



OREGON WATER RESOURCES DEPARTMENT WATER SUPPLY DEVELOPMENT ACCOUNT LOAN AND GRANT APPLICATION

I. Project Information

Project Name: Mosier Deep Water Supply Wells

Type of Project: Water Supply Development Account Check box if project type includes storage

Funding Request Type: Loan Grant

Funding Amount Requested: \$ \$917,238 Total cost of project: \$ \$1,225,013

Note: Grant funding requests must demonstrate cost match of at least 25% of total project cost. This may include in-kind.

II. Applicant Information

Principal Contact: Shilah Olson	Fiscal Officer: Shilah Olson
Address: <u>2325 River Rd, Suite 3</u> <u>The Dalles, OR 97058</u>	Address: <u>2325 River Rd., Suite 3</u> <u>The Dalles, OR 97058</u>
Phone: <u>541-296-6178</u> Fax: <u>541-296-7868</u>	Phone: <u>541-296-6178</u> Fax: <u>541-296-7868</u>
Email: <u>shilah.olson@or.nacdn.net</u>	Email: <u>shilah.olson@or.nacdn.net</u>

Involved Landowner 1: Bryce Molesworth	Involved Landowner 2: Wade Root
Address: <u>1656 Walker Farm Rd</u> <u>Mosier, OR 97040</u>	Address: <u>697 Dry Creek Rd</u> <u>Mosier, OR 97040</u>
Phone: <u>541-490-1475</u> Fax: _____	Phone: <u>541-490-8095</u> Fax: _____
Email: <u>bryce@gorge.net</u>	Email: <u>wroot@duckwallfruit.com</u>

**Please include a supplementary document that lists all additional involved landowners if applicable.*

Certification:

I certify that this application is a true and accurate representation of the proposed project work 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 funding award and are prepared to implement the project if awarded.

Applicant Signature: Shilah Olson Date: 1/19/2016

Print Name: Shilah Olson Title/Organization: District Manager / Wasco Co SWCD

III. Project Summary

Please provide a description of the need, purpose and nature of the project. Include what the applicant intends to complete and how the applicant intends to proceed.

PROJECT SUMMARY - NEED, PURPOSE, AND NATURE OF PROJECT-

We are applying for a grant from the OWRD Water Supply Development Account program to address a long-standing and worsening problem with declining groundwater levels in the Mosier community. Groundwater levels in the upper Columbia River Basalt aquifers in the Mosier Creek watershed have declined nearly 200 feet over the past 40 years in the Mosier area, which threatens the water supply for the community and has also reduced stream flow in hydraulically connected Mosier Creek. Our goal is to drill two deep water supply wells to reduce demand on the upper and administratively withdrawn Columbia River Basalt aquifers near Mosier to improve long-term groundwater supply availability and streamflows in Mosier Creek.

The two wells will be drilled for irrigation use by Bryce Molesworth and Wade Root, the two largest irrigators in the watershed. The wells will be drilled to approximately 1,200 (Molesworth) and 1,700 feet deep (Root), respectively; with sealing depths of approximately 900 and 1300 feet. It is anticipated the wells will be completed in the lowest aquifer in the Frenchman Springs basalt or the upper most aquifer of the Grande Ronde basalt. Neither of the target aquifers are known to be connected to nearby surface water sources.

Groundwater from the upper (Pomona and Priest Rapids) Columbia River Basalt Group aquifers is the primary source of water for domestic, municipal and irrigation uses in the Mosier area. According to a 2012 USGS study, groundwater levels in the upper aquifers have declined by 150 - 200 feet in the past 40 years in the upper aquifers. (Burns, E.R., Morgan, D.S., Lee, K.K., Haynes, J.V., and Conlon, T.D., 2012, Evaluation of long-term water-level declines in basalt aquifers near Mosier, Oregon: U.S. Geological Survey Scientific Investigations Report 2012–5002, <http://pubs.usgs.gov/sir/2012/5002/>). Groundwater declines began in the 1970's during a period of intense development of groundwater resources. Studies by Oregon Water Resources Department and the US Geological Survey have documented the effects of groundwater declines, including the impact on surface water.

Aquifers in the Mosier area occur between Columbia River Basalt flows. The upper basalt flows are tilted in a downstream direction along Mosier Creek at a greater angle than the stream gradient, exposing the aquifers in the streambed. The pressurized aquifers have historically discharged groundwater to Mosier Creek; approximately 70% of total stream flow in Mosier Creek is provided by groundwater inputs. As water levels have declined in the aquifers over the years, less groundwater has discharged to Mosier Creek. In addition, seasonal impacts from groundwater pumping have recently been measured in Mosier Creek stream flow (Lite and LaMarche, 2014). Mosier Creek summer-time stream flow is decreased 30-40 percent by groundwater pumping from the upper basalt aquifers during the irrigation season.

In the late 1980's, state-level efforts were made to stem the decline through an Oregon Water Resources Department administrative area designation, which restricts additional groundwater withdrawals in two of the most severely affected aquifers, Pomona and Priest Rapids. However, OWRD has continued to document declines. The cause for the decline was attributed to a combination of consumptive use and leakage between aquifers through well boreholes open to multiple aquifers, known as commingling. The conclusion of the 2012 USGS report (Burns, et al 2012) indicates that commingling aquifers through leaky wells may have accounted for up to 80-90% of the decline in groundwater levels in the watershed, and groundwater pumping accounted for the remaining portion. However, the severe decline in groundwater levels has resulted in significant reduction in the overall rate of commingling within the watershed as the upper aquifers become unsaturated or depressurized. For example, the two most severely commingling wells that have been identified to date recently have been permanently abandoned without any measurable change to the decline rate. Consequently, the degree that continued water level declines in the upper aquifers in the watershed are attributable to pumping has increased, and reducing pumping is needed, in addition to repair of commingling wells, to help shallow aquifers stabilize and restore summer streamflows to Mosier Creek.

The two proposed deep irrigation supply wells to be drilled will be used to replace a significant portion of irrigation pumping within the upper aquifers in the watershed to remove a significant amount of demand on the upper aquifers and increase groundwater supply to Mosier Creek. Mosier Creek is a direct tributary to the Columbia River, and enters the Columbia near the town of Mosier. Mosier Creek is home to an isolated population of cutthroat trout, due to the barrier natural waterfall near its confluence with the Columbia. According to ODFW, Mosier Creek has never had any introduction of hatchery origin fish, and because of this and its isolation above the falls the population of cutthroat trout

in Mosier Creek is believed to be relatively genetically unique. Mosier Creek is utilized by Middle Columbia River steelhead and Coho salmon for spawning below the barrier falls.

In 2004, Rock, Mosier and Dry creeks were listed by DEQ as water quality limited year round for temperature for the beneficial use of salmon and trout rearing and migration (18 deg. C). The 2008 Middle Columbia-Hood Subbasin Total Maximum Daily Load for temperature, which includes Mosier area creeks, lists reduction of summer time flow as one of the human-induced causes of thermal loading to streams. Both water quantity and quality limit the production of salmonid fish in both Mosier and Rock creeks.

Mosier groundwater restoration has been identified as a top priority project in several local and regional action plans because the upper aquifers in the Mosier area are the main source of supply for high-value irrigated agricultural, and the sole source of supply for potable domestic and community uses. The 2005 Mosier Watershed Council Action Plan identifies declining water levels and the consequent threat to a stable supply of water as one of the highest priority concerns within the watershed. The Mosier Action Plan identifies the following primary objectives for the watershed (1) stabilize or reverse water level declines in principal aquifers of the Mosier area and (2) increase summer base flows in Mosier Creek, and (3) support a viable agricultural economy in the valley. The plan further specifies the goals of improving water quality and fish habitat in Mosier Creek, and cooling stream temperatures in Mosier Creek.

The 2012-13 Mid-Columbia Comprehensive Economic Development Strategy (CEDS), which covers Wasco, Hood River, and Sherman Counties in Oregon, identifies Mosier groundwater restoration evaluation and repair as the #1 priority technical assistance project proposed in the region. The Mid-Columbia Economic Development District ranked Mosier groundwater restoration a top priority for funding in the 2014 and 2015 Wasco County Economic Development Strategic Action Plans, which informs the regional CEDS. Additionally, the Mosier groundwater restoration project is a State of Oregon Regional Solutions Priority. Oregon Regional Solutions, established by the State of Oregon, works at the local level to identify priority projects throughout Oregon.

WHAT APPLICANT INTENDS TO ACCOMPLISH-

Working with U.S. Geological Survey and Oregon Water Resources Department, we intend to drill two deep water supply wells to reduce demand on the upper and administratively withdrawn Columbia River Basalt aquifers near Mosier. We will work closely with OWRD staff for technical guidance and to ensure that the proper water rights are transferred and/or filed.

The purpose of the project is to locate a deep Columbia River Basalt (CRB) aquifer that will provide sustainable water supplies for the two largest irrigators in the Mosier Valley, which will allow them to remove their pumping demands on the shallow Columbia River Basalt aquifers in the area, which are declining at an alarming rate. We intend to use these wells to slow down the rate of decline to the critical aquifers while we simultaneously repair and remediate commingling wells in the Mosier community. These new deep wells will access previously untapped aquifers, while sealing off any exposure to the declining aquifers and hydraulically connected streams, and will be used in lieu of drawing water from the critical aquifers.

A new source of groundwater through this project will allow the two largest irrigators to stop drawing from the critical Pomona and Priest Rapids aquifers. These irrigators have approximately 330 irrigated acres between them that they plan to irrigate with the new well (there are an additional 36 irrigated acres that will stay on the current well). The landowners have water rights for 3 acre feet of water/acre/year (conservation measures have reduced their current use to approximately 2 acre feet/acre/year). This project has the potential to relieve a burden of between 660 acre feet and 990 acre feet of groundwater pumping per year in the administratively withdrawn basalt aquifers near Mosier.

By reducing withdrawals from the upper CRB aquifers by between 660 and 990 acre feet per year, we expect to see a stabilization and rebound of the aquifers in the Mosier area, which in part, have been withdrawn from further appropriation. This action, combined with repairs of commingling wells will help restore the groundwater levels and allow some since-dry springs to recover. Restoration of groundwater levels will have multiple benefits to the ecosystem while helping to stabilize the local economy. We intend to work with OWRD to quantify the recovery over time.

In addition to an increase in available water supplies to the community, this project is likely to yield an improvement in both water quantity and water quality in Mosier streams. Reducing demand on the Mosier aquifers is expected to increase natural groundwater discharge to streams and thus increase streamflow, which in turn is expected to result in decreased stream temperature, and dilution of any contaminants. Mosier Creek is listed for Temperature on the State 303d list. DEQ lacks sufficient data to list Mosier Creek for sediment, or other contaminants such as pesticides. Increased flows in the creek will also support riparian vegetation, which will lead to increased shading, and will maintain cooler stream temperatures. Improvements to both water quality and quantity will improve habitat and food production for fish and other wildlife.

To summarize, by removing the demand of the 2 major irrigators on the community's primary aquifers, this project is expected to increase the long-term availability of the groundwater supply for Mosier's vital agricultural community and for the community at large, while also benefiting water quantity and quality in Mosier Creek. The Wasco County Soil and Water Conservation District and Mosier Watershed Council will continue to promote conservation practices, and to identify and repair or remediate commingling wells throughout the rest of the Mosier area. We believe that these combined actions will stabilize and eventually reverse the groundwater declines experienced in this area.

IV. Project Specifics

Instructions: Answer all questions in this section by typing the answer below the question, using additional space as needed.

- 1. Describe how the project will provide public benefits in each of the three public benefit categories.** Project applications will be scored and ranked based on the economic, environmental and social/cultural public benefits identified below. Describe the conditions prior to and after project implementation to demonstrate changes resulting from the project. Descriptions should be quantitative when possible. Information provided must be sufficient to allow evaluation of the public benefits of the project. **Please see the Public Benefit and Evaluation Guidance document for a description of how public benefits will be evaluated.** Applications that do not demonstrate public benefit in each of the three categories (economic, environmental, social/cultural) will be deemed incomplete. Leave blank any categories that are not applicable to project.

Economic Benefits ORS 541.673(2)

(a) Job creation or retention:

This project is highly likely to have exceptional results in retention of permanent jobs on agricultural lands.

Retention of stable long-term agricultural jobs is critical to the economy of the Mosier community.

Farms and orchards are major employers in the Mosier agricultural community, and water supply is essential to the continuation of these farms and the family wage jobs that they support.

The two largest irrigators who will be accessing the deeper aquifer together employ six year round employees, four employees for ten or more months/year, eight employees for six months/year, and 325 to 375 seasonal employees at peak season, for four to six weeks. These two farms make a substantial contribution to Mosier's economy. With improvements in water supplies, there is also potential for these two orchards (and possibly others) to make some expansions in their orchards by bringing an additional 55 acres under irrigation (15% of their current areage), which could create additional employment opportunities.

Short-term jobs will be created during the construction phase of the project. Jobs will be created for one or more well drillers, and jobs will be created through road building as well as extension of power to new well sites.

These farms also create jobs connected to agriculture indirectly through tourism, food processing, the agriculture supply industry, and other services.

In addition to jobs connected to agriculture, the town of Mosier and its businesses depend on a sustainable water supply, and will benefit from this project.

Because of Mosier's water supply issues, new residents have been discouraged from moving to Mosier, and the housing market has been suppressed. A residential base is needed to provide a firm foundation for economic activity in Mosier, and to allow businesses in town to flourish. Local businesses need support in the winter from residents, when tourism dies down. A sustainable water supply is needed to attract new residents to Mosier. According to the City Manager, six new building permits have been issued in the past year, a hopeful trend, compared to 0 between 2008 - 2014. The city of Mosier supports the proposal to drill new wells into the deeper aquifer, as a means to relieve demands on the aquifer the city currently uses, and as a potential water source for the city in the future. By ensuring a stable water supply, this project will support a growing residential base in Mosier, which in turn will provide a firm foundation for businesses and jobs in the town.

(b) Increases in economic activity:

This project is likely to result in exceptional increases in economic activity for five or more years.

By reducing demand on Mosier's main aquifers this project will support an expected increase in economic activity in the Mosier Community. This project will maintain and enhance the existing economy on agricultural lands by providing a sustainable water supply. The project will support continued orchard and vineyard production and sale of crops, and may allow for an increase in production in the long term if additional acres are brought under irrigation.

This stable agricultural economy will support growing tourism in Mosier and the Columbia River Gorge. The Oregon Tourism Commission anticipates a continued increase in tourism in the Columbia River Gorge in the coming years as the surrounding region's population continues to grow (Columbia River Gorge Tourism Studio, September 2015). Agriculture in the Mosier area is directly connected with tourism, including U-pick opportunities, wineries, backroads tours of iconic farms and orchards, and the annual cherry blossom festival. Without water for agriculture, these tourism opportunities would not exist.

In 2009, National Geographic Traveler ranked the Columbia River Gorge region 6th internationally on its destination scorecard to the world's most iconic destinations (Mid-Columbia Economic Development District Comprehensive Economic Development Strategy, 2014). The Columbia River Gorge National Scenic Area, which includes Mosier, attracts over 2 million visitors annually to tour the region (www.fs.usda.gov/detail/crgnsa), supporting nearby hotels, restaurants, wineries, vineyards, and outdoor recreation businesses in the process. The scenic value of the regions farms and orchards is essential to tourism opportunities in the Columbia River Gorge National Scenic Area.

An abundance of recreational opportunities exist for tourists in the Mosier watershed and nearby area, including cycling, racing events, wind surfing and water sports, wildflower viewing, hiking, camping, and fishing. The Mosier area will be in an excellent position to take advantage of the expected increase in tourism by maintaining a sustainable water supply for services offered in Mosier, including Mosier's Main Street businesses, and its parks and public landscapes.

In addition to supporting the agriculture and tourism sectors, by providing a sustainable water supply this project is expected to stabilize land values in the Mosier community, which will encourage a strong residential base in town to support new and existing businesses.

(c) Increases in efficiency or innovation:

This project will result in exceptional efficiency of water and energy use.

The two landowners who seek to drill new wells into the deeper aquifer have made a series of efficiency upgrades over the years, from dryland farming to hand lines (70% efficiency), to solid set (75% efficiency), to impact sprinklers, to micro sprinklers(85-90% efficiency), and finally to drip irrigation systems (92% efficiency, NRCS National Engineering Handbook, 2014). They are currently using the highest efficiency irrigation technology available.

Building on the landowner's investment in the most water efficient irrigation technology, this project will use state of the art pumps with the best pump curves, and variable-frequency drives. Variable frequency drives will increase electrical efficiency of the pumps.

- (d) Enhancement of infrastructure, farmland, public resource lands, industrial lands, commercial lands or lands having other key uses:

This project will provide exceptional enhancement of water resource infrastructure, to both the farmland served by the wells and all lands that are accessing water from the critical groundwater area. This project ensures a long-term water supply for the entire community, which will contribute to maintaining or increasing land value of both commercial and domestic properties. Soil quality is enhanced by agricultural irrigation, and will also contribute to maintaining or increasing land value. All lands, public, commercial and private, will be enhanced by a sustainable community water supply.

The two landowners who seek to drill new wells into the deeper aquifer have invested in a series of efficiency upgrades over the years, culminating in their current use of the highest efficiency irrigation technology available. The investment the landowners have made to maximize efficient use of water resources will be further enhanced by accessing the deeper aquifer, so that they can continue to sustain productivity of their farms, while reducing demands on the critical aquifers now in use.

- (e) Enhanced economic value associated with tourism or recreational or commercial fishing, with fisheries involving native fish of cultural significance to Indian tribes or with other economic values resulting from restoring or protecting water instream:

This project is likely to result in exceptional enhancement of Mosier's economy associated with tourism and recreation, by resulting in a long-term sustainable water supply for the Mosier community.

Agriculture in Mosier is directly connected with tourism, including U-pick opportunities, wineries, viewing of iconic farms, and the blossom festival.

In addition to farm related tourism, additional tourism opportunities in the Mosier watershed and nearby include hiking and camping, cycling, wild flower and wildlife viewing, wind surfing and water sports, and recreational fishing. Tourism and recreational opportunities will be maintained and enhanced by maintaining and improving the community's water supply.

The Columbia River Gorge National Scenic Area, which includes the town of Mosier, attracts over 2 million tourists annually to tour the regions towns, backroads, and natural areas. This in turn supports nearby hotels, restaruants, wineries, vineyards, and outdoor recreation businesses. The scenic value of the regions farms and orchards is essential to the character of the Columbia River Gorge National Scenic Area and its tourism. Scenic values in the Mosier valley will be maintained and enhanced by providing a long-term sustainable water supply. As the Portland/Vancouver metropolitan area grows, opportunities for tourism will increase in the National Scenic Area, including Mosier. By maintaining a sustainable water supply the Mosier area will be in an excellent position to take advantage of the economic benefits of this expected increase in tourism.

This project is also expected to result in enhancement of economic value associated with fisheries, including recreational fishing, commercial fishing, native species of cultural significance to Indian tribes and other economic values resulting from restoring water in-stream.

Mosier Creek provides habitat for a genetically unique population of cutthroat trout, and is also utilized by Middle Columbia River steelhead and coho salmon below Mosier Falls. It is likely that Pacific Lamprey may also be present, as they use habitat similar to that of steelhead. Steelhead, coho salmon, and Pacific lamprey are all species of cultural significance to Indian tribes. By stabilizing or reversing water level declines in principal aquifers of the Mosier area, summer baseflows in Mosier Creek are expected to improve. Increased summer base flows in Mosier streams will contribute to aquatic habitat in the watershed and in the mainstem Columbia River, supporting continued opportunities for both recreational and commercial fishing, as well as tribal fisheries.

- (f) Increases in irrigated land for agriculture:

This project will result in a maintained land base of irrigated agriculture, as well as a potential increase in irrigated land of up to 15%. The goal of the project is not to increase irrigated lands, but to stabilize and maintain what currently exists, to meet current demands. There is a potential to increase irrigated land on

adjacent acres if tapping into the deeper aquifer is so successful that additional water is available after current needs are met.

One irrigator currently has 200 acres under irrigation, and has 25 adjacent farmland acres that could potentially be irrigated if the water became available. This would increase his irrigated acreage by 12.5%. The second landowner currently has 166 acres under irrigation (130 acres associated with the proposed new well, and 36 acres that will remain on the old well), and has 30 adjacent farmland acres that could potentially be irrigated, which would increase his irrigated acreage by 18%. The combined increase in irrigated acres for the two landowners would be 15% of the current total, or 55 acres, if additional water supply from the deeper aquifer allows expansion of their irrigated crop. A few years after project completion, the irrigators may be able to apply

Environmental Benefits ORS 541.673(3)

- (a) A measurable improvement in protected streamflows that accomplishes one or more of the following:
- (A) Supports the natural hydrograph;
 - (B) Improves floodplain function;
 - (C) Supports state- or federally-listed sensitive, threatened or endangered fish species;
 - (D) Supports native fish species of cultural importance to Indian tribes; or
 - (E) Supports riparian habitat important for wildlife:

This project is likely to yield exceptional improvements in streamflows in Mosier Creek which are not likely to be diverted by irrigation. We intend to work with OWRD to quantify improvements to streamflows over time.

By providing irrigation water to the two largest irrigators in the Mosier valley, this project is expected to significantly reduce demand on the currently used hydraulically connected aquifers, resulting in increased flow in Mosier Creek. The two landowners have water rights for 3 acre feet of water/acre/year, and conservation measures have reduced their current use to approximately 2 acre feet/acre/year. This project has the potential to relieve a burden of between 660 acre feet and 990 acre feet of groundwater pumping per year in the administratively withdrawn basalt aquifers near Mosier.

The project is expected to reduce seasonal pumping interference (drawdown) with Mosier Creek. According to Bob Wood, Wasco County WaterMaster since 2004, there has been plenty of water in Mosier Creek to serve all the irrigators. "Given there has been no regulation for senior rights and the creek has not gone dry (to my knowledge) I would assume there is sufficient water most years to meet out of stream needs." (Communication with Bob Wood, December 30th, 2015.) It is anticipated therefore, that any groundwater returns to Mosier Creek resulting from this project would likely not be diverted by irrigation, and would therefore contribute to stream flow.

Floodplain function is expected to improve with increased stream flow and reduced drawdown of the aquifer. Mosier Creek provides habitat for spawning below the barrier falls for ESA listed Middle Columbia River Steelhead and Lower Columbia River Coho Salmon, both listed as Threatened. These species would benefit from improved stream flows and potential improvements in riparian vegetation. Winter steelhead and coho salmon are also of cultural significance to Indian tribes.

Additionally, one of the landowners is working on obtaining surface water rights to 40 acres on Mosier Creek that he currently leases.

To irrigate the orchard the landowner needs the new well to produce a minimum of 225 gallons/minute at the highest ground in the orchard. Once this is accomplished the 40 acres water right on Mosier Creek will not be needed for orchard irrigation. If the landowner succeeds in purchasing the property, and if the new well produces the 225 gallons/minute needed, he plans to transfer water rights for the 40 acres back into Mosier Creek for in-stream use.

(b) A measurable improvement in groundwater levels that enhances environmental conditions in groundwater restricted areas or other areas:

This project is likely to yield exceptional improvements in groundwater levels.

There have been significant studies undertaken in the Mosier area in an attempt to understand the problem underlying groundwater declines in the Columbia River Basalt aquifers. One recent study, "USGS Scientific Investigations Report 2012-5002: Evaluation of Long-Term Water-Level Declines in Basalt Aquifers near Mosier, Oregon", and a presentation to the Mosier Community "The Influence of Groundwater Flow in Columbia River Basalt - Examples from Mosier, Oregon, Kenneth E.Lite Jr., ORWD", demonstrate the relationship between comingling wells, groundwater declines, and decreased streamflow in Mosier Creek.

We anticipate we will see a stabilization and rebound of the upper Columbia River Basalt aquifers in the Mosier area, which in part have been withdrawn from further appropriation, when water demand by the two largest irrigators is removed from these shallower aquifers that are declining. This action, combined with repairs of comingling wells, will help restore the groundwater levels and allow some since-dry springs to recover. We intend to work with OWRD to quantify both the decline in groundwater, and its recovery over time.

(c) A measurable improvement in the quality of surface water or groundwater:

This project is expected to result in a measureable improvement in the quality of surface water. By reducing demand on the currently used aquifers, groundwater resources are expected to increase base flows in Mosier Creek. An increase of base flows to Mosier Creek is in turn expected to decrease stream temperature, and to dilute contaminants such as sediment. Mosier Creek is Water Quality Limited for Temperature (Lower Deschutes Agricultural Water Quality Management Area Plan Decemer 2014). Increased flows in the creek will also support riparian vegetation, which will lead to an increase in stream shading and help to maintain cooler stream temperature.

Existing wells are currently contaminated with iron oxide bacteria, which causes additional costs and labor for orchardists. It is possible that groundwater accessed by the new wells from the untapped aquifer will not have the iron oxide bacteria. This would be an additional economic and water quality benefit provided by the project.

We intend to work with OWRD over time to quantify improvements to stream flow and stream temperature.

(d) Water conservation:

This project will result in a continuation of water conservation measures taken to date, and will potentially relieve a burden of between 660 acre feet and 990 acre feet of groundwater pumping per year in the administratively withdrawn basalt aquifers near Mosier. Drilling Mosier deep water supply wells will conserve water use in the upper aquifers, by using a new source of deeper groundwater.

The 2 landowners who seek to drill new wells have made a series of efficiency upgrades over the years, beginning as dryland farmers upgrading to hand lines (70% efficiency), to solid set (75% efficiency), to impact sprinklers, to micro sprinklers(85-90% efficiency), and finally to drip irrigation systems (92% efficiency, NRCS National Engineering Handbook, 2014). They are currently using the highest efficiency irrigation technology available, conserving an additional 22% of the water previously used before they implemented their upgrades.

Building on the landowner's investment in the most water efficient irrigation technology, this project will use state of the art pumps with the best pump curves, and variable-frequency drives, further demonstrating their commitment to resource conservation.

(e) Increased ecosystem resiliency to climate change impacts:

This project is likely to result in an exceptional increase in ecosystem resiliency to climate change. Restoring and stabilizing the Mosier aquifers will increase natural groundwater discharge to streams and thus increase streamflow, resulting in decreased stream temperature, and enhanced habitat. More water in stream will result in more riparian vegetation, leading to a greener, cooler environment. Additional riparian vegetation will result in increased carbon dioxide exchange. There will be a decreased risk of drought for agriculture and the community due to more sustainable aquifers.

(f) Improvements that address one or more limiting ecological factors in the project watershed:
This project is likely to make progress toward removing limiting ecological factors.

Mosier Creek is TMDL listed for temperature, and is included in the MIDDLE COLUMBIA-HOOD (MILES CREEKS) SUBBASIN TMDL, published by DEQ in December 2008:

<http://www.deq.state.or.us/wq/tmdls/docs/hoodbasin/MilesCreeks/MilesCreeksTMDLFinal.pdf>.

Mosier is also included in the DPS (Distinct Population Segment) for steelhead in the Northwest Power and Conservation Council Fifteenmile Subbasin Plan (<https://www.nwcouncil.org/fw/subbasinplanning/fifteenmile/plan>). The following information from the Fifteenmile Subbasin Plan pertains to limiting factors for fish in the Mosier Creek Watershed, which include flow, temperature, riparian habitat, and groundwater in Mosier.

"In 2000, DEQ placed electronic temperature loggers in Mosier Creek and Rock Creek., as part of their TMDL development process. Both streams were found to violate the state temperature standard for salmonid spawning and rearing. These streams were subsequently placed on the 2002 303(d) list of Water Quality Limited Waterbodies. If current trends are allowed to continue, groundwater depletion will result in loss of streamflow in Mosier Creek and therefore, continued loss of water quality and fish habitat quality. It will also result in severe economic loss for the local community not limited to the collapse of the commercial orchard industry in the Mosier Valley." (Fifteenmile Subbasin Plan, section 3, page 35).

"The highest priorities for restoration of resident fish reaches are all within the Mosier Creek Watershed, which has the highest human population density, and the most intensive land use. Key environmental factors affecting fish populations in Mosier Creek include changes in channel form, loss of habitat diversity, low summer flows and consequent high temperature, and potential agrichemical contamination. Data is lacking on chemical pollutants in Mosier Creek. Mosier Creek Road follows the stream for nearly its first eight miles, and riparian vegetation is interrupted by rural residential development. Groundwater overdraft has been shown to have an effect on stream flows." (Fifteenmile Subbasin Plan, section 3, page 66).

"The problem of groundwater overdraft in the Mosier Valley has not yet been resolved and represents an impending natural resource crisis in that area (Fifteenmile Subbasin Plan, section 4, page 36). The Mosier Watershed Council emphasizes that the greatest threat to natural resources in the Mosier Watershed is groundwater overdraft. Groundwater and surface water are closely linked in the Mosier area. Falling groundwater levels in the aquifers of the Mosier Valley threatens not only the sustainability of agriculture within the valley, but also threatens the cutthroat and steelhead populations within the watershed." (Fifteenmile Subbasin Plan, section 5, page 7).

"If no action is taken to stabilize the aquifers in the Mosier Valley, then dropping aquifer levels may lead to reduced stream flows and warmer summer water temperatures in Mosier Creek. This will negatively affect cutthroat trout in Mosier Creek, as well as steelhead and coho in the mouth of Mosier Creek." (Fifteenmile Subbasin Plan, section 5, page 50).

By reducing irrigation demands on the shallow aquifers in Mosier, groundwater is expected to recharge, resulting in increased stream flows, which will lead to cooler stream temperatures and enhanced habitat for native fish.

Social/Cultural Benefits ORS 541.673(4)

(a) The promotion of public health and safety and of local food systems:

This project will promote exceptional improvements in public health, public safety, and local food systems.

Mosier valley has diverse agriculture, including orchards, bee keepers, and vineyards. These agricultural lands represent a local and sustainable food system. Mosier also hosts a weekly Farmers Market from June to September and has a higher prevalence of Farmer's Markets per 1000 population as compared to the state of Oregon.

Stabilizing the groundwater supply in the Mosier valley will ensure the continuation of Mosier's local food system. This project is expected to reduce demand on the two current aquifers in use, by tapping into a new deeper aquifer that the two largest irrigators in Mosier plan to use. While this project takes place on two distinct farms, the public benefits from this project will positively impact the entire community.

In addition to sustaining and promoting local food systems, stabilizing Mosier's groundwater supply in the area will also promote public health and safety by ensuring a sustainable supply of safe drinking water for the entire community. A stable community water supply is also necessary for both sanitation and fire suppression, which are essential to public health.

This project will promote and sustain local food systems, as well as multiple public health benefits, including a stable water supply, sanitation services, and fire suppression, all necessary to a stable and flourishing community.

(b) A measurable improvement in conditions for members of minority or low-income communities, economically distressed rural communities, tribal communities or other communities traditionally underrepresented in public processes:

This project is likely to provide significant benefits to low income, hispanic, and economically distressed rural communities. These traditionally underrepresented communities were included in the process of developing this project.

Mosier is an economically depressed rural community, and has a higher percentage population of Latinos than the average for Oregon, as well as a higher percentage of population in limited English speaking households. Mosier has fewer residents with health insurance than the state average. Mosier households have a higher rate of housing cost burden, as compared to the state average (<http://oe.oregonexplorer.info>). These "environmental justice" communities would be more adversely affected by declining jobs in the community if the availability of a sustainable water supply is not addressed. While this project takes place on two distinct farms, the public benefits will positively impact the entire community.

Mosier's groundwater issues have been the subject of a very open, transparent and ongoing collaborative process through the Mosier Watershed Council, in conjunction with the Wasco County Soil & Water Conservation District. Community meetings open to the public have been widely advertised, to ensure that all stakeholders in the community have an opportunity to participate. Community outreach included posting flyers throughout the town at locations frequented by residents, publishing announcements in the community newsletter and local newspaper, and making radio announcements.

(c) The promotion of recreation and scenic values:

This project is likely to result in exceptional promotion of recreation and scenic values.

Agriculture in the area is directly connected with tourism and recreation, including U-pick opportunities, wineries, viewing of iconic farms, and the blossom festival.

The CRG National Scenic Area, which includes Mosier, attracts thousands of tourists annually to tour the regions towns and backroads. The scenic value of the regions farms and orchards is essential to the character of the Columbia River Gorge National Scenic Area, and these farms rely on a sustainable water supply.

In addition to farms, the entire community, as well as the city water system, relies on Mosier's aquifers and the supply of water they provide. This includes all services within the town of Mosier, including Mosier's parks and public landscapes that are used for recreation.

Recreation opportunities in the Mosier watershed and nearby also include cycling, wind surfing, hiking, camping, fishing and hunting. Some people move to Mosier because of these recreation opportunities, while many more come from out of town as visitors. A sustainable water supply to the community is essential to supporting these recreational opportunities.

As tourism continues to grow in the Columbia River Gorge, recreation and scenic values will continue to be vitally important to the Mosier community. By ensuring a sustainable water supply for the community this project will enable Mosier to continue to offer recreation and scenic values far into the future.

(d) Contribution to the body of scientific data publicly available in this state:

This project is likely to contribute an exceptional amount of new scientific data publicly available in the state.

OWRD and USGS are very interested in learning more about Columbia River Basalt (CRB) aquifers. This project is important as it is located in a state groundwater withdrawal area. These wells will provide information on CRB aquifers, which are widespread in the state. The knowledge gained through the analysis of drill cuttings and ongoing monitoring will be invaluable. These data will contribute to understanding the problems with declining CRB aquifers statewide. The new wells will be carefully logged and the geologic units described, providing significant scientific understanding of the groundwater resources near Mosier and in adjacent areas.

(e) The promotion of state or local priorities, including but not limited to the restoration and protection of native fish species of cultural significance to Indian tribes:

This project is likely to play an exceptional role in supporting a number of state and local priorities. This project addresses several actions identified in Oregon's Integrated Water Resources Strategy, including improving water resource data collection and monitoring and improving water conservation. Mosier well repair appears as a high priority project in Wasco County in the Mid-Columbia Comprehensive Economic Development Strategy.

Commingle well evaluation, prioritization, and repair is the highest priority item in the Mosier Watershed Council Action Plan. Wasco County SWCD also treats Mosier well remediation as a high priority; the SWCD has already invested nearly a million dollars to date in groundwater studies, well assessments, and well repairs.

If the groundwater levels are restored and positively impact stream flows, the project will help address the Mid-Columbia salmon and steelhead recovery plans, as well as the Oregon Plan for Salmon and Watersheds.

The project also benefits native fish species of cultural significance to Indian tribes. Coho salmon and steelhead use lower Mosier Creek below the falls for spawning and rearing. Improved stream flows will help reduce the stream temperature in Mosier Creek, which is 303(d) listed as water quality limited for temperature, and will contribute benefits downstream in the Columbia River.

Additionally, the larger Mosier groundwater restoration project that this project is associated with is a State of Oregon Regional Solutions Priority.

(f) The promotion of collaborative basin planning efforts, including but not limited to efforts under Oregon's Integrated Water Resources Strategy:

The Mosier groundwater issues have been the subject of a very open, transparent and ongoing collaborative process through the Mosier Watershed Council, in conjunction with the Wasco County Soil & Water Conservation District. Agendas and minutes for recent Mosier Watershed Council meetings are available online at http://wascoswcd.org/wcsxcd_021.htm. All past agendas and minutes are available by contacting Watershed Coordinator Abbie Forrest at Abigail.Simmons@or.nacdn.net.

There have been significant studies undertaken in the Mosier area in an attempt to understand the problem underlying groundwater declines in the Columbia River Basalt aquifers. One recent study, "USGS Scientific Investigations Report 2012-5002: Evaluation of Long-Term Water-Level Declines in Basalt Aquifers near Mosier, Oregon", and a presentation to the Mosier Community "The Influence of Groundwater Flow in Columbia River Basalt - Examples from Mosier, Oregon, Kenneth E.Lite Jr., ORWD", demonstrate the relationship between comingling wells, groundwater declines, and decreased streamflow in Mosier Creek. This project, which was identified with technical assistance through OWRD, will remove two of the largest irrigators from the system. Removing these irrigators will take pressure off of the critical groundwater system, benefitting community members who identified the problem through collaborative process and studies.

This project is one important component in a three-pronged approach adopted by the Mosier Watershed Council. The other two actions promoted by the Mosier Watershed Council are conservation, and repair of comingling wells.

2. Identify Project Location.

(a) Attach map of project implementation area if appropriate. List map(s) in this space and attach to application.
SEE APPENDIX F; MAPS

1)Proposed - Mosier Deep Water Supply Wells - Project Implementation Area

2)Molesworth - Potential rock units

2)Root - Potential rock units

(b) Township	Range	Section	Quarter-Quarter Section
<i>2N</i>	<i>12E</i>	<i>18</i>	<i>NW, SW and</i>
<i>2N</i>	<i>12E</i>	<i>7</i>	<i>NE, SW</i>

(c) Tax Lot Number(s)

Account # 565: Molesworth

Account # 449: Root

(d) Latitude/Longitude

45.65962/ -121.37943 Molesworth

45.674890/-121.36407 Root

(e) County

Wasco

(f) Watershed

6. Attach a completed feasibility analysis if one has been completed.

We anticipate the wells will be completed in the lowest aquifer in the Frenchman Springs basalt or the upper most aquifer of the Grande Ronde basalt.

Our understanding of the Columbia River Basalt aquifer group based on conversations with USGS and OWRD staff is that additional water bearing zones exist in these aquifers.

7. Provide suggestions for interim and long-term project performance benchmarks.

Interim benchmarks: We will take a phased approach and use findings from the first well drilled as basis for further work.

Long-term benchmarks: We will work with OWRD to log flows from wells and track recovery over time.

8. Provide letters of support for the proposed project (list in this space and attach to application).

SEE APPENDIX E: Letters of Support.

Letters of Support Received:

USGS

Mosier Watershed Council

Representative John Huffman

The City of Mosier

Oregon DEQ

Wasco County Commissioners

The Dalles Area Chamber of Commerce

Oregon NRCS

ODFW

Confederated Tribes of Warm Springs

Bryce Molesworth

Wade Root

9. Describe partnerships and collaborative efforts associated with the project.

Wasco SWCD has worked in collaboration with Mosier Watershed Council on the Mosier groundwater issues on an ongoing basis for several years, with guidance and support from USGS and OWRD. All Council meetings are open to the public, and larger community-wide meetings related to Mosier groundwater issues have been held to present key information periodically. The Mosier Watershed Council strives to include a balance of interested and affected parties in the watershed. This may include, but is not limited to: a) Local and regional boards, commissions, districts and agencies; b) Federally recognized Indian tribes; c) Public interest groups; d) Residents; e) Private landowners; f) Industry/Agriculture; g) Members of academic, scientific and professional communities; h) State and federal agencies; and i) Public non-profits.

10. Consultations/communications with affected Indian tribes and with the Legislative Commission on Indian Services regarding the project.

Has the Legislative Commission on Indian Services been contacted to identify tribes affected by the project?

Yes No

Please provide correspondence as an attachment to this application.

SEE ATTACHED- Appendix F, Tribes

Has there been consultation/communications with affected Indian tribes?

Yes No

Please provide a description of consultation/communication that occurred and attach documents to this application if applicable.

Initial contact was made with all of the tribes recommended by the Legislative Commission on Indian Services, including Warm Springs, Umatilla, Grand Ronde, and Siletz. A letter of support was provided by The Confederated Tribes of Warm Springs's Habitat Biologist, Scott Turo.

11. Provide a description of:

(a) Required local, state and/or federal [permits](#) and/or authorizations for project implementation that have been secured to date. Please attach secured permits/authorizations to the application.

Well Permit will be provided by well driller.

(b) Required local, state and/or federal permits and/or authorizations that will be secured in the future to implement the project. Describe efforts to date in securing these permits and/or authorizations.

Additional consultation with Tribes will be undertaken at project location if needed.

Well driller will provide certificate/permit for wells.

12. Provide any additional supplemental materials to demonstrate ability to implement the project. Examples include project plans and specifications, engineering details and [water availability analysis](#). List documents in this space and attach to application.

SEE APPENDIX A: USGS Scientific Investigations Report 2012-5002: Evaluation of Long-Term Water-Level Declines in Basalt Aquifers near Mosier, Oregon, <http://pubs.usgs.gov/sir/2012/5002/>.

SEE APPENDIX B: The Influence of Groundwater Flow in Columbia River Basalt - Examples from Mosier, Oregon, Kenneth E. Lite Jr., ORWD.

V. Storage Project Requirements (if not a storage project continue to Section VI)

For any storage project please contact Water Resources Grant Administrator, Jon Unger, at (503) 986-0869 prior to completing the application.

13. Storage Project Type: Above Ground Below Ground

14. If above-ground storage, would the proposed storage project be located in-channel?

Yes No N/A

15. Identify the capacity in acre-feet of the proposed storage project.

16. Has a water right application been filed for the proposed storage project?

Application not yet made.

Water right application made; permit not yet issued Application #

Permit issued. Application # Permit #

For Questions 17 & 18 answer the following:

(a) Does the proposed storage project impound surface water on a perennial stream?

Yes No Uncertain

(b) Does the proposed storage project divert water from a stream that supports state- or federally-listed sensitive, threatened or endangered fish species?

Yes No Uncertain

(c) Does the proposed storage project divert more than 500 acre-feet of water annually?

Yes No

17. Water Dedicated Instream N/A

For above ground storage projects seeking grant funding: If you answered “yes” to any of the questions posed in a-c above a minimum volume of water equal to at least 25% of the stored water must be dedicated to instream use.

Identify percentage of stored water to be dedicated to instream use.

%

Note: Any storage project dedicating 25% of stored water to instream use will automatically receive a median score in the environmental public benefit category with the opportunity to demonstrate additional environmental benefit to increase the score.

18. Seasonally Varying Flow Prescription

For all storage projects: If you answered “yes” to any of the questions posed in a-c above the project will need a **Seasonally Varying Flow (SVF) Prescription**, determining the duration, timing, frequency and volume of flows (including ecological baseflow), necessary for protection and maintenance of biological, ecological, and physical functions outside of the official irrigation season. The initial step in defining

the SVF for the project is to schedule an SVF meeting with OWRD. For assistance and more information please contact Water Resources Grant Administrator Jon Unger at (503) 986-0869.

Identify whether the storage project will need a Seasonally Varying Flow Prescription.

Yes No Uncertain

VI. Environmental Public Benefit for Conservation Projects Dedicating Water Instream (if not a conservation project continue to Section VII)

19. Identify percentage of conserved water to be dedicated to instream use. N/A

Wasco SWCD has had preliminary discussion with DEQ regarding State of Oregon applying for an in-stream water right on a percentage of the conserved water. The percentage has not been identified at this time. %

Note: Any project that conserves water and dedicates at least 25% of the conserved water quantity to instream use will automatically receive a median score in the environmental public benefit category with the opportunity to demonstrate additional environmental benefit to increase the score. Water dedicated to instream use must be permanently placed instream and protected by the Oregon Water Resources Department.

VII. Financial Information

For Loan Applicants – Since loan applications do not require cost match, loan applicants who do not offer a cost match need not complete Section A and can disregard the match funding columns in Sections B and C. Budget and costs of key tasks must be identified in sections B & C. Loan applicants will be required to provide additional financial information related to their ability to repay the loan. This request for information will take place after the scoring and ranking process for those projects that are recommended for funding.

For Grant Applicants – Complete Sections A, B and C.

Section A – Cost Match Information

Applicants must demonstrate a minimum 25% funding match based on the total project cost. The match may include: a) applicant funds or 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 project. For secured funding, the applicant must attach a funding award letter 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. Funds expended prior to grant agreement are not reimbursable nor do they qualify for cost match without prior authorization by the Department.

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 - Funding commitments already secured 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>Bryce Molesworth</i>	<input checked="" type="checkbox"/> cash <input checked="" type="checkbox"/> in-kind	<input checked="" type="checkbox"/> secured <input type="checkbox"/> pending	\$164,775	9/1/2016
<i>Wade Root</i>	<input checked="" type="checkbox"/> cash <input checked="" type="checkbox"/> in-kind	<input checked="" type="checkbox"/> secured <input type="checkbox"/> pending	\$143,000	9/1/2016
	<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		
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