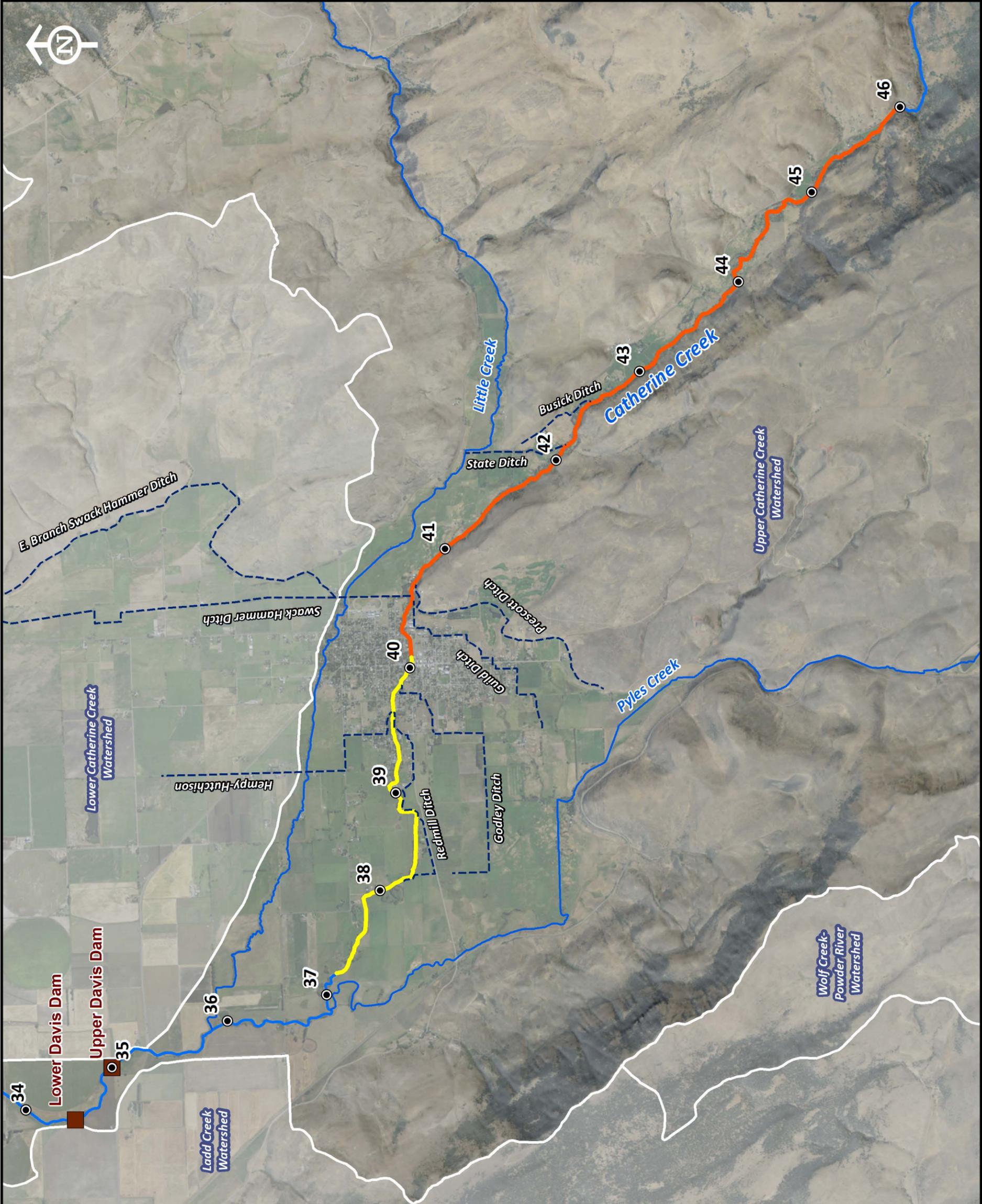
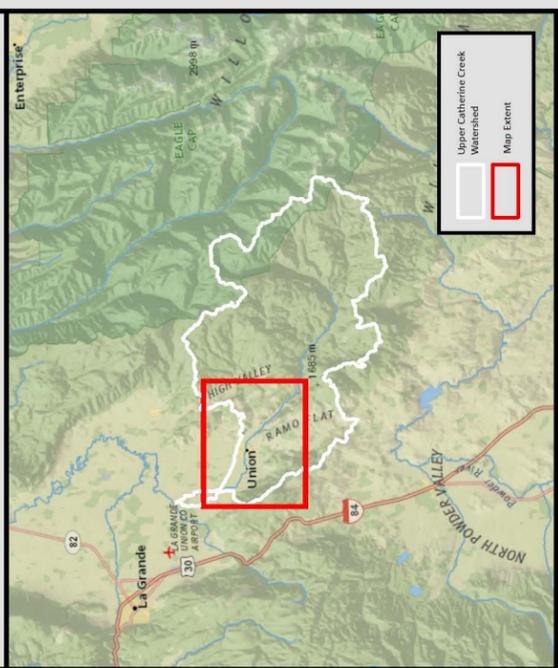


Upper Catherine Creek Conserved Water Feasibility Study Area

- Catherine Creek River Mile
- Dam
- Major Ditch
- Creek
- Catherine Creek
- Reach 3 (RM 37.2 - 40.78)
- Reach 4 (RM 40.78 - 45.8)
- Watershed Boundary (HUC10)



Date: 1/28/2016



Appendix C: Request to be Added to Inventory of Potential Conservation Opportunities

Request to be added to the Oregon Water Resources Department's
Inventory of Potential Conservation Opportunities

The purpose of this inventory is to catalogue potential conservation projects that water users themselves have identified but not yet pursued because of financial, institutional, or other barriers. For the purpose of this application, water storage other than above-ground are included as conservation opportunities and are most likely capital conservation projects.

As a water provider or user, you know your water demands and water conservation opportunities better than anyone. We would appreciate your assistance with this important data collection effort by completing this survey. Your participation will help provide the building blocks we need to begin to identify and achieve potential future water supplies. Please answer the questions as completely as possible, to the best of your ability. We appreciate your help with this important effort.

This inventory of already-identified, potential conservation projects includes both capital and programmatic projects. Capital projects are defined as one-time, large investments resulting in water savings. Examples include reclaimed water plants, reservoir covering, transmission line upgrades reducing leaks, or industrial engineering modifications to re-use process water. Programmatic projects are defined as ongoing investments resulting in water savings. Examples include facilitating upgrades to more efficient water using devices (e.g., distributing free showerheads, toilet rebates) and distribution system leak detection programs. The conservation inventory is primarily intended to include “planned” projects rather than projects that are currently being implemented. However, currently active programmatic projects may be listed if they will continue or expand in future years. The inventory of projects submitted will be compiled by county or basin.

Examples are provided below.

	Example Capital Conservation Project	Example Programmatic Conservation Project
Project Description Provide brief sentence	Line 3 miles of unlined ditch.	Toilet rebate program for residential customers
Estimated Future Savings Provide brief sentence, including information regarding savings seasonality.	20 acre feet of water per year	If we spend our full budget each year, we estimate 50,000 gallons of water save per year
Seasonality Indicate what part of the year savings are generated (e.g. year-round; summer only; etc.).	Peak (irrigation) season savings.	Savings should occur throughout the year.
Estimated Future Costs Provide brief sentence.	\$500,000 total project costs.	\$40,000 a year.
Implementation Schedule Provide brief sentence.	Not set. Have conducted cost and savings estimate, but still seeking funding.	We started the program in 2005 and plan to implement until 2015.
Project Funded? Designate either “yes”, “no”, or provide brief sentence if necessary	No. Pursuing grant funding.	Yes. IN our CIP through the next 5 years.

To add a project to the inventory of potential conservation opportunities, please provide the following information for each conservation project.

This is a <input checked="" type="checkbox"/> Capital Conservation Project <input type="checkbox"/> Programmatic Conservation Project	
Project #/Name	Upper Catherine Creek Irrigation Efficiency
Project Description	Piping/lining earthen canals to reduce seepage loss and upgrading on-farm irrigation efficiency to reduce diversion requirements in upper Catherine Creek watershed
Estimated Future Savings	Up to 12 CFS during irrigation season depending on diversion rate and time of year
Seasonality	Irrigation season in Catherine Creek is not specified by certificate or decree but for purposes of instream protection a period of March 1 to October 31 is used. Peak savings in early summer when flows are higher and rights satisfied at certificated 1/40 CFS/acre rate; lower savings in late summer when Watermaster delivers rights at 1/80 CFS/acre rate.
Estimated Future Costs	\$502,092 according to October 2014 Draft NE Oregon Snake River Spring and Summer Chinook and Steelhead Recovery Plan. Refined cost estimates to be determined through proposed feasibility study.
Implementation Schedule	Not set. Have not yet completed cost and water savings estimates. Implementation will likely occur in phases according to prioritized conserved water roadmap.
What are the barriers to implementation, e.g. funding?	Need to complete feasibility study of conserved water potential and complete engineering designs and cost estimates (in-kind match funding secured for feasibility study, seeking OWRD matching grant). Funding not currently secured for implementation but potential to use conserved water savings to offset costs of piping/lining.
This is a <input checked="" type="checkbox"/> Capital Conservation Project <input type="checkbox"/> Programmatic Conservation Project	
Project #/Name	Godley Ditch Piping/Lining
Project Description	Pipe or line 2-mile-long Godley Ditch to reduce seepage loss and upgrade on-farm irrigation efficiency to reduce diversion requirements
Estimated Future Savings	1.2-5.1 CFS during irrigation season depending on diversion rate and time of year
Seasonality	Irrigation season in Catherine Creek is not specified by certificate or decree but for purposes of instream protection a period of March 1 to October 31 is used. Peak savings in early summer when flows are higher and rights satisfied at certificated 1/40 CFS/acre rate; lower savings in late summer when Watermaster delivers rights at 1/80 CFS/acre rate.
Estimated Future Costs	\$300,000 including piping/lining and on-farm efficiency upgrades
Implementation Schedule	Desire to implement in summer/fall 2018
What are the barriers to implementation, e.g. funding?	Need to complete feasibility study of conserved water potential and complete engineering designs and cost estimates (in-kind match funding secured for feasibility study, seeking OWRD matching grant). Funding not currently secured for implementation but potential to use conserved water savings to offset costs of piping/lining.

- Include this form with your application -

Appendix D: Letters of Support

1. Eastern Oregon Agriculture and Natural Resource Program
2. Grande Ronde Model Watershed
3. Oregon Department of Fish and Wildlife
4. U.S. Bureau of Reclamation



Eastern Oregon Agriculture and Natural Resource Program
205 Badgley Hall, Eastern Oregon University, La Grande, Oregon 97850
T 541-962-3612 | F 541-962-3444 | http://agsci.oregonstate.edu/ag_program_eou/

To: Jon Unger, Grant Specialist
Water Conservation, Reuse and Storage Feasibility Study Grant Program
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

January 27, 2016

Dear Jon,

This support letter is being written on behalf of The Freshwater Trust as they complete their application for the OWRD grant to fund a feasibility study of conserved water potential in upper Catherine Creek. The Eastern Oregon Agriculture and Natural Resource Program (EOANRP) is just one producer who would benefit from the findings in this study. The EOANRP obtains irrigation water from the Godley Ditch, which is a main ditch off the Catharine Creek system.

Conservation and a mutual allocation of water are essential for agriculture as well as endangered and protected fish species dependent on late-season stream flow. This is especially true as we have been seeing and continue to forecast unpredictable moisture in Eastern Oregon. Climate change over the past 100 years has dramatically altered stream flow dynamics and reduced available water for agricultural production systems. The EOANRP has dramatically and voluntarily converted their irrigation practices in the past two years to demonstrate their awareness and partnership in making correct ecological water management decisions. A component that is unknown to water users on Catharine Creek is what water is lost from the point of diversion to the point of delivery. Knowing the potential water lost on the Godley Ditch would provide a qualitative base for the EOANRP in their goal for water conservation. Without this feasibility study, this component will remain unknown.

This study would also be an asset to both The Freshwater Trust and the EOANRP as we continue to demonstrate that the perception and complexity of production agriculture and ecological groups interested in water conservation for fisheries can be mitigated. This proposed study dovetail with our recent faculty hires and the curriculum related to sustainable agricultural production practices taught to our undergraduate and graduate students in the OSU Program.

From a teaching, research and production standpoint the EOANRP support and welcome this feasibility study.

Sincerely,

A handwritten signature in purple ink that reads 'Tim DelCurto'.

Tim DelCurto
Program Head & Director EOANRP

A handwritten signature in black ink that reads 'Austin Hawks'.

Austin Hawks
EOANRP Crop and Soil Science Instructor / EOANRP Production irrigation management



GRANDE RONDE MODEL WATERSHED

1114 J Ave.
La Grande, Oregon 97850

(541) 668-0570
Fax: (541) 962-1585

<http://www.grmw.org>

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Lacey Moore

Jeff Oveson

Jesse Steele

January 29, 2016

Jon Unger, Grant Specialist

Water Conservation, Reuse, and Storage Feasibility Study Grant Program

Oregon Water Resources Department

725 Summer Street NE, Suite A

Salem, Oregon 97301

RE: Water Conservation Feasibility Study Grant Application – The
Freshwater Trust (Upper Catherine Creek)

Dear Mr. Unger,

The Grande Ronde Model Watershed (GRMW) supports The Freshwater Trust's application for the Water Conservation, Reuse and Storage Feasibility Study Grant Program and is pleased to be a part of the proposed project team to assess water conservation potential in the Upper Catherine Creek Watershed. As the primary entity coordinating habitat restoration projects within the Grande Ronde Basin, the GRMW has worked for decades with agricultural producers in Upper Catherine Creek and supports actions designed to increase late-summer streamflow conditions in order to improve habitat for anadromous fish. Low flows in Upper Catherine Creek during irrigation season are widely recognized as a primary limiting factor to the recovery of salmon and steelhead, but until now there has never been a focused assessment of the instream flow benefits that could be realized from piping or lining irrigation ditches and modernizing on-farm irrigation methods.

The GRMW understands that this feasibility study grant requires a 50 percent match in funding and is pleased to offer \$37,600 of in-kind support. The GRMW has a knowledgeable team of biologists and resource managers with extensive experience in the Upper Catherine Creek Watershed, and we can contribute to this feasibility study in the following ways:

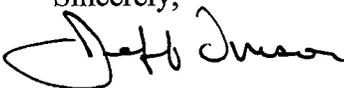
- Sharing and summarizing of available datasets and previously completed reports (approximately 40 hours of time);

Cooperators: Union County • Wallowa County • Northwest Power Conservation Council • Bonneville Power Administration
Oregon State Natural Resource Agencies; ODFW, ODF, OWEB, ODA, OWRD, DSL, DOGAMI, EDD, DEQ
Eastern Oregon University • Union & Wallowa Soil & Water Conservation Districts • Oregon Cattlemen's Association
Boise Cascade Corporation • U.S.D.A. Forest Service & Natural Resources Conservation Service • U.S.D.I. Bureau of Reclamation

- Supporting field data collection, management, and analysis (approximately 80 hours of time);
- Providing expert review of Godley Ditch irrigation efficiency analysis and selecting preferred alternative for development of engineering designs (approximately 60 hours of time)
- Contributing to the analysis and completion of a water conservation prioritization summary report (approximately 240 hours of time); and
- Employing a 0.5 FTE position to coordinate fieldwork activities with landowners, arrange project team meetings, and facilitate timely completion of study deliverables for duration of feasibility study.

Consistent with GRMW's approach of using the best available science to design and implement restoration actions, this feasibility study will give resource managers, landowners, and funders a roadmap for pursuing irrigation efficiency projects with the greatest net benefits to the Upper Catherine Creek Watershed. As such, the GRMW supports The Freshwater Trust's proposal and urges the Department to award funding to this feasibility study.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeff Oveson". The signature is fluid and cursive, with a large initial "J" and "O".

Jeff Oveson
Executive Director



Oregon

Kate Brown, Governor

Department of Fish and Wildlife

East Region

107 20th Street

La Grande, OR 97850

541-963-2138

Fax: 541-963-6670



January 29, 2016

Jon Unger, Grant Specialist
Water Conservation, Reuse and Storage Feasibility Study Grant Program
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

Dear Mr. Unger:

The Oregon Department of Fish & Wildlife, La Grande Fish District enthusiastically supports The Freshwater Trust's (TFT) application for funding to support the Upper Catherine Creek Irrigation Conservation Feasibility Study. This study seeks to design one water conservation project on the Godley Ditch and collect information needed to potentially develop conservation projects on other major irrigation ditches on Catherine Creek. Should this project lead to actual implementation of conservation work, a portion of the conserved water would be secured for instream use to support the recovery of native fish including spring Chinook salmon, summer steelhead, and bull trout, all of which are listed as Threatened under the Federal Endangered Species Act.

The Catherine Creek population of spring Chinook salmon is one of the most imperiled in the Columbia River Basin. Increased instream flow is a critical limiting factor that must be addressed in order to restore this population of fish. The TFT's application targets the reach for which flow restoration for spring Chinook salmon is of highest priority, the core area for reproduction of this population.

Instream flow restoration in Catherine Creek is also important for restoring populations of summer steelhead and bull trout.

Sincerely,

Timothy D. Bailey
La Grande District Fish Biologist



Caylin Barter

From: McLaughlin, Jeff [jmclaughlin@usbr.gov]
Sent: Wednesday, January 13, 2016 4:12 PM
To: Caylin Barter
Cc: Paul Drury; John Simpson; Darrell Dyke
Subject: partnership and funding for Catherine Creek Irrigation Feasibility Study

Hi Caylin

The US Bureau of Reclamation through the Columbia/Snake River Salmon Recovery Office would be very interested in partnering with the Fresh Water Trust and other participants on the proposed Catherine Creek Irrigation Feasibility Study as proposed for ODWR funding.

We would anticipate that the study as proposed would be a good fit to inform on-going efforts at water efficiency to provide in stream benefits to listed fish. Most projects aimed at irrigation efficiencies have benefits to both ag producers and fish and wildlife.

The US Bureau of Reclamation proposes that we provide technical services using USBR personnel and/or contractors to help the study team with services like GIS mapping, water measurements, identification of cropping patterns, crop water use, and irrigation sources, as well as engineering support to the team. We would anticipate an initial commitment of between \$35,000 to \$50,000 per year in fiscal years 2016 and 2017 for a total commitment of up to \$100,000 if needed.

Our BiOp Commitment in the Grande Ronde Basin is significant and results in an annual USBR expenditure in the GR sub basin of about \$3 million per year. Our contact for coordination and support will be Darrell Dyke who is stationed in the Grande Ronde Basin. Please contact Darrell at 541-663-0177 for any additional information you may need.

We are excited to participate in this important work and fully support the Fresh Water Trust's efforts to acquire funding.

Jeff McLaughlin
CSRO Habitat Program Manager
208-378-5251
208-867-3178 cell

Appendix E: Feasibility Study Location Photos

Photo 1: Typical Condition of Irrigation Ditch in Upper Catherine Creek Valley near Catherine Creek State Park



Photo 2: Godley Ditch near Point of Diversion (summer)



Photo 3: Godley Ditch near Point of Diversion (winter)



Photo 4: Godley Ditch Near Point of Diversion After Completion of 2011 Fish Passage Project by GRMW



Photo 5: Godley Ditch at Pump Site at Eastern Oregon Agriculture and Natural Resource Program Center (at ditch mile 1.1)



Photo 6: Eastern Oregon Agriculture and Natural Resource Program Center New Pump (at ditch mile 1.1)





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February 1, 2016

Oregon Water Resources Department
Attention: Jon Unger, Water Resources Grant Administrator
725 Summer Street NE, Suite A
Salem, OR 97301

Dear Mr. Unger,

The Freshwater Trust (TFT) appreciates the opportunity to submit a grant application to the Oregon Water Resources Department's Water Conservation, Reuse and Storage Feasibility Study Grant Program. TFT is committed to working with local landowners to improve irrigation efficiency in order to place conserved water instream to enhance aquatic ecosystems while advancing agricultural sustainability. Catherine Creek in Union County, OR, supports ESA-listed Chinook and steelhead populations and a vibrant agricultural community. With in-kind support from the Grande Ronde Model Watershed and the U.S. Bureau of Reclamation, we submit for your consideration a feasibility study designed to benefit both the environmental and agricultural interests of the Upper Catherine Creek watershed.

Please find the following attachments:

- Upper Catherine Creek Irrigation Efficiency and Water Conservation Study Application
- Appendix A: Supplemental Tables and Figures
- Appendix B: Feasibility Study Location Map
- Appendix C: Request to be Added to Inventory of Potential Conservation Opportunities
- Appendix D: Letters of Support
 1. Eastern Oregon Agriculture and Natural Resource Program
 2. Grande Ronde Model Watershed
 3. Oregon Department of Fish and Wildlife
 4. U.S. Bureau of Reclamation
- Appendix E: Feasibility Study Location Photos

Thank you again for this opportunity, and we appreciate your consideration of our application.

Sincerely,

Caylin Barter
Flow Restoration Director