OREGON WATER RESOURCES DEPARTMENT

WATER PROJECT GRANTS AND LOANS

GRANT APPLICATION

I. Project Information

Project Name: Highland Ditch Piping Project

Project Type: ☒ Conservation ☐ Reuse ☐ Flow Restoration and Protection
☐ Above-Ground Storage ☐ Below-Ground Storage
☒ Water Infrastructure ☐ Other: _____

Grant Funding Requested (must be no more than 75% of Total Cost of Project): $ 2,250,000

Match Funding (must be no less than 25% of Total Project Cost): $ 750,000

Total Cost of Project: $ 3,000,000

II. Applicant Information

Applicant Name: Badger Improvement District		**Co-Applicant Name:**
Address:	P.O. Box 276	Address:
	Tygh Valley, OR 97063	
Phone:	541-544-2212	Phone:
Fax:		Fax:
Email:	badgerirrigation@hotmail.com	Email:

Principle Contact: Eric Nordquist		**Fiscal Officer:**	
Address:	P.O. Box 276	Address:	P.O. Box 276
	Tygh Valley, OR 97063		Tygh Valley, OR 97063
Phone:	541-544-2190	Phone:	541-993-3419
Fax:		Fax:	
Email:	enfarms2003@gmail.com	Email:	joshtdor@gmail.com

Certification: I certify that this application is a true and accurate representation of the proposed work and that I am authorized to sign as the Applicant or Co-Applicant. By the following signature, the Applicant and Co-Applicant (if applicable) certify that they are aware of the requirements of an Oregon Water Resources Department funding award, have read and are aware of conditions within the example grant agreement on the Department's website and are prepared to implement the project, if awarded.

Signature of Applicant/Authorized Person: _____ Date: _____

Print Name: Eric Nordquist Title: President, BID

Signature of Co-Applicant/Authorized Person: _____ Date: _____

Print Name: _____ Title: _____

III. Eligibility

Select applicant entity type for both applicant and co-applicant (if applicable).

☐	City		☐	Oregon County
☐	Port		☒	Irrigation District
☐	Drainage District		☐	Water Improvement District
☐	Water Control District		☐	Non-Profit Organization
☐	Soil and Water Conservation District		☐	Corporation
☐	Partnership		☐	Sole Proprietorship
☐	Cooperative		☐	Indian tribe
☐	State of Oregon Agency		☐	Individual
☐	Federal Agency		☐	Other:

To be eligible for funding a project must address an instream and/or out-of-stream water supply need and result in project implementation. Does the project address an instream and/or out-of-stream water supply need and result in project implementation? ☒Yes ☐No

Provide a brief, one to two paragraph description of the water supply need that the project intends to address. Please reference (and attach) supporting data or reports that document the need.

Currently, roughly 3600 acres are supplied irrigation water for 40+ users in the Wamic/Pine Hollow area. The economic security of these producers is dependent on maintaining the flow of irrigation water diverted from Badger Creek into the Highland Ditch. The initial 2½ miles of ditch is in steep terrain that can ordinarily only be accessed by foot for monitoring or repair if needed. The health of this portion of the ditch is vital to maintaining a local agriculture economy. Gross income for irrigated land is $1,000-$5,000 per acre, and gross income for non-irrigated land is $100 per acre or less in this area.

An additional benefit from piping this section of this ditch is the ability to leave more water in Badger Creek. As with any open ditch, this ditch is subject to leaks and seepage. Piping will solve any potential leaks or seepage issues that would occur without piping.

Is either the Applicant or Co-Applicant required to have a Water Management and Conservation Plan?
☐Yes ☒No

If yes, has the plan been submitted to the Water Resources Department and received approval?
☐Yes ☐No

Note: Pursuant to ORS 541.659 if an applicant is required to have a water management and conservation plan, the plan must be submitted to the Water Resources Department and receive approval prior to department acceptance of an application for a loan or grant from the account.

IV. Project Summary

Provide a brief, 4-5 sentence summary of the proposed project. This summary should include a brief description of the goal and scope of the project as well as summarize project implementation (i.e., planned infrastructure or activity). Please refer to the Water Project Grants and Loans Application Instructions for additional information on what to include in your project summary.

This proposed project would pipe roughly 14,000 ft of irrigation ditch with a 30" PVC or HDPE pipe. The current open ditch is in steep terrain and surrounded by the Badger Creek Wilderness Area in the Mt. Hood National Forest. The ditch is difficult to access and repair and is subject to possible washout due to debris filling the ditch. As this ditch is the main supply of irrigation water to farmers in the area, a ditch failure would threaten the economic stability of agriculture in the area. Additionally, installing a pipe would help prevent washouts which would negatively affect fish habitat in Badger Creek due to large amounts of dirt and debris filling the creek. Because of leaching and seepage in the existing ditch, a pipe would also keep up to ½ cfs in Badger Creek and improve the overall efficiency of Badger Improvement District's (BID) irrigation system.

V. Project Location

Instructions: Please answer the following questions about the location of the proposed project.

1. Please provide the following information about the project location.
    a. Latitude/Longitude (in decimal degrees): N45.276747 / W121.454389
    b. County: Wasco
    c. Watershed/Basin: White River/Deschutes

2. Please attach and label, Attachment #1, a site plan map showing the following (✓ when complete):
    a. ☒ Project area boundaries
    b. ☒ True north arrow
    c. ☒ Map title and legend
    d. ☒ Latitude and longitude of project location
    e. ☒ Property boundaries
    f. ☐ Tax Map and Lot numbers of each property in project area boundary and listed in Question #3. Use the same Tax Lot No. on the map as is used in Question #3.
    g. ☒ Surface water bodies
    h. ☒ Location of involved structures (existing or proposed)
    i. ☒ Point of Diversion and Place of Use associated with the project (if applicable)
    j. ☒ Proposed measurement locations (if applicable)

3. In the table below, identify any properties which project implementation impacts, indicate the types of activities that would occur on that site, and include a landowner agreement form and map for each property. *Add rows as needed.*

Tax Map No. (e.g. 12S06W-12714)	**Tax Lot No.** (e.g. 100)	**Ownership Type (✓ One)**	**Property Owner of Record**	**What type of activity occurs on this site as part of project implementation? (✓ all that apply)**	**If applicable, identify the type and extent of ground disturbing activity (e.g. test pits, borings, new road construction, excavation, etc.).**	**Landowner Agreement Form Attached (✓ when complete)**
03S11E100		☒Public ☐Private	USFS	☐ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	Buried Pipeline	☐
		☐Public ☐Private		☐ Access site ☐ Project work ☐Ground disturbing activity ☐Other impact: _____		☐
		☐Public ☐Private		☐ Access site ☐ Project work ☐Ground disturbing activity ☐Other impact: _____		☐
		☐Public ☐Private		☐ Access site ☐ Project work ☐Ground disturbing activity ☐Other impact: _____		☐

4. For **each** property listed in Question #3, attach a Landowner Agreement Form. Attach Landowner Agreement form(s) and label Attachment #2.
    a. Where a single landowner entity is the owner of record for multiple properties, one form may list the multiple properties owned by that entity.
    b. For *public* lands attach the landowner form or other documented authorization from the federal or state government property owner allowing project implementation **or** documentation that demonstrates such authorization is being pursued.

VI. Project Specifics

Instructions: Please answer the following questions.

Project Description, Needs, and Goals

5. Provide additional information (building on the project summary) to further describe the proposed project and the project goal.

Currently, roughly 3600 acres are supplied irrigation water for 40+ users in the Wamic/Pine Hollow area. The economic security of these producers is dependent on maintaining the flow of irrigation water diverted from Badger Creek into the Highland Ditch. The initial 2 ½ miles of ditch is in steep terrain that can ordinarily only be accessed by foot for monitoring or repair if needed. The health of this portion of the ditch is vital to maintaining a local agriculture economy. Gross income for irrigated land is $1,000-$5,000 per acre, and gross income for non-irrigated land is $100 per acre or less in this area.

An additional benefit from piping this section of this ditch is the ability to leave more water in Badger Creek. As with any open ditch, this ditch is subject to leaks and seepage. Piping will solve any potential leaks or seepage issues that would occur without piping.

This project was originally planned to be done in several stages, starting from the headgate down. Due to logistical concerns of transporting all the materials (pipe and backfill material) through difficult terrain to the start of the ditch and working down, it was decided it would more be more efficient and logistically easier to start at the finishing point of the pipeline and working up, using the covered pipeline as a road. This would require completing the entire pipeline at one time.

Goals:

- Provide a long term solution to a currently fragile ditch
- Upgrade and increase the efficiency to the BID system
- Return ½ cfs to Badger Creek

6. Provide a summary of evidence to demonstrate project feasibility. This summary may include the results of a feasibility study. Attach the results of the study or other evidence, as necessary to support the summary.

Attached (#4) is an engineering plan completed by McMillen Engineering of Boise, ID in 2005. The entire technical data can be provided upon request.

7. Describe partnerships and collaborative efforts associated with the planning or implementation of this project. Include a description of how parties of diverse interests worked, or will work together to achieve a common goal.

BID is working with the local NRCS/Wasco County Soil & Water Conservation District office to implement and plan this project, as well as the USFS to update the working agreement with BID.

8. List letters of support (name and/or affiliation of sender is sufficient). Attach copies of the letters to your application.

US Forest Service
Wasco County Soil & Water Conservation District
Wasco County Board of Commissioners
South Wasco County Park & Recreation District
Round Prairie Improvement District
Pat Davis
Wamic Market
Kathleen Williams

Project Tasks

9. Identify tasks necessary for the proposed project using the following format and including as many tasks as necessary to implement the project. In the event that your proposed project receives grant funding, the tasks identified will be incorporated into your grant agreement as the "Project Description."

   Note: Project management and administration are common functions within specified project tasks and not a separate project task. All cost match and grant budget funds must apply to the tasks identified below. See the Budget Procedures and Allowable Costs document for more.

   For each Task address the following:

   Task number. Key Task Title
   - Task schedule: The approximate dates during which the key task will be completed.
   - Description of key task activities: Include specific details of the task such as task purpose, planned approach, and proposed methods.
   - Permits/Regulatory Approvals Required: List any permits or regulatory approvals required to conduct the task. All permits/regulatory approvals identified must also be listed in question 15 of this application.

   Task 1. Secure Funding
   - Task schedule: May 2021 to Early 2022
   - Description of key task activities: Secure funding through grants, loans and in-kind sources.
   - Permits/Regulatory Approvals Required: None

   Task 2. Secure Permits
   - Task schedule: May 2021 to Early 2022 (concurrent with Task 1)
   - Description of key task activities: Update BID's agreement with the USFS.
   - Permits/Regulatory Approvals Required: None

Task 3. Secure Materials

- Task schedule: Summer of 2022
- Description of key task activities: After funding is secured, purchase pipe, fittings and fill material.
- Permits/Regulatory Approvals Required: None

Task 4. Install Pipeline

- Task schedule: Fall 2022
- Description of key task activities: Install Pipe and back fill. Build intake structure and rip-rap outlet.
- Permits/Regulatory Approvals Required: Updated USFS agreement

Task 5. Legally Protect Conserved Water Instream

- Task schedule: 2023
- Description of key task activities: Perform necessary steps to complete issuance of instream water right certificate.
  Permits/Regulatory Approvals Required: Oregon Water Resources Department Water Resources Department Instream Water Right Certificate.

Copy and paste additional tasks as needed.

10. Project Task Scheduling – Estimated total project duration: Summer 2021 to December 2023 (months/years)

    Place an "X" in the appropriate column to indicate when each Project Task would take place. Note that successful projects generally do not receive their first reimbursement until late Q1 or early Q2 of the year after application submission. Project tasks listed must match the tasks identified in Question 9.

Key Tasks (Add additional rows as needed)	**Grant year**				**Grant year**				**Grant year**			
	2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Secure Funding	☐	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐
Secure Permits	☐	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐
Secure Materials	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐
Install Pipeline	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐
Legally Protect Conserved Water Instream	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☒

11. Describe how you propose to measure and report the water diverted and used from the proposed project. Include a proposed method, timing, frequency, and location of measurement in your proposal. If you have questions please contact the Department for more information. Consider that many forms of measurement will incur additional costs.

    Note: Funded projects are required by statute to "regularly measure and report the water diverted and used from the project" [ORS 541.692(3)]." Common approaches for measuring water diverted and used include totalizing flow meters, stream gages, reservoir staff plates and water level sensors paired with volume-depth curves, and flumes. The Department makes the final determination on the method, timing, frequency, and location of measurement. This requirement applies if there is any diversion of water. Grant/loan funds can be used to pay for measurement and reporting expenses during the life of the grant.

Method: Currently there are two measuring devices in this ditch. A Parshall flume is located on the downstream side of the fish-screen, and a "gauging station" that is monitored by the local watermaster, is currently immediately downstream from this project area. These would continue to be the methods used to monitor the flow.

Timing/Frequency: As the diversion point for this ditch is remote and not easily accessed, measurements would be taken twice a week using the Parshall flume during the irrigation season.

Location: The Parshall flume is located at the diversion point which is located at GPS coordinates: N45.276747/W121.454389

Reporting: Measurements are taken by an employee of Badger Improvement District and are recorded and stored.

12. Provide suggestions for interim and long-term project performance benchmarks and how those benchmarks would be measured.

The main goal of this project is to prevent future catastrophic failure of the current open ditch. (This happened to a small degree in 2020 when a tree blew over, taking out ditch bank with it. See attachment 8) There are also several small leaks in the ditch bank that are discovered each year that must be addressed before they cause damage additional damage. A pipe would eliminate the danger caused by those leaks. An additional goal is to keep ½ cfs in Badger Creek during the irrigation season when the flow in Badger Creek is the lowest. Piping this section of the ditch would help maintain the economic security of farm producers in BID. Gross income for irrigated land is $1,000-$5,000 per acre, and gross income for non-irrigated land is $100 per acre or less in this area. Additionally, this project would provide economic security for recreational industries that use Pine Hollow Reservoir, which is owned by BID and used for recreational purposes under an easement with the ODFW and is filled by this ditch. Long term success would be the continued flourishing of these industries

13. Describe any issues, unknowns, or conditions that may affect the completion of the key tasks or project. If applicable, describe any measures planned to mitigate them.

The main goal of this project is to prevent future catastrophic failure of the current open ditch. An additional goal is to keep ½ cfs in Badger Creek during the irrigation season when the flow in Badger Creek is the lowest. Piping this section of the ditch would help maintain the economic security of farm producers in BID. Gross income for irrigated land is $1,000-$5,000 per acre, and gross income for non-irrigated land is $100 per acre or less in this area. Additionally, this project would provide economic security for recreational industries that use Pine Hollow Reservoir, which is owned by BID and used for recreational purposes under an easement with the ODFW and is filled by this ditch. Long term success would be the continued flourishing of these industries.

Permits and Regulatory Approvals

14. Identify any water rights needed to implement the proposed project below. Check all of the following that apply and provide the information requested:
    a. ☐ The proposed project requires a new water right or other water right transactions. If checked, list transaction(s) required (e.g., new right, transfer, etc.): _____
    b. ☐ The applicants holds the water right(s) required for the project. If checked, list all such water rights required for the project in the table below, adding rows as needed. See the Application Instructions for further instruction, including how to find water right information.
    c. ☐ The applicant has legal access to a water right that will required for the project and has been given permission to utilize the water right(s). If checked, list all such water rights required for the project in the table below, adding rows as needed. See the Application Instructions for further guidance, including how to find water right information.

Water Right Number (Include prefixes, if applicable, e.g., G 00010)	Is this an application, permit, certificate, limited license, special or final order, transfer, decree, lease, or claim?	Water Right Amount			Tax Map/Lot IDs within the Place of Use where water will be used to implement the proposed project
		Max Volume (ac-ft)	Max Rate (cfs)	Duty (ac-ft/ac)	
5733	Certificate	526.5	4.3875	3.0	See Attached Summary
7221	Certificate	30	0.13	3.0	See Attached Summary
7865	Certificate	57	0.24	3.0	See Attached Summary
7917	Certificate	60	0.25	3.0	See Attached Summary
9017	Certificate	30	0.13	3.0	See Attached Summary
9529	Certificate	18	0.15	3.0	See Attached Summary
11377	Certificate	12	0.05	3.0	See Attached Summary
46368	Certificate	4775.4	21.00	3.0	See Attached Summary
46530	Certificate	1204.05	5.15	3.0	See Attached Summary
46531	Certificate	2966.1	24.72	3.0	See Attached Summary

46532	Certificate	1446.9	24	3.0	See Attached Summary
50066	Permit	1063.8	8.9	3.0	See Attached Summary
51486	Certificate	1.8	15	3.0	See Attached Summary
51487	Certificate	3550	86.7825	3.0	See Attached Summary

See Attachment #7

15. In the table below, provide a list of any permits and regulatory approvals needed to implement the project and indicate the status of each in the table below. Please submit copies of any secured permits/approvals or describe efforts in securing necessary permits/approvals, including current status. If no permits or regulatory approvals are required, please provide an explanation. *Add rows as needed.*

A NEPA analysis has already been completed, but will be reassessed by the USFS. No other permits are needed. BID has an easement with the USFS that will need to be updated.

Permit/ Regulatory Approval	Status and Efforts To Date
NEPA Analysis	Completed, but will be reassessed by USFS
Update USFS Easement and agreement	To be completed, but in contact with USFS

VII. Public Benefits

Instructions: Describe how the project would provide public benefits in each of the three public benefit categories identified below. In your responses, describe current conditions and anticipated project outcomes and benefits and provide evidence to support your claims. Describe how the project outcomes will contribute to each anticipated public benefit. Descriptions should be quantitative when possible. Applications will be scored and ranked solely based on the descriptions of the economic, environmental, and social/cultural public benefits and the likelihood of the project achieving the claimed benefits. More specifically, the evaluation will be based on the change in conditions expected to result from the project as demonstrated in the application.

Please see the Scoring Criteria document available on the Applications, Forms and Guidance webpage, for definitions of each public benefit and a description of how the 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 public benefits that are not applicable to the proposed project.

16. Economic Benefits – ORS 541.673(2)

a. Does the project create or retain jobs? If so, explain.

This project will maintain the agricultural industry in the area. There are currently 40+ users and members of BID. Some are sole owner/operators, but many employ several farm workers. A ditch failure in this section of the ditch would destroy the agricultural industry it this area, resulting in loss of jobs of the farm workers, and also the owner/operators themselves. The arable land in this area is fairly shallow and not very suitable for dryland farming.

Historically this area has grown irrigated wheat and irrigated forage for hay and pasture. Increasingly over that last 20 years more and more fruit acres have been added. Apple, pears and blueberry crops have been planted. As these crops are more labor intensive than wheat and forage, they have brought in more and more farm laborers. Some of these jobs are short term migrant jobs but there are also an increasing number of full time positions as well. Also, traditional crops are largely summer seasonal and are dormant in the winter months, but fruit crops require care in the winter, bringing in more opportunities for jobs in the winter.

b. Does the project increase economic activity? If so, explain.

This piping project could increase and largely maintain current economic activity. Currently, the agricultural lands served by this ditch produces grazing and hay on the low end of the economic scale (gross value of $500-$1,500/acre) up to fruit crops (apple, pear, and blueberry) on the high end of the economic scale (gross value of $5,000-$10,000/acre). If a ditch failure occurred, and irrigation was cutoff, the only dryland crops in the area are grain crops or grazing, reducing the gross values to less than $100/acre. Property values would also be significantly reduced. They are currently in the range of $3,000 to $5,000 per acre for irrigated land. Dryland property values are more in the range of $400 to $800 per acre.

This project could increase economic activity by helping to provide security for the future growth of these more valuable and labor intensive crops to be grown in this area. Although more and more high value crops are being grown here they typically take up to five or more year to reach their full potential. Irrigation security would help growers feel more comfortable investing thousands or millions of dollars in crops with little return for several years.

c. Does the project result in increases in efficiency or innovation? If so, explain.

This piping project would eliminate current ditch loss and seepage in the section being piped, but it would also help BID lead its growers in more innovative ways to save water. It would

help the overall mindset of increasing water conservation.

d. Does the project result in enhancement of infrastructure, farmland, public resource lands, industrial lands, commercial lands or lands having other key uses? If so, explain.

This piping project would eliminate current ditch loss and seepage in the section being piped. But it would also help BID lead its growers in more innovative ways to save water. It would help the overall mindset of increasing water conservation.

e. Does the project enhance 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? If so, explain.

As this portion of the ditch is the main artery to supply water to fill Pine Hollow Reservoir, tourism would be greatly impacted in the area. The reservoir is the main tourist draw to this area for camping, fishing and boating. Pine Hollow Reservoir was built in the early 1970's in cooperation with BID, ODFW and Wasco County, to provide enhanced irrigation for BID, and to fishing and boating opportunities. A ditch failure in this portion of the ditch would significantly impact tourism in this area.

The in-stream water would benefit native redband trout, which are state listed sensitive. The redband trout in the White River Watershed are genetically unique as they are genetically dissimilar to the redband trout in the Lower Deschutes River and genetically similar to the redband trout in the Upper Fort Rock Basin. This has been attributed to their physical isolation created by White River Falls.

At the time of the engineering, "the USFS included replacing Highland Ditch with a pipe line in their most recent environmental assessment addressing steelhead recovery on Forest Service Lands." (McMillen Engineering Design Report, October 2005)

f. Does the project result in increases in irrigated land for agriculture? (which may include increasing irrigated acres, agricultural economic value, or productivity of irrigated land) If so, explain.

This project would protect existing irrigated land rather than increase irrigated land and enable the current acres to be irrigated more efficiently leaving more water in Badger Creek.

In June of 2020, there was a washout on Highland Ditch. The water was shut off in order for repairs to be made. During this time, farmers had to shut off water to their crops. This directly affected crop potential as this happened during a peak watering time and warmer temperatures. Fortunately, the repairs were done quickly but this may not always be the case and the potential is there for a much longer shut off time depending on the leak which could be devasting to growers in this District.

17. Environmental Benefits – ORS 541.673(3)

    a. Describe any measurable improvements in protected streamflows that are likely to result from the project. First, fill in the table below by, 1) listing the existing water right information of the source water right to be moved, protected, or transferred instream, and 2) naming the legal means proposed to permanently dedicate and protect water instream by the Oregon Water Resources Department. After filling in the table, complete your answer to this question by describing how protected streamflows will result in the environmental public benefits in the box below the table. *Note: The legal protection of water instream MUST be included to receive a score for this public benefit. Projects which permanently dedicate water instream will receive a scoring bump in the environmental public benefit category.*

Legal Protection of Water Instream *(add rows to table as needed)*

Water right permit or certificate number to be used in transaction for instream protection (e.g., irrigation, reservoir, or AR/ASR; S-####)	**Rate(s) (cfs)/duty (ac-ft/ac) or volume (ac-ft) of the contributing water right**	**Estimated rate (cfs)/duty (ac-ft/ac) or volume (ac-ft) of water to be legally protected instream**	**Percent (%) of right to be legally protected instream**	**Transaction for Legal Means of Instream Protection * (chose one)**
New Right	1 cfs	0.5 cfs	50%	☒ Instream transfer ☐ Allocation of Conserved Water** ☐ Above ground storage release ☐ Below ground storage release
				☐ Instream transfer ☐ Allocation of Conserved Water** ☐ Above ground storage release ☐ Below ground storage release
				☐ Instream transfer

				☐ Allocation of Conserved Water** ☐ Above ground storage release ☐ Below ground storage release

Attention: If awarded funding, water rights legally protected instream will be identified in the grant agreement.

IF USING THE ALLOCATION OF CONSERVED WATER PROGRAM: Identify the portion of the conserved water that will be permanently dedicated instream and protected by the Oregon Water Resources Department: 50 % **

Attention: If awarded funding, the legal protection of water instream will be a condition of funding. The grant agreement will identify the percent of conserved water identified above that will be permanently dedicated instream.*

Describe how the protected streamflows accomplish 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:

The increased streamflow due to this project will support the state listed redband trout and help support the riparian area which in the aired eastern Oregon climate is critical to wildlife

b. Does the project result in water conservation? If so, explain.

1 cfs of ditch loss has been observed in this section of the ditch. 50% of this flow would be conserved by the installation of a pipe line in the ditch.

c. Describe the anticipated measurable improvement in groundwater levels that enhances environmental conditions in groundwater restricted areas or other areas.

d. Describe if and how the project would create a measurable improvement in the quality of surface water or groundwater.

Piping this section of ditch will ensure that the ditch will not washout filling Badger Creek with sediment. This section of Badger Creek in in the Badger Creek Wilderness Area.

In June of 2020, there was a washout in the ditch bank due to a tree blowing over. Water flowed from the ditch down into Badger Creek creating muddy water conditions for several miles downstream. See attachment #8.

e. Does the project increase ecosystem resiliency to climate change impacts? If so, explain.

As drought conditions may become more frequent in the future, the need to conserve water becomes increasingly necessary. Installing this pipeline would be another step toward better water efficiency in the BID system.

f. Does the project result in improvements that address one or more limiting ecological factors in the project watershed? If so, explain.

This project will help prevent destruction of fish habitat in Badger Creek and downstream from large amounts of debris entering the creek by reducing the possibility of washouts from failure in the current open ditch.

One objection that has been raised is that the pipeline would eliminate an open source of water currently used for wildlife in the area. The current open ditch system catches a series of springs in two locations. These springs have been measured by Wasco County SWCD to flow between 1/2 to 3/4 CFS. In conjunction with the piping, culverts will be installed underneath the pipe to allow these springs to flow naturally into Badger Creek. These springs will again flow in areas cutoff from water since the ditch was built, increasing aquatic diversity along the way.

18. Social/Cultural Benefits – ORS 541.673(4)

a. Does the project promote public health and safety and of local food systems? If so, explain.

This project will help protect the local agricultural economy and help sustain the possibility of a local food system. Locally grown food co-ops are in the beginning stages of being formed, with the Pine Hollow/ Wamic area being promoted specifically.

The continued impact of COVID this year will have lasting effects and already the nation has seen the impact on local food sources. The dairy and large animal food industries have suffered huge losses with packing plants being shutdown. Many local communities are working hard to promote Community Sponsored Ag food boxes as well as maintain their presence in Farmer's Markets. There has never been more of an increased demand for such locally grown food sources and without the main water source, this opportunity would be non-existent for members within Badger Improvement District.

b. Does the project result in measurable improvements in conditions for members of minority or low-income communities, economically distressed rural communities, tribal communities or other communities traditionally underrepresented in public processes? If so, explain.

Maintaining the viability of this waterway by piping will continue to provide local farm jobs, which typically benefit minority and low-income individuals. South Wasco County is an especially low income area. Historically this area has grown irrigated wheat and irrigated forage for hay and pasture. Increasingly over that last 20 years more and more fruit acres have been added. Apple, pears and blueberry crops have been planted. As these crops are more labor intensive than wheat and forage, they have brought in more and more farm laborers. Some of these jobs are short term migrant jobs, there are also an increasing number of full time positions as well. Also, traditional crops are largely summer seasonal and are dormant in the winter months, but fruit crops require care in the winter, bringing in more opportunities for jobs in the winter.

c. Does the project promote recreation and scenic values? If so, explain.

Although this area has traditionally been an agricultural community, it is increasingly seen as a recreational area. With the building of Pine Hollow came homes that surrounded it. Many of these home were initially weekend homes, but there is now an increasing number of permanent residents as well. The reservoir is surrounded by homes and provides many recreational activities, including camping, fishing and boating. These recreational activities provide valuable recreation and economic values to the Wamic/Pine Hollow area, including increased local property values, and jobs in the local economy.

There are two main ditches that fill Pine Hollow, one is the Round Prairie ditch, which is used to supplement the filling of Pine Hollow in the winter from about February 1st until the irrigation season starts in April. The other ditch is the Highland Ditch. This is the ditch that BID uses to fill Pine Hollow in the fall after the irrigation season, in the spring before irrigation season starts, and to keep it full during the irrigation season in the spring and summer.

Without the Highland Ditch it would be impossible to keep Pine Hollow full. The Round Prairie Ditch can fill Pine Hollow by about half, but cannot keep it full during the summer tourist season. The Highland ditch is the main source of water for Pine Hollow, both to fill it and to keep it full. Not only would the impact directly affect the local farmers, as this is their irrigation water, but the general public would also be impacted if Pine Hollow remained relatively empty for a period of time. It is hard to imagine the local tourist and recreation community being able to survive without the Highland Ditch.

d. Does this project contribute to the body of scientific data publicly available in this state? If so, explain.

e. Does this project promote state or local priorities, including but not limited to the restoration and protection of native fish species of cultural significance to Indian tribes? If so, explain.

This project is consistent with:

- Oregon Plan for salmon and watersheds
- WCSWCD long range plan
- Spirit of the Salmon Plan
- ODFW stream flow restoration priority for Badger Creek is medium

f. Does this project promote collaborative basin planning efforts, including but not limited to efforts under Oregon's Integrated Water Resources Strategy? If so, explain.

This projects fits into the goals of USDA/NRCS/White River Regional Conservation Partnership Program.

VIII. Project Budget

Instructions: Please answer the following questions about the proposed project budget using the tables provided. All Grant and Other Funds must be allowable costs as described in the Department's Grant Budget Procedures and Allowable Costs document.

19. Please provide an estimated line item budget for the proposed project. Examples include: direct project specific costs, such as in-house staff salary, contractual services, travel and administrative costs. See the Budget Procedures and Allowable Costs on the OWRD Applications, Forms, and Guidance webpage for further guidance.

OVERALL PROJECT BUDGET 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**
Materials	14,225 ft	$104.52/ ft			$1,486,800	$1,486,800
Contractual/Consulting	14,225 ft	$104.52/ ft		$723,600	$763,200	$1,486,800
Staff Salary/Benefits	600 hours	$20/hr		$12,000		$12,000
Equipment (must be approved)						
Supplies						
Other: Wasco Co. Soil & Water Conservation Dist.	160 hours	$40/hr	$6,400			$6,400
Administrative Costs**	200 hours	$40/hr	$8,000			$8,000
Total			**$14,400**	**$735,600**	**$2,250,000**	**$3,000,000**

** The "Unit" should be per "hour" or "day" – not per "project" or "contract." Units x Unit Costs = Total Cost*
*** Administrative Costs may not exceed 10% of the total funding requested from the Department*

20. Identify the budget for each key task below. Key tasks identified below should be the same as the key tasks identified in Questions 9 and 10.

Key Tasks	**In-Kind Match**	**Cash Match Funds**	**OWRD Grant Funds**	**Total Cost**
Task 1- Secure Funding	*$2,000*			*$2,000*
Task 2- Secure Permits	*$2,500*	*$8,000*		*$10,500*
Task 3- Secure Materials	*$2,900*	*$8,600*	*$1,486,800*	*$1,498,300*
Task 4- Install Pipeline	*$2,000*	*$719,000*	*$763,200*	*$1,484,200*
Task 5- Legally Protect Conserved Water Instream	*$5,000*			*$5,000*
Total	**$14,400**	**$735,600**	**$2,250,000**	**$3,000,000**

IX. Match Funding

Instructions: Fill out the table below and attach the appropriate documentation for both secured and pending match (add rows as needed). Label the documentation as Attachment #3. Applications requesting grant funds must demonstrate match that at a minimum equals 25% of total project cost.

For secured funding, you must *attach a letter of support* from the match funding source that:

- Specifies the dollar amount identified for this project,
- Equals the dollar amount shown in the "Amount/Dollar Value" column in the table below, and
- Describes the work to be accomplished through the match.

For pending resources, you must attach *other written documentation showing a request* for the matching funds. Documentation must:

- Include the project name,
- Note the date on which a future funding application will be submitted,
- Identify the funding program from which funds are pending, and
- Provide evidence that the project is eligible for the funding program identified.

Match Funding Source (if in-kind, briefly describe the nature of the contribution)	**Type (✓ only One)**	**Status (✓ only One)**	**Amount/ Dollar Value**	**Date Match Funds Available** *(Month/Year)*
BID	☐cash ☒in-kind	☒secured ☐pending	$8,000	4/2019
BID	☒cash ☐in-kind	☒secured ☐pending	$12,000	4/2019
Wasco Co. Soil & Water Conservation District	☐cash ☒in-kind	☐secured ☒pending	$6,400	5/2021
OWEB	☒cash ☐in-kind	☐secured ☒pending	$450,000	Winter/Spring 2022
DEQ Loan	☒cash ☐in-kind	☐secured ☒pending	$273,600	Winter/Spring 2022
Total of Match Funds			= $750,000	

X. Storage-Specific Project Requirements (if not a storage project skip this section)

Instructions: If your proposal is for a storage project that will divert water under an existing or new storage water right or limited license, answer questions 21 through 23 in this section. If your proposal is for above-ground storage, also answer question 24 through 26. All other projects can skip this section.

21. Identify Storage Project Type: ☐ Above-Ground ☐ Below-Ground

22. Indicate the capacity of the storage project and any new-developed water below:
    a. What will be the *total* capacity of the storage project in acre-feet after completion? _____
    b. What will be the volume of the *newly-developed* water in acre-feet? _____

23. Answer the following "Yes/No" questions about the storage project.
    a. Will the project divert more than 500 acre-feet of surface water annually? Yes ☐ No ☐
    b. Will the project impound surface water on a perennial stream? Yes ☐ No ☐
    c. Will the project divert water from a stream that supports sensitive, threatened or endangered species? Yes ☐ No ☐

    If you answered "yes" to **any** of the questions above, (a), (b), or (c), the project will need a *Seasonally Varying Flow (SVF) Prescription,* determining the duration, timing, frequency and volume of flows (including ecological base flow), necessary for protection and maintenance of biological, ecological, and physical functions outside of the irrigation season. The Department will establish the SVF prescription after funding is awarded, for more information about this requirement, please contact Technical Coordinator, Rachel LovellFord at 503-986-0941.

24. **Above-Ground Storage Only:** If you answered "yes" to Question 23 (a), (b), or (c) above, your proposed project is above-ground storage, **and** you are requesting **grant** funding then a **minimum of 25%** of the newly developed water must be dedicated to instream use. This is separate from the SVF Prescription. ***If awarded funding, the percentage identified below will be a condition of funding.*** *Note: Any storage project which permanently dedicates water instream will receive a scoring bump in the environmental public benefit category.*

    Please identify the percentage of stored water to be dedicated to instream use. _____%

25. **Above-Ground Storage Only:** Into which stream(s) will the project release water? _____

26. **Above-Ground Storage Only:** How does the project control the outflow from the reservoir? Describe:
    a. What infrastructure governs changes to reservoir outflow rates?
    b. Whether changes to the outflow rate are made automatically or by hand.
    c. If water is released into more than one stream, what controls the rate of release and how much water goes to which stream?
    d. What are minimum and maximum release rates to each water source?
    e. Any other factors that limit the rate at which water is released from the reservoir.

OREGON

WATER RESOURCES DEPARTMENT

2021 SOLICITATION

WATER PROJECT GRANTS AND LOANS

GRANT APPLICATION

APPLICATION DEADLINE: BY 5:00PM ON APRIL 28, 2021

Application must be received by this date and time

Send application electronically to: WRD_DL_waterprojects@oregon.gov

Mail application to:

OREGON WATER RESOURCES DEPARTMENT
Attention: Grant Program Coordinator
725 Summer Street NE, Suite A
Salem, OR 97301

APPLICATION SUBMISSION INSTRUCTIONS

1. Complete Sections I through X in the spaces provided. **Use the Grant Application Instructions and Scoring Criteria when completing your application.** All resources are available at the Water Project Grants and Loans webpage.

2. Taking part in a Pre-Application Conference prior to applying is ***highly*** recommended. The pre-application conference request form is available at the Water Project Grants and Loans, Applications, Forms and Guidance webpage. To learn more contact the Department.

3. Complete and sign the application checklist.

4. An application must be submitted on the attached form provided by the Department and may not be altered for the purpose of formatting or changing the document structure.

5. Please ensure that the Certification portion of Section II is signed with a live signature by the Applicant and, if applicable, the Co-Applicant.

6. Electronic application submission is the preferred method. You may scan a copy of the signed signature page and submit it with your application as long as both documents are included in the same email.

7. If application is submitted in hard copy - use 8 ½" x 11" single sided, unstapled pages. Provide any attachments to the application on 8 ½" x 11" single-sided, unstapled pages.

8. Contact the Department 503.986.0869 or WRD_DL_waterprojects@oregon.gov if you have any questions.

WATER PROJECT GRANTS AND LOANS APPLICATION CHECKLIST

Instructions: Use this checklist to ensure that your application is complete. An incomplete application may be deemed ineligible for further review and consideration. Checklist sections A and B must be completed and the checklist signed in order for your application to be considered complete.

Application Checklist Must Be Completed and Signed

SECTION A - Application

I. Project Information
- ☒ Project name and type(s) is complete and correct.
- ☒ The requested grant amount does not exceed 75% of the total cost of the project.

II. Applicant Information
- ☒ All applicant and co-applicant name(s) and contact information is complete and correct.
- ☒ Application is signed by Applicant/Authorized Person.
- ☒ Application is signed by Co-Applicant/Authorized Person *OR* there is no co-applicant.

Note: *If the project is awarded funding the co-applicant will be required to sign and be party to the grant agreement.*

III. Eligibility
- ☒ All questions have been addressed.
- ☒ The project addresses and instream and/or out-of-stream need.

IV. Project Summary
- ☒ Project summary does not exceed 5 sentences.

V. Project Location
- ☒ All questions have been addressed.

VI. Project Specifics
- ☒ All questions have been addressed.
- ☒ Each project task is identified and includes task schedule, description of task activities, and permits/regulatory approvals needed for the task.

VII. Public Benefits
- ☒ All questions have been addressed.
- ☒ Public benefit is identified in each of the three public benefit categories.

VIII. Project Budget
- ☒ All budget items are allowable costs as identified in the Department's Grant Budget Procedures and Allowable Cost document the OWRD Funding Opportunities Forms webpage.
- ☒ All budget task totals and addition of totals is correct.
- ☒ Key tasks listed in Project Budget (IX) match those identified in Questions 9 & 10.

IX. Match Funding Information
- ☒ Match funding table is complete.

X. Storage-Specific Project Requirements (if applicable)
- ☒ All questions have been addressed *OR* the application is not for a storage project.

SECTION B - Application Attachments

Instructions: Use this checklist to ensure required attachments are included with your application. All attachments to the application must be numbered as well as included in this list. All attachments should have a separate cover sheet identifying the attachment number and name. For all attachments ensure documentation meets any criteria identified in the application instructions or Guidance on Budget Procedures and Allowable Costs. For "other" optional attachments in excess of the three required, include a supplemental list. Consider including optional attachments only if the document is referenced specifically in the application or if it provides specific information needed to supplement an answer to the application questions.

Required Attachments:

☒ Attachment 1 – Site map (Question 2)

☒ Attachment 2 – Property access authorization (Question 4) includes the following:

a) Complete Landowner Agreement form(s) attached for each privately owned property listed.

b) Authorization to implement the project for each publically owned property, or documentation that such authorization is requested.

☒ Attachment 3 – Documentation of matching funds (Section IX) includes the following:

a) Match documentation for all match fund sources listed in the match fund table.

b) Match fund documentation that clearly identifies the dollar amount and describes the work to be accomplished with the match.

Optional Attachments:

☒ Project feasibility documentation (Question 6): Attachment # 4

☒ Letters of support (Question 8): Attachment # 5

☒ Plans, designs, and/or engineering specifications: Attachment # 4

☒ Secured permits and regulatory approvals needed to implement the project (Question 15): Attachment # 6

☒ Other: List of Water Rights Attachment # 7

☒ Other: Ditch Leak Pictures Attachment # 8

☐ Other: Attachment #

All required items within Section A and B of the application checklist are completed and all identified criteria are addressed to the best of my knowledge.

Signature of Applicant/Authorized Person: Eric Nordquist Date: 4/28/2021

Print Name: Eric Nordquist Title: President, BID

OREGON WATER RESOURCES DEPARTMENT

WATER PROJECT GRANTS AND LOANS

GRANT APPLICATION

I. Project Information

Project Name: Highland Ditch Piping Project

Project Type: ☒ Conservation ☐ Reuse ☐ Flow Restoration and Protection
☐ Above-Ground Storage ☐ Below-Ground Storage
☒ Water Infrastructure ☐ Other: _____

Grant Funding Requested (must be no more than 75% of Total Cost of Project): $ 2,250,000

Match Funding (must be no less than 25% of Total Project Cost): $ 750,000

Total Cost of Project: $ 3,000,000

II. Applicant Information

Applicant Name: Badger Improvement District	**Co-Applicant Name:**
Address: P.O. Box 276	Address:
Tygh Valley, OR 97063	
Phone: 541-544-2212	Phone:
Fax:	Fax:
Email: badgerirrigation@hotmail.com	Email:

Principle Contact: Eric Nordquist	**Fiscal Officer:**
Address: P.O. Box 276	Address: P.O. Box 276
Tygh Valley, OR 97063	Tygh Valley, OR 97063
Phone: 541-544-2190	Phone: 541-993-3419
Fax:	Fax:
Email: enfarms2003@gmail.com	Email: joshtdor@gmail.com

Certification: I certify that this application is a true and accurate representation of the proposed work and that I am authorized to sign as the Applicant or Co-Applicant. By the following signature, the Applicant and Co-Applicant (if applicable) certify that they are aware of the requirements of an Oregon Water Resources Department funding award, have read and are aware of conditions within the example grant agreement on the Department's website and are prepared to implement the project, if awarded.

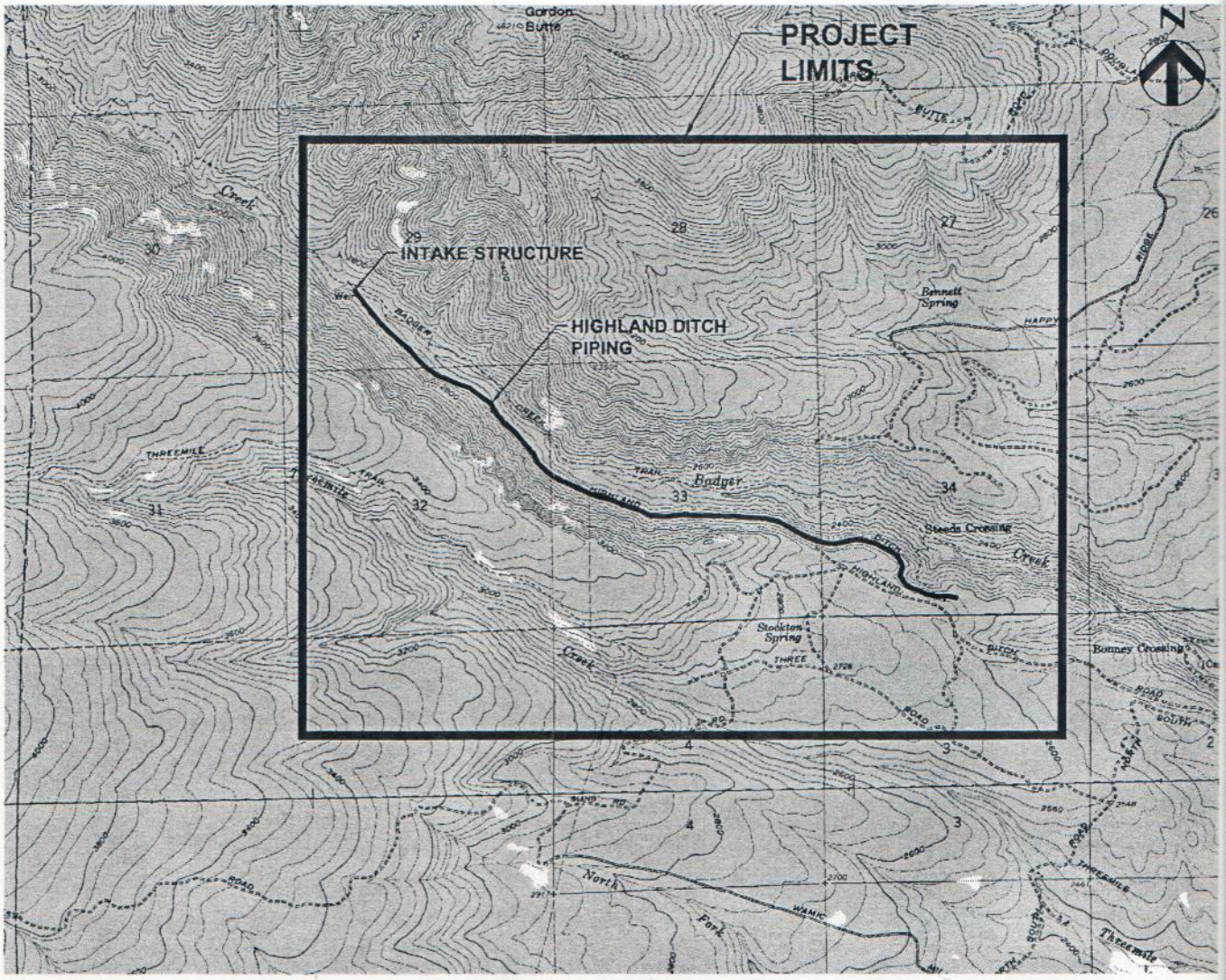
Signature of Applicant/Authorized Person: Eric Nordquist Date: 4/28/2021

Print Name: Eric Nordquist Title: President, BID

Signature of Co-Applicant/Authorized Person: _____ Date: _____

Print Name: _____ Title: _____

NRCS - OREGON
HIGHLAND DITCH PIPING
FINAL DESIGN



36.5 MILES TO THE DALLES →

PROJECT LIMITS
SECTIONS 29, 32, 33, 34, TOWNSHIP 4S, RANGE 11E, BM
WASCO COUNTY,
FLAG POINT

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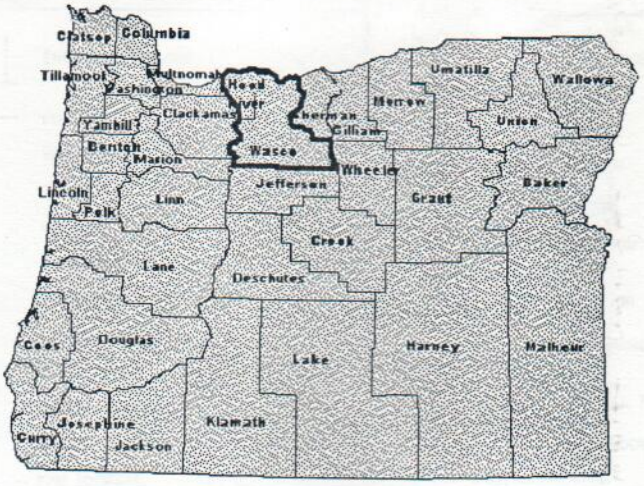
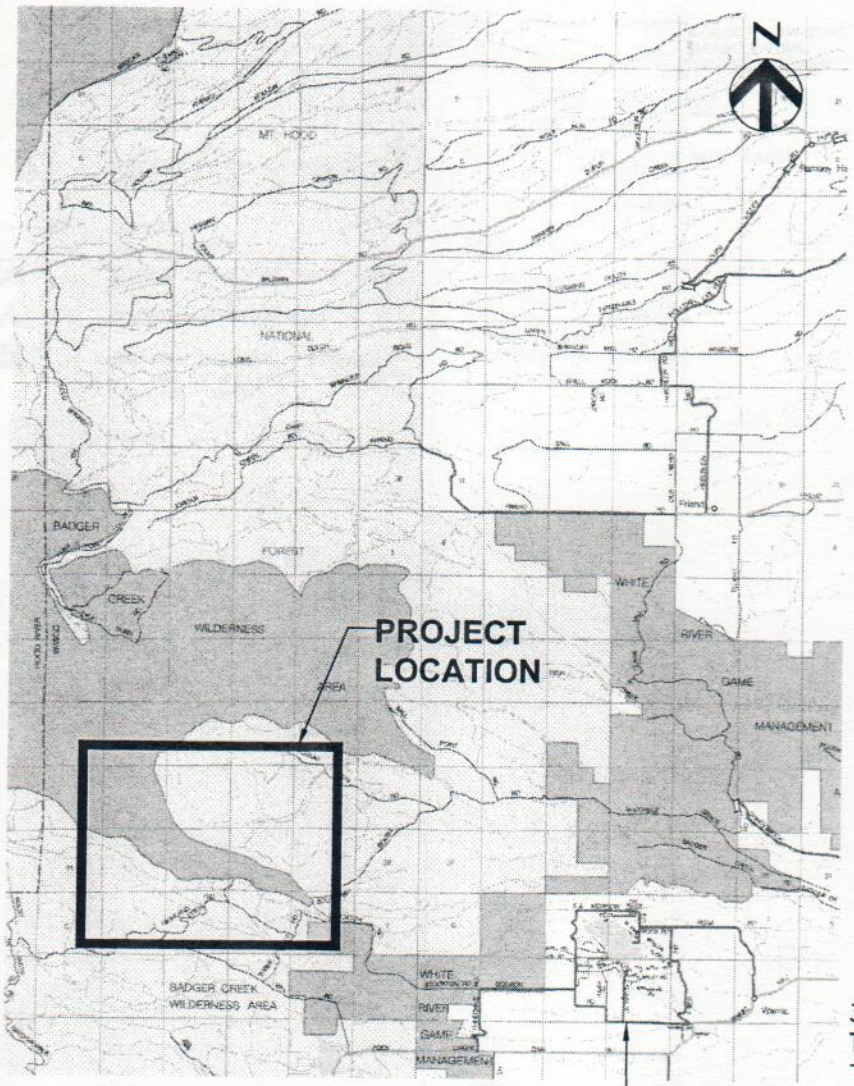
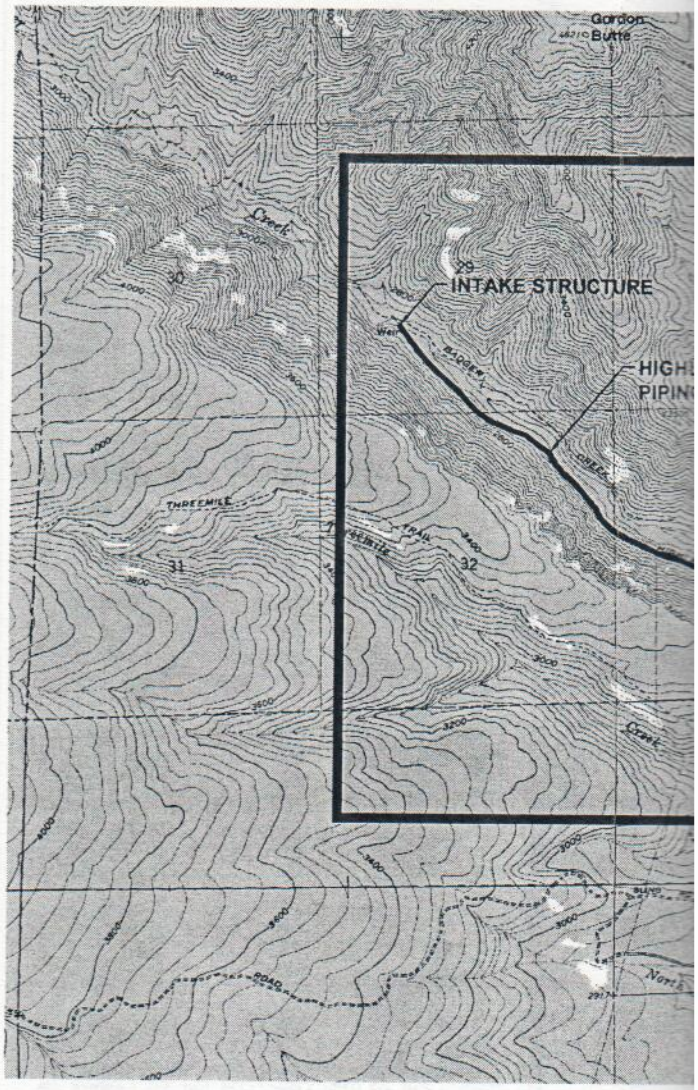
NRCS -
HIGHLAND I
FINAL



LOCATION MAP
NTS



VICINITY MAP
NTS



36.5 MILES TO
THE DALLES

PROJEC
SECTIONS 29, 32, 33, 34, TO
WASCO
FLAG

NO.	DATE	BY	DESCRIPTION

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IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

DESIGNED D. Axness

DRAWN R. Guerrero

CHECKED M. McMillen

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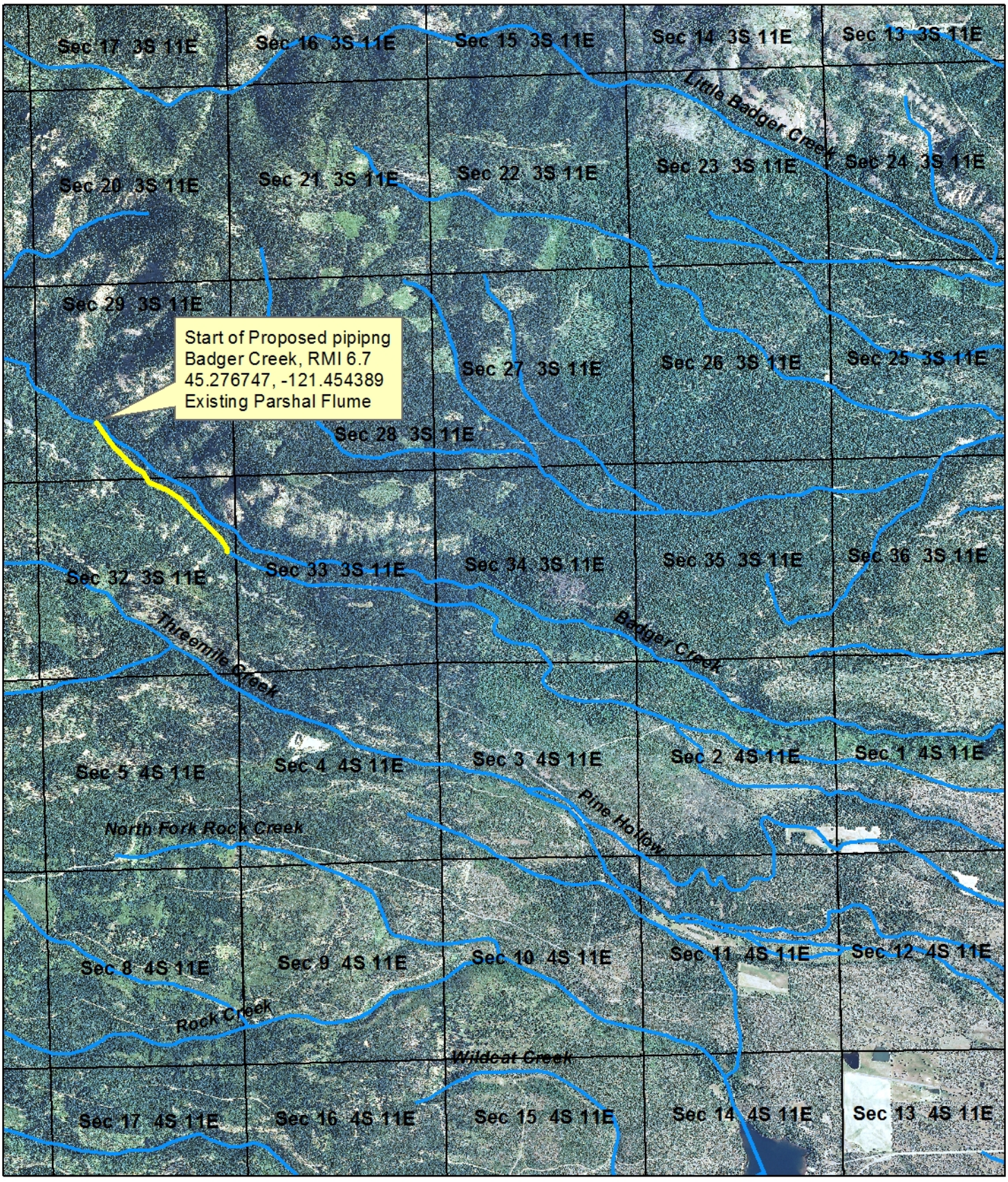
BOISE,

Badger Ditch Piping



Legend

- Streams
- Public Lands Survey

N W E S

0 1,700 3,400 6,800 10,200 13,600 Feet

FS-2700-9a (9/96)
OMB No. 0596-0082

U.S. DEPARTMENT OF AGRICULTURE
Forest Service
AGRICULTURE IRRIGATION AND LIVESTOCK WATERING SYSTEM EASEMENT
Act of October 21, 1976, Act of October 27, 1986
(P.L. 99-545), 36 CFR 251, Subpart B

THIS EASEMENT issued this 13TH day of DECEMBER, 2000, by the **UNITED STATES OF AMERICA**, acting by and through the Forest Service, Department of Agriculture, hereinafter called Grantor, to Badger Improvement District, a Private Corporation, of the State of Oregon, hereinafter called the Holder(s).

WHEREAS, the Holder has applied for an easement under Section 501 of the Federal Land Policy and Management Act of October 21, 1976, as amended by P. L. 99-545 *(90 Stat. 2743; 43 U.S.C. 1761)*, for agricultural irrigation or livestock watering system facilities located on lands owned by the United States on the **Mount Hood National Forest**, in the Counties of **Hood River and Wasco**, State of **Oregon.**

WITNESSETH

WHEREAS, upon acceptance of this easement the Holder relinquishes all right, title, and interest in and to any easement issued for the same lands by the United States by any previous grant or permit.

NOW THEREFORE, the United States does hereby grant, subject to valid existing rights, an easement for occupancy with water conveyance system facilities of lands described below and shown on the plat map as contained in Exhibit "A", Sheets 1 and 2, attached hereto and incorporated herein, as provided by the Holder and hereby accepted by the Authorized Officer.

Certified correct as to consideration,

DESCRIPTION OF WATER SYSTEM

Facility Name: RESERVOIR OF BADGER LAKE and OUTLET:
Dam Height 17 ft., Hazard Class M, 610 Acre Ft. capacity
HIGHLAND DITCH:
Length on National Forest System Lands: 30,238 ft.
Width of Easement: 30 feet (15 ft. each side of centerline)
1 HEADGATE AT DAM LOCATION

Location: LEGAL DESCRIPTION :

RESERVOIR OF BADGER LAKE and OUTLET:
Within: Section 16, Section 20, and Section 21; Township 3 South, Range 10 East, W. M.

HIGHLAND DITCH:
Within: Sections 29, 32, 33, 34; Township 3 South, Range 11 East, W.M.,
Sections 1, 2, and 3; Township 4 South, Range 11 East, W.M.
Section 6; Township 4 South, Range 12 East, W.M.
Counties of Hood River and Wasco, State of Oregon

Acres of Easement:	Reservoir of Badger Lake:	47.5 acres
	Highland Ditch:	20.7 acres
Total Acreage:		68.2 acres

This easement is issued subject to the following terms, provisions, and conditions applicable to the Holder, its permittees, contractors, assignees, and successors in interest.

1. AUTHORIZED USE. This easement authorizes only the right-of-way and water conveyance system facilities as constructed and operated on October 21, 1976, as specified herein.

2. EXTENSIONS or ENLARGEMENTS. This easement does not authorize extensions or enlargements of the water conveyance system.

3. FEES. This easement is issued free of charge.

4. TRANSFERABILITY. This easement is fully transferable provided the water conveyance system facilities are used for agricultural irrigation or livestock watering. Holder shall notify Grantor within sixty (60) days of any address change or change in ownership.

5. TENURE. This easement shall continue for as long as the above described lands and water conveyance system facilities are used, operated, and maintained in accordance with the terms and conditions herein described.

6. OPERATION and MAINTENANCE.

   a. Holder agrees to operate and maintain the facilities and use the authorized easement in accordance with applicable Federal, State, and local laws, regulations, and standards.

   b. Holder shall notify, consult with, and obtain concurrence of the Grantor for operation and maintenance of the authorized facilities.

   c. Holder agrees to install and maintain an operable headgate at each diversion structure. Such headgate shall be capable of controlling the amount of water entering the system.

   d. Holder will not use fire or herbicides on the authorized right-of-way except as permitted in writing by the Grantor.

   e. Holder agrees to operate and maintain the facilities and use the authorized easements in accordance with the attached operation and maintenance plan.

DAM SAFETY

(1) Definitions. The following definitions apply to this clause:

Qualified Engineer. An engineer authorized to practice engineering in the field of dams in the State where the dam is located, either by professional registration as provided by State law or by reason of employment by the State or Federal government.

Dam Failure. Catastrophic event characterized by the sudden, rapid, and uncontrolled release of impounded water. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters which adversely affect a dam's primary function of impounding water may also be considered a failure.

Rehabilitation or Modification. Repair of major structure deterioration to restore original condition; alteration of structures to meet current design criteria, improve dam stability,

enlarge reservoir capacity, or increase spillway and outlet works capacity; replacement of equipment.

Hazard Potential. The classification of a dam based on the potential for loss of life or property damage that could occur if the structure failed **(FSM 7500)**.

Emergency Action Plan. Formal plan of procedures to prevent or reduce loss of life and property that could occur if the structure failed. The plan does not include flood plain management for the controlled release of floodwaters for which the project is designed.

(2) DAM CLASSIFICATION. The dam constructed pursuant to this authorization shall be classified according to its height and storage capacity (water, debris or both) as well as its hazard potential as follows:

Height and Storage Capacity (A, B, C, or D) ____**C**____
Dam Height: **17 Feet**
Storage Capacity: **610 Acre Feet**
Hazard Potential (Low, Moderate, High) : **Moderate**

The hazard potential of the dam shall be reassessed at least every ten years by a qualified engineer retained by the holder, and this information made available to the authorized officer. The Forest Service may change the hazard potential at any time based on changed conditions or new information.

(3) CONSTRUCTION, INSPECTION, CERTIFICATION, AND PROJECT FILES. For construction, rehabilitation or improvement, the holder shall provide for inspection by a qualified engineer to ensure adequate control of the work being performed. At a minimum, the qualified engineer shall maintain a daily inspection diary, descriptions of design changes, and records of construction material and foundation tests.

Upon completion of construction, rehabilitation, or improvement, the holder shall forward to the Forest Service a statement from the qualified engineer responsible for inspection certifying that the works were built in accordance with the approved plans and specifications, or approved revisions thereto. No water shall be impounded until approval is given by the authorized officer.

All design notes, as-built plans, and the aforementioned diaries and records shall be maintained in a project file by the holder for the duration of this authorization, and shall be available to the Forest Service or other inspection personnel.

(4) DAM OPERATION AND MAINTENANCE PLANS. Prior to the storage of water, the holder shall have an approved plan or plans for the operation and maintenance of the dam and appurtenant structures. The plans will, at a minimum, describe operating requirements and procedures to be followed for the operation of the structure; routine or recurring maintenance required; recordkeeping to be performed for operation and

maintenance; and individuals responsible for implementing the plans. The holder shall ensure the plans are available to the individual responsible for plan implementation and the engineer performing any inspection, are reviewed at least at the time of the operation and maintenance inspection and are amended as conditions or requirements so warrant. No plans or amendments thereto shall be valid until approved by the authorized officer.

7. EMERGENCY REPAIRS.

   a. Except for emergency repairs required to protect the environment, property of the United States, or public health and safety, the Holder may not use materials on National Forest System lands outside the easement prior to obtaining written authorization and paying for the materials to be used. Holder's use of material within the easement is limited to maintenance of the water conveyance system facility.

   b. If the water conveyance system facilities authorized by this Easement are allowed to deteriorate to the point of threatening persons or property, and the Holder, after notification by the Grantor, refuses to perform the repairs and maintenance required to remove the threat to persons or property, Grantor shall have the right to undertake such repair and maintenance and to assess the Holder for the costs of such repair and maintenance, regardless of whether Grantor had required the Holder to furnish a bond or other security.

8. INDEMNIFICATION. Holder shall indemnify the United States against liability for any and all injury, loss, or damage, including fire suppression costs, that the United States may suffer as a result of claims, demands, losses, or judgements caused by the Holder's use or occupancy under this easement.

9. LIABILITY. Holder is liable for and agrees to repair damage to National Forest System lands caused by Holder's negligence, intentional acts, or of failure to comply with the terms and conditions of this easement or of any law or regulation applicable to the National Forests.

10. SITE RESTORATION. Holder shall, upon termination of this easement, stabilize the site as required by the Grantor. If Holder does not stabilize the site, the Holder agrees to pay the costs of such stabilization if undertaken by the Grantor.

11. SPECIAL PROVISIONS.
    The reservoir water shall be maintained at a level that will sustain fish and other auquatic life, as well as to provide for public fishing.

The foregoing notwithstanding, this easement is granted subject to the following reservations by Grantor, for itself, its permittees, contractors, and assigns.

A. NONEXCLUSIVE USE. The Grantor reserves the right to use or permit others to use the easement area, provided such use does not unreasonably interfere with the rights and privileges hereby authorized.

B. TERMINATION. This easement may be terminated with consent of Holder, or if Holder fails to exercise the rights and privileges authorized for any continuous period of five (5) years or more. This easement expires according to its terms if Holder uses the water conveyance system for any purpose other than agricultural irrigation or livestock watering. Grantor may take action to terminate this easement under 7 CFR 1.130 - 1.151, for noncompliance with applicable statutes and regulations, or the terms and conditions of this easement.

ACCEPTANCE On this 16 day of November, 2000 I, the undersigned Holder have read, understand, and accept the terms and conditions of this easement.

Holder

The following certificate shall be executed by the Secretary or Assistant Secretary of the Corporation:

I, Suzann B Alsup, certify that I am the Secretary of the Corporation that accepted the above easement; that Suzann R Alsup who signed said easement on behalf of said Corporation was then Secretary of said Corporation; that I know his/her signature, and that his/her signature on said easement is genuine; and that said easement was duly signed, sealed, and attested to for and on behalf of said Corporation by authority of its governing body.

(CORPORATE SEAL)

Suzann R Alsup

(~~Assistant~~) Secretary

IN WITNESS WHEREOF, Grantor, by its Director of Recreation, Lands, and Mineral Resources, Pacific Northwest Region, Forest Service, has executed this easement pursuant to the delegation of authority specified in 7 CFR 2.60, 36 CFR 251.52, and delegation of authority by the Regional Forester published June 23, 1997 (62 F.R. 33826), on the day and year first above written.

UNITED STATES OF AMERICA

Kimberly Ebert Bown, Director, BLM

Recreation, Lands, and Mineral Resources
Pacific Northwest Region
USDA Forest Service

ACKNOWLEDGMENT

STATE OF Oregon)
)ss.
County of Wasco)

On this 16 day of Nov 2000, before me, the undersigned, personally appeared Suzann R Olsup, _____ Director of Recreation, Lands, and Mineral Resources, Pacific Northwest Region, Forest Service, Department of Agriculture, the same person who executed the within and foregoing instrument, who being by me duly sworn according to law, did say that he/she executed said instrument on behalf of the United States of America by its authority duly given and by him/her delivered as and for its act and deed. And he/she did further acknowledge that he/she executed said instrument as the free act and deed of the United States of America, for the purposes and consideration herein mentioned and set forth, and I do hereby so certify.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year first above written.

OFFICIAL SEAL
MARYLN C. SAWYER
NOTARY PUBLIC-OREGON
COMMISSION NO. 060860
MY COMMISSION EXPIRES JAN. 16, 2001

Marylin C Sawyer
Name (Printed) MARYLN C SAWYER
Notary Public for the State of Oregon
My Commission Expires 01-16-2001

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082.

This information is needed by the Forest Service to evaluate requests to use National Forest System lands and manage those lands to protect natural resources, administer the use, and ensure public health and safety. This information is required to obtain or retain a benefit. The authority for that requirement is provided by the Organic Act of 1897 and the Federal Land Policy and Management Act of 1976, which authorize the Secretary of Agriculture to promulgate rules and regulations for authorizing an managing National Forest System lands. These statutes, along with the Term Permit Act, National Forest Ski Area Permit Act, Granger-Thye Act, Mineral Leasing Act, Alaska Term Permit Act, Act of September 3, 1954, Wilderness Act, National Forest Roads and Trails Act, Act of November 16, 1973, Archeological Resources Protection Act, and Alaska National Interest Lands Conservation Act, authorize the Secretary of Agriculture to issue authorizations for the use and occupancy of National Forest System lands. The Secretary of Agriculture's regulations at 36 CFR Part 251, Subpart B, establish procedures for issuing those authorizations.

The Privacy Act of 1974 (5 U.S.C. 552a) and the Freedom of Information Act (5 U.S.C. 552) govern the confidentiality to be provided for information received by the Forest Service.

Public reporting burden for this collection of information, if requested, is estimated to average 1 hour per response for annual financial information; average 1 hour per response to prepare or update operation and/or maintenance plan; average 1 hour per response for inspection reports; logs, facility and user information, sublease information, and other similar miscellaneous information requests. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

ACKNOWLEDGMENT

STATE OF OREGON)
)ss.
County of MULTNOMAH)

On this 13TH day of DECEMBER, 19 2000, before me, the undersigned, a Notary Public in and for said State personally appeared KIMBERLY EVART BOWN, _____ Director of Recreation, Lands, and Mineral Resources, Pacific Northwest Region, Forest Service, Department of Agriculture, the same person who executed the within and foregoing instrument, who being by me duly sworn according to law, did say that he/she executed said instrument on behalf of the United States of America by its authority duly given and by him/her delivered as and for its act and deed. And he/she did further acknowledge that he/she executed said instrument as the free act and deed of the United States of America, for the purposes and consideration herein mentioned and set forth, and I do hereby so certify.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year first above written.

OFFICIAL SEAL
SANDRA DIAZ
NOTARY PUBLIC-OREGON
COMMISSION NO. 338095
MY COMMISSION EXPIRES AUG. 31, 2004

Sandra Diaz
Name (Printed) SANDRA DIAZ
Residing at PORTLAND
My Commission Expires 8-31-2004

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082.

This information is needed by the Forest Service to evaluate requests to use National Forest System lands and manage those lands to protect natural resources, administer the use, and ensure public health and safety. This information is required to obtain or retain a benefit. The authority for that requirement is provided by the Organic Act of 1897 and the Federal Land Policy and Management Act of 1976, which authorize the Secretary of Agriculture to promulgate rules and regulations for authorizing and managing National Forest System lands. These statutes, along with the Term Permit Act, National Forest Ski Area Permit Act, Granger-Thye Act, Mineral Leasing Act, Alaska Term Permit Act, Act of September 3, 1954, Wilderness Act, National Forest Roads and Trails Act, Act of November 16, 1973, Archeological Resources Protection Act, and Alaska National Interest Lands Conservation Act, authorize the Secretary of Agriculture to issue authorizations for the use and occupancy of National Forest System lands. The Secretary of Agriculture's regulations at 36 CFR Part 251, Subpart B, establish procedures for issuing those authorizations.

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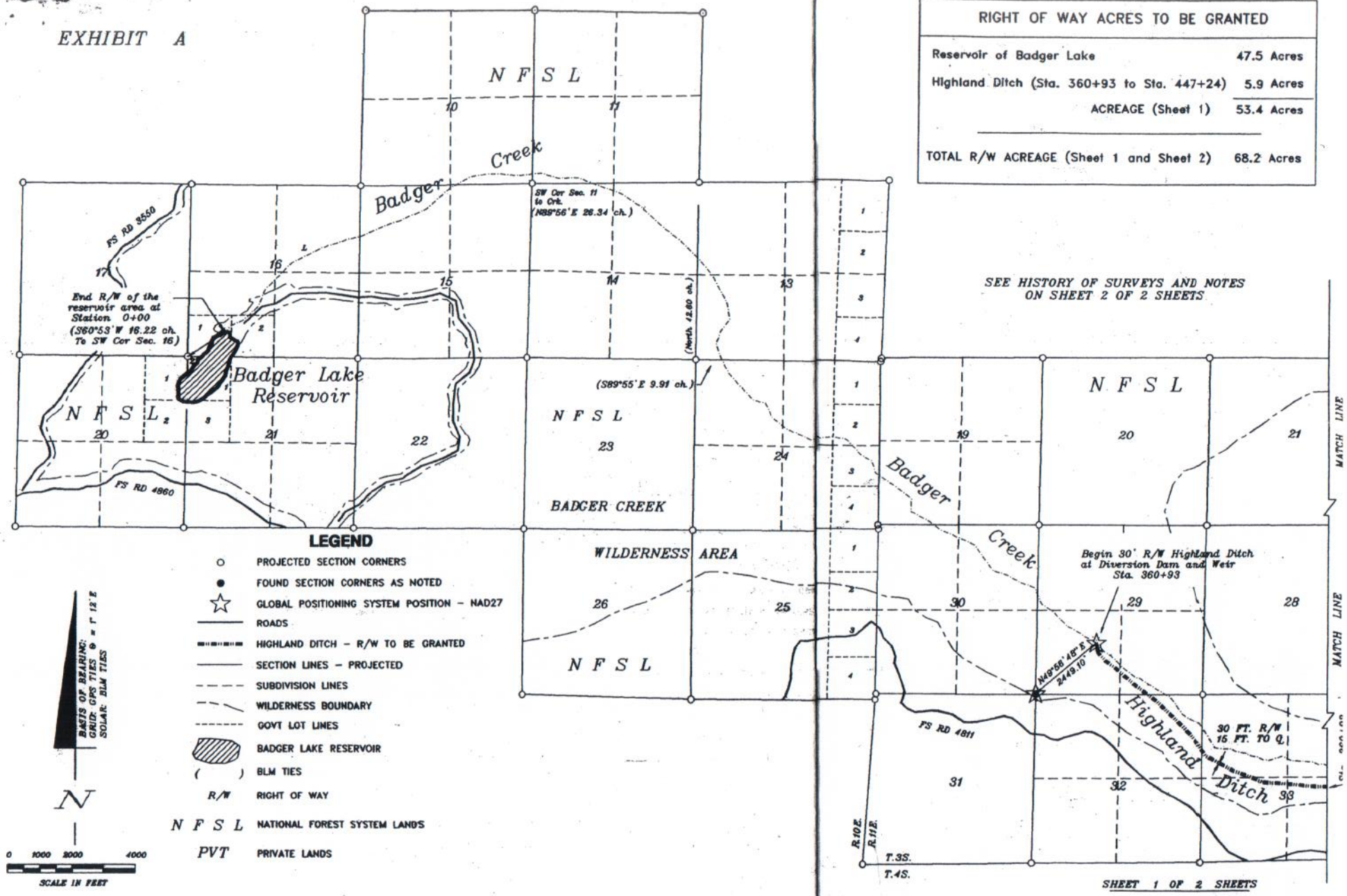
EXHIBIT A



LEGEND

- PROJECTED SECTION CORNERS
- FOUND SECTION CORNERS AS NOTED
- GLOBAL POSITIONING SYSTEM POSITION – NAD27
- ROADS
- HIGHLAND DITCH – R/W TO BE GRANTED
- SECTION LINES – PROJECTED
- SUBDIVISION LINES
- WILDERNESS BOUNDARY
- GOVT LOT LINES
- BADGER LAKE RESERVOIR
- ( ) BLM TIES
- R/W RIGHT OF WAY
- N F S L NATIONAL FOREST SYSTEM LANDS
- PVT PRIVATE LANDS

RIGHT OF WAY ACRES TO BE GRANTED	
Reservoir of Badger Lake	47.5 Acres
Highland Ditch (Sta. 360+93 to Sta. 447+24)	5.9 Acres
ACREAGE (Sheet 1)	53.4 Acres
TOTAL R/W ACREAGE (Sheet 1 and Sheet 2)	68.2 Acres

SHEET 1 OF 2 SHEETS

NATIONAL FOREST SYSTEM LANDS

PROJECT NAME: HIGHLAND DITCH EASEMENT
PROJECT LOCATION:
BADGER LAKE RESERVOIR :
T.3S. R10E. SECTIONS 16,20,21, W.M.
HIGHLAND DITCH :
T.3S. R.11E. SECTIONS 29,32,33,34, W.M.
T.4S. R.11E. SECTIONS 1,2,3, W.M.
T.4S. R.12E. SECTION 6, W.M.
METHOD OF SURVEY
ORIGINAL SURVEY: TRANSIT AND TAPE
CURRENT SURVEY: NIKON NTD-4
GPS TRIMBLE PATHFINDER

SURVEYED BY Donald Kunz DATE 10/95
PLATTED BY N. Phillips DATE 4/96
REVIEWED BY Donald Kunz DATE 5-96
APPROVED BY Jack Hardman DATE 3/20/00

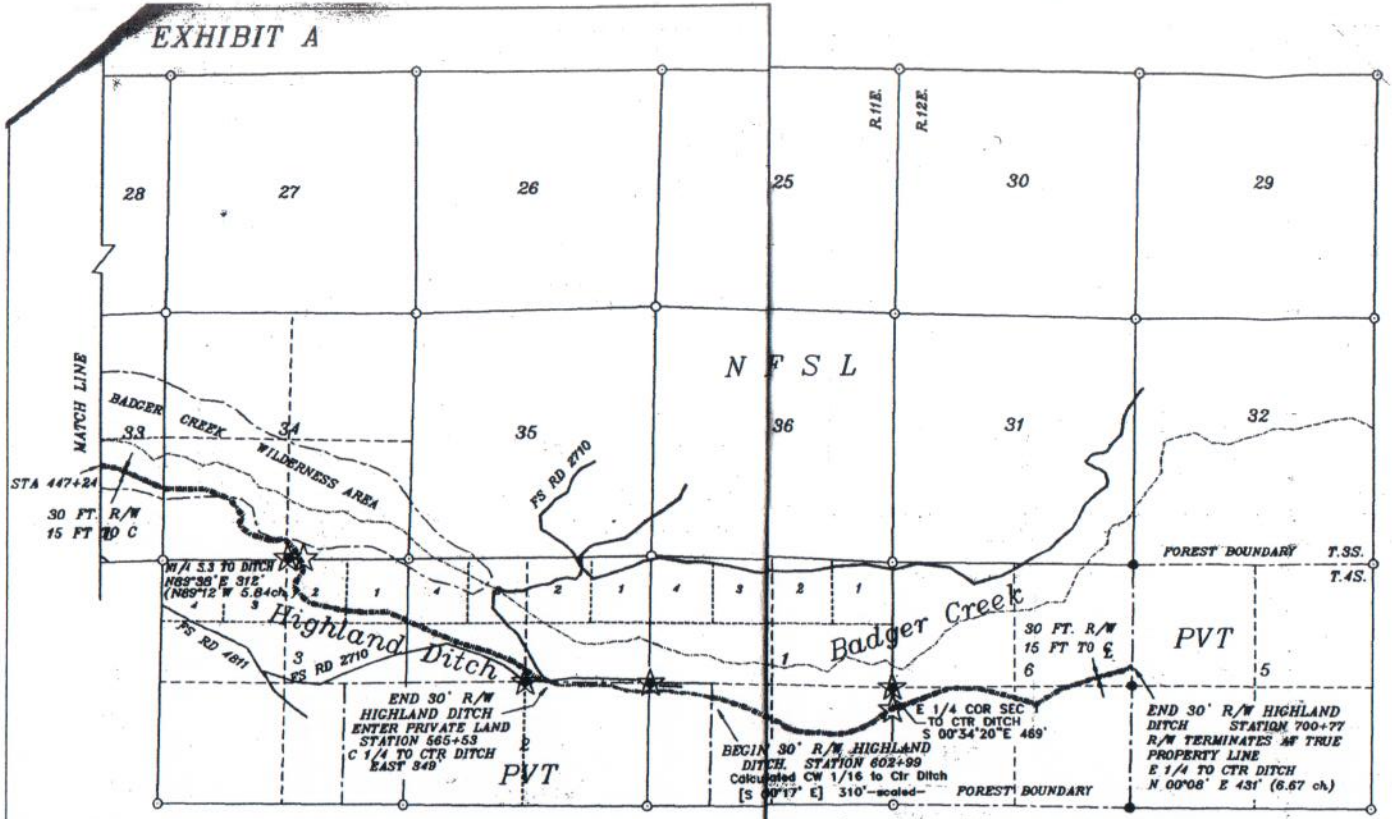
COLUMBIA BOUNDARY MANAGEMENT ZONE
10600 NE 51 CIRCLE
VANCOUVER, WA 98682 PH: 360-891-5171

RESERVOIR OF BADGER LAKE AND HIGHLAND IRRIGATION DITCH EASEMENTS

2730 RIGHT OF WAY GRANT

USDA FOREST SERVICE REGION 6
MOUNT HOOD NATIONAL FOREST
BARLOW RANGER DISTRICT
HOOD RIVER AND WASCO COUNTIES, OREGON

EXHIBIT A



0 1000 2000 4000

SCALE IN FEET

BASIS OF BEARING:
GRID: GPS TIES 0 = 1° 12' E
SOLAR: BLM TIES

N

LEGEND

- PROJECTED SECTION CORNERS
- FOUND SECTION CORNERS AS NOTED
- GLOBAL POSITIONING SYSTEM POSITION – NAD27
- ROADS
- HIGHLAND DITCH – R/W TO BE GRANTED
- SECTION LINES – PROJECTED
- SUBDIVISION LINES
- GOVT LOT LINES
- ( ) BLM TIES
- [ ] GLO TIES
- FOREST BOUNDARY
- WILDERNESS BOUNDARY
- R/W RIGHT OF WAY
- N F S L NATIONAL FOREST SYSTEM LANDS
- PVT PRIVATE LANDS

RIGHT OF WAY ACRES TO BE GRANTED	
Highland Ditch (Sta. 447+24 To Sta. 565+53)	8.1 Acres
Highland Ditch (Sta. 602+99 To Sta. 700+77)	6.7 Acres
ACREAGE (Sheet 2)	14.8 Acres
TOTAL R/W ACREAGE (SHEET 1 AND SHEET 2)	68.2 ACRES

NOTES

This plat covers an area within Mt. Hood National Forest, Barlow Ranger District. It is in Hood River and Wasco Counties, Oregon.

The purpose of this survey was to locate that portion of Badger Lake, and Highland Irrigation Ditch in T.3S. R.10E. Sections 16,20,21; T.3S. R.11E. Sections 29, 32, 33, 34; T.4S. R.11E. Sections 1,2,3; T.4S. R.12E. Section 6; Willamette Meridian on National Forest System lands, to grant an easement to the Badger Improvement District.

All portions of Badger Lake,and Highland Irrigation Ditch are located within the boundaries of NFSL with the exception of a portion of Highland Ditch on private land in T.4S. R.11E. Sections 1 and 2.

Location of Badger Creek & Highland Ditch as shown is based

1) Ownership and Diversion Plat, Badger Improvement District, Wamic, Wasco County, Oregon, No. 9–4–990A, 12–11–39, which is referenced to the E. R. Wilson survey plat of Highland Ditch, July 1914.

2) BLM ties to Badger Creek and Highland Ditch.

3) USFS ties to Badger Creek and Highland Ditch.

4) Section lines, corners and features as digitized from USDA Forest Service Quadrangle Maps: Badger Lake 1979, Flag Point 1962, Friend 1962, Wamic 1962, and Rock Creek Reservoir 1962.

Ditch ties are to the centerline of Highland Ditch. GPS Pathfinder positions were differentially corrected to Portland Base Station. Accuracy is 2 meters RMS.

Survey notes and documents for this survey are located at the Forest Headquarters, Gifford Pinchot National Forest, 6926 E. Fourth Plain Boulevard, Vancouver, WA 98668–8944.

The Right of Way being granted includes Badger Lake, T.3S. R.1 Willamette Meridian, and the Highland Irrigation Ditch. The rout extends from and terminates at the true property lines. The ri of way granted is 30 ft. wide, 15 ft. on each side of the cen line of the Highland Ditch.

HISTORY OF SURVEYS

The original survey of the Highland Ditch was made June–July 1914 by E. R. Wilson, Surveyor, Wamic, Oregon. The plat based on that survey was referred to by the later Ownership and Diversion Plat of the Badger Improvement District, Wamic, Wasco County, Oregon, dated 12–11–39, Drawing No. 9–R–990A.

GLO and BLM Surveys of this area made numerous ties to Badger Creek and Highland Ditch. They include:

The subdivisional survey of T.3S. R.10E. and the meander survey of Badger Lake by Leonard Carter in 1939.

The subdivisional survey of T.3S. R.11E. by Robert A. Emmitt 1901,

The dependent resurvey of parts of T.4S. R.11E. and T.4S. R.12E. by Gerald E. Chittick 1969.

The remonumentation survey of T.4S. R.11E. and T.4S. R.12E. by James E. Jelley 1965.

A boundary survey, Bonney Crossing Cadastral, by James R. Tye Sun Country Engineering, Bend, Oregon 1987, for the USDA–Forest Service in T.4S. R.11E. Sections 1,2,3 and T.4S. R.12E. Section 6.

The GPS Trimble Pathfinder ties to verify the locations of Badge Creek and Highland Ditch were made by the Columbia Boundary Management Zone in October 1995.

NATIONAL FOREST SYSTEM LANDS

PROJECT NAME: HIGHLAND DITCH EASEMENT
PROJECT LOCATION:
BADGER LAKE RESERVOIR :
T.3S. R10E. SECTIONS 16,20,21, W.M.
HIGHLAND DITCH :
T.3S. R.11E. SECTIONS 29,32,33,34, W.M.
T.4S. R.11E. SECTIONS 1,2,3, W.M.
T.4S. R.12E. SECTION 6, W.M.
METHOD OF SURVEY
ORIGINAL SURVEY: TRANSIT AND TAPE
CURRENT SURVEY: NIKON NTD–4
GPS TRIMBLE PATHFINDER

SURVEYED BY Dennis Kent DATE 10/25
PLATTED BY D. Killion DATE 4/96
REVIEWED BY Dennis Kent DATE 5-96
APPROVED BY Jack Pettington DATE 3/20/00
FOREST LAND SURVEYOR
FOREST ENGINEER

COLUMBIA BOUNDARY MANAGEMENT ZONE
10600 NE 51 CIRCLE
VANCOUVER, WA 98682 PH:360.891.5171

RESERVOIR OF BADGER LAKE AND HIGHLAND IRRIGATION DITC EASEMENTS
2730 RIGHT OF WAY GRANT
USDA FOREST SERVICE REGION 6
MOUNT HOOD NATIONAL FOREST
BARLOW RANGER DISTRICT
HOOD RIVER AND WASCO COUNTY, OREG

USDA-Forest Service
Badger Improvement District, Inc.
Badger Lake Dam and Highland Ditch

Operation and Maintenance Plan
Part 1 of 2: Process and Definitions

Operation

Badger Improvement District, hereinafter called the Operator, shall update the Forest Service annually on their plan of operation. This plan shall include the approximate irrigation season when ditches are in use, proposed periods of shutdown for planned maintenance, and times when dams and head gates will be opened and closed.

Maintenance

The Operator may perform emergency repairs and short-term maintenance as described below without contacting the Forest Service. Should the scope of work exceed routine work)or require heavy machinery), the Forest Service shall be contacted for approval.

The Forest Service and the Operator shall meet annually on the first of March or April, weather permitting, to agree on the general work plan for that operating season which follows a maintenance plan for the Badger Lake dam and the Highland ditch system on National Forest land. That Plan will be developed from the condition survey of the ditch system. The condition survey shall be conducted jointly by the Forest Service and designated representatives of the Operator at least once every five (5) years. Photographs and legal descriptions shall be used to document problem areas.

The Maintenance Plan shall identify the proposed methods for repair or upgrade as well as types of equipment to be used no larger that a DR cat or backhoe. Sources for emergency rock and fill material shall be identified. The Forest Service will advise the operator of seasonal closures or other restrictions in place that would affect the scheduling of maintenance. The Maintenance Plan should be updated and modified as work is completed.

The Maintenance Plan will have 3 components – Short Term Maintenance, Long Term Maintenance, and Emergency Repairs. They are defined as follows:

Short Term Maintenance:

This includes the schedule of work to be completed during the current year, routine maintenance, and the approximate date of the annual ditch walk.

Long Term Maintenance:

This is the schedule for major ditch upgrading. Projects involving heavy equipment other than a backhoe or cat, off road work, timber falling, etc., requires review by other FS personnel. It is important that planned work be identified as far in advance as possible.

Emergency Repairs:

This includes a contingency plan for repairs of an emergency nature. An emergency is an event that is currently causing or could cause environmental damage or a threat to water delivery. In the event of an emergency, the Forest Service at the Barlow Ranger District office in Dufur will be contacted by the Operator. While contact is being made, the Operator can initiate action within the easement. The Operator will contact the Forest Service by telephone and facsimile at (541) 467-2291.

USDA-Forest Service
Badger Improvement District, Inc.
Badger Lake Dam and Highland Ditch

Operation and Maintenance Plan
Part 2 of 2: Condition Survey and Schedule of Maintenance

Condition Survey

A condition survey needs to be done and will be attached to this plan. The last survey was done in September of 1988. Last inspection of the Badger Lake dam was done in 1979. A survey will be planned for the spring of 1999 or 2000.

Short Term Maintenance

During the annual inspection of the ditch and dam, trees and shrubs up to 6" diameter may be cut on the downhill side of the berm. Blowdown trees of any size across the ditch may be removed from the ditch bank to the toe of the term. Bucked sections will be removed from the ditch and placed so they will not roll back into the ditch. All cut material will be left on site. From the annual inspection, weak spots in the ditch bank should be identified that will require attention during the current year to prevent a breach. Equipment and materials needed for these repairs other than a backhoe or small dozer (DR cat or smaller) will be discussed at this time. Use of heavy equipment in addition to the backhoe and small dozer within the easement or any equipment outside the easement will require prior Forest Service notification and approval.

Seasonal restrictions may apply for use of power equipment along certain sections of the ditch or at the damsite for high fire danger or wildlife nesting concerns.

Long Term Maintenance

No plans at this time. Annual repairs to existing alignment as needed.

The Forest Service shall be contacted prior to performing any maintenance not listed in the Maintenance Plan and/or any changes in the methods and types of equipment listed in the Maintenance Plan.

Emergency Repairs

Except for emergency repairs required to protect the environment, property of the United States, or public health and safety, the Operator may not use materials on National Forest System lands outside the easement prior to obtaining written authorization and paying for the materials to be used. Operator's use of material within the easement is limited to maintenance of the water conveyance system facility. The Forest Service will be contacted when any emergency repairs

are necessary. the annual operating plan will identify the contact person and current phone numbers for notification.

Source of Rock and Fill Material

Have yet to be identified.

Seasonal Closures and/or Other Restriction

Modification of this agreement will not be made without the written consent of both parties.

Paul W. Bryant
District Ranger

Badger Improvement District, Inc.
President

Attachment 3- Documentation of matching funds (Section IX)

Plan and Timeline for Pending Funding Sources:

In addition to applying for an OWRD grant for the Highland Ditch Piping Project, Badger Improvement District will be applying for an OWEB Restoration Grant and a DEQ loan from The Clean Water State Revolving Fund to supply the needed 25% in matching funds.

The OWEB grant is due in the fall of 2020 and BID will apply for a restoration grant for $450,000.

The DEQ loan application is due August 13, 2021 or December 10, 2021. We are eligible as an Irrigation District for this loan program and will apply by the deadline for $300,000.

BADGER IMPROVEMENT DISTRICT
P.O. Box 276
Tygh Valley, OR 97063
541-544-2212

May 25, 2020

Pending Match Funding Resources for the Highland Ditch Piping Project

We have requested administrative support from Wasco County Soil and Water Conservation District. They have indicated via attached support letter that they would contribute 160 hours. An hourly rate was verbally indicated to be around $40/hour for a value of $6400 for this project. There is not a hard date that these funds will become available as no actual monies for services will be exchanged.

Eric Nordquist
President, BID

BADGER IMPROVEMENT DISTRICT
P.O. Box 276
Tygh Valley, OR 97063
541-544-2212

May 28, 2020

Match Funding Source for the Highland Ditch Piping Project

The members of the Badger Improvement District voted again at their most recent meeting on March 07, 2020 for the Board to proceed with the OWRD Grant. They were supportive of and committed to the $20,000 cash and in-kind contribution towards the Highland Ditch Piping Project.

Eric Nordquist
President, BID

Highland Ditch Piping

Diversion from Badger Creek

Tygh Valley, Oregon

Approximately 9.7 Miles NW of Wamic, Oregon

FINAL REPORT

Prepared by:

ME | McMillen Engineering
910 Main Street, Suite 258
Boise, Idaho 83702

October 2005

TABLE OF CONTENTS

APPENDICES

Highland Ditch Piping
Diversion form Badger Creek
Tygh Valley, Oregon

Approximately 9.7 Miles Northwest of Wamic, Oregon

October 2005

1.0 INTRODUCTION

1.01 Purpose
The purpose of this Design Report is to document the development of the design and construction documents for piping approximately 14,300 lineal feet of the existing Highland Ditch. The ditch is located in portions of the sections 29, 32, 33 and 34; Township 4 South, Range 11 East; BM. The project starts at the diversion of Highland Ditch from Badger Creek which is located approximately 9.7 miles northwest of Wamic, Oregon and ends approximately 7.1 miles northwest of Wamic where the new pipe line will discharge into the existing Highland Ditch. From the end of the piping project, the ditch flows approximately 6 miles to Pine Hollow Lake.

The existing ditch conveys approximately 30 cfs of water down stream to the collection facility at Pine Hollow Lake. Water is then used to irrigate land in the Tygh Valley area. The ditch company directed that the design be based on passing 30 cfs through the project area.

1.02 Scope
The irrigation system design presented within this design report includes the following:

- Project Photographs
- Hydraulic Design
- Optional Fish Screen Preliminary Design Drawings
- Construction Plans (22"x34" sheets)
- Ditch Boring and Pipe Layout Details
- Oregon NRCS Construction Specifications
- Operation and Maintenance Requirements
- Quality Assurance Plan

1.03 Background
Highland Ditch delivers water from a diversion structure located on Badger Creek to Pine Hollow Lake several miles down stream which distributes water to irrigators in the Tygh Valley. The ditch company's water rights allow up to 53 cfs to be diverted however, the ditch company diverts a maximum of 30 cfs during normal operation. This design is based on delivery of 30 cfs as directed by the ditch company.

The beginning of the Highland Ditch Piping project is located approximately 9.7 miles northwest of Wamic, Oregon at the diversion of Highland Ditch form Badger Creek and ends

approximately 7.1 miles northwest of Wamic, Oregon (see project photographs, Appendix 1). The project includes the removal of the existing diversion structure located at the beginning of the Highland Ditch, construction of new headworks, and installing approximately 14,300 lineal feet of 30 inch plastic pipe (PVC C-905 or class 50 HDPE pipe).

Highland Ditch was constructed prior to the designation of the surrounding area as a Wilderness Area. The ditch falling within the project area has experienced failures in the past due to landslide blockage and dike failures. The topography is steep within the project area with several sections located within active rock slide areas. Access to the ditch is limited to the ditch making maintenance activities difficult. The pipeline project is designed to replace the ditch in the area most sensitive to failure. The U.S. Forest Service (USFS) included replacing Highland Ditch with a pipe line in their most recent environmental assessment addressing steelhead recovery on Forest Service lands.

1.04 Pertinent Data

Table 1 presents a summary of the pertinent data for the Highland Ditch Piping project.

Table 1. Pertinent Data

Project Name	Highland Ditch Piping
Legal Description	Township 4S; Range 11E. Section 3. BM: Sections 29,32,33 &34
7.5' Quadrangle	Flag Point
County	Wasco
Nearest City	Wamic, OR
Job Class	430 – EE – III
Contact Person	Jim Nordquist (541) 296-9666

2.0 CONCEPTUAL LEVEL FEASIBILITY ANALYSIS

2.01 Alternative Analysis

Two piping material options were considered, Polyvinyl Chloride (PVC) and High Density Polyethylene (HDPE) for piping the existing ditch. These piping options were based on passing a minimum of 30 cfs through the inlet structure and piping system with a gravity pressure pipeline. The pipeline will not have downstream control valves.

The preliminary cost estimate for the pipe and some of the related ditch work was $1.33 million for the PVC and $1.40 million for the HDPE options.

PVC pipe materials are produced in standard 20 foot lengths which can be moved up the alignment and installed in a continuous operation. Sections of pipe and required pipe elbows can be placed and assembled with minimal effort and small equipment.

The HDPE pipe system is fabricated in 50 foot sections with each pipe joint welded together. The welder would take approximately 1.5 hours per joint to setup, weld and stage to the next joint. The welding operation reduces daily installation production. If the pipe was to be welded at a central location it may be difficult to pull the pipe up the length of the project as well as join the

pipe with the multiple elbows. Overall, production would be reduced by the joint welding requirements and limited construction access space, and maintaining safe working conditions.

The preliminary estimates were based on prices quoted by the individual manufacturer's quotes and petroleum prices as of September 30, 2005. One representative stated that their prices had increased 7% since they provided the quote and they were expecting additional increases in the near future. The overall cost estimates could increase due to increases in raw material costs, such as steel and petroleum.

Optional Design Features Fish Screen Option and 6' X 14' Collection Box

Included in Appendix 3 are two **preliminary** designs to construct either a 20 foot long fish screen or a grated 6 foot by 14 foot collection box and related items. The preliminary design allows for the fish screen or the collection box to be added at a later date or could be constructed as part of the project without having to reconstruct any portion of the new intake structure or make changes to the rock weir proposed in Badger Creek. For either option, the construction plans would need to be advanced to 100% final design prior to being constructed. Neither of these alternatives was included in the construction drawings.

2.02 Proposed Alternative Description

The proposed alternative presented in the construction drawings is to remove the existing concrete ditch intake and diversion structure constructing a new concrete intake structure and rock weir along with installation of approximately 14,300 lineal feet of 30 inch PVC buried pipeline in Highland Ditch. The proposed alternative consists of replacing the existing intake/diversion structure with a concrete intake structure and rock weirs. The intake structure would deliver water into two 30 inch PVC pipes. These pipes would empty into a flume, combining flows into a 30 inch PVC pipe. This pipe would deliver the water approximately 14,300 feet ending in the Highland Ditch.

2.03 Proposed Alternatives Evaluation

Piping of the ditch will reduce the amount of daily maintenance, reduce erosion and seepage, and protect the ditch bank from failure and impacting the surrounding Wilderness Area. This alternative conforms with the recommendations of the USFS.

Table 2 presents a cost estimate for completing the work based on the September 30, 2005 petroleum prices plus a 7% increase. The pipe cost includes pipe line excavation, pipe bedding, furnishing and installing the pipe, pipe trench backfill and compaction.

Table 2. Opinion of Probable Cost

Item No.	Item	Amount	Units	Unit Cost	Cost
1	30 inch C-905 PVC Pipe	14,225	LF	$110.00	$1,564,750
2	11¼ Degree Pipe Elbow	66	EA	$1,700.00	$112,200
3	22½ Degree Pipe Elbow	27	EA	$1,700.00	$45,900
4	30 Degree Pipe Elbow	12	EA	$1,700.00	$20,400
5	45 Degree Pipe Elbow	5	EA	$1,700.00	$8,500
6	60 Degree Pipe Elbow	1	EA	$2,000.00	$2,000
7	30" C-10 Canal Gate	3	EA	$3,000.00	$9,000
8	Stop logs	1	LS	$6,000	$6,000
9	12" Fabric wrapped PVC Perforated Pipe	200	LF	$30.00	$6,000
10	12" PVC Pipe	350	LF	$25.00	$8,750
11	Filter Fabric	230	SY	$6.00	$1,380
12	2" Drain Rock	45	CY	$20.00	$900
13	12" Drop Inlet Spring Connection	1	EA	$600.00	$600
14	12" Drop Inlet	13	EA	$575.00	$7,475
15	6" of 4" Minus Gravel	800	CY	$15.00	$12,000
16	Ditch Backfill	11,800	CY	$5.00	$59,000
17	Rip-Rap Pipe Outlet	1	LS	$2000.00	$2000
18	Remove Existing Headwall and Disposal of Structures	1	LS	$7,500.00	$7,500
19	Rock Weir Badger Creek	1	LS	$20,000.00	$20,000
20	New Intake Structure	1	LS	$28,000.00	$28,000
21	Sub – Total				$1,922,355
23	10% Contingency				$192,235

Estimated Total **$2,114,590**

3.0 BASIS FOR DESIGN

3.01 Topography

The project begins approximately 9.7 miles northwest of Wamic, Oregon (5.7 miles west Tygh Valley, Oregon) where the Highland Ditch is diverted from Badger Creek. The Highland Ditch is the furthest upstream diversion on Badger Creek. The new pipeline follows the existing ditch alignment horizontally and vertically to keep the pipeline within the existing narrow easement. Highland Ditch follows along the hillside with steep slopes uphill and down hill for most of the project and as a result, the workable area for construction activities ranges from 15 to 20 feet wide. The area on either side of the ditch easement is classified as Wilderness Area and access for construction will not be allowed.

Highland Ditch falls from approximate elevation 2660 feet from the Flag Point Quadrangle (for purposes of the design assumed elevation 1546) to elevation 2610 feet (for purpose of the design assumed elevation 1496) or approximately 50 feet over the length of the project. The ditch follows the hillside above Badger Creek which is located southerly from Gordon Butte in the Mt. Hood National Forest.

3.02 Pipeline Criteria

3.02.1 Pipeline purpose

The pipeline is intended to deliver water from the diversion structure to the existing ditch downstream from the sensitive areas. The reason for piping the ditch is to reduce or eliminate the chance of a ditch bank failure primarily in the Badger Creek Wilderness Area. In addition, minor ditch losses will be eliminated. Overall, operation and maintenance activities will be decreased reducing the annual maintenance cost of the project.

3.02.2 Pipeline Layout

The existing ditch is constructed along a very steep hillside (see project photos and cross section information in Appendices 1 and 6). The ditch was constructed by blasting and excavating through the hillside. Over the years, hillside soil and rock has fallen into the ditch and been disposed of in the downhill ditch bank.

The ditch company has an easement of 12 feet on each side of the ditch centerline. The USFS has shown a willingness to negotiate temporary additions to the easement in specific locations to support the pipeline construction.

The cut bank is quite steep in most locations (see cross sections in Appendix 6 sheets X-1 to X-19). The layout of the pipeline is controlled by reducing impact to the cut slope and the steep downhill fill slope by placing the new pipeline within 4 feet of the existing ditch centerline.

3.02.3 Pipeline Hydraulics

The pipeline falls approximately 50 feet along it's length of 14,300 feet. The existing ditch average slope is approximately 0.287% along the total length. The pipe line does not have any downstream controls (valves). The pipeline is designed as a low pressure pipe for flows in excess of 28 cfs. For flows less than 28 cfs the pipeline is designed as an open channel. (Refer to section 6.0 Hydraulic Design)

3.02.4 Constructability

There are several issues to be considered when constructing this project including but not limited to:

1. A limited work area
2. The ability to excavate the trench to lay the pipe
3. Store materials
4. Stage equipment
5. Maintain erosion control requirements

6. Limited construction season after irrigation water is out.

When considering the easement area of the project, and the existing back slope and the adjacent wilderness area designation, there is approximately a15 feet wide strip of land upon which the project can be constructed.

Based on the soils information from October 2005 as shown in Appendix 4, it is estimated that at least 30% to50% of the project may require rock excavation to install the pipe. One method of construction is to use a track mounted trenching machine or rock saw. Additional geotechnical investigation work would be recommended to determine the location and volume of rock excavation.

Pipe bedding and pipe trench backfill materials meeting the NRCS requirements may be difficult to find without importing the necessary material. It has been specified that the contractor may use on-site materials in lieu of importing materials if they can meet the required specifications. One way to accomplish this is to utilize a small mobile screen to produce the needed materials.

As shown in Section 2.0, Conceptual Level Feasibility Analysis, either the 30 inch PVC or 30 inch HDPE pipe will provide the required flows in the pipeline. Of the two the PVC pipe will have the least down time during construction due to the method for joining the pipe sections. HDPE pipe will require more time to install as a result of the required welding of each joint.

3.03 Structure Design

3.03.1 Structure Purpose

The structures are designed to function together to control and screen the water entering the pipeline. The intake structure and flume provide flow control, trash removal and access to the stream and intake trash rack. The fish screen and collection box shown at a preliminary design level provide an additional level of screening to protect fish. This proposed fish screen, if built, will remove fine debris and guide fish back to Badger Creek.

3.03.2 Layout

The structures layout was developed to minimize impact to the hydraulics and sediment transport of Badger Creek while delivering clean water to the pipeline. The intake structure is oriented nearly parallel to the stream centerline and provides a low level trash rack as well as a grated access. The grated access can also function as a high level trash rack a future fish screen. (See Appendix 3 Optional Fish Screen Preliminary Drawings)

3.03.3 Code and Assumptions

The following codes, standards, and specifications will serve as the general design criteria for structural design for the project. The applicable version of each document is the latest approved edition unless noted otherwise.

The structural design, engineering, materials, equipment, and construction will conform to the following codes and standards:

Table 3. Applicable Standards

AISC	American Institute of Steel Design
AWWA	American Waterworks Association
ACI 350-01	American Concrete Institute, Code Requirements for Environmental Engineering Concrete Structures
SEI/ASCE7	Minimum Design Loads for Buildings and Other Structures
IBC 2003	International Building Code
ACI 318-05	American Concrete Institute, Building Code Required for Structural Concrete

The material properties assumed for preparation of the conceptual design and applicable for final engineering are:

Table 4. Miscellaneous Requirements

Structural Steel	
Structural steel	Supports, guides, wide flange sections, ASTM A992
Other shapes and plates	ASTM A36
Bolts	ASTM A325 hot-dip galvanized, anchors-ASTM A36, A307 or stainless steel
Anchor Bolt Expansion	AISI 1038, AISI 1144 – ER 4627
Anchor bolt epoxy	Two component epoxy, ASTM C-881
Miscellaneous Metals	
Grating	Hot dip galvanized steel
Handrails	Hot dip galvanized steel
Concrete	
Concrete f'c	4000 psi, normal weight
Rebar	Grade 60

The general loads considered in the design of the structures are summarized in the following table. These loads, plus site specific loads, will be grouped into various loading conditions to assess factors of safety.

Table 5. Load Requirements

Dead Load (DL)	The structural system for all project elements will be designed and constructed to support all dead loads, permanent or temporary, including but not limited to self weight, pipe systems, fixed mechanical, walkways, and railings.
Live Load (LL)	Live loads during construction and operation consist of; workers on the structure and other temporary stored equipment on the project elements based on 20 lbs. per square foot.
External Hydrostatic Loads	A triangular distribution of static water pressure is assumed to act normal to the upstream faces of all screen panels, stoplogs, and gate and concrete structures.
Buoyancy Loads	Structures will be designed to resist upward hydrostatic pressures from high groundwater or river levels.
Earthquake Loads (E)	Earthquake loads will be selected based on the IBC (2003) related maps and tables. The seismic assessment will consider the site geology, proximity to major faults, regional seismic history, and seismic risk. Seismic factor I_E=1.0, Site Class D
Impact Loads	In stream structures will be designed to resist impact loads from logs and other debris carried in the river system.

Snow Loads (SL)	The structures will be designed to carry the applicable snow load of 50 per square foot. Grating area will be treated as impervious surface with no reductions applied for the open area of the grating surface.
Wind Loads (W)	Wind loads will be applied only to elevated structures. For elevated structures, wind loads will be computed per the IBC (2003) using a 3 second wind gust of 90 miles per hour. Exposure C, wind loads will be compared to the seismically induced forces and used if critical. Wind factor I_W=1.0

4.0 LAYOUT AND PROJECT QUALITY CONTROL

The landowner and/or contractor will be responsible for field staking the project according to the approved and accepted plans and specifications along with providing quality control of construction work for this project. Plans and specifications are provided and indicate the grade and tolerances required for the headwork's and pipeline. A pre-construction meeting with all parties will be required prior to beginning construction. This report includes a quality assurance plan in Appendix 9.

A NRCS/Engineering Contractors representative will be on-site periodically to review progress and check that the plans and specifications are followed.

5.0 IRRIGATION WATER MANAGEMENT PLAN

An Irrigation Water Management Plan was not compiled for this project as it is a delivery system to an existing ditch, and not an irrigation application system.

6.0 HYDRAULIC DESIGN

Hydraulic design was based on the requirements of the irrigation owners to convey 30 cfs of water in a gravity flow condition along the existing Highland Ditch. The new pipeline follows the existing ditch horizontal and vertical alignment with the new pipe crown at or near the flow line of the existing ditch.

The pipeline was designed using a Hazen-Williams roughness coefficient of 150 for pressure pipe flow and a Manning's N of 0.010 for open channel flow. The pipeline will not have a valve on the downstream end and thus is not designed for water hammer associated with valve closure. Flow measurement and control will be accomplished at the upstream end at the headworks. The pipeline will function as a pressure pipeline with an open discharge from 28 cfs to 32 cfs. The EPA net output is presented in Appendix 2. Velocities range from 5.7 fps at 28 cfs to 6.5 fps at 32 cfs. Unit headloss at full flow nearly matches the pipe grade.

Table 6 below displays hydraulic parameters at flows ranging from 1-30 cfs. Note that from flows of 1 to 19, the Froude number exceeds 1.0 and the flow will be super critical from station 0+53 to station 3+00. At flows in excess of 19 cfs, flows will be sub critical. At about station 3+00 the flow changes from super critical flow to sub critical flow. Also at this station the pipeline slope changes from 1.215% to 0.287%. At this junction, a thrust block and an air vent will be required.

Table 6. Hydraulic Parameters

DESCRIPTION	VALUE
Channel Bottom Slope (ft/ft).....	0.0029
Manning's Roughness Coefficient (n-value).....	0.01
Pipe Diameter (ft).....	2.5

COMPUTATION RESULTS			
Flow Depth (ft)	Flow Rate (cfs)	Flow Velocity (fps)	Froude Number
0.7	4.92	4.37	1.088
0.8	6.37	4.7	1.088
0.9	7.96	5	1.083
1	9.68	5.28	1.075
1.1	11.49	5.52	1.064
1.2	13.39	5.75	1.049
1.3	15.34	5.95	1.032
1.4	17.31	6.12	1.011
1.5	19.29	6.27	0.987
1.6	21.24	6.4	0.96
1.7	23.13	6.51	0.929
1.8	24.92	6.59	0.895
1.9	26.58	6.64	0.855
2	28.07	6.67	0.81
2.1	29.32	6.66	0.758
2.2	30.27	6.62	0.695
2.3	30.82	6.52	0.616
2.4	30.76	6.35	0.504
2.5***	0	0	0

COMPUTATION NOTES

*** Rating Curve terminated at flow depth = 2.50
Flow depth equals or exceeds channel diameter (2.50)

7.0 STRUCTURAL DESIGN

The intake structure is constructed with a 12 inch thick floor with two mats of reinforcing steel. The walls are sized to provide durability in this remote, steep and high velocity stream. Thinner walls will resist the hydraulic loading adequately but may not have the strength/durability needed to resist impacts from floating trees and rolling boulders.

Minimum temperature steel reinforcement grade 60 and 4,000 psi concrete shall be used for all concrete structures. The structure has been designed and proportioned using grade 60 steel and 2500 psi concrete for strength calculations. Specifying higher grade materials increases the durability and that the materials will meet minimum criteria.

Appendix 3 includes the **preliminary** fish screen drawings and Appendix 6 includes the intake structure construction drawings. Appendix 10 presents the structure calculations for the intake structure.

8.0 ENVIRONMENTAL CONSIDERATIONS

It is the responsibility of the owner(s) and contractor to be aware of any impacts that may result negatively to any aspect of the surrounding environment and/or cultural resources. The owners and contractors shall be responsible for reviewing, preparing and initiating a sediment and erosion control plan for the project.

9.0 CONSTRUCTION DRAWINGS AND SPECIFICATIONS

Construction drawings are attached in Appendix 6. NRCS-Oregon Standard construction specifications are attached in Appendix 7. Special care shall be required to install the pipe at a grade of 1.215% between Stations 0+53 and 3+00 and 0.287 % between station 3+00 and the end of the project. Avoiding low points and high points is crucial.

10.0 CONSTRUCTION SCHEDULE

The construction can begin once the plans are accepted and approved by all parties.

11.0 OPERATION MAINTAINANCE

In order for the project to function as required, McMillen Engineering has developed an Operation and Maintenance (O&M) plan specific to this project (see Appendix 8).

12.0 PROJECT COMPLETION/REVIEW

At the completion of this project, a McMillen Engineering or NRCS representative will visit the site to inspect and document the project has been completed.

13.0 AUTHORITY

PLANS PREPARED BY:
Daniel Axness, PE
McMillen Engineering, LLC
Date: October 19, 2005
Phone 208-342-4214, Fax 208-342-4216
dan.axness@mcm-eng.com

CHECKED BY: Matt McMillen Date: 10/31/05

APPROVED BY: Daniel S Cf Date: Oct. 31, 2005

USDA United States Department of Agriculture | Forest Service | Mt. Hood National Forest | Barlow Ranger District
780 NE Court StreetDufurOR97021
541-467-2291541-467-2271

File Code: 2700
Date: **April 26, 2019**

Oregon Water Resources Department
Attn: Grant Review Team
725 Summer Street NE, Ste A
Salem, OR 97301

To Whom It May Concern:

This letter serves to recognize the Badger Improvement District's effort to secure grant funding for piping the Highland Ditch within the Badger Creek Wilderness on the Mt. Hood National Forest.

The Highland Piping project was analyzed by the Forest Service in an Environmental Assessment (EA) completed in 2001; and a Decision Notice (DN) was signed by the Mt. Hood Forest Supervisor in 2002.

Due the length of time that has passed since this project was analyzed under the National Environmental Policy Act (NEPA), my staff will need to review the existing EA and DN to ensure consistency with NEPA and other Federal statutes, including the Wilderness Act and the National Forest Management Act. This is necessary to update the Badger Improvement District's existing special use permit and easement. Once this review is completed, the operations and maintenance plan for the easement can be updated accordingly.

The Forest Service works closely with the Badger Improvement District, the Natural Resource Conservation Service, and the Wasco County Soil and Water District to support water conservation projects within Wasco County.

If you have any questions or would like to discuss this further, please call me at 541-467-5101.

Sincerely,

KAMERON C. SAM
District Ranger

cc: Badger Improvement District

Wasco County Soil & Water Conservation District

2325 River Road. Suite 3
The Dalles, OR 97058-3551
Tel: (541) 296-6178 ext. 3, Fax: (541) 296-7868, E-mail: wasco.swcd@oacd.org

May 12th, 2020

Oregon Water Resources Department
Attn: Grant Review Team
725 Summer Street NE, Ste A
Salem, OR 97301

RE: Water Supply Development Account Grant Application

Dear Grant Review Team,

I am writing in support of the Badger Ditch Piping Grant submitted by Badger District Improvement Company for 5,000 feet of piping in the Badger wilderness. District staff have worked with BDIC, NRCS and the US Forest Service over the years in determining the feasibility of this project, and contracting with McMillen Engineering for the pipeline design. The piping was previously included in a forest wide restoration analysis, and is in the process of being renewed the Forest Service. This renewed analysis will cover federal NEPA policy and is a major item in the planning process.

Our district technicians work closely with NRCS engineering staff to perform construction inspections on piping projects. Wasco County SWCD has committed 160 hours of technician time towards the Badger Piping project if it is successful in its funding efforts.

Thank you for considering this proposal.

Sincerely,

Shilah Olson

Shilah Olson
District Manager
C: f

WASCO COUNTY

BOARD OF COUNTY COMMISSIONERS

511 Washington St, Ste. 101 • The Dalles, OR 97058
p: [541] 506-2520 • f: [541] 506-2551 • www.co.wasco.or.us

Pioneering pathways to prosperity.

Oregon Water Resources Department
Attention: Grant Review Team
725 Summer Street NE, Suite A
Salem, Oregon 97301

April 17, 2019

Please consider this letter in support of a grant proposal submitted by Badger Improvement District (BID) to pipe a portion of their Highland Ditch in Southern Wasco County. Wasco County, the Oregon Department of Fish and Wildlife, and the Wasco County Soil and Water Conservation District supported and helped BID build Pine Hollow Reservoir In 1968. The Reservoir was built to support the agriculture and recreation economy of Southern Wasco County.

The reservoir maintains a minimum pool for year round fishing in Wasco County. Wasco County built two boat ramps at the reservoir in 1968. The County helped create the South Wasco County Park and Recreation District which has assumed responsibility for the boat ramps and the public restroom facilities at the reservoir. There WAS a 10 foot wide foot easement reserved around the reservoir for fishing and walking access by ODFW when the reservoir was built.

BID fills and maintains the minimum pool in Pine Hollow Reservoir with water from Badger Creek located inside the Mt. Hood National Forest in Southern Wasco County. The Diversion Point for Highland Ditch is 8+\- miles west of Pine Hollow Reservoir in Badger Canyon. The ditch maintains a grade out of the Canyon inside the Badger Creek Wilderness Area. If the adjudicated water rights of the BID members (including ODFW) were not delivered and stored in Pine Hollow Reservoir annually the economic benefit from the fishery, recreational, and agricultural communities from Pine Hollow Reservoir would be lost to Southern Wasco County. BID Members excluding ODFW store and distribute 2400 acre feet of water annually from Pine Hollow Reservoir to farms in Southern Wasco County. ODFW maintains 1200 acre feet of water for fish and recreation year round in Pine Hollow Reservoir.

In 1973 a forest fire burned several thousand acres of public and private land in Southern Wasco County. The proposed piping project would help insure the delivery of water to Pine Hollow Reservoir during and after a Wildfire on National Forest Lands. Piping the ditch will assist the USFS in the prudent management of its Natural Resources and be a positive benefit to Oregon Citizens, Wasco County residents, and the economy of Southern Wasco County.

The BID has the full support of Wasco County to pipe Highland Ditch from its Diversion Point out of the Badger Creek Wilderness on the Mt. Hood National Forest. The project is shovel ready, the engineering is done, a Fish Screen has been installed and the project has a NEPA approval. Wasco County requests you approve BID's grant application to pipe Highland Ditch out of the Badger Creek Wilderness.

Thank you,
Wasco County Board of Commissioners

Steve D. Kramer
Commission Chair

Scott C. Hege
Vice-Chair

Kathleen B. Schwartz
County Commisioner

South Wasco Park & Recreation District
Board of Directors

Brian Manning, President
Franl Veenker, Vice President, Val Manning, Secretary
Bill Brackman, Treasurer, David Deurwaarder

SWPRD16@gmail.com - P.O. Box 177, Tygh Valley, OR 97063

April 11, 2019

Mr. Eric Nordquist
Badger Improvement District
Sent via Email

Subject: Badger Improvement District Grant Application to Improve the Highland Ditch

Greetings,

Pine Hollow Reservoir in Wasco County, Oregon falls within the boundaries of the South Wasco Park and Recreation District (SWPRD).

Pine Hollow is a primary fishing and boating reservoir for many SWPRD residents, visitors, and property owners. If Pine Hollow Reservoir were to fail to fill in any year due to a failure of the Highland Ditch, it would have a significant impact on recreational opportunities within SWPRD.

For this reason, SWPRD supports the grant application being submitted by the Badger Improvement District to the Oregon Water Resources Department to improve the Highland Ditch.

Please don't hesitate to contact me should you have any questions.

Sincerely yours,

William Brackman, Board Member, South Wasco Park & Recreation District

ROUND PRAIRIE IMPROVEMENT DISTRICT
P.O. Box 276
Tygh Valley, Oregon 97063

May 06, 2020

Oregon Water Resources Department
Attn: Grant Review Team
725 Summer Street NE, Suite A
Salem, Oregon 97301

Re: Support letter for Badger Improvement District (BID)

Because of the COVID-19 Pandemic the District's annual meeting has been delayed until the State of Oregon lifts the closure put in place mid-March 2020. However, the District Membership remains 100% supportive of The Badger Improvement District piping Highland Ditch.

On April 13, 2019, the Round Prairie Improvement District (RPID) held their annual members meeting at the Pine Hollow Fire Department. The members unanimously voted in favor of supporting a grant application to fund piping a portion of BID's Highland Ditch from its diversion point on Badger Creek for 2.2+\- miles out of the Badger Creek Wilderness in the Mount Hood National Forest.

RPID is a small irrigation district whose members rely on BID to deliver them the majority of their water from Badger Creek during the annual irrigation season. RPID delivers exclusively to its member's water from Threemile Creek in the early part of the season. RPID was incorporated in 1876 as the Round Prairie Ditch Company and has been in continuous operation since that time. After the spring runoff, Threemile Creek is reduced to a flow that does not support the water rights adjudicated to RPID's members.

After Pine Hollow Reservoir was built (1968), BID filed for a winter fill permit from Threemile Creek in recognition of the difficulty presented by the location and elevation of the Highland Ditch diversion structure inside the Mt. Hood National Forest. Inclement winter weather conditions make it impossible to run water in an open ditch out of Badger Canyon December through March. RPID members depend on water stored in Pine Hollow Reservoir to receive late season water from Badger Creek transported in

Highland Ditch from mid-July to mid-October. The two districts work co-operatively to deliver a full season of irrigation water to their respective members.

RPID recognizes the risks associated with Highland Ditch's present and future ability to deliver water from Badger Creek inside the Mt. Hood National Forest. The ditch is built on grade out of a deep Canyon at a diversion point that forecloses water management in the winter. In the past, summer delivery has been stopped by vandalism causing severe erosion in the Badger Creek Wilderness. The ongoing risk of forest fire is ever present July through September. Under current US Forest Service policy, a wildfire in the Badger Creek Wilderness would burn uncontrolled across Highland Ditch causing significant maintenance expenses for the delivery of RPID and BID's members for years to come.

Piping Highland Ditch out of the Badger Creek Wilderness (2.2+\- miles) would better assure the members of RPID the delivery of their water rights from Badger Creek during the irrigation season which is April 15th through October 15th and would facilitate running winter water from Badger Creek to Pine Hollow Reservoir from December to March.

RPID understands BID holds a permanent easement for Highland Ditch with the USFS, has installed a Fish Screen, has completed engineered plans for the piping project, and has obtained NEPA approval from the USFS for the project. The RPID Board of Directors and members support BID's grant proposal and urges its approval.

Yours Truly,

Dan VanVactor

Dan VanVactor, President

Pat Davis
78305 Woodcock Rd
Wamic, Oregon 97063
e-mail ppatdavis@hughes.net

April 16, 2019

Oregon Water Resources Department
Attention: Grant Review Team
725 Summer Street NE, Suite A
Salem, Oregon 97301

This letter is in support of a grant proposal submitted by Badger Improvement District (BID) to pipe a portion of their Highland Ditch in Southern Wasco County. As a member of the Wamic Community who has served as president of the Rock Creek Improvement District and currently chair the White River Watershed Council I want to urge the Grant Review Team to approve the proposal to pipe 2.2+\- miles of Highland Ditch inside the Badger Creek Wilderness Area on the Mt. Hood National Forest.

The Watershed Council has not been formally asked to endorse the proposal but has discussed its importance for several years. Seven years ago when the Council received a presentation from the USFS on the forest condition related to an area known as the Rocky Burn (7000+ acres that burned in a 1973 forest fire) the importance of protecting Highland Ditch in the event of a future fire in the Badger Creek Wilderness was discussed. Based on my knowledge of the area I am of the opinion the only way to insure the long term functionality of the Highland Ditch would be to bury a pipe protect the water delivery from wildfire, vandalism and erosion.

Highland Ditch is used to fill and maintain Pine Hollow Reservoir. The reservoir is a fishing and recreation resource for Oregon residents as well as the storage facility for BID members who farm irrigated ground west, south and north of Wamic. Insuring the water from Badger Creek is delivered to the reservoir is an annual challenge for the district given the elevation and location of its diversion in the Badger Creek Wilderness. By piping the waterworks out of Badger Canyon the district can better insure its members and Pine Hollow Reservoir's recreation users will have dependable water delivery for the long term.

The project has a permanent easement from the USFS, NEPA approval, an installed fish screen, and engineered plans making it shovel ready. Please approve BID's grant proposal.

Yours truly,

Pat Davis

WAMIC Market
57016 Wamic Market Road Wamic Oregon

Wamic Market LLC
PO Box 967
The Dalles, OR 97058

541-544-2333
admin@wamicmarket.com

Oregon Water Resources Department
Attn: Water Grants and Loan Program
725 Summer Street NE, Suite A
Salem, OR 97301

RE: OWRD Water Project Grants and Loans

Dear OWRD:

We're writing in support of the Badger District Improvement Company's Application for funding for the Badger Ditch Piping Project. The Badger District Improvement Company is a vital part of our community. The irrigation water they provide not only maintains a sustainable agricultural in our community, their storage reservoir is the centerpiece of recreation in our community. Without the Irrigation District and their reservoir, we would not have the seasonal tourism that we do. This seasonal tourism supports the Wamic Market, which helps employs 9 full time employees year round.

Without a pipeline in Badger Canyon, the ditch will eventually "blow out" as it has done in the past. With all of the increases in regulation, I fear the repair of such a blowout either would never be approved, or would take so long to approve, that our community would not be able to recover from the economic impacts of being without water for such time resulting in our employees losing their livelihoods.

I strongly urge you to consider this project for funding to help maintain our community's viability.

Sincerely,

Travis and Tiffany Hillman
Wamic Market LLC

Kathleen S. Willis
83121 Tygh Valley Road
Tygh Valley, Oregon 97063
Email: kathleenwillis7@gmail.com

May 28, 2020

Oregon Water Resources Dept.
ATTN: Grant Review Team
725 Summer Street NE, Suite A
Salem, Oregon 97031

This letter is in support of a grant proposal submitted by Badger Improvement District (BID) to pipe a portion of the Highland Ditch in South Wasco County.

As a member of the South Wasco community who has served in several civic capacities, including on the Boards of the Barlow Gate Grange and the South Wasco Alliance, I am currently involved in the ongoing development of our local food system in South Wasco. This long-term community effort spans a wide range of projects and activities, including an organizing meeting in March, 2020, facilitated by the Columbia Gorge Food Bank, the formation of two permanent food pantries (in process now), and a portfolio of projects to support the nascent specialty farming economy in South Wasco County.

Specialty farming (high-value niche crops) is a compliment to the traditional agriculture (wheat, cattle, hay, orchards) and recreational tourism businesses already well established in the area. More importantly, it is a unique means by which to diversify and create a more sustainable, equitable (accessible), and prosperous rural economy in our part of Oregon. Because of the necessity to support this critical "building block" of our local food system and economy, the South Wasco Community is working in close collaboration with local, regional, federal, and university partners and programs to promote and support maturation of the local food system and specialty farming , including with the Columbia Gorge Food Bank (CGFB), Oregon State University Extension (OSU.Ext), University of Virginia/OSU Data Science for Public Good project, Gorge Grown, the City of Maupin, AmeriCorps volunteers on assignment with the CGFB and OSU/Ext, and the Columbia Gorge Community College.

The purpose of sharing this information is to draw a direct connection between ***having a sustainable source of water*** for BID members to ***the development and ongoing promotion of our local food system*** in South Wasco. This becomes even more compelling given the impact that locally grown and available food will have on health and economic outcomes in South Wasco. I've attached an excerpt from a 2017 OSU report to provide an idea of the potential economic impact.

Thank you for your consideration of this letter of support. I respectfully urge the Grant Review Team to approve BID's grant proposal.

Kathleen S. Willis

DECISION NOTICE
and
FINDING OF NO SIGNIFICANT IMPACT

RESTORATION 2001

USDA FOREST SERVICE
MT. HOOD NATIONAL FOREST

An Environmental Assessment (EA) titled Restoration 2001 has been prepared for fish habitat and water quality restoration projects. Projects are located across the Mt. Hood National Forest as well as on adjacent off-Forest lands. Many projects are included in the EA, but this decision notice only addresses a portion of those projects.

DECISION

It is my decision to select Alternative 2 and proceed with the following projects:

- **Ditch Piping -** Irrigation systems were developed many years ago to divert stream water into ditches to deliver water for agricultural use. These projects involve converting ditches to pipes to transport water more efficiently and installing fish screens. Approximately 3.6 miles of the Highland Ditch and approximately 2,200 feet of the Lost & Boulder Ditch would be converted to pipe.

- **Quarry Rehabilitation -** Quarries were developed to provide rock for roads and other developments. When they are no longer needed, restoration of these sites is appropriate. These projects include recontouring by filling with soil, shaping for drainage and/or installation of waterbars. Sites would also be revegetated. Vehicular access to sites would be blocked with a berm or other device. The names of the four quarries are Stockton, K2, Kink and Stone Creek. Kink would be totally closed out but the others would be partially rehabilitated where they are near streams but other portions of the quarries would remain in service.

- **Road Decommissioning -** Some roads have been damaged by severe storm events, are causing resource damage, or are unsafe. Roads would be decommissioned where repair would not likely solve the problem or where continued maintenance is not cost effective. This would involve the removal of gravel surfacing and culverts if present, and the deep scarification of road surfaces. It may also include pulling back unstable fill slopes to prevent future landsliding. Berms would be constructed to block vehicular access and disturbed soils would be revegetated. Approximately 26 miles of roads would be decommissioned including all or a portion of the following roads: 6300016, 6320165, 6322180, 6340030, 4620013, 4620240; 4621(0.68 mi.), 4621027, 4622115, 4630150, 4280011, 4280013, 4280232, 4280244, 4280245, 4280246, 4600246, 4631018, 4635122, 4661018, 5730120, 5800017, 5800023, 5800024, 5800138, 5800150, 5810018, 5810019, 5820022, 5820023, 5820024, 5830270, 5860020, 5860022, 5860242 and 5870011.

- **Upland Erosion Control -** Some old timber harvest areas have skid trails and temporary roads. These areas often contain bare compacted soils that impede vegetation growth. Projects include the installation of waterbars and/or berms. Disturbed soils would be revegetated. Approximately 144 acres would be treated.

- **In-stream and Riparian Improvement -** In-stream conditions are sometimes not optimal for fish. Streams can be improved by replacing lacking elements or by repairing existing features. Projects include the installation of logs or boulders in the stream, adding structure to ponds and lakes to improve habitat, riparian planting and noxious weed removal. There are seven project areas that need treatment.

In-stream and Riparian Project Name	**Notes**
3 mile Creek	Place logs with helicopter, 1.5 mi.
Barlow Trail	Riparian planting, noxious weed removal by hand.
Round Lake	Place logs and gravel at inlet and outlet with helicopter, riparian planting.
Richardson Creek	Place logs and riparian planting.
Knotweed	Manual cutting of invasive weed along 8 miles of Salmon River and Still Creek.
Arrah Wanna River Keeper	Restore side channel of Salmon River, manipulate pond and add woody debris. Includes annual side channel maintenance.
Resort at the Mountain River Keeper	Boulder structures in Salmon River to direct force of river toward middle of channel.

RATIONALE - This alternative best meets the purpose and need described in the EA and moves the landscape toward the desired future condition. These projects will individually and cumulatively result in improved water quality and improved conditions for fish. The **need** to restore water quality and fish habitat is urgent because past management actions (such as road construction, quarry development and irrigation diversions) have altered watersheds where important fish stocks occur and where water is withdrawn for human uses. The **purpose** of the proposal is to repair specific problem areas that have been identified as the most urgent. The objective is to have healthy functioning watersheds that provide clean water and sustain quality fisheries. Another objective is to provide a safe transportation system that meets fish and water quality objectives while providing access to the forest.

I considered the substantive comments that were raised during scoping. A summary of relevant comments and responses can be found in an appendix to the EA. (Some comments relate to projects not covered by this decision notice.) I am approving the projects listed above because the concerns have been adequately mitigated.

- There is a concern that sediment might enter streams from projects that involve heavy equipment or other ground disturbance. The EA contains a list of mitigations such as seasonal restrictions and measures that would minimize erosion. This sediment, if any, would be localized and short-term. Long-term sediment input to streams would be reduced by projects that restore chronic erosion sources.

- There is a concern that fertilizer that would be applied to areas disturbed by heavy equipment would get into streams and would interfere with natural soil nutrient process. The fertilization mitigation measure was carefully created to minimize impacts to water quality while providing important benefits for erosion control. It results in rapid growth of erosion control plants in areas that no longer have naturally fertile soils. It is used carefully, applied by hand and kept ten or more feet from streams. The mulch that is often applied at the same time helps to hold the fertilizer in place. The restoration projects that are close to streams and that would need erosion control are widely scattered across the Forest and would be implemented over several years. If any fertilizer runs into streams during storms it would be quickly diluted to immeasurably small levels. Previous monitoring and the professional experience of fisheries biologists indicate that quick establishment of vegetation to prevent erosion is important and that there would be little or no effect to soils or to water quality. I have decided to continue to use fertilizer as a part of erosion control efforts.

OTHER ALTERNATIVES CONSIDERED

Alternative 1 is the no-action alternative and was not selected because it would not repair specific problem areas that have been identified as urgent. In some cases passive restoration may occur over a long time period but in most cases, chronic problem areas would continue to prevent watersheds from becoming fully functioning and healthy in terms of water quality and fish habitats. Important fish stocks that are at risk would not be assisted toward recovery.

Consideration was given to a much longer list of projects. The proposed action does not fully restore watersheds: there are known restoration opportunities that are not included and there are ideas for restoration that are not yet fully developed to the point where analysis can proceed. The included projects are supported by Watershed Analysis and are considered to be priority projects by the Forest-wide prioritization model (Appendix A of EA). The logistics involved with project design, field survey work and the available funding also contributed to the shaping of the proposed action. Many roads were considered for decommissioning but were deferred until after completion of a Forest-wide Roads Analysis.

Consideration was given to several projects during early planning stages that have since been deleted from this EA. Examples would include the Road 57 repair and reconstruction, and the Evans Ditch and Central Canal Piping projects. These projects were reconsidered due to comments received during scoping. These are still valid and important projects, but it was felt that the degree of complexity warranted a separate analysis of effects and alternatives.

Consideration was given to including only the projects that had certain funding. This would have been a much shorter list of projects. The sources of potential funding are many and varied and it was decided to pursue a long list knowing that funding may materialize in the near future.

Consideration was given to an alternative that would defer all road decommissioning until after

the Forest-wide Roads Analysis. This was not fully developed because this would not meet the purpose and need. The prioritization model (summarized in Appendix A of the EA) shows that certain roads with their impact on fish and water quality are high priority for restoration.

Consideration was given to an alternative that would not fully decommission roads but would remove culverts and gate the roads instead. This suggestion was received through scoping. The concern was that a public investment was made to access the forest for logging and that decommissioning the roads would be a waste of that investment. This alternative was not fully developed because gates are costly to maintain and some roads have erosion problems that are best addressed by scarification, water bar installation and revegetation. The roads that are proposed for decommissioning are those that have no anticipated need for a decade or two.

FINDING OF CONSISTENCY WITH MT. HOOD FOREST PLAN (as amended by the Northwest Forest Plan)

I have determined that the proposed action is consistent with Management Area goals, desired future conditions, and standards and guidelines identified in the Mt. Hood National Forest Land and Resource Management Plan (Mt. Hood Forest Plan) (36 CFR 219.27).

- Projects are consistent with the objectives of the Aquatic Conservation Strategy.

- Projects in riparian reserves and late-successional reserves are consistent with applicable standards and guidelines.

- Projects in or near wild, scenic or recreational rivers are consistent with applicable standards and guidelines and each river's outstandingly remarkable values.

- Surveys have been conducted where needed for Survey and Manage Species. Known sites of Survey and Manage Species are being managed in accordance with management recommendations.

FINDING OF NO SIGNIFICANT IMPACT (40 CFR 1508.27)

I have determined that this is not a major Federal action that would significantly affect the quality of the human environment; therefore, an Environmental Impact Statement is not needed.

- THREATENED, ENDANGERED, AND SENSITIVE SPECIES - Formal consultation with U.S. Fish & Wildlife Service for this project has been completed. The Letter of Concurrence written by U.S. Fish & Wildlife Service and dated November 9, 2001, concludes that the projects are not likely to adversely affect the northern spotted owl. Several fish species are listed as threatened or proposed. The projects are covered by The Endangered Species Act Section 7 Consultation for Programmatic Actions, in

which the National Marine Fisheries Service specifies that restoration projects may proceed without further individual project consultation. A biological evaluation states that the projects are not likely to cause a trend toward federal listing or loss of viability.

- CUMULATIVE EFFECTS - Cumulative effects have been considered. No significant cumulative or secondary effects were identified. The EA elaborates on cumulative impacts and cumulative benefits related to water quality and fish habitat on page 19. It discloses that impacts would be short term and largely mitigated while benefits would be long term and substantial.

- HEALTH AND SAFETY - There will be minimal effect on public health and safety. Job hazard analysis will be documented for projects to provide for safety of operations. A site analysis has been conducted which implements the direction given by the Record of Decision and Mediated Agreement for the "Managing Competing and Unwanted Vegetation" Environmental Impact Statement. The use of herbicides is not being proposed for any project. Mitigations have been included to minimize the risk of spreading noxious weeds. Some projects include the mechanical or hand removal of noxious weeds already present. The EA contains a summary of the site analysis and the proposed treatments.

- CRITICAL AREAS – Many projects are in rivers, streams and riparian areas. Project location, design and mitigation measures combine to provide adequate protection and substantial benefits to these resources. Many projects fall within Recreational or Scenic segments of Federally designated Wild and Scenic Rivers and State Scenic Waterways. The projects would not degrade the natural character of these rivers and would enhance fish habitat and recreational fishing. The Highland Ditch Piping project is in the Badger Creek Wilderness. The project has been designed to minimize impacts to wilderness values while fixing a section of ditch prone to washouts.

- CONTROVERSY - The effects of the preferred alternative will not be highly controversial. Many comments received were supportive of restoration.

- UNKNOWN RISKS - Past experience has shown that the proposed action will not involve any significant unknown risks.

- PRECEDENT - This action will not establish a precedent for future actions. Other similar actions have occurred in the past.

- CULTURAL RESOURCES - Field surveys have been conducted and protection measures incorporated.

- LEGAL – The interdisciplinary team has not discovered any potential inconsistencies with applicable laws such as the Clean Water Act or the Endangered Species Act.

The environmental assessment was available for a 30-day public comment period that ended on November 1, 2001. I have considered the public comments received. Comments and responses are included in a supplemental appendix to the Environmental Assessment.

Appeal Rights:

The decision is subject to appeal pursuant to Forest Service regulations at 36 CFR 215. Any appeal of this decision must be in writing and fully consistent with the content requirements described in 36 CFR 215.14. The Appeal must be postmarked or received by the Appeal Deciding Officer, Regional Forester, ATTN.: 1570 APPEALS, P.O. Box 3623, Portland, OR 97208-3623 within 45 days of the date legal notice of this decision was published in the Oregonian. For further information regarding these appeal procedures, contact the Forest Environmental Coordinator Mike Redmond at (503) 668-1700.

Project Implementation:

Implementation of this decision may occur on, but not before, 5 business days from the close of the 45-day appeal filing period described above. If an appeal is filed implementation may not occur for 15 days following the date of appeal disposition (36 CFR 215.10).

The EA can be downloaded from the Forest web site at www.fs.fed.us/r6/mthood/pubs.htm.

For further information contact Jim Roden, Estacada Ranger Station, 595 NW Industrial Way, Estacada, OR 97023.

Phone: (503) 630-8722
Email: jroden@fs.fed.us

Responsible Official:

/s/ *Kathryn J. Silverman* Feb. 11 2002

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KATHRYN J. SILVERMAN Date Published
Acting Forest Supervisor

RESTORATION 2001
ENVIRONMENTAL ASSESSMENT

Title:	Restoration 2001
Lead Agency:	U.S.D.A. Forest Service, Mt. Hood National Forest
Responsible Official:	Gary L. Larsen Forest Supervisor Mt. Hood National Forest 16400 Champion Way Sandy, OR 97055 (503) 668-1700
For Further Information:	Jim Roden Team Leader 595 NW Industrial Way Estacada, OR 97023 (503) 630-8722 jroden@fs.fed.us
Abstract:	The proposed action involves many fish habitat and water quality restoration projects. Projects are located across the Mt. Hood National Forest as well as on adjacent off-Forest lands.

Table of Contents

CHAPTER 1 - PURPOSE AND NEED FOR ACTION

Introduction

This Environmental Assessment (EA) includes many fish habitat and water quality restoration projects. In 1994, the Northwest Forest Plan (NFP) recognized the need for Watershed Restoration. "Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. Restoration will be based on watershed analysis and planning." (NFP p. B-30) "The most important components of a watershed restoration program are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity." (NFP p. B-31)

The Mt. Hood National Forest (Forest) has accomplished numerous restoration projects in the past few years including road decommissioning, culvert replacement for improved fish passage, in-stream projects to create pools, riparian planting, etc. In the previous decade, the Forest decommissioned about 12% of its roads. The watershed analyses recommended these restoration actions and many others that have not yet been funded or implemented.

Approximately 30 watershed analyses have been completed across the Forest, recommending many restorations. Since the Forest receives a limited amount of funding for fisheries and water quality restoration projects each year, it became apparent that a Forest-wide analysis would greatly facilitate prioritization of actions. A concerted effort was made to consolidate watershed analysis data and new data into a Forest-wide analysis to determine Forest restoration priorities.

The Forest now has a prioritization model that examines watersheds and ranks them according to the urgency of restoration. The model incorporates factors such as watershed sensitivity, management intensity and biological factors. The proposal in this EA utilizes that information and is summarized in Appendix A.

This assessment also includes off-Forest projects. Contacts were made with local watershed councils to obtain recommendations for off-Forest project proposals. It is recognized that many serious fish and water quality problems occur off-Forest. The "Wyden Amendment" (Section 323 of P.L. 105-277) authorizes the expenditure of federal funds for these projects.

Many projects are grouped collectively into this EA for efficiency and to facilitate analysis of cumulative effects and benefits. The following section demonstrates that these projects are "similar actions" because of their common goal to enhance fish habitat and water quality. Some of the projects listed here will qualify for categorical exclusion (FSH1909.15.30) and a decision memo will be issued. One or more decision notices may be issued for the remaining projects.

This assessment is tiered to the Mt. Hood National Forest Land and Resource Management Plan (hereafter referred to as the Forest Plan), and the Standards and Guidelines of the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl as amended (hereafter referred to as the Northwest Forest Plan or NFP).

The following desired conditions are derived from the Forest Plan and the Northwest Forest Plan Aquatic Conservation Strategy.

- **Watersheds** have hydrologic and sediment regimes that function within their ranges of natural variability. They contain a network of healthy riparian areas and streams.

- **Streams** provide a diversity of aquatic habitat for fish and other stream-dwelling organisms. They offer sufficient quantities of large woody debris; they have clean and abundant spawning gravel; and they have stable banks that are well vegetated and have cool water.

- **Riparian Areas** contain plant communities that are diverse in species composition and structure. They provide summer and winter thermal regulation; nutrient filtering; and have appropriate rates of surface erosion, bank erosion, and channel migration. They also supply coarse woody debris sufficient to sustain physical complexity and stability. Riparian reserves provide mature forest connectivity.

- A **Transportation** system allows safe access to the Forest where appropriate, and it is carefully designed and maintained to minimize impacts to aquatic and terrestrial forest resources.

Purpose and Need

The need for fish habitat and water quality restoration is evident when the above desired conditions are compared to existing conditions at site-specific locations:

- The Forest has streams and rivers that provide habitat for important stocks of fish, many of which are listed under the Endangered Species Act. Many of the streams and rivers also provide water for human uses. Certain watersheds are designated as Key Watersheds where restoration efforts are a high priority.

- Hydrologic regimes, riparian vegetation and aquatic habitats have been altered by:

    - Roads
    - Timber harvest
    - Rock quarry developments
    - Recreation uses
    - Grazing
    - Dams and irrigation diversions
    - Spreading noxious weeds

- Some roads have culverts that block or impede fish passage.

- Some streams have low levels of in-stream large woody debris, inadequate recruitment of future woody debris, and poor aquatic habitat conditions.

The **purpose** of the proposal is to repair specific problem areas that have been identified as the most urgent. The objective is to have healthy functioning watersheds that provide clean water and sustain quality fisheries. Another objective is to provide a safe transportation system that meets fish and water quality objectives while providing access to the forest. It is recognized that it may take many years of action and many years of "healing time" to totally restore these resources. The projects described below are one step in the process of moving toward the desired conditions.

Projects have been grouped by type to more clearly and efficiently discuss objectives, issues and effects. The following section has more detail on the specific objectives for each project type.

Fish Passage/Culverts

Some roads have culverts or other structures that block or impede fish passage or are not large enough to accommodate a 100-year flood event and associated sediment and debris. These projects involve the design and installation of structures that allow passage of fish and other channel related material. There is an urgent need to improve 25 structures that would improve fish passage on approximately 31 miles of streams. There are additional miscellaneous culverts that would be replaced during road repairs or removed during road decommissioning that would also help meet this need.

Fencing

Livestock are naturally attracted to streams, meadows and other sensitive areas where their use often causes damage to streambanks and riparian areas. These projects include the construction of fences to control livestock movement within these sensitive areas. There is an urgent need to build approximately 8 miles of fence.

Ditch Piping

Irrigation systems were developed many years ago to divert stream water into ditches to deliver water for agricultural use. These projects involve converting ditches to pipes to transport water more efficiently and installing fish screens. There is an urgent need to convert approximately 4 miles of ditch. An estimated quantity of conserved water would be returned to the stream and would be guaranteed through a written agreement with the irrigator.

Quarry Rehabilitation

Quarries were developed to provide rock for roads and other developments. When they are no longer needed, restoration of these sites is appropriate. These projects may include recontouring by filling with soil, shaping for drainage and/or installation of waterbars. Sites would also be revegetated. Vehicular access to sites would be blocked with a berm or other device. There is an urgent need to rehabilitate 4 quarries.

Roads

Some roads have been damaged by severe storm events, are causing resource damage, or are

unsafe. Roads would be repaired where cost, level of use and resource considerations warrant. This includes heavy maintenance and deep patch repairs to stabilize cracked or sinking road surfaces. Projects may also include the placement of additional cross drain culverts, increasing existing culvert size, replacement of bridges and the stabilization of cut and fill slopes. There is an urgent need to repair approximately 77 miles of roads and replace 3 bridges.

Other roads would be decommissioned where repair would not likely solve the problem or where repair is not cost effective. This may involve the removal of gravel surfacing and culverts if present, and the deep scarification of road surfaces. It may also include pulling back unstable fill slopes to prevent future landsliding. Berms would be constructed to block vehicular access and disturbed soils would be revegetated. There is an urgent need to decommission approximately 26 miles of roads.

Some roads would be 'Storm Proofed' by installing drivable waterbars on system roads. There is an urgent need to storm proof approximately 1.6 miles of roads.

Riparian Areas Damaged by Vehicles

Riparian areas are often favorite places for people to camp and recreate. The use of vehicles in these areas can cause erosion, soil compaction, and the degradation of vegetation. Projects involve the placement of boulders to allow appropriate camping and recreation while containing vehicles on designated parking areas. Other repairs would occur based on a site-specific need and may include adding gravel to parking areas, planting trees and shrubs, decompacting soils, and fertilizing. There is an urgent need to restore 20 sites.

Upland Erosion

Some old timber harvest areas have skid trails and temporary roads. These areas often contain bare compacted soils that impede vegetation growth. Projects include the deep subsoiling of old temporary roads and major skid trails and the installation of waterbars and/or berms. Disturbed soils would be revegetated. There is an urgent need to correct erosion problems on approximately 300 acres.

In-stream

In-stream conditions are sometimes not optimal for fish. Streams can be improved by replacing lacking elements or by repairing existing features. Projects include the installation of logs or boulders in the stream, adding structure to ponds and lakes to improve habitat, riparian planting, noxious weed removal, nutrient enhancement and the maintenance of side channels. Also included is the maintenance of smolt trapping sites which are needed to monitor fish movement and populations. There are nine project areas that need treatment.

Nutrient enhancement and the maintenance of side channels and fish traps are annual activities. Nutrient enhancement is the placement of dead fish into streams and rivers to emulate the nutrient cycling that would have occurred years ago when greater numbers of salmon returned to spawn and then die. Some creatures that feed on the carcasses are in turn eaten by fish. The carcasses are provided by fish hatcheries as a result of surplus returns and are generally placed in the same drainage basin as the hatchery. Smolt traps and side channels sometimes require

annual or biannual channel manipulation with an excavator to achieve the desired flow. The equipment would use the same access route each time maintenance is needed. These maintenance activities would continue as needed for several years or until new information indicates a need for reassessment. There is the need to do periodic in-stream maintenance on seven fish trap sites and seven side channels.

Proposed Action

The proposed action includes many projects. The objectives for the projects are discussed in the previous section. The proposed action is alternative 2 and tables listing each project can be found in Chapter 2. Maps showing general project vicinities can be found in Appendix C. Site-specific maps and detailed project descriptions can be found in the analysis file.

Scoping

This proposal was published in the fall 2000 and the winter, spring and summer 2001 issues of the Mt. Hood National Forest publication Sprouts. In June of 2001, over 500 letters were mailed to Federal, State and local government agencies, tribal governments, organizations and citizens describing the proposed project and soliciting comments. The comments helped shape the proposed action.

Issues

No key issues were identified through scoping. Key issues are those that would influence the development of alternatives to the proposed action. The interdisciplinary team did identify one concern – impacts to water quality and fish habitat. There is a concern that ground disturbance associated with restoration projects, particularly where they happen close to streams and rivers, may result in short-term sedimentation and increased turbidity until erosion control measures take effect.

CHAPTER 2 - MANAGEMENT ALTERNATIVES

Alternatives Considered but Not Fully Developed

Consideration was given to a much longer list of projects. The proposed action does not fully restore watersheds: there are known restoration opportunities that are not included and there are ideas for restoration that are not yet fully developed to the point where analysis can proceed. The included projects are supported by Watershed Analysis and are considered to be priority projects by the Forest-wide prioritization model (Appendix A). The logistics involved with project design, field survey work and the available funding also contributed to the shaping of the proposed action. Many roads were considered for decommissioning but were deferred until after completion of a Forest-wide Roads Analysis.

Consideration was given to several projects during early planning stages that have since been deleted from this EA. Examples would include the Road 57 repair and reconstruction, and the

Evans Ditch and Central Canal Piping projects. These projects were reconsidered due to comments received during scoping. These are still valid and important projects, but it was felt that the degree of complexity warranted a separate analysis of effects and alternatives.

Consideration was given to including only the projects that had certain funding. This would have been a much shorter list of projects. The sources of potential funding are many and varied and it was decided to pursue a long list knowing that funding may materialize in the near future.

Consideration was given to an alternative that would defer all road decommissioning until after the Forest-wide Roads Analysis. This was not fully developed because this would not meet the purpose and need. The prioritization model found in the Appendix A shows that certain roads with their impact on fish and water quality are high priority for restoration. The project level roads analysis demonstrates that the included roads are not needed for resource management and are contributing to sedimentation.

Consideration was given to an alternative that would not fully decommission roads but would remove culverts and gate the roads instead. This suggestion was received through scoping. The concern was that a public investment was made to access the forest for logging and that decommissioning the roads would be a waste of that investment. This alternative was not fully developed because gates are costly to maintain and some roads have erosion problems that are best addressed by scarification, water bar installation and revegetation. The roads that are proposed for decommissioning are those that have no anticipated need for a decade or two. At the time of future timber harvest, decisions would be made about whether to reopen these decommissioned roads or to use alternative means to remove the timber.

Alternative 1 (No Action)

Alternative 1 is the "no action" alternative. Under this alternative, no restoration activities would occur.

Alternative 2 (Proposed Action)

The following restoration projects would be implemented. Individual projects are displayed in tables below organized by general restoration project type. All projects are assigned identification numbers so that they may be tracked in this document and on maps that are in the analysis file.

Project Type: **Fish Passage/Culverts**

Some road crossings or other structures block or impede fish passage. Surveys conducted in FY 2000 identified culverts that are full or partial passage barriers to all or some life stage of fish species. These projects involve the design and installation of a better structure.

MAP ID	5th Field Watershed	Project Name Road/Creek	Seasonal Restrictions	Notes These projects (except C9) qualify for categorical exclusion under 31.1b-4.
C2	East Fork Hood	3540/Pocket	2,4,5	1 structure
C3	East Fork Hood	3500681/Meadow	2,4	1 structure
C4	Mill	1711630/N. F. Mill	2,4,5	1 structure
C5	Sandy	Hwy 26/Alder	2	Repair blockage under bridge, Off-Forest
C6	Sandy	18/Bear	2,5	1 structure
C7	Bull Run	Unnamed Road/ Sewerline Cr.	2,5	1 structure, Off Forest
C8	Zigzag	1819/Henry	2,5	1 structure, Off Forest
C9	Sandy	Cedar Hatchery	2	Fish Hatchery weir, Off Forest This projects qualify for categorical exclusion under 31.1b-3.
C10	Upper Clackamas	4671/Rhododendron	2,4,5	1 structure
C11	Upper Clackamas	4671/Fawn	2,5	1 structure
C12	Upper Clackamas	4671160/Fawn	2,5	1 structure
C13	Upper Clackamas	4660/Pot	2,5	1 structure
C14	Oak Grove Fork	57/Anvil	2,5	1 structure
C15	Oak Grove Fork	5820/Anvil	2,5	1 structure
C16	Oak Grove Fork	5730/Chief	2,5	1 structure
C17	Oak Grove Fork	4630/Pint	2,4,5	1 structure
C18	Oak Grove Fork	4630/1/2 Pint	2,4,5	1 structure
C19	Collawash	6300/Happy	2,5	1 structure
C20	Collawash	6311/Sluice	2,5	1 structure
C21	Collawash	6300170/Peat	2,4,5	1 structure
C22	Lower Clackamas	46/Mag	2,5	1 structure
C23	Lower Clackamas	4600200/Cripple	2,4,5	Baffle installation under bridge
C25	Lower Clackamas	4600210/Bull	2,4,5	1 structure
C26	Hot Springs Fork	70/Thunder-Dutch	2,4,5	2 structures

Project Type: **Fencing**

These projects include the construction of fences to control livestock movement within sensitive areas such as streams and meadows**.**

MAP ID	5th Field Watershed	Project Name	Seasonal Restrictions	Notes These projects qualify for categorical exclusion under 31.2-9. Lengths are approximate
F1	Miles	Boundary	4,5	15,600 feet
F2	White	Camas	5	5,450 feet
F3	East Fork Hood	Neal Cr	5	5,400 feet
F4	Mill	N. F. Mill		3,100 feet
F5	Salmon	Jackpot	5	1,000 feet
F6	Salmon	Salmon R. Meadow	5	3,250 feet

Project Type: **Ditch Piping**

These projects involve converting ditches to pipes to transport irrigation water more efficiently.

MAP ID	5th Field Watershed	Project Name	Seasonal Restrictions	Notes Lengths are approximate
P1	Badger-Tygh	Highland Ditch	2,4,5	3.6 miles
P2	White	Lost & Boulder	2,5	2,200 feet

Project Type: **Quarry Rehabilitation**

These projects would include recontouring by filling with soil, shaping for drainage and/or installation of waterbars. Sites would also be revegetated. Vehicular access to sites would be blocked with a berm or other device.

MAP ID	5th Field Watershed	Project Name	Seasonal Restrictions	Notes
Q1	Rock-3 mile	Stockton Quarry		Partial rehab. of riparian area.
Q2	Oak Grove Fork	K2/Kink Quarries	2,5	Full rehab of Kink and Partial rehab. of K2 near riparian area. Includes decommission of ½ mile of 5730120 and removal of 2 culverts on 5720140.
Q3	Oak Grove Fork	Stone Creek Quarry	5	Partial rehab. of riparian area.

Project Type: **In-stream/Riparian**

Streams would be improved by replacing lacking elements or repairing problem areas.

MAP ID	5th Field Watershed	Project Name	Seasonal Restrictions	Notes
I1	Rock-3 mile	3 mile Creek	2,4	Place logs with helicopter, 1.5 mi.
I3	Middle Fork Hood	Clear Branch	1,2	Reconfigure dam spilling basin and fish trap
I4	Bull Run	Lower Bull Run	2,4,5	Place logs, 1.5 mi.
I5	Sandy	Barlow Trail		Off Forest, riparian planting, noxious weed removal by hand, 10 acres
I6	Collawash	Round Lake	5	Place logs and gravel at inlet and outlet with helicopter, riparian planting
I7	Clackamas	Richardson Creek	1,2	Off Forest, Place logs, riparian planting, 1600 ft.
I8	Salmon	Knotweed		Manual cutting of invasive weed along Salmon River and Still Creek, 8 mi.
I9	Several	Smolt Traps	1,2,4	Annual maintenance at 6 smolt traps, 2 Off Forest. These projects qualify for categorical exclusion under 31.2-7.
I10	Upper Clackamas	Side Channels	1,2,4	Annual maintenance at 6 Clackamas River side channels. These projects qualify for categorical exclusion under 31.2-7
I11	Several	Nutrient Enhancement	3,4,5	Place fish carcasses in streams. This project qualify for categorical exclusion under 31.2-7
I12	Salmon	Arrah Wanna River Keeper	1,2	Side channel annual maintenance, add woody debris, manipulate pond, Off Forest
I13	Salmon	Resort at the Mountain River Keeper	1,2	Boulder structures in river to direct force of river toward middle of channel, Off Forest

Project Type: **Road Repair**

This includes heavy maintenance and deep patch repairs to stabilize cracked or sinking road surfaces. Projects would also include the placement of additional cross drain culverts, upgrading existing culverts, replacement of bridges and the stabilization of cut and fill slopes.

MAP ID	5th Field Watershed	Project Name (Road Number)	Seasonal Restrictions	Notes These projects qualify for categorical exclusion under 31.1b-4.
R1	East Fork Hood & Miles	4420	2,5	Resurface with gravel, replace culverts with larger size, 1.5 mi.
R2	Roaring	4610	5	Slide repair, mile post 21.2, 0.1 mi.
R3	Lower Clackamas	4620	2,5	Near jct. 4620190, Gully/drainage repair, install culvert, 0.1 mi.
R4	Upper Clackamas	4671	5	Stabilization, cracking, 0.2 mi.
R5	Hot Springs Fork	6340/6341	5	Stabilize, cracking, convert pavement to aggregate surface, 4.3 mi.
R6	Fish & Lower Clackamas	5410	4,5	Stabilize. Create berm to redirect flood waters from Rim Rock Cr. away from road. 6.48 mi.
R7	Lower Clackamas	46 1st segment	3,5	Stabilization, jct. 57 to jct. 63, 3.6 mi.
R8	Upper Clackamas	46 2nd segment	5	Stabilization, jct. 63 to jct. 42, 11.3 mi.
R9	Upper Clackamas	46 3rd segment	5	Stabilization, jct. 42 to jct. 6350, 12.5 mi.
R10	Collawash	63 1st segment	4,5	Stabilization, Hot Springs Fork bridge to Tom's Meadow, 4.6 mi.
R11	Collawash	63 2nd segment	5	Stabilization, Tom's Meadow to jct. 6350, 2.8 mi.
R12	Collawash	63 3rd segment	5	Stabilization, convert from pavement to gravel. jct. 6350 to jct. 6370, 3.8 mi.
R13	South Fork Clackamas	45	3,4,5	Stabilization, 25.9 mi.
R15	Middle Fork Hood	Eliot Bridge/2840	2,5	Replace flood damaged bridge
R16	Middle Fork Hood	Eliot Bridge/2840620	2,5	Replace flood damaged bridge
R17	West Fork Hood	Divers Bridge/1300	2	Replace flood damaged bridge, Off Forest
S	Several	5810030; 4621022,023; 4672075; 4680025; 6350310;	3,4(4621022) 4(4621023), 5	Storm proof roads, drivable waterbars, 1.6 mi.

Project Type: **Road Decommission**

This would involve the removal of gravel surfacing and culverts if present, and the deep scarification of road surfaces. It would also include pulling back unstable fill slopes where needed to prevent future landsliding. Berms would block vehicular access and disturbed soils would be revegetated.

MAP ID	5th Field Watershed	Project Name (Road Number)	Seasonal Restrictions	Notes
D	Bull Run	1015 and tributary roads past bridge	1,2,5	Past flood damaged log bridge crossing Log Creek, 3.6 mi.
D	Collawash Hot Springs Fork	6300016; 6320165; 6322180; 6340030.	1,5	1 mi.
D	Lower Clackamas	4620013,240; 4621(0.68 mi.); 4621027; 4622115; 4630150.	1, 2(4630150) 3(4621027) 4(4620013, 4621, 4621027, 4630150),5	2.7 mi.
D	Oak Grove Fork	4280011,013,232,244,245,246; 4600246; 4631018; 4635122; 4661018; 5730120; 5800017,023,024,138,150; 5810018,019; 5820022,023,024; 5830270; 5860020,022,242; 5870011.	1, 4(4600246, 4631018, 4661018),5	19 mi.

Project Type: **Riparian Areas Damaged by Vehicles**

Projects involve the placement of boulders to allow appropriate camping and recreation while containing vehicles on designated parking areas. Other repairs would occur based on a site-specific need including adding gravel to parking areas, planting trees and shrubs, decompacting soils, and fertilizing.

MAP ID	5th Field Watershed	Project Name	Seasonal Restrictions	Notes These projects qualify for categorical exclusion under 31.1b-5.
V1 to V8	Oak Grove Fork	Oak Grove Fork	4,5	Near road 57, between jct. 4630 and 5810, 8 sites, vehicles are driving to river's edge.
V9 to V17, V19	Upper Clackamas	Clackamas River at Big Bottom	4,5	Near road 46, between jct. 63 and 4600320, 10 sites, vehicles are driving to river's edge, most were previously repaired but need more work.
V18	Upper Clackamas	Cabin Cr.	5	Near junction of road 4660 and 4661, one site, impacts caused by vehicles and horses.
V20	Hot Springs Fork	Hot Springs Fork	4,5	Road 70, near Bagby Hot Springs, one site.

Project Type: Upland **Erosion**

Projects include the deep subsoiling of old temporary roads and major skid trails and the installation of waterbars and/or berms. Disturbed soils would be revegetated.

MAP ID	5th Field Watershed	Project Name	Seasonal Restrictions	Notes
E1 to E5	Lower Clackamas & Oak Grove Fork	Skid trail/temp road subsoiling, waterbar	4(E1-E4)	159 acres, rip in spring when soil moisture is optimal
E6 to E15	Oak Grove Fork & Upper Clackamas	Skid trail/temp road waterbar and/or berm	4(E6&E8), 5	144 acres

Mitigations

Seasonal Restrictions

1. **Erosion**: No ground based equipment would be used within Riparian Reserves between Oct. 1 and June 15 to limit the likelihood of surface erosion and sediment transport and reduce the intensity and duration of anticipated short-term turbidity increases. This restriction may be waived with the concurrence of a soil, watershed or fisheries specialist, if long periods of dry weather are anticipated. This restriction applies to the following projects: I3, I7, I9, I10, I12, I13 all D's.

2. **Fish**: In-stream projects would only occur within work timing guidelines for in-stream projects set up by Oregon Department of Fish and Wildlife (ODFW) to protect incubating fish eggs and spawning fish. In-stream work would occur within the following periods: Clackamas, Sandy, East Fork Hood River, and the mainstem Hood River - July 15 through August 31, Middle Fork Hood River and West Fork Hood River - July 15 through August 15, Mile Creeks watershed - July 1 through October 31. This restriction may be waived if ODFW biologists concur. This restriction applies only to the portion of a project where in-stream work is conducted and not to other project phases such as road paving. This restriction applies to the following projects: All C's, all P's (in-stream work at ditch inlets), Q2, I1, I3, I4, I7, I9, I10, I12, I13, R1, R3, R6, in-stream components of bridge replacements R15 to R17, D1015, D4620240, D4621, D4630150, D4280011, D4600246, D4631018, D5800138, and D5800150.

3. **Peregrine Falcon**: No equipment would be operated between January 1st – July 31st to protect nesting peregrine falcons. This applies to projects I11, R7, R13, D-4621-027, and S-4621-022. This requirement may be waived by the District Ranger if the site is unoccupied or if nesting efforts fail and there is no possibility of re-nesting efforts.

4. **Deer and Elk**: No equipment would be operated in certain special winter range areas between December 1 and March 31. This winter range restriction applies to projects C10, C17, C18, C20, C21, C23 to C26, Q1, I1, I4, I9, I10, I11, R6 to R10, R13, S-4621022, S-4621023, D-4620013, D-4621, D-4621027, D-4630150, D-4600246, D-4631018, V1 to V4, V9 to V17, V19, V20 and E1 to E4. No equipment would be operated in key calving areas between April 1st and July 30th. This calving restriction applies to projects C2, C3, D-4661018, E6 and E8.

5. **Northern Spotted Owl**: To minimize impacts to owls during the critical breeding season, no equipment would be operated between March 1st and July 15th. This applies to projects C2, C4, C6 to C8, C10 to C26, F1 to F3, F5, F6, P1, P2, Q2, Q3, I4, I6, I11, R1 to R16, all S's, all D's, all V's and E6 to E15. (I11 would be restricted where helicopters are used but would be exempt as described below where helicopters are not used.) Projects are exempt from this restriction if they meet one or more of the following three criteria: 1) If a project is greater than ¼ mile from unsurveyed suitable habitat; 2) If the area around a project is surveyed and the project is found to be greater than ¼ mile from any activity centers; or 3) if the project does not generate noise above the ambient noise level. Projects C3, C5, C9, F4, Q1, I1, I3, I5, I7 to I10, I12, I13 and R17 have been determined to meet one of these criteria and are exempt from this seasonal restriction. Projects E1 to E5 may occur during this time period even though they do not meet the above 3 criteria (see wildlife section).

Other Mitigation Measures

6. During the culvert replacement projects, stream flow would be guided or diverted away from the reconstruction site. Flow would be restored to the reconstructed stream course once construction is complete. Excavated materials would be removed from the flood plain. Erosion control devices would be installed to capture and reduce downstream transport of fine sediments.

7. To reduce erosion, bare soils would be revegetated. Grass seed and fertilizer would be evenly distributed at sites of soil disturbance. Steeper slopes that have bare soils would also have mulch applied to ensure successful establishment. Effective ground cover would be installed prior to October 1 of each year.

8. To minimize the spread of noxious weeds the following actions would be taken for all projects where applicable.

Clean heavy equipment prior to arrival on Forest to prevent introduction of new noxious weed seed. The contract administrator or project activity coordinator would inspect all project equipment before it is allowed to operate at the project site. The equipment shall be free of soil clumps and vegetative matter or other debris that could contain or hold seeds. Cleaning of the equipment may include pressure washing and shall be done outside of the National Forest Boundary.

If horses or pack animals are used, clean hooves and groom animals prior to arrival on site. Use weed free feed for 3 days prior to arrival on site and throughout duration of project.

If topsoil is disturbed, save topsoil on site and replace over disturbed soil before replanting.

If soil disturbance occurs, revegetate with site-appropriate, locally collected native seed or native plants. When these are not available, use noninvasive and nonpersistent non-native species. When seed is used it should be either certified noxious weed free or from Forest Service native seed supplies. Check with the District Botanist for appropriate species.

If straw mulch is needed, use either mulch from fields which grow State of Oregon Certified grass seed (which is certified free of Oregon noxious weeds) or other sources which are determined to be free of noxious weeds. Mulch species shall preferably be from native seed sources or annual rye or cereal grain fields.

If gravel or soil is imported from outside of the project area, consult with the District Botanist to ensure that weeds are not introduced from the supply source.

Avoiding heavy equipment disturbance to existing concentrations of noxious weeds. Projects that would get special attention include C5, C6, C7, C8, C9, I12, I13, R15, and R17.

9. Avoid fertilizer use in close proximity to live streams and wetlands. Generally a 10-foot buffer would be used for hand application but this would be adjusted based on site-specific conditions.

10. Culvert replacements, bridges and other stream crossings would be designed to accommodate at least the 100-year flood event, including associated bed load and debris where there is a high risk of debris flows.

11. A site specific Spill Prevention Control and Countermeasure Plan for project sites and staging areas would be developed. If fuels are stored in the project area, the Forest Service would approve the site in advance. Appropriate measures for containment, such as berms and catch basins with plastic liners would be used.

12. Where project design within Riparian Reserves involves excavation of existing topsoil, special efforts would be taken to restore the site. The topsoil with its accompanying large woody debris would be removed and stored nearby. Prior to completion of project, the topsoil and large woody debris would be placed back onto suitable areas to facilitate revegetation.

13. All projects would comply with the State Water Quality Standards.

14. All known heritage resources would be protected. Should heritage resources be located during project implementation, project activities would be halted until consultation with the Forest Archeologist can determine appropriate site-specific mitigation.

15. To minimize effects to white water river users, logs would be placed so that they do not cross the entire channel.

16. Trail #537 (the old 1910 trail) requires special attention during the decommissioning of roads 4280-232 and 4280-240. A 3-foot wide tread would be retained where the trail crosses 4280-232 and where the trail occupies the north-south section of 4280-240.

CHAPTER 3 - ENVIRONMENTAL CONSEQUENCES

Effects of Alternative 1 (No Action)

Fish and Water Quality

With alternative 1, none of the goals described in the purpose and need section would be met. The objective of moving toward healthier watersheds would not be met. Fish runs that have been in a state of decline would not be assisted toward recovery. The transportation system that has been deteriorating in recent years would continue to deteriorate until conditions become unsafe. Roads may also fail causing landsliding and further deterioration of watershed conditions. It is recognized that it would take many years of restoration effort to fully meet the goals of watershed recovery. Alternative 1 does not take any steps in that direction.

Fish Passage Barriers

In stream systems that currently have partial or full fish passage barriers due to inadequate stream crossings (approximately 31 miles), fish would continue to have problems moving throughout the stream system. These impediments result in fish not fully utilizing spawning and rearing habitats and hinder the broad exchange of genetics throughout the population. When culverts are too small to accommodate a 100-year flood event, there is the potential for culverts to become plugged, possibly resulting in washouts and much damage if not observed and unplugged in time. Washouts would introduce a pulse of road-related sediment into the stream system and negatively effect downstream aquatic habitat.

Riparian Areas With Livestock Impacts

Livestock are naturally attracted to streams, meadows and other sensitive areas where overuse often causes damage to the aquatic system. The impacts associated with livestock presence including removal or degradation of riparian vegetation, stream bank sloughing, and erosion, would increase through time.

Ditches

Ditches would continue to leak and washout causing erosion. The practice of withdrawing more water than needed for irrigation to compensate for leakage and evaporation would continue. Ditch water would continue to seep into the ground beneath the ditches and contribute to landslides where ditches traverse steep side-slopes. These landslides, if large enough, would transport sediment off the hillslopes and into the streams below.

Quarries

Quarries would continue to be sources of erosion and two acres of riparian areas would not be fully functional.

Roads

Some roads have been damaged by severe storm events, are causing resource damage, or are unsafe. This condition would continue. Chronic sources of sediment would continue impacting fish and water quality. Approximately 100 miles of roads would continue to deteriorate.

Riparian Areas Damaged by Vehicles

Vehicles would continue to be driven right up to the edge of rivers and streams causing compaction, erosion, death of vegetation and damage to roots of trees. Approximately 5 acres would continue to deteriorate.

Upland Erosion

Old skid trails and temporary roads would continue to be sources of erosion. Approximately 300 acres would remain in an unvegetated condition.

In-stream

In-stream conditions would continue to be less than optimal for fish. There would be inadequate pools, wood, and shade. Side channels would be dewatered or heated up during the dry season killing the fish that took refuge there. Streams would continue to have nutrient poor conditions and native riparian vegetation would be replaced by invasive weeds.

Effects Determination for Threatened or Proposed Fish, Critical Habitat and Essential Fish Habitat - Alternative 1 (No Action)

Impact Types	Determination
Quarries Road Problems Near Streams Riparian Areas Damaged by Vehicles Riparian Areas With Livestock Impacts	**May Affect and are Likely to Adversely Affect (LAA)** threatened and proposed species found within the impact areas due to the probability of take, both in terms of mortality and harassment. **May Not Adversely Modify** designated critical habitat where Lower Columbia River steelhead, Lower Columbia River chinook salmon, or Upper Willamette River chinook salmon occur. Adverse effects to fish species and habitat would be continual and would progressively get worse as time goes by. **May Not Adversely Affect** Essential Fish Habitat due to disturbance within riparian areas and erosion. The effects to EFH would be continual and would progressively get worse as time goes by. (Except projects that are outside of the historic range of Coho, Chum and Chinook Salmon, see Biological Evaluation.)
Fish Passage Barriers In-stream Road related problems outside Riparian Reserves Ditches Upland Erosion	**May Affect, Not Likely to Adversely Affect (NLAA)** determination for threatened and proposed fish species. **May Not Adversely Modify** designated critical habitat where Lower Columbia River steelhead, Lower Columbia River chinook salmon, or Upper Willamette River chinook salmon occur. Adverse effects to fish species and habitat would be continual and would progressively get worse as time goes by. **May Not Adversely Affect** Essential Fish Habitat. These impact areas are not anticipated to contribute sediment directly to streams and therefore would not affect EFH.

Cumulative Effects

Alternative 1 would not contribute to short-term cumulative effects since no ground disturbance would occur but it would also not contribute to long-term cumulative benefits. Long-term detrimental cumulative effects would occur and would progressively get worse as time goes by if problem areas are not treated.

Other Resources

The no-action alternative would have little or no effect to other resources such as wildlife, recreation or heritage resources. The continuation of existing conditions would have minor negative consequences for a few species that rely on aquatic ecosystems such as amphibians and aquatic plants.

Effects of Alternative 2

Cumulative Effects Discussion For Fish and Water Quality

Cumulative effects are additive through time and space. They are the impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions across a larger landscape regardless of who undertakes those actions. This section is a summary of the cumulative effects analysis efforts that have been conducted and documented through watershed analysis.

Approximately 30 watershed analyses have been completed across the Forest. A concerted effort was made to consolidate this information into a Forest-wide analysis. Appendix A contains a summary of the Forest-wide analysis that takes the form of a prioritization model. It describes the current condition and it describes past resource impacts.

The following parameters were modeled:

- **Watershed sensitivity** was evaluated by looking at inherent features of the natural landscape that could contribute to a concern about fish or water quality.
- **Management Intensity** evaluated roads, timber harvest and grazing in terms of their proximity to streams and riparian areas.
- **Biological factors** relating to fish habitat and fish presence were included.

Projects have been proposed in the following 5th field watersheds that scored high in terms of priority for restoration: Lower Clackamas River, Fish Creek, Upper Clackamas River, Collawash River, Oak Grove Fork Clackamas River, Hot Springs Fork Collawash River, White River, and West Fork Hood River. Projects have been proposed in the following 5th field watersheds that scored moderate in terms of priority for restoration: Miles Creek, East Fork Hood River, Middle Fork Hood River, Sandy River, South Fork Clackamas River, Salmon River, Bull Run River, Zigzag River, Little Sandy River, and Rock-Three Mile Creek. Projects were also included off-Forest and in lower priority watersheds where there was a clear and urgent need for restoration action.

Cumulative Benefits

Chapter 1 describes the objective of all of the included projects as having healthy functioning watersheds that provide clean water and sustain quality fisheries. (Several sections below elaborate on the direct and indirect benefits of the listed projects to these resources.) Watershed restoration is an ongoing process, not just this short list of projects, but a series of efforts that span the previous decade and the decades to come.

- Some restoration has been completed, but time is needed for vegetation to grow before the healing process is complete.
- Some projects have been planned but not yet implemented.
- Some projects are in the early planning phase and would be implemented in the coming years.
- Efforts are underway to restore streams and riparian areas on private property.

There are other efforts underway that are not restoration projects but would result in having healthier watersheds that provide clean water and sustain quality fisheries.

- The process of relicensing hydropower facilities would likely result in improved conditions for fish through improved fish passage facilities at dams, increased in-stream flows, and habitat mitigation projects.
- As forest management occurs, standards and guidelines and regulations require state-of-the-art practices to be implemented.

The result is a trend of improving conditions for fish and water quality. Beneficial effects include long-term improvements to water quality, fish habitat and riparian areas, restored fish passage for all life stages of threatened and proposed species, re-established connectivity of fish populations above and below human-made barriers, restoration of hydrologic function, more natural routing of wood and sediment through stream systems, a decrease in drainage network, and a reduction in sediment delivery to streams.

Cumulative Impacts

Many restoration projects result in short-term sedimentation until erosion control measures take effect. Other projects that occur in the same watersheds such as timber harvest and road construction have the potential to contribute cumulatively to the sediment load moving down streams and rivers.

Projects on federal lands would be designed to be consistent with the Aquatic Conservation Strategy of the Northwest Forest Plan and Best Management Practices. The harvest level in recent years has been well below the level projected by the Northwest Forest Plan for a number of reasons including appeals, litigation and areas established for survey and manage species. The short-term sedimentation associated with restoration projects when combined with all other sources would not likely result in harm to fish habitats or water quality for the following reasons:

- Each project would contain mitigations to minimize or eliminate sources of erosion by applying grass seed and/or mulch to areas of bare soil.
- Some projects would be designed to avoid ground disturbance by using helicopters or low impact ground based equipment.
- Riparian reserves would be delineated and associated Aquatic Conservation Strategy Objectives would be met.
- Seasonal restrictions would be observed where appropriate to accomplish work during the dry season.

Restoration projects, timber harvest and road construction on federal land would incorporate these protections where appropriate.

There are many sources of sedimentation in the portions of watersheds that are privately managed. Timber harvest and road building would meet the standards of the Oregon Forest Practices Act that contains many provisions to minimize erosion. Farming, orcharding,

grazing, and land development are other potential sources of sedimentation.

All activities that are potential sources of sedimentation, whether public or private, would likely occur widely dispersed geographically and chronologically, therefore concentrations of sediment in any given watershed at any given time would be unlikely. The projects would be implemented over multiple years in a number of different watersheds. The recovery from short-term effects from one project may be complete by the time another project in the same watershed is implemented. In addition, some of the projects would result in immediate benefits such as projects repairing riparian areas damaged by vehicles and some road repair projects and these would offset the short-term sediment inputs of other projects.

The majority of the restoration projects repair human created features of the landscape. Since project inception was guided by the restoration prioritization computer model (Appendix A) it stands to reason that many restoration projects fall in 5th field watersheds that have had the greatest intensity of management. Four 5th field watersheds have multiple restoration projects as well as other activities such as timber harvest that have the potential to cumulatively contribute short-term sediment to streams (Upper Clackamas, Oak Grove, Lower Clackamas and Collawash).

The proposed action involves the placement of logs in streams to create pools and enhance diversity (I1, I4, I6, I7 and I12). The intent is to replicate the natural process of adjacent trees falling into or across a stream. It is the Forest's current practice to not recruit wood from streamsides but bring it in from other areas. Sources may include trees that fall across roads and must be removed, logs that float into reservoirs, logs from ongoing timber sales or down trees adjacent to roads. Logs may also be purchased or acquired from off-Forest. There currently are stockpiles of logs available for this and other restoration projects. The process is opportunistic and ongoing: as logs become available they are stockpiled and used as needed. Acquiring the logs from these sources is more expensive but has a lower environmental effect than recruiting them from adjacent riparian areas since trees there provide shade to streams and other benefits. The environmental analysis and documentation under the National Environmental Policy Act for the acquisition of logs is separate from this EA and was either completed previously or is ongoing.

Fisheries

Existing Conditions

The waters of the Mt. Hood National Forest provide important habitat for native populations of fish in over 1,200 miles of streams. Approximately 300 miles of streams support anadromous fish populations. Past land management activities have had impacts on watersheds throughout the Forest, but natural conditions and processes, such as highly erodible soils, also dictate current conditions. Management activities, which have had negative impacts on fish and aquatic resources, include road building, timber harvest, water diversions, hydroelectric development, grazing, and recreation.

There are 12 Tier One, Key watersheds, on the Mount Hood National Forest. These watersheds identified in the Northwest Forest Plan, provide refugia habitat that is critical for the conservation of at-risk anadromous salmonids, bull trout, and resident fish species, as well as

having a high potential for successful watershed restoration. These "key" watersheds support seven salmon and trout "evolutionarily significant units" (ESU's) under the federal Endangered Species Act (ESA). According to the Northwest Forest Plan, Tier One, Key watersheds should receive the highest priority of protection and restoration of anadromous fish habitat within any watershed restoration program.

The proposed projects have been developed through assessing primary restoration needs, off-Forest opportunities, and recommendations identified in Watershed Analysis. The projects are designed to improve fish passage that has been interrupted by road building activities, reduce sedimentation and erosion, restore riparian areas, enhance aquatic habitat, and improve water quality for fish and other aquatic species.

ESA species occurring on or near the Mt. Hood National Forest

Species	ESU	Status	Watershed
Bull Trout *(Salvelinus confluentus)*	Columbia River Distinct Population Segment	Threatened 5/98	Hood River
Steelhead *(Oncorhynchus mykiss)*	Lower Columbia River	Threatened 3/98	Sandy River, Clackamas River, Hood River
Steelhead *(Oncorhynchus mykiss)*	Middle Columbia River	Threatened 3/99	Fifteenmile Creek, Mill Creek
Chinook *(Oncorhynchus tshawytscha)*	Lower Columbia River	Threatened 3/99	**Sandy River, Hood River**
Chinook *(Oncorhynchus tshawytscha)*	Upper Willamette River	Threatened 3/99	Clackamas River
Coastal Cutthroat Trout *(Oncorhynchus clarki)*	Southwest WA/Columbia River	Proposed 4/99	Clackamas River, Sandy River, Hood River, Fifteenmile Creek, Mill Creek
Coho *(Oncorhynchus kisutch)*	Lower Columbia River/Southwest WA	Candidate 7/95	Clackamas River, Sandy River

Lower Columbia River Steelhead (*Oncorhynchus mykiss*) Threatened (NMFS)

Lower Columbia River steelhead occur in the Clackamas River, Sandy River, and Hood River basins. Adult winter steelhead enter the waters of the Mt. Hood National Forest primarily during April through June with peak migration occurring in May. A small run of summer steelhead occurs in the Hood River. These fish enter the mainstem Hood River from June through September.

Steelhead use the majority of the mainstem rivers and tributaries as spawning and rearing habitat. Adult steelhead spawn in late winter to spring (January–June), depending in part on the run type (summer or winter steelhead), discharge and water temperature. Winter steelhead fry emerge between late June and late July and rear in freshwater habitat for one to three years. Juvenile steelhead during their first year, usually are found in riffle habitat but some of the larger juvenile steelhead will be found in pools and faster runs. Smolt emigration takes place March thru June during spring freshets.

Mid-Columbia River Steelhead (*Oncorhynchus mykiss*) Threatened (NMFS)

Mid-Columbia steelhead occurring on the Mt. Hood National Forest is limited to the Mile Creeks and Mill Creek drainages. This stock is the easternmost run of indigenous winter steelhead trout in the Columbia River basin. Steelhead have been documented on Forest in North Fork Mill Creek, Fifteenmile Creek, Ramsey Creek, and Eightmile Creek. A barrier falls restricts steelhead from ascending Forest lands on the South Fork of Mill Creek.

Adult steelhead enter Mt. Hood watersheds during January through March and spawn in April and May, depending on flows and water temperatures. Winter steelhead fry emerge between late June and late July and rear in freshwater habitat for one to three years. Juvenile steelhead during their first year, usually are found in riffle habitat but some of the larger juvenile steelhead will be found in pools and faster runs. Smolt emigration takes place March thru June during spring freshets.

Columbia River Bull Trout (Salvelinus confluentus) Threatened (USFW)

Columbia River bull trout are presently found in the Hood River drainage. Bull trout presence has been documented in Middle Fork Hood River, Clear Branch Creek both above and below Clear Branch dam, Pinnacle Creek, Coe Branch Creek, and Eliot Branch Creek. This bull trout population is the only known population occurring on the Forest.

Bull trout populations occurring in the Middle Fork Hood River are found primarily within Laurance Lake Reservoir and adjacent Clear Branch and Pinnacle Creeks. The Clear Branch Dam has altered this subpopulation of bull trout from a fluvial to an adfluvial form. Adult fish reside in the reservoir and move into Clear Branch as early as June and spawn mainly during September, before moving back into the reservoir. It is known that a small number of individuals within the Hood River annually move into the Columbia River with some returning into the Hood River.

Bull trout were once prolific in the Clackamas River system. At present, they are believed to be extinct. There are unconfirmed reports of their presence in the Sandy River basin in the late 1950's. However, recent fish sampling conducted in both the Sandy River and Clackamas River drainages failed to uncover any bull trout presence.

Bull trout reach sexual maturity between four and seven years of age and are known to live as long as 12 years. Bull trout spawn in the fall and require clean gravel cold-water temperatures for egg incubation. Although adults can stand water temperatures up to 8° C, incubation of eggs is best with temperatures no more than 2° C (36° Fahrenheit).

Bull trout fry utilize side channels, stream margins, and other low velocity areas. Fluvial adults require large pools with abundant cover in rivers. Some bull trout remain residents within the area in which they hatch, while others migrate from streams to lakes or the ocean. Presumably, the various forms of bull trout interbreed, which helps to maintain viable populations throughout their range.

Lower Columbia River Chinook (*Oncorhynchus tshawytscha*) Threatened (NMFS)

Lower Columbia River chinook salmon occur in the Sandy River, Hood River, and Clackamas River basins. These stocks are made up of both a spring run and a fall run component. The spring run occurs in the Hood River and Sandy systems, while fall run chinook are present in the Clackamas River and Sandy Rivers.

Most spring chinook salmon in the Hood River basin ascend the West Fork Hood River, and based on available information, use appears to be low in the Middle Fork Hood River. Spring chinook in the Sandy River basin utilize the mainstem Sandy River and upper basin tributary streams such as the Salmon River, Zigzag River, Still Creek, and Clear Fork of the Sandy River. They enter these watersheds from April through August and spawn from August through early October.

The fall chinook occurring within the Sandy and Clackamas Rivers primarily spawn and rear in the mainstem and larger tributaries downstream from Forest lands.

Upper Willamette River Chinook (*Oncorhynchus tshawytscha*) Threatened (NMFS)

Upper Willamette River spring chinook salmon occur in the Clackamas River. The ESU consists of both naturally spawning and hatchery produced fish. These spring chinook enter the Clackamas basin from April through August and spawn from September through early October with peak spawning occurring the 3rd week in September. These fish primarily spawn and rear in the mainstem Clackamas River and larger tributaries.

Adults in the Lower Clackamas drainage spawn in Eagle Creek, below River Mill Dam and between River Mill and Faraday diversion dams. Spawning in the upper Clackamas drainage has been observed in the mainstem Clackamas from the head of North Fork Reservoir upstream to Big Bottom, the Collawash River, Hot Springs Fork of the Collawash River, lower Fish Creek, South Fork Clackamas River and Roaring River.

Lower Columbia River/Southwest Washington Coho Salmon
(*Oncorhynchus kisutch*) Candidate for Listing (NMFS)

The National Marine Fisheries Service is currently reviewing all Lower Columbia River coho stocks for possible listing under the Endangered Species Act. Coho stocks occurring on the Forest are currently found in the Sandy and Clackamas River systems. The indigenous run of coho salmon in the Hood River is considered extinct. Very few coho ascend the Hood River at present and those are considered to be hatchery strays. The Clackamas River contains the last significant run of wild late-winter coho in the Columbia Basin.

Adult coho salmon enter the Sandy and Clackamas Rivers from September through February. Spawning occurs mid-January to the end of April with the peak occurring mid-February. Adults prefer deep pools and tributaries for over-wintering while juveniles will seek out inundated floodplains and other protected slow-water habitats such as side channels and slow-water pools. Woody debris and habitat diversity are important to this species.

Southwestern Washington/Columbia River Cutthroat Trout
(*Oncorhynchus clarki*) Proposed (USFW)

Southwest Washington/Columbia River coastal cutthroat trout occurring in waters of the Forest are composed of two native stocks: an anadromous (sea-run) form and resident form. Resident populations of cutthroat appear healthy in the Clackamas River, Sandy River, Hood River, and Mile Creeks basins. High numbers are usually seen by Forest personnel while conducting snorkel or electrofishing surveys.

Historically sea-run cutthroat trout occurred in the Clackamas River, Sandy River, and Hood River basins. More recently, anadromous cutthroat populations appear to have greatly declined throughout these watersheds. We do not have consistent indicators of trends in abundance for most populations of searun cutthroat trout. However, anecdotal information, creel surveys and fish counts at dams have raised concerns that anadromous populations in Oregon may be experiencing a widespread decline. The anadromous cutthroat trout is likely at a very depressed level, possibly near extinction.

Coastal cutthroat trout tend to spawn in very small (first and second order) tributaries. They spawn from December-May; alevins (24 mm) emerge from gravel during June and July. Young fry move into channel margin and backwater habitats during the first several weeks. During the winter, juvenile cutthroat trout use low velocity pools and side channels with complex habitat created by large wood. Coastal searun cutthroat juveniles rear in freshwater for 2-3 years. Smolts migrate during April and May to estuaries and marine water. They usually remain close to natal estuary (within 10 km), but may range up to 70 km. Immature fish and adults return to over-winter in freshwater streams in fall and return to estuarine areas in spring. Adults hold in tidal pools as early as July in preparation for spawning migration as 4-5 year olds.

Columbia Dusky Snail (*Lyogyrus n. sp. 1*) Survey and Manage

This species of aquatic mollusk has a very sporadic distribution in the central and eastern Columbia Gorge, Washington and Oregon. Known sites on the Mt. Hood National Forest occur in Clackamas, Multnomah, and Hood River counties. Lyogyrus have been identified in most subwatersheds on the Forest.

This species occurs in cold, well oxygenated springs and spring outflows on soft substrates in shallow, slow-flowing areas where it appears to feed on decaying organic particles. It prefers areas without macrophytes (macroscopic emergent and submerged aquatic plants), but may also occur in areas with watercress and water hemlock. It co-occurs with *Pristinicola hemphilli* and Juga (*Oreobasis*) spp., which are typically found in small, cold, pristine springs.

Basalt Juga (*Juga (O)* n. sp. 2) Survey and Manage

This species occurs sporadically in springs in the central and eastern portions of the Columbia Gorge, Oregon side only: Hood River and Wasco counties Oregon, including sites in Mt. Hood National Forest and sites in the Columbia Gorge National Scenic Area. It is known to occur at 28 sites.

This species occurs in small, shallow, undisturbed perennial springs and small springs that flow into the Columbia River. It prefers gravel substrates where watercress is usually present. Occupied springs are often surrounded by basalt talus.

Effects of Projects on Aquatic Habitats

Aquatic Habitat Projects: Fish Passage, In-stream, Road Work Near Streams & Riparian Restoration Projects

Many projects involve work within or adjacent to the active stream channel. If not done carefully they could deliver sediment, create turbidity, and cause stream bank erosion. The use of heavy mechanized equipment such as a track hoe or walking excavator, could disturb the stream influence zone, disturb fish, and cause incidental mortality. There is also the potential of an accidental fuel/oil spill.

These projects may cause a short-term degradation of water quality due to sediment input and chemical contamination. Stream bank condition and habitat substrate may also be adversely affected in the short term. However with careful project design and mitigation, these effects are expected to be of a limited extent and duration.

Direct effects to fish species resulting from these projects include reduced feeding efficiency during times of increased turbidity and the possibility of individual mortality during construction. Fish rely on sight to feed so feeding success could be hampered during those times turbidity is increased. This would be a short-term effect since turbid conditions would dissipate soon after an in-stream work phase was completed, generally within a few hours.

Any time there is digging or equipment used within the live stream channel there is a possibility fish could be killed or seriously injured by being crushed or run over by equipment. Based on previous experience with in-stream restoration projects, most fish vacate the area when equipment disturbs the stream channel.

Indirect effects are possible from increased amounts of fine sediment degrading aquatic habitat after project implementation is completed. Fine sediment sources include material mobilized from the stream channel during construction or erosion of exposed soil during and after project implementation. Potential impacts from increased amount of fine sediments are degradation of spawning habitat and a reduction in rearing habitat caused by sediments filling in pools. Wood placed in the stream channel would cause changes in channel hydraulics and may cause bank erosion and/or stream bed scour. Although these processes occur naturally, the addition of large wood or changes in channel geometry as a result of restoration activities could cause localized areas of erosion until the channel reaches equilibrium at those sites.

The amount of sediment generated from these projects is expected to be low due to the time when the projects are implemented and the use of best management practices. Once exposed soil areas are re-vegetated and stabilized, erosion would be negligible. Affected areas would be localized and probably extend no further than several hundred feet downstream from the project site. The effects would be relatively short-term; as flows in the winter increase, any sediment caused by project activity would be redistributed downstream and in effect diluted as material settles in different areas.

The probability of "take" of threatened or proposed species resulting from the implementation of these types of projects is low, but present regardless. Following in-stream work guidelines, project design criteria, using aggressive erosion control measures, and adherence to applicable Best Management Practices (BMP's) effects would be negligible at the watershed scale.

These projects are expected to provide long-term ecological benefits, such as restoring habitat connectivity to all life histories of fish and aquatic species, restoring fish passage to historical habitats, reducing erosion and sedimentation, restoring riparian vegetation and natural processes, improving nutrient levels and improving spawning and rearing habitat for all fish species.

Road Related Projects: Repair, Decommissioning & Storm Proofing roads

One of the most important aquatic components of watershed restoration is control and prevention of road-related runoff and sediment production. Road related projects include repair, decommissioning, and storm proofing. These projects involve work within the existing road prism. Thus, the potential exists to deliver sediment to streams and create turbidity, particularly where roadwork happens close to streams.

These activities may cause a short-term degradation of water quality and aquatic habitat due to sediment inputs. Potential direct effects to fish species resulting from implementing road projects are increased turbidity levels which may reduce feeding efficiency. This is likely to only occur in the vicinity of stream crossings where project work may directly impact stream habitat, as in the case of culvert removal during road decommissioning. In the long-term, these projects would restore aquatic habitat by reducing sediment delivery to streams and improving fish passage by removing culverts where roads are obliterated. Indirect effects are possible from increased delivery of fine sediment from erosion of exposed soil during and after project implementation.

Road decommissioning projects would also tend to restore hydrology by reducing peak flows (reducing the amount of non-permeable surface thus reducing run-off) and reducing drainage network. Watershed conditions would also be improved as road densities are reduced and riparian reserves are restored. These projects may also potentially improve floodplain connectivity where culverts are removed.

The proposed projects would result in improved long-term water quality. Areas of chronic sediment supply would be stabilized and re-vegetated. Road-related watershed restoration treatments proposed in this document would hasten the recovery of watershed health and long-term water quality conditions. Long-term beneficial effects result from restoration of hydrologic functions, reduced risk of washouts and landslides, and reduction of sediment delivery to streams.

Quarry Rehabilitation

The rehabilitation of a quarry site would include adding fill material where needed, recontouring, and revegetation. Activities associated with rock quarry operations have the potential to cause short-term degradation of water quality and aquatic habitat due to sediment

input caused by hauling materials to and from the site.

The quarries proposed for rehabilitation are within Riparian Reserves thus they presently pose a potential risk to water quality. Rehabilitation of these sites would have a long-term beneficial effect on water quality and aquatic habitat.

Fencing Projects

Fencing projects are required to control livestock use levels in and around wet meadows and riparian areas. No disturbance would occur close to stream channels. Control of livestock utilization levels is needed, where there are no present barriers to animal movement in and out of meadow and riparian ecosystems.

Expected Benefits to fish and water quality: The expected benefits to fish are habitat enhancement by controlling trampling/consumption of vegetation and stream bank damage by livestock. The benefits to water quality would be the reduction and/or elimination of both non-point and point source pollutants.

Ditch Piping Projects

Ditch piping projects involve converting existing irrigation ditches to pipes in order to transport water more efficiently and installing screens to exclude fish from entering the irrigation systems. Project work would occur within the existing ditch path, when the ditches are dry. Any ground disturbance during project implementation is not expected to deliver sediment to adjacent stream courses. Piping would have a long-term beneficial effect on fish and water quality by reducing the amount of sediment entering stream channels, allowing the saved water to remain in streams and eliminating entrainment of fish into the irrigation system.

Erosion Control Projects

Upland erosion control projects are designed to decompact soils and revegetate old temporary roads and skid trails. Subsoiling of skid trails and temporary roads would help restore permeability to the soil, which would reduce surface runoff and restore a more natural flow regime. No measurable amount of sediment would be transported to streams from project construction. Erosion and resulting sedimentation originating from these disturbed areas would also be reduced significantly due to revegetation and restoration of more natural water flow patterns.

Effects Determination for Threatened or Proposed Fish, Critical Habitat and Essential Fish Habitat – Alternative 2

Project Types	Determination
Fish Passage/ Culverts Quarry Rehabilitation In-stream/ Riparian Road Work Near Streams Riparian Areas Damaged by Vehicles	**May Affect and are Likely to Adversely Affect (LAA)** threatened and proposed species found within the project areas due to the probability of take, both in terms of mortality and harassment. **May Not Adversely Modify** designated critical habitat where Lower Columbia River steelhead, Lower Columbia River chinook salmon, or Upper Willamette River chinook salmon occur. Any adverse effects to fish species or habitat would be short-term, within the first few years. The long-term effects of these projects are beneficial. **May Not Adversely Affect** Essential Fish Habitat due to disturbance within the stream channel. The effects to EFH would be short-term and limited to site-specific areas where project work takes place. These projects would have a beneficial effect on EFH in the long-term. (Except projects that are outside of the historic range of Coho, Chum and Chinook Salmon, see Biological Evaluation.)
Road related projects outside Riparian Reserves Upland Erosion	**May Affect, Not Likely to Adversely Affect (NLAA)** determination for threatened and proposed fish species. **May Not Adversely Modify** designated critical habitat where Lower Columbia River steelhead, Lower Columbia River chinook salmon, or Upper Willamette River chinook salmon occur. Any adverse effects to fish and habitat would be short-term, within the first few years. The long-term effects of these projects are beneficial. **May Not Adversely Affect** Essential Fish Habitat. These projects are not anticipated to contribute sediment to streams and therefore would not affect EFH.
Fencing Ditch Piping	**No Effect** to any threatened or proposed fish species. **May Not Adversely Modify** designated critical habitat. **May Not Adversely Affect** Essential Fish Habitat.

Designated Critical Habitat

The Endangered Species Act requires that critical habitat be designated when it is determined that a species is threatened or endangered. A critical habitat designation contributes to species conservation by identifying important areas and describing the features within those areas that are essential to species preservation.

Critical habitat is defined in section 3 (5)(A) of the ESA as the specific areas within the geographical area occupied by the species on which are found those physical or biological

features essential to the conservation of the species and which may require special management considerations or protection. In designating critical habitat for anadromous fish, NMFS considers requirements of the species such as space for individual and population growth, nutritional or physiological requirements, cover or shelter, sites for breeding, reproduction, or rearing of offspring, and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of the species.

Critical habitat consists of the water, substrate, and adjacent riparian zone. NMFS has defined the adjacent riparian zone based upon key riparian function such as shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter.

Lower Columbia River Steelhead - Critical habitat is designated to include all river reaches accessible to listed steelhead in Columbia River tributaries between the Cowlitz and Wind Rivers in Washington and the Willamette and Hood Rivers in Oregon. This designation includes all accessible river reaches in the Clackamas, Sandy, and Hood River subbasins.

Lower Columbia River Chinook - Critical habitat is designated to include all river reaches accessible to listed chinook salmon in Columbia River tributaries between the Grays and White Salmon Rivers in Washington and the Willamette and Hood Rivers in Oregon. This designation includes all river accessible reaches in the Clackamas, Sandy, and Hood River subbasins.

Upper Willamette River Chinook - Critical habitat is designated to include all river reaches accessible to listed chinook salmon in the Clackamas River and the Willamette River and its tributaries above Willamette Falls.

Critical habitat has not yet been designated for Columbia River Bull trout, Southwestern WA/Columbia River cutthroat trout or Lower Columbia River/Southwest WA coho salmon.

Essential Fish Habitat Consultation

The Sustainable Fisheries Act of 1996 amended the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to establish new requirements for Essential Fish Habitat (EFH) descriptions in federal fishery management plans and to require Federal action agencies to consult with the NMFS regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect essential fish habitat (EFH) identified under the MSA.

Essential Fish Habitat means those “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH includes those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery (i.e., properly functioning habitat conditions necessary for the long-term survival of the species through the full range of environmental variation). EFH includes all streams, lakes, ponds, wetlands, and other water bodies currently, or historically, accessible to salmon in Washington, Oregon, Idaho, and California.

Three salmonid species are identified under the MSA, chinook salmon, coho salmon and Puget Sound pink salmon. Chinook and coho salmon occur on the Forest in the Clackamas River,

Hood River, and Sandy River basins therefore, EFH consultation is necessary for agency actions within these watersheds. Although no chinook or coho salmon occur in the Mile Creeks or Mill Creek basins they lie within the EFH boundary thus, consultation is required for actions within the these watersheds.

The MSA defines adverse effects as any impact, which reduces the quality and/or quantity of Essential Fish Habitat. Adverse effects include direct, indirect, and site-specific or habitat wide impacts, including individual, cumulative or synergistic consequences of actions.

Survey and Manage Species

Projects were surveyed for aquatic mollusk species. *Lyogyrus* was found in many of the proposed project areas. Management Recommendations indicate that the proposed restoration projects would be acceptable since they would enhance habitat, decrease sediment input, and improve dispersal capabilities for these species. Project implementation would not increase water temperatures or introduce high levels of sedimentation, nor reduce dissolved oxygen levels necessary to sustain viable populations of the *Lyogyrus*. Adherence to mitigation measures such as erosion control, site specific Spill Prevention Control and Countermeasure Plans, and timing of in-stream work when flows are low, would provide the recommended protection for this species.

Recreational Fishing

The proposed projects would improve recreational fishing opportunities by restoring fish habitat conditions. Road decommissioning may increase walk in distances for some anglers.

Water Quality

Fish Passage Projects

In general, culvert removal would result in short-term input of sediment (immediately and up to 1 to 2 years after project completion) downstream from the project site. Since all of these pipes are on fish-bearing streams, some sediment would be delivered to areas of existing fish habitat. Mitigation measures that are focused on reducing sediment production including operating in the low-water season, isolating the work site from exposure to water, and revegetating disturbed areas after completion of work would minimize the amount of sediment entering surface water.

These projects would not only benefit fish movement, they would decrease aquatic habitat fragmentation. Larger culverts or bridges would allow wood, water and sediment to move more naturally through these crossing sites.

Fencing Projects

No measurable amounts of sediment are expected to be delivered to adjacent streams from project construction. A net decrease in sediment production and delivery would result due to elimination of streambank trampling from livestock use. This reduction would be greatest in high use areas that have steep banks composed of fine material. Additional indirect benefits to

bank stability and resulting sediment delivery would be derived from riparian vegetation recovery due to livestock exclusion. Recovery of the riparian area would increase bank stability due to increased root cohesion.

Ditch Piping Projects

The majority of the affected area for these projects is expected to take place in the existing "footprint" of disturbance. Work would most likely take place during periods of non-irrigation so there would be no interruption of flow to users. Since most of the work would take place when the ditches are dry, it is not expected that sediment would be introduced to surface flow via these ditches. Piping would have a considerable benefit to water quality by isolating surface water from herbicides, pesticides, and sediment. Piping would also reduce loss of water from evaporation, which should translate into a more efficient conveyance system. A more efficient conveyance system may lead to a reduced need to divert flow from existing rivers and reservoirs keeping more water in these features.

Quarry Rehabilitation Projects

Runoff from quarries can be a source of sediment to surrounding surface water. In some cases, excavation during quarry development can intercept subsurface flow and route it through spoil piles or other unconsolidated material, creating a sediment source. In other cases, these areas can collect snowmelt or rainfall and focus runoff through unconsolidated material and into surface water.

Quarry rehabilitation is not expected to introduce sediment due to implementation of mitigation measures such as working during the dry period of the year and employing erosion control measures. Several beneficial effects are expected to result from this project type. These include a reduction of sediment through controlling runoff and revegetation, and increase of riparian area function in riparian area quarries. Revegetation with trees should increase stream shading, potential large woody material and bank stability over the long term.

Road Repair

Road repair projects include a variety of different types. The majority of these projects propose to upgrade culverts to handle larger flood events or replace flood-damaged bridges. Effects from these type of projects would be similar to those described for installation of fish passage culverts. Increasing culvert size would decrease aquatic habitat fragmentation. Larger culverts would allow wood, water and sediment to move more naturally through these crossing sites.

Road Decommissioning

In general, culvert removal during road decommissioning would result in short term input of sediment (immediately and up to 1 to 2 years after project completion) downstream from the project site. Mitigation measures that are focused on reducing sediment production including operating in the low-water window, isolating the work site from exposure to water, and revegetating disturbed areas after completion of work would minimize the amount of sediment entering surface water.

Ripping of the road surface would help restore infiltration and resulting movement of water vertically through the soil profile. This in turn, should help restore flow quantity and timing and basin hydrology. Erosion and resulting sedimentation originating from these roads would also be reduced significantly due to revegetation and restoration of more natural water flow patterns.

Storm Proofing Roads

Storm proofing consists of installation of waterbars. No sediment is expected to result from this project due to implementation of mitigation measures designed to reduce erosion. Waterbars would help disperse water flow down these road surfaces, reducing the erosion potential and resulting sedimentation.

Projects Repairing Riparian Areas Damaged by Vehicles

No measurable amounts of sediment are expected to be delivered to adjacent streams from project construction due to implementation of mitigation measures aimed at reducing erosion and resulting sedimentation. A net decrease in sediment production and delivery would result due to elimination of streambank damage from vehicle use. This reduction would be greatest in high use areas that have steep banks composed of fine material. Additional indirect benefits to bank stability and resulting sediment delivery would be derived from riparian vegetation recovery due to exclusion. Recovery of the riparian area would increase bank stability due to increased root cohesion.

Upland Erosion Projects

No measurable amounts of sediment are expected to be delivered to adjacent streams from project construction due to implementation of mitigation measures aimed at reducing erosion and resulting sedimentation. Subsoiling of skid trails and temporary roads would help restore infiltration and resulting movement of water vertically through the soil profile. This in turn, should help restore flow quantity and timing and basin hydrology. Erosion and resulting sedimentation originating from these disturbed areas would also be reduced significantly due to revegetation and restoration of more natural water flow patterns.

In-stream Projects

Ground disturbing activities either nearby or within stream channels would likely result in localized short-term increases in turbidity. Most of this sediment is associated with equipment access roads and bank or channel excavation. Increases in turbidity would be of low intensity and short-lived from access roads. Turbidity from channel excavation for wood placement or other aquatic enhancement projects can be quite high during equipment operation. Mitigation measures such as timing of operations, use of drainage diversions, sediment filters and timely erosion control applications would reduce the magnitude of short-term water quality effects.

In the long term, these projects would lead to a more natural aquatic environment due to increased channel complexity. This increased channel complexity would restore a more natural flow of wood, water and sediment through these reaches, which would lead to better aquatic

and riparian area function.

Adding fish carcasses to streams is intended to add nutrients to systems that are currently nutrient poor. While contributing positive benefits to on-Forest streams, there is the potential to contribute cumulatively to down-stream river reaches where nuisance algae blooms are sometimes a problem. This contribution is expected to be minimal and would be within the range of natural nutrient input that has been experienced in the past and is expected once fish runs are restored. This activity has been reviewed and permitted by the Oregon Department of Environmental Quality, with certain conditions such as limiting distribution to a maximum of 2500 pounds per mile.

Fertilizers are applied as a part of erosion control efforts for many of the above project types. Raw soils that are exposed during project implementation are seeded and mulched to establish grasses and other plants that protect soils and hold them in place. As with fish carcasses, there is the potential for fertilizer application to contribute nutrients into streams. Effects would be minimized by mitigation measures have been included to prevent runoff of fertilizer into streams.

The Forest has a water quality nutrient monitoring program that would provide feedback.

Soils/Geology

Many construction projects that involve heavy equipment have the potential to disturb soils and generate sediment that could reach the stream. Sediment can be delivered to streams through surface erosion and mass wasting (landslides). Erosion and landslides affect water quality and fish habitat but there is also a negative effect up-slope at the source, where productivity and stability of the land is reduced.

Fish Passage Projects

Naturally occurring channelized debris flows are likely to occur in some streams during large flood events. These debris flows transport large boulders and large wood debris that are deposited in lower gradient stream reaches where they enhance fish habitat. Crossings that are designed to pass a large storm event are much less likely to fail and thereby contribute road-related sediment to the stream, and more likely to allow a flood or debris flow to pass over or through the crossing, thereby allowing those natural processes to proceed uninterrupted.

Fencing

Cattle would be kept out of identified sensitive areas and natural vegetation would be encouraged to recolonize these areas, thereby reducing grazing induced soil impacts.

Ditch Piping

Ditch water would be diverted into pipes, eliminating ground seepage and the potential for landslides.

Quarry Rehabilitation

Recontouring, spreading soil, and planting would begin the process of establishing more natural drainage patterns and vegetation.

Road Repair / Road Decommissioning

Repairing, storm proofing, or decommissioning these roads would greatly reduce the volume of delivered sediment from road related surface erosion and road-induced landslides.

Riparian Areas Damaged by Vehicles

Restricting vehicle access, decompacting soil, plantings, and fertilizing would, promote vegetative growth and reduce erosion.

Upland Erosion

Surface erosion from the old skid trails and temporary roads would be virtually eliminated after scarification, water barring, and revegetation. Water would have an increased ability to infiltrate into the ground instead of running off on the surface.

In-stream

The placement of large woody debris would return the stream velocities to the natural range and reduce the amount of channel erosion.

Manual cutting of weeds, annual maintenance of side channels, annual maintenance of smolt traps, and the placement of fish carcasses in waterways (Projects I8, I9, I10, I11, I12) would have no effect on sediment delivery.

Wildlife

Federally Listed Species

Northern Spotted Owl (threatened) – In Oregon spotted owls successfully breed mainly in late-successional mixed conifer forests, usually dominated by Douglas-fir. The species prefers larger forest stands (more than 1,200 acres) with multiple layers and a closed canopy. The owls' main food items are flying squirrels, red tree voles, western red-backed voles, and dusky-footed woodrats.

The proposed projects do not involve any modification of northern spotted owl habitat. The primary impact would be disturbance due to the noise of equipment.

March 1st through July 15th is the critical breeding period. Projects E1 to E5 must occur during this time period to have optimal soil moisture conditions for proper decompaction. These projects would generate noise above the ambient noise level and are within ¼ mile of unsurveyed suitable habitat. They would have an effects determination of "may effect, likely to adversely affect."

There are several conditions that could result in a "no effect" determination. 1) If a project is greater than ¼ mile from unsurveyed suitable habitat; 2) If the area around a project is surveyed and found to be greater than ¼ mile from any activity centers; or 3) if the project does not generate noise above the ambient noise level. Projects C3, C5, C9, F4, Q1, I1, I3, I5, I7 to I10, I12, I13 and R17 meet one or more of these criteria. A project would also be "no effect" if it were implemented between October 1st and February 28th, but due to likely inclement weather, most projects can not operate during this time period.

The second part of the breeding season (when young owls are being cared for at the nest) is July 16th through September 30th. Most projects would be implemented during this time period. Since most projects are within ¼ mile of unsurveyed suitable habitat, they would have an effects determination of "may effect, not likely to adversely affect." Projects C2, C4, C6 to C8, C10 to C26, F1 to F3, F5, F6, P1, P2, Q2, Q3, I4, I6, I11, R1 to R16, all S's, all D's, all V's and E6 to E15 are in this category.

Consultation with U.S. Fish and Wildlife Service is ongoing. The results of consultation and any terms and conditions will be discussed in later decision documents.

Bald Eagle (threatened) – Bald eagles require large trees and snags for nesting and roosting, and large bodies of water such as lakes and major rivers for foraging.

No known eagle nests occur within the vicinity of any of the proposed projects. No habitat modification to any potential eagle nesting or foraging habitat would occur. Since there are no known nests nearby, no disturbance effects to the species is expected with implementation of any of the proposed projects.

A determination of "no effect" has been made for these projects.

Canada Lynx (threatened) – The Forest has made the determination, based on best available scientific and commercial data, that the Canada lynx and its habitat are currently not present on the Forest and therefore no effects are expected from management activities, including these proposed projects.

Sensitive Species

Oregon Slender Salamander, Larch Mountain Salamander and Baird's Shrew

Oregon slender salamander is found under bark or moss in mature and second-growth Douglas-fir forests, as well as under rocks or logs in stands of moist hardwood forests within coniferous forests landscapes. The Larch Mountain salamander is generally found in talus slopes within areas of Douglas-fir forests, although the species may also be found in general forested areas. Baird's shrew is found in cool, moist areas, usually within coniferous or deciduous forests. These species have potential habitat in the vicinity of the fencing projects.

Ground disturbance associated with fencing projects would be very minimal. Neither individuals nor their habitat would be impacted.

Effects Determination = No impact.

Cope's Giant Salamander and Cascade Torrent Salamander

Cope's giant salamander is found in moist forested areas in clear, cold streams, brooks, and ponds with gravel bottoms and boulders. Cascade torrent salamander is most abundant in rocks bathed in a constant flow of cold water, also occurring in cool rocky streams, lakes, and seeps. Habitat exists for this species near several of the projects including culvert replacement, in-stream, road decommissioning and ditch piping projects.

Seasonal restrictions for in-stream work (mitigation #2) would also protect these salamanders for a majority of the breeding period. However, there is still a slight potential of impact to adult and juvenile individuals due to the species' long breading season. Long-term effects would be beneficial due to reduction of sedimentation.

Effects Determination = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Oregon Spotted Frog, Painted Turtle and Northwestern Pond Turtle

Oregon spotted frog is frequently found in waters and associated vegetated shorelines of ponds, springs, marches, and slow-flowing streams. Painted turtle is found in shallow, quiet waters with a muddy or sandy substrate. They live in lakes, ponds, marches, and small streams. The Northwestern pond turtle prefers quiet water in small lakes, marshes, and sluggish streams and rivers. Habitat exists for these species within the ditch piping and some of the riparian/in-stream projects.

Work in conjunction with the ditch piping projects would occur after they have been drained. Although the ditches would not be providing habitat for these species during project implementation, the result of implementation would be the removal of some human created habitat for the Oregon spotted frog, painted turtle, and Northwestern pond turtle.

For in-stream projects, seasonal restrictions for in-stream work (mitigation #2) would also protect these species during all or part of their breeding period (February – June for the Oregon spotted frog, May – July for the painted turtle, and May – August for the Northwestern pond turtle). However, there is still a slight potential of impact to adult and juvenile individuals.

Effects Determination = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Horned Grebe and Gray Flycatcher

The horned grebe favors areas with much open water surrounded with emergent vegetation. The gray flycatcher prefers relatively treeless areas with tall sagebrush, bitterbrush, or mountain mahogany communities, but will also occupy these communities within open forest of ponderosa or lodgepole pine. No habitat exists for these species in the project areas.

Effects Determination = No impact

Bufflehead: This species nests near mountain lakes surrounded by open woodlands containing snags. Habitat exists for this species within a few of the riparian/in-stream projects.

Seasonal restrictions for in-stream work (mitigation #2) would also protect these species during most of its breeding season (May – August). However, there is still a slight potential of impact to adult and juvenile individuals.

Effects Determination = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Harlequin Duck: This species breeds along relatively low-gradient, slower-flowing reaches of mountain streams in forested areas. Habitat exists for this species near several of the projects including culvert replacement, in-stream, road decommissioning and ditch piping projects.

Harlequin ducks are known to be sensitive to disturbance. The projects involving road decommissioning would reduce open road densities near potential harlequin duck habitat. This would improve the quality of the habitat for this species at these locations. Seasonal restrictions for in-stream work (mitigation #2) would also protect these ducks for a majority of the breeding period (April – August). However, there is still a slight potential of impact to adult and juvenile individuals.

Effects Determination = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

American Peregrine Falcon: The most critical habitat components for this species are suitable nest sites, usually cliffs, over-looking fairly open areas with an ample food supply.

Implementation of projects would not negatively affect any potential or known habitat for this species. There are currently two active peregrine falcon eyries on the Forest. To protect these sites from disturbance, a seasonal restriction would be placed on the following projects: I11, R7, R13, D (4621-027), and S (4621-022). These projects would not be implemented from January 1st – July 31st.

Peregrine falcons are known to be sensitive to disturbance. The projects involving road decommissioning would reduce road densities near potential and current peregrine falcon habitat. This would improve the quality of the habitat for this species at these locations. In addition, project implementation has the slight potential to disturb individuals not currently known or present on the Forest.

Effects Determination = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Pacific Fringe-tailed Bat and Pacific Fisher

The Pacific fringe-tailed bat is found in a wide variety of habitats throughout its range, but it seems to prefer forested or riparian areas. Pacific fisher primarily use mature, closed-canopy coniferous forests with some deciduous component, frequently along riparian corridors. Noise

from equipment is the primary concern for these species.

Implementation of projects would not negatively affect any potential habitat for the Pacific fringe-tailed bat and Pacific fisher. Noise and associated activity created by project implementation is not predicted to be at a high enough magnitude or scale to disturb individuals.

Effects Determination = No impact

California Wolverine: In Oregon, the wolverine typically is found in open forests at higher elevations and in alpine areas. Wolverines are known to be sensitive to disturbance.

Implementation of projects in potential wolverine habitat would not negatively affect the quality of the habitat being provided for the species.

The projects involving road decommissioning would reduce road densities near potential wolverine habitat. This would improve the quality of the habitat for this species at these locations. In addition, there is the slight possibility that a wolverine traveling through the area could be impacted by the disturbance associated with implementation of the action alternative.

Effects Determination = May impact individuals but is not likely to cause a trend toward federal listing or loss of viability.

Deer and Elk (Indicator Species): The west side of the Forest has black-tail deer and Roosevelt elk. On the east side, mule deer and rocky mountain elk predominate. Deer and elk are known to be sensitive to disturbance and high open road densities reduce habitat quality.

The projects involving road decommissioning would reduce harassment of deer and elk. Erosion control seed placed on decommissioned roads, erosion control projects and quarries would improve the quantity and quality of forage.

There are proposed projects within certain special winter range areas that have the potential to disturb deer and elk if they were implemented during the critical winter months (December 1st – March 31st). There is a similar concern for projects in key calving areas from April 1st to July 30th. Mitigation #4 provides a seasonal restriction to avoid this impact. There are areas where animals have grown accustomed to ambient noise levels such as near highways or residential areas. Projects in these areas would be exempt from seasonal restrictions where a biologist has determined that the intensity of noise is within the range of ambient noise, and therefore would not cause alarm or increased stress to animals there. The winter range restriction would apply to projects C10, C17, C18, C20, C21, C23 to C26, Q1, I1, I4, I9, I10, I11, R6 to R10, R13, S-4621022, S-4621023, D-4620013, D-4621, D-4621027, D-4630150, D-4600246, D-4631018, V1 to V4, V9 to V17, V19, V20 and E1 to E4. The calving restriction would apply to C2, C3, D-4661018, E6 and E8.

Survey and Manage Species

The Northwest Forest Plan as amended, identifies survey and manage species. The recent amendment is titled: The Standards and Guidelines for Amendments to the Survey and

Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, January 2001 (S&M). These standards apply to both National Forest and Bureau of Land Management and do not apply to projects on other lands.

The wildlife species that are known or suspected to fall within the range of the projects are the red tree vole (*Arborimus longicaudus*), Larch Mountain salamander (*Plethodon larselli*), and various terrestrial mollusk species (*Deroceras Hesperium, Hemphillia malonei, Memphillia glandulosa, Hemphillia burringtoni, Hemphillia pantheris, Pristiloma arcticum crateris, Cryptomastix devia, Cryptomastix hendeersoni, Monadenia fedelis minor, and Megomphix hemphilli*).

Known sites of these species would not be negatively affected by the proposed action due to the distance from projects and due to the minor levels of habitat disturbance. The S&M Standards and Guidelines (page 22) define when pre-disturbance surveys are not need. It has been determined by a wildlife biologist that no pre-disturbance surveys would be conducted for the proposed projects.

The following is the rationale for this determination:

Red tree voles would not be impacted since no projects involve tree harvest.

Fish Passage/Culverts: Disturbance for these projects would be primarily within the stream channel and within the road prism. These areas are not considered habitat for any of the wildlife survey and manage species. See Fisheries section for discussion of aquatic mollusks and Botany section. There may be minor ground disturbance associated with excavators or other equipment that move off the road prism to facilitate culvert removal or replacement. This disturbance would involve minor amounts of new disturbance in potential habitat for survey and manage species. Disturbance would be very minimal and would not likely have a significant negative impact on the species' habitat, its life cycle, microclimate, or life support requirements.

Fencing: For amphibians fence construction and reconstruction are exempt from pre-disturbance surveys (except under particular circumstances not applicable here), as noted in the *Survey Protocols for Amphibians Under the Survey and Manage Provision of the Northwest Forest Plan,* October 1999. There is potential habitat for terrestrial mollusks. The boundary fence project includes the installation of a barbwire fence that requires posts to be placed in the ground. No pre-disturbance surveys would be conducted due to the insignificance of the quantity habitat disturbance and because the area has already been disturbed by the existing boundary fence. The other fences involve above ground construction with no postholes and would not disturb habitat for any wildlife survey and manage species. Ground disturbance associated with posthole digging or fence installation would be very minimal in scope and would not likely have a significant negative impact on the species' habitat, its life cycle, microclimate, or life support requirements.

Ditch Piping: Ground disturbance for both ditch-piping projects would occur primarily within the existing ditches and associated access routes. These ditches and the immediate surrounding area are considered previously disturbed sites. There may be minor amounts of new ground disturbance associated with excavators or other equipment that move off the ditch and access

routes to facilitate pipe placement and backfilling. This disturbance would involve minor amounts of new disturbance in potential habitat for survey and manage species. Disturbance would be very minimal and would not likely have a significant negative impact on the species' habitat, its life cycle, microclimate, or life support requirements.

Quarry Rehabilitation: All ground disturbance associated with projects would occur within the existing quarries. These quarries are intensively disturbed sites and do not contain habitat.

In-stream/Riparian: Stream channels are considered non-habitat for terrestrial wildlife species. Some projects such as those that use only helicopters or handwork would result in no habitat disturbance. Other projects involve minor ground disturbance associated with excavators that move from an adjacent road to the stream to accomplish the needed work. For some projects, such as side channel and fish trap maintenance, this disturbance would occur within previously disturbed sites but there are other projects that would involve minor amounts of new disturbance in potential habitat for survey and manage species. Disturbance would be very minimal and would not likely have a significant negative impact on the species' habitat, its life cycle, microclimate, or life support requirements. Due to seasonal restrictions to project fish and water quality, these projects would be implemented during the dry season when many of the terrestrial species are underground.

Road Repair and Road Decommissioning: Ground-disturbance would occur within the road prism. No habitat is present.

Riparian Areas Damaged by Vehicles: Project implementation would occur within previously disturbed sites. No habitat is present.

Upland Erosion: All ground-disturbance would occur within the previously disturbed areas associated with skid trails or temporary roads. No habitat is present.

Recreation

Some kinds of recreationists may be negatively affected by projects that decommission roads or that limit vehicle use. Those that rely on vehicle access such as harvesting of special forest products or people going for a drive in the woods might be most negatively affected. Decommissioning may actually enhance opportunities for those looking for solitude or a quality hunting experience. Approximately 26 miles of roads would be decommissioned. However, many of these roads are already closed to vehicle traffic, therefore only 13 miles could be considered new closures. These new closures represent 0.4% of the open roads on the Forest. Forest users would continue to have access to many roads and the landscapes and resources that are accessed. However, there may be certain individuals that frequent roads proposed for decommissioning that would be displaced to somewhere else.

There are 20 projects (V1 to V20) that affect recreationists by limiting where vehicles can go. All of these 20 projects involve what are often referred to as 'dispersed camp sites.' These are not designated campgrounds but are areas where people choose to camp frequently and they are usually close to rivers or streams. This type of vehicle use in Riparian Reserves is considered unauthorized and is inconsistent with the objectives of the Aquatic Conservation Strategy when

it causes damage to the aquatic habitat. The proposed projects would place boulders to contain vehicles in appropriate parking areas, while still allowing tents and other uses. Some campers may consider this arrangement to be inconvenient. While the boulders would be placed as aesthetically as possible, there would be a degree of regimentation and formality that some users may object to. Some users may attempt to move the boulders while others may choose to create new campsites elsewhere, damaging additional riparian areas.

Recreationists may be positively affected by projects that improve fisheries and recreational fishing both on-Forest and off. See Fisheries section. Recreationists may also benefit from projects that repair roads. Some of the roads have slumps or cracks that make driving slow or even dangerous. Alternative 1 would not have these enhancements.

The Highland Ditch project (P1) is in the Badger Creek Wilderness. Trail 479 follows along Badger Creek: on the opposite side of the stream from the Highland Ditch. Each spring the ditch is inspected and heavy equipment is brought in to repair ditch failures and doing other routine maintenance. Similar equipment would be used to place the pipe into the ditch reducing future needs for repair and maintenance. There would be some short-term increase in noise levels during project implementation for hikers traveling on the 479 trail, but in the long term, noise would be reduced. Also additional water would be left in the stream enhancing fish habitat and improving fishing opportunities.

Impacts of in-stream structures to white water river users would be minimized by placing logs so that they do not cross the entire channel.

Transportation – Roads Analysis

The recently established Roads Analysis rule requires that decisions about road management be informed by a roads analysis. The proposed action includes many project types that involve roads including fish passage projects, quarry rehabilitation projects, road repair, road decommissioning, and storm proofing roads. Projects repairing riparian areas damaged by vehicles also involve travelways used by vehicles even though they have not been formally recognized as roads. The Upland Erosion Projects also involve restoration work on temporary roads.

A formal Roads Analysis will be developed at the Forest level, but this process will take a couple of years to complete. In the interim, road management decisions would be informed by project-level analysis. The proposed action was carefully designed to include projects that were urgent and where the need for restoration to benefit fish and water quality is clear. Other potential projects with less concern were deferred until the Forest-level analysis could be completed.

This project-level roads analysis tiers to efforts already completed. Watershed Analysis began this process and it was further developed by the Forest-level Access and Travel Management Plan that was completed in 1999. This proposal is consistent with the ATM plan. All roads proposed for decommissioning are either closed or their objective maintenance level is 1. Further analysis was conducted for this EA (summarized in Appendix A). The prioritization model includes an analysis of road related features such as the number of road/stream crossings, roads in landforms with high risk for landslides, open roads within 200 feet of

perennial streams and a hydrologic recovery analysis that includes the impact of roads. The 5th field watersheds that have the greatest level of these road-related features are Lower Clackamas, Collawash, Oak Grove Fork, Upper Clackamas, and White River. Some road related restorations have already occurred in these and other watersheds in the past ten years; most notably in Fish Creek where 100 miles of roads were decommissioned after severe flooding.

Even though many of the project types deal with roads, the following summary of the roads analysis will focus on the roads proposed for decommissioning. The list of potential roads to decommission was generated from the various watershed analyses, with an emphasis on the 5th field watersheds that ranked highest in the prioritization model. These roads were confirmed through the Access and Travel Management Plan and were examined road by road (by local land managers with the greatest knowledge of the road and resources affected) to ensure that the roads with the greatest urgency were included. The analysis file contains the rationale and specific circumstances for individual roads.

Roads require regular inspection and maintenance to keep them drivable, and to prevent resource damage. Funding for road maintenance is lower than the level needed to properly maintain the approximate 3000 miles of open roads on the Forest. The Access and Travel Management Plan of 1999 identified the need to eventually close approximately half of the current road system.

The process of decommissioning roads varies based on site-specific need. Culverts would be removed if present. If quality aggregate is present it would be removed to give vegetation a better chance to take root. The aggregate would be recycled by stockpiling it for use on some other road. If unstable fill slopes are present, this material would be pulled back to prevent future landsliding. Deep scarification of road surfaces would be followed by seeding for erosion control. Berms or boulders would block vehicular access. Of the 26 miles of roads proposed for decommissioning, 13 miles are already closed to vehicles. The cost of decommissioning would be about $6,000 per mile plus an additional $9,000 per mile to remove aggregate where present. The cost of aggregate removal would eventually be offset by savings when the aggregate is reused.

The road repairs proposed would enhance public safety. These roads are designated in the Access and Travel Management Plan as being needed for long-term forest access. The needs vary by road but usually involve deep patch repairs of sinking and cracking pavement and repaving. This work can cost $200,000 per mile or more.

Costs and Benefits

The total for all projects is approximately 20 million dollars, which includes project design and administrative costs. Each project is designed with cost effectiveness as a primary objective so that the limited funding available for restoration can be efficiently used to achieve the greatest benefit.

In addition to the resource benefits described elsewhere, there are considerable economic values gained by society when fish habitat and water quality are restored.

Commercial and recreational fishing may be enhanced as fish runs are restored.
Municipal water providers that filter might see cost savings as water quality improves.
Irrigators would spend less repairing and maintaining ditches.
The Forest would spend less for road maintenance on decommissioned roads.
The Forest would spend less for flood repairs when culverts are redesigned.

Funding is not secured for most of these projects. Since the cost is greater than the budget traditionally allocated to the Forest and the benefits are widespread, many of the projects would be funded by non-traditional sources. Efforts are ongoing to find partnerships with other public and private agencies to provide funding, equipment, labor, or design expertise. Efficiencies in planning have been gained by combining all of these projects into a unified document as compared to separate documentation for each project. The cost and skills needed to prepare documentation and the associated survey, analysis, and design phases would have been an impediment for projects with limited funding.

Grazing

The grazing of livestock occurs on portions of the Forest. The fencing projects would direct livestock away from sensitive riparian areas. This protects these areas from trampling while redistributing livestock to more appropriate areas. This action does not significantly reduce the quantity of forage available for livestock.

Botany

Endangered, Threatened and Sensitive Plants (including proposed species)

A search of the Forest database found no known sites within close proximity to any project. There are no known endangered or threatened species or habitats associated with project areas. All project sites were reviewed to determine their potential for sensitive species habitat. Sites associated with disturbed areas, such as roads and quarries, are not potential habitat. Project sites with potential habitat for species are associated with riparian habitat adjacent to streams or lakes.

The following is a list of sensitive species with potential habitat at project sites.

Agoseris elata, Botrychium lunaria, Botrychium lanceolatum, Botrychium minganense, Botrychium montanum, Botrychium pinnatum, Carex livida, Coptis trifolia, Corydalis aquae-gelidae, Fritillaria camschatcensis, Howellia aquatilis, Lycopodiella inundata, Ophioglossum pusillum, Scheuchzeria palustris, Sisyrinchium sarmentosum, Tauchia stricklandii, Wolfia borealis, and *Wolfia columbiana.*

A survey was conducted at each project site identified as having potential habitat. No species were located during surveys. There would be no affect to endangered, threatened, or sensitive species resulting from project implementation.

Survey and Manage Species

A search of the Interagency Species Management System database (ISMS) for Category A, B, C, D or E species, found four known sites near projects. Projects would not negatively affect habitat at these four sites because they do not alter forest canopy. See analysis file for details.

Species requiring pre-disturbance surveys with potential habitat near projects:

Species	Group	Category
Schistostega pennata	Bryophyte	A
Tetraphis geniculata	Bryophyte	A
Bridgeoporus nobilissimus	Fungi	A
Bryoria tortuosa	Lichen	A
Hypogymnia duplicata	Lichen	A
Leptogium burnetiae var. hirsutum	Lichen	A
Leptogium cyanescens	Lichen	A
Lobaria linita	Lichen	A
Niebla cephalota	Lichen	A
Platismatia lacunosa	Lichen	C
Pseudocyphellaria rainierensis	Lichen	A
Ramalina thrausta	Lichen	A
Teloschistes flavicans	Lichen	A
Botrychium minganense	Vascular plant	A
Botrychium montanum	Vascular plant	A
Coptis trifolia	Vascular plant	A
Corydalis aquae-gelidae	Vascular plant	C
Cyprepedium fasciculatum	Vascular plant	C
Cyprepedium montanum	Vascular plant	C
Galium kamtschaticum	Vascular plant	A

A survey was conducted at each project site identified as having potential habitat.
The surveys did not detect the presence of any Survey and Manage species.

There would be no affect to Survey and Manage Species resulting from project implementation.

Wild and Scenic Rivers

Appendix A indicates which projects are within the various Wild and Scenic River management areas. Each river has a list of Outstandingly Remarkable Values (ORVs). These are the features of the rivers that make them special. The Clackamas River is also listed as a State Scenic Waterway. The ORVs for the Clackamas River are: Botany/Ecology, Fish, Wildlife, Recreation, and Cultural Resources. Projects proposed on this river include culvert replacements, road repairs, fish trap and side channel maintenance, and the repair of riparian areas. The ORVs for the Salmon River are: scenery, recreation, water quality, fish, waterfalls, and unique botanical, ecological and wildlife values in the Red Top/Salmon River Meadows complex. Projects proposed on this river include the fencing of Salmon River Meadows to

control livestock and hand cutting of Knotweed, a non-native plant. The ORV for the Sandy River is scenery. The fish trap in the Sandy River would help monitor fish populations. All of these projects protect or enhance the ORVs for these rivers: the fisheries and water quality components would be improved, and the other ORVs would remain unaltered. The effects to resources described by the ORVs are elaborated elsewhere in this chapter.

Other Resources

Heritage Resources

The National Historic Preservation Act and the National Environmental Protection Act both require consideration be given to the potential effect of federal undertakings on historic resources, (including historic and prehistoric cultural resource sites). The guidelines for assessing effects and for consultation are provided in 36 CFR 800. To implement these guidelines, in 1995, Region 6 of the Forest Service entered an agreement with the Oregon State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP). In accordance with this agreement, the proposed activities were considered on a case-by-case basis and separated into one of two categories: 1) Activities considered to have little or no potential to affect historic properties and are excluded from review; and 2) Activities requiring a survey.

The surveys and project documentation resulted in determinations of "No Historic Properties", "No Effect" and "No Adverse Effect."

These projects will not adversely affect any prehistoric or historic sites.

Air Quality

Implementation of proposed projects would have little or no effect on air quality since no burning is proposed. There would be some minor short-term impacts from dust and exhaust from equipment during project implementation.

Competing and Unwanted Vegetation

Noxious weeds and invasive non-native plant species have been introduced to North America intentionally or unintentionally from other countries. The associated natural predators and diseases that controlled them in their native lands are not present in the United States. As non-native plant infestations increase they threaten biological diversity, threaten rare habitats, and can alter ecosystem processes such as fire frequency and intensity, hydrologic cycles, and soil erosion rates. They can also poison livestock and reduce the quality of recreational experiences. There are an estimated 2,000 invasive and noxious weed species in the U.S. and nearly 600 in Oregon.

Noxious weeds are nuisance species that are targeted for control by the Oregon State Department of Agriculture (ODA). In the 1998 Final EIS for Managing Competing and Unwanted Vegetation, the Forest Service established that coordinated efforts for noxious weed

control are necessary to prevent adverse effects on the environment.

Invasive non-native plant species are not classified as "noxious" by the ODA but are a threat to biodiversity. Refer to the recent Executive Order regarding Invasive Species (2/3/99, sections 2 and 3) and Forest Standards and Guidelines FW-148 and FW-162.

Forest Service Manual direction requires that Noxious Weed Risk Assessments be prepared for all projects involving ground-disturbing activities. For projects that have a moderate to high risk of introducing or spreading noxious weeds, recent Forest Service policy requires that decision documents must identify noxious weed control measures that would be undertaken during project implementation (FSM 2081.03, 11/29/95). To be in compliance with the EIS for Managing Competing and Unwanted Vegetation, it is recommended the Standard Procedures to Reduce the Risk of Spreading Weeds be implemented in all projects, regardless of weed risk ranking.

Mitigation measure #8 would prevent the spread of noxious weeds and would be applied to all projects. This includes actions such as the cleaning of equipment and using certified seed for erosion control.

Weed Risk Ranking Summary

Several projects have populations of noxious weeds in the vicinity and have a high-risk or moderate-risk rating.

Project specific measures have been identified for certain projects that currently have noxious weeds. (See botany report for details.) This primarily involves avoiding heavy equipment disturbance to concentrations of weeds. Projects that would get special attention include C5, C6, C7, C8, C9, I12, I13, R15, and R17.

Two projects (I7, I8) have the specific objective of removing noxious weeds. These project areas as well as other areas that have weeds present, would be monitored periodically and follow-up actions proposed where appropriate.

Minority Groups, Women, Civil Rights and Environmental Justice

There would be no adverse effects on minorities, women, civil rights or environmental justice.

Flood plains and Wetlands

There would be no negative effects to flood plains or wetlands.

Irreversible and Irretrievable Commitment of Resources

There would be no significant irreversible or irretrievable commitments.

CHAPTER 4 - CONSULTATION WITH OTHERS

Partial List of Entities Consulted, See mailing list in analysis file.

U.S. Fish and Wildlife Service
National Marine Fisheries Service
Environmental Protection Agency
Oregon Historic Preservation Office
Confederated Tribes of Warm Springs
Confederated Tribes of Grande Ronde
Yakima Indian Nation Tribal Council
Bureau of Indian Affairs
Bureau of Land Management
Bonneville Power Administration
Northwest Power Planning Council
Eagle Creek National Fish Hatchery
Metro
City of Maupin
City of Portland
City of Hood River
City of The Dalles
City of Estacada
City of Gresham
City of Lake Oswego
City of Gladstone
City of Oregon City
City of West Linn
Clackamas County
Hood River County
Wasco County
Multnomah County
Marion County
Oregon Department of Transportation
Oregon State Parks
Oregon Department of Forestry
Oregon Department of Fish and Wildlife
Oregon Division of Lands
Oregon Marine Board

This project has appeared in the publication "Sprouts," a quarterly newsletter sent out by the Mt. Hood National Forest to notify interested people, organizations, and other agencies of proposed projects and solicit comments on them. A letter describing the project and requesting comments was sent out to a mailing list of over 500 agencies, organizations and individuals.

From these public involvement efforts, several letters and emails were received. They are in the analysis file. These comments were considered during the development of the issues, alternatives and mitigations. See Appendix D for comments received during scoping and responses. After the 30-day comment period, a synopsis of the new comments and responses will be added to Appendix D.

CHAPTER 5 - LIST OF PREPARERS

Bob Bergamini	Fisheries Biologist
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Rich Hagestedt	Computer Modeler
Sharon Hernandez	Wildlife Biologist
Tom Deroo	Geologist

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	c.5733 Badger Cr 5/27/1893	c.46530 Badger Cr 8/8/1914	c.7865 Badger Cr 1/5/1925	c.7917 Badger Cr 1/14/1925	c.7221 Badger Cr 4/27/1925	c.46532 Badger Cr 10/21/1929	c.9529 Badger Cr 11/6/1929	c.9017 Badger Cr 6/11/1930	c.11377 Badger Cr 7/1/1932	c.46531 Badger Cr/ Badger Lk 4/12/1941	**Total Pre-1961**	c.46368 Badger Cr/ Badger Lk 3/22/1961	**Total Badger Acres**	c.51486 7/23/1968 Pine Hollow Res.
Alsup	4s 12 1 400	SW/NW	7	1	4	12	8.1	2				0.5					**10.6**		**10.6**	
Alsup	4s 12 1 401	SE/NE	4	2	4	12										1	**1**		**1**	
Anderson	4s 12 9 0500	NE/SW	9	9	4	12											**0**	39.1	**39.1**	
Anderson	4s 12 9 0501	NW/SW	10	9	4	12											**0**	1.65	**1.65**	
Archer	4s 12 0 0600	NE/SE	13	3	4	12		1.5				0.1					**1.6**		**1.6**	
Archer	4s 12 0 0600	NW/SE	14	3	4	12						5.7				9.5	**15.2**	11.1	**26.3**	
Archer	4s 12 0 0600	SW/SE	15	3	4	12										5.9	**5.9**	2.9	**8.8**	
Archer	4s 12 0 0600	SE/SE	16	3	4	12		2				4.4				16.9	**23.3**	4.9	**28.2**	
Archer	4s 12 0 0600	NE/NE	1	10	4	12										6.6	**6.6**	11.6	**18.2**	
Archer	4s 12 0 0600	NW/NE	2	10	4	12										3.2	**3.2**		**3.2**	
Archer	4s 12 3 200	SE/NE	4	3	4	12						8				17	**25**	11.2	**36.2**	
Benzel	4s 12 0 1900	SE/SW	12	12	4	12										2.1	**2.1**	13.7	**15.8**	
Benzel	4s 12 0 1900	SW/SE	15	12	4	12											**0**	6.9	**6.9**	
Benzel	4s 12 0 1900	NE/NE	1	13	4	12										5	**5**	35	**40**	
Benzel	4s 12 0 1900	NW/NE	2	13	4	12						12				4	**16**	19.5	**35.5**	
Benzel	4s 12 0 1900	NE/NW	5	13	4	12						4					**4**	13.6	**17.6**	
Benzel	4s 13 0 1400	SW/SW	11	7	4	13		2.6				4				7.9	**14.5**	23.7	**38.2**	
Benzel	4s 13 0 1400	SE/SW	12	7	4	13										4.4	**4.4**	8.9	**13.3**	
Benzel	4s 13 0 1400	NW/NW	6	18	4	13											**0**	23.9	**23.9**	
Briggs	4s 12 4 0400	SE/NW	8	4	4	12						4.6					**4.6**		**4.6**	
Brittain	4s 12 11 700	SW/SW	11	11	4	12											**0**	0.2	**0.2**	
Bussard	4s 12 11 501	SE/NW	8	11	4	12		2.64									**2.64**		**2.64**	
Bussard	4s 12 0 1700	NE/NE	1	11	4	12		1.76								21.5	**23.26**	8.03	**31.29**	
Bussard	4s 12 0 1700	SE/NE	4	11	4	12										26.6	**26.6**		**26.6**	
Bussard	4s 12 0 1700	NE/NW	5	12	4	12											**0**		**0**	
Bussard	4s 12 0 1700	NW/NW	6	12	4	12		18									**18**	20.7	**38.7**	
Bussard	4s 12 0 1700	SW/NW	7	12	4	12	1.8	5.5									**7.3**	12.8	**20.1**	
Bussard	4s 12 0 1700	SE/NW	8	12	4	12	2.8										**2.8**		**2.8**	
Bussard	4s 12 2 800	SE/SE	16	2	4	12										0.3	**0.3**	0.4	**0.7**	
Cameron	4s 12 9 0100	NE/NW	5	9	4	12										2.3	**2.3**		**2.3**	
Cameron	4s 12 9 0100	NW/NW	6	9	4	12						5				4	**9**		**9**	
Cameron	4s 12 9 0100	SW/NW	7	9	4	12											**0**		**0**	
Cameron	4s 12 9 0100	SE/NW	8	9	4	12										0.4	**0.4**		**0.4**	
Cameron	4s 12 9 0200	NE/NW	5	9	4	12		1.6								0.5	**2.1**		**2.1**	
City of Wamic	4s 12 14	NW/NE	2	14	4	12											**0**		**0**	
City of Wamic	4s 12 14	NE/NW	5	14	4	12											**0**		**0**	
City of Wamic	4s 12 14	NW/NW	6	14	4	12											**0**		**0**	
Dodge	4s 13 0 1100	NE/SW	9	5	4	13										7.4	**7.4**	1.4	**8.8**	
Dodge	4s 13 0 1100	NW/SW	10	5	4	13										20	**20**	12.8	**32.8**	
Dodge	4s 13 0 1100	SW/SW	11	5	4	13		11.2									**11.2**	28.4	**39.6**	
Dodge	4s 13 0 1100	SE/SW	12	5	4	13		3								11.5	**14.5**	24.7	**39.2**	
Dodge	4s 13 0 1100	NW/SE	14	5	4	13										4	**4**	1.8	**5.8**	
Dodge	4s 13 0 1100	SW/SE	15	5	4	13										8.6	**8.6**	3.8	**12.4**	
Dodge	4s 13 0 1100	NE/SE	13	6	4	13						10					**10**	18.8	**28.8**	
Dodge	4s 13 0 1100	NW/SE	14	6	4	13						10					**10**	26.3	**36.3**	

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	c.5733 Badger Cr 5/27/1893	c.46530 Badger Cr 8/8/1914	c.7865 Badger Cr 1/5/1925	c.7917 Badger Cr 1/14/1925	c.7221 Badger Cr 4/27/1925	c.46532 Badger Cr 10/21/1929	c.9529 Badger Cr 11/6/1929	c.9017 Badger Cr 6/11/1930	c.11377 Badger Cr 7/1/1932	c.46531 Badger Cr/ Badger Lk 4/12/1941	**Total Pre-1961**	c.46368 Badger Cr/ Badger Lk 3/22/1961	**Total Badger Acres**	c.51486 7/23/1968 Pine Hollow Res.
Dodge	4s 13 0 1100	SW/SE	15	6	4	13		1.8								20	**21.8**	15.7	**37.5**	
Dodge	4s 13 0 1100	SE/SE	16	6	4	13	2	8.3				10			4		**24.3**	14.9	**39.2**	
Dodge	4s 13 0 1100	NE/NE	1	7	4	13	2	3				14.2					**19.2**	20.2	**39.4**	
Dodge	4s 13 0 1100	NW/NE	2	7	4	13	10									20	**30**	9.7	**39.7**	
Dodge	4s 13 0 1100	SW/NE	3	7	4	13											**0**	8	**8**	
Dodge	4s 13 0 1100	SE/NE	4	7	4	13										6.5	**6.5**	2	**8.5**	
Dodge	4s 13 0 1100	NE/NW	5	8	4	13										20	**20**	17.7	**37.7**	
Dodge	4s 13 0 1100	NW/NW	6	8	4	13	0.5			20		10					**30.5**	5.5	**36**	
Dodge	4s 13 0 1100	SW/NW	7	8	4	13										7.8	**7.8**		**7.8**	
Dodge	4s 13 0 1100	SE/NW	8	8	4	13										7.6	**7.6**		**7.6**	
FDD Ranch(Dulchich)	4s 12 0 0500	SW/SW	11	2	4	12		3.6								21.9	**25.5**		**25.5**	
FDD Ranch(Dulchich)	4s 12 0 0500	SE/SW	12	2	4	12						14.1					**14.1**		**14.1**	
FDD Ranch(Dulchich)	4s 12 0 0500	SW/SE	15	2	4	12											**0**	0.9	**0.9**	
FDD Ranch(Dulchich)	4s 12 0 0500	NE/NW	5	11	4	12		7.9				10				3.5	**21.4**		**21.4**	
FDD Ranch(Dulchich)	4s 12 0 0500	NW/NW	6	11	4	12		4.2								2.9	**7.1**	0.4	**7.5**	
FDD Ranch(Dulchich)	4s 12 0 0500	SW/NW	7	11	4	12											**0**		**0**	
FDD Ranch(Dulchich)	4s 12 0 0500	SE/NW	8	11	4	12										1.3	**1.3**	15.9	**17.2**	
Fargher	4s 12 9 0300	NE/NW	5	9	4	12		6.4								1.2	**7.6**		**7.6**	
Fargher	4s 12 9 0300	SE/NW	8	9	4	12										1.3	**1.3**		**1.3**	
Frame	4s 12 9 0400	NE/NW	5	9	4	12											**0**		**0**	
Frame	4s 12 9 0400	SW/NW	7	9	4	12											**0**		**0**	
Frame	4s 12 9 0400	SE/NW	8	9	4	12										2.3	**2.3**		**2.3**	
818 Baker(Gramzow)	4s 12 1 500	NE/SW	9	1	4	12	0.9										**0.9**	18.5	**19.4**	
818 Baker(Gramzow)	4s 12 1 500	NW/SW	10	1	4	12											**0**	7.5	**7.5**	
818 Baker(Gramzow)	4s 12 1 500	SW/SW	11	1	4	12											**0**	0.5	**0.5**	
818 Baker(Gramzow)	4s 12 1 500	SE/SW	12	1	4	12										0.4	**0.4**	1.2	**1.6**	
818 Baker(Gramzow)	4s 12 1 500	NE/SE	13	1	4	12		0.05									**0.05**	11.25	**11.3**	
818 Baker(Gramzow)	4s 12 1 500	NW/SE	14	1	4	12	0.9	5.7								8.8	**15.4**	6.2	**21.6**	
818 Baker(Gramzow)	4s 12 1 500	SW/SE	15	1	4	12	0.7	8				20					**28.7**	11.6	**40.3**	
818 Baker(Gramzow)	4s 12 1 500	SE/SE	16	1	4	12		1.2				15.8					**17**	4.7	**21.7**	
818 Baker(Gramzow)	4s 12 1 700	NE/SE	13	1	4	12											**0**	9.4	**9.4**	
818 Baker(Gramzow)	4s 12 1 700	SE/SE	16	1	4	12						14.2					**14.2**	4.1	**18.3**	
818 Baker(Gramzow)	4s 13 0 1200	SE/NW	8	6	4	13											**0**		**0**	
818 Baker(Gramzow)	4s 13 0 1200	NE/SW	9	6	4	13										15.5	**15.5**	6.6	**22.1**	
818 Baker(Gramzow)	4s 13 0 1200	NW/SW	10	6	4	13										1.3	**1.3**	18.1	**19.4**	
818 Baker(Gramzow)	4s 13 0 1200	SW/SW	11	6	4	13											**0**	38	**38**	
818 Baker(Gramzow)	4s 13 0 1200	SE/SW	12	6	4	13										37	**37**	3.1	**40.1**	
818 Baker(Gramzow)	4s 13 0 1200	NE/NW	5	7	4	13						8.1					**8.1**	3.4	**11.5**	
818 Baker(Gramzow)	4s 13 0 1200	SE/NW	8	7	4	13											**0**	2.4	**2.4**	
Harvey	4s 12 2 100	SE/NE	4	2	4	12		0.25									**0.25**		**0.25**	
Hesla	4s 12 2 500	NE/NW	5	2	4	12											**0**	0.8	**0.8**	
Hesla	4s 12 2 500	NW/NW	6	2	4	12											**0**	9.5	**9.5**	
Hesla	4s 12 2 500	SW/NW	7	2	4	12						24.4					**24.4**	1.2	**25.6**	
Hesla	4s 12 2 500	NW/SW	10	2	4	12										13.3	**13.3**	5.4	**18.7**	
Iverson	4s 12 0 1500	SE/SE	16	8	4	12											**0**	0.5	**0.5**	

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	c.5733 Badger Cr 5/27/1893	c.46530 Badger Cr 8/8/1914	c.7865 Badger Cr 1/5/1925	c.7917 Badger Cr 1/14/1925	c.7221 Badger Cr 4/27/1925	c.46532 Badger Cr 10/21/1929	c.9529 Badger Cr 11/6/1929	c.9017 Badger Cr 6/11/1930	c.11377 Badger Cr 7/1/1932	c.46531 Badger Cr/ Badger Lk 4/12/1941	**Total Pre-1961**	c.46368 Badger Cr/ Badger Lk 3/22/1961	**Total Badger Acres**	c.51486 7/23/1968 Pine Hollow Res.
Iverson	4s 12 0 1600	SW/SE	15	9	4	12						7					**7**	26.8	**33.8**	
Iverson	4s 12 0 1600	SE/SE	16	9	4	12						6.5				10.1	**16.6**	18.6	**35.2**	
Iverson	4s 12 0 1600	NE/NW	5	15	4	12		4								8.4	**12.4**	4.8	**17.2**	
Iverson	4s 12 0 1600	NW/NW	6	15	4	12		12.5									**12.5**	14.3	**26.8**	
Iverson	4s 12 0 1600	NE/NE	1	16	4	12										10	**10**	20.8	**30.8**	
Iverson	4s 12 0 1600	NW/NE	2	16	4	12										25	**25**	4.7	**29.7**	
Iverson	4s 12 0 1600	NE/NW	5	16	4	12											**0**	1	**1**	
Iverson	4s 12 0 1600	NW/NW	6	16	4	12											**0**		**0**	
Jackson	4s 12 4 0800	SE/SW	12	4	4	12										7.8	**7.8**	2.6	**10.4**	
Kennedy	4s 12 0 0400	SE/SW	12	2	4	12						3.6					**3.6**		**3.6**	
Kennedy	4s 12 0 0400	NW/SE	14	2	4	12											**0**	17	**17**	
Kennedy	4s 12 0 0400	SW/SE	15	2	4	12										1.5	**1.5**	11.3	**12.8**	
Kennedy	4s 12 0 0400	SE/SE	16	2	4	12										16.1	**16.1**	3.8	**19.9**	
Kennedy	4s 12 0 0400	NW/NE	2	11	4	12		1.6								7.8	**9.4**	10	**19.4**	
Kennedy	4s 12 0 0400	SW/NE	3	11	4	12										0.7	**0.7**	2.1	**2.8**	
Kennedy	4s 12 0 0400	NE/NW	5	11	4	12										3.6	**3.6**		**3.6**	
Kennedy	4s 12 0 0400	SE/NW	8	11	4	12										1.8	**1.8**		**1.8**	
Kentopp	4s 12 0 1100	NE/SW	9	8	4	12										8.8	**8.8**	7.6	**16.4**	
Kentopp	4s 12 0 1100	NW/SW	10	8	4	12										8.4	**8.4**	6.8	**15.2**	
Kentopp	4s 12 0 1100	NE/SE	13	8	4	12		2									**2**	12	**14**	
Kentopp	4s 12 0 1100	NW/SE	14	8	4	12		20.8									**20.8**		**20.8**	
Kinzey Estate	4s 12 4 0300	SW/NW	7	4	4	12						2.5					**2.5**	7.2	**9.7**	
Kinzey Estate	4s 12 4 0300	SE/NW	8	4	4	12						1.7					**1.7**	1	**2.7**	
Kinzey, H	4s 12 0 2900	NE/NE	1	18	4	12						2.5				2.5	**5**	3.8	**8.8**	
Kinzey, H	4s 12 0 2900	NW/NE	2	18	4	12											**0**	2.05	**2.05**	
Klindt	4s 13 0 2000	NE/SW	9	9	4	13										6.2	**6.2**	7	**13.2**	
Klindt	4s 13 0 2000	NW/SW	10	9	4	13		3.5									**3.5**	9.8	**13.3**	
Klindt	4s 13 0 2000	SW/SW	11	9	4	13		1.1									**1.1**	1.9	**3**	
Klindt	4s 13 0 2000	SE/SW	12	9	4	13										7	**7**	1.7	**8.7**	
Klindt	4s 13 0 2000	NE/SE	13	9	4	13										3	**3**	19.2	**22.2**	
Klindt	4s 13 0 2000	NW/SE	14	9	4	13		12.5									**12.5**	22.5	**35**	
Pintail,LLC & Stix,LLC	4s 12 1 301	NE/NE	1	1	4	12											**0**	2.6	**2.6**	
Pintail,LLC & Stix,LLC	4s 12 1 301	NW/NE	2	1	4	12										16.2	**16.2**		**16.2**	
Pintail,LLC & Stix,LLC	4s 12 1 301	SW/NE	3	1	4	12						15				19	**34**	3.6	**37.6**	
Pintail,LLC & Stix,LLC	4s 12 1 301	SE/NE	4	1	4	12	3	3.2									**6.2**	12.9	**19.1**	
Pintail,LLC & Stix,LLC	4s 12 1 301	NE/NW	5	1	4	12										0.6	**0.6**	8.8	**9.4**	
Pintail,LLC & Stix,LLC	4s 12 1 301	SW/NW	7	1	4	12	0.4	5.65			5	8.1				1.2	**20.35**		**20.35**	
Pintail,LLC & Stix,LLC	4s 12 1 301	SE/NW	8	1	4	12						15				22	**37**	0.2	**37.2**	
Lindell	4s 13 0 0900	SW/NE	3	9	4	13	25										**25**		**25**	
Lindell	4s 13 0 0900	SE/NE	4	9	4	13	15										**15**		**15**	
Lindell	4s 13 0 0900	SW/NW	7	9	4	13	8										**8**		**8**	
Lindell	4s 13 0 0900	SE/NW	8	9	4	13	8										**8**		**8**	
Magill	4s 12 0 1800	NE/SE	13	11	4	12											**0**		**0**	
Magill	4s 12 0 1800	SE/SE	16	11	4	12											**0**		**0**	
Magill	4s 12 0 1800	NW/SW	10	12	4	12											**0**		**0**	

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Magill	4s 12 0 1800	SW/SW	11	12	4	12											**0**		**0**	
Magill	4s 12 0 1800	NW/NW	6	13	4	12											**0**	3	**3**	
Magill	4s 12 0 1800	NE/NE	1	14	4	12											**0**	12.4	**12.4**	
Magill	4s 12 11 1000	NE/SW	9	11	4	12											**0**	3.35	**3.35**	
Magill	4s 12 11 1000	SE/SW	12	11	4	12						6					**6**	12.2	**18.2**	
Magill	4s 12 11 1000	NW/SE	14	11	4	12											**0**		**0**	
Magill	4s 12 11 1000	SW/SE	15	11	4	12											**0**	3.45	**3.45**	
Magill Trust	4s 13 0 1600	NE/SW	9	8	4	13										5	**5**	7.6	**12.6**	
Magill Trust	4s 13 0 1600	SE/SW	12	8	4	13											**0**	0.3	**0.3**	
Magill Trust	4s 13 0 1600	SW/SE	15	8	4	13											**0**	9.2	**9.2**	
Magill Trust	4s 13 0 1700	SW/NE	3	8	4	13	30.06										**30.06**		**30.06**	
Magill Trust	4s 13 0 1700	SE/NE	4	8	4	13	30.1										**30.1**		**30.1**	
Magill Trust	4s 13 0 1700	NE/SE	13	8	4	13											**0**	34	**34**	
Magill Trust	4s 13 0 1700	NW/SE	14	8	4	13											**0**	20	**20**	
McAllister Ranches	4s 13 6 400	SW/NW	7	6	4	13		4.6									**4.6**	3.6	**8.2**	
McAllister Ranches	4s 13 6 400	SE/NW	8	6	4	13											**0**	1.1	**1.1**	
McAllister Ranches	4s 13 6 400	NE/SW	9	6	4	13		2.1								1.9	**4**	0.9	**4.9**	
McAllister Ranches	4s 13 6 400	NW/SW	10	6	4	13		2.1								8.2	**10.3**	4.9	**15.2**	
McAllister Ranches	4s 12 1 601	SE/NE	4	1	4	12		5.7									**5.7**	5.07	**10.77**	
McAllister Ranches	4s 12 1 601	NE/SW	9	1	4	12											**0**	3.4	**3.4**	
McAllister Ranches	4s 12 1 601	NE/SE	13	1	4	12										10	**10**	8.7	**18.7**	
McAllister Ranches	4s 12 1 601	NW/SE	14	1	4	12										10.6	**10.6**	6.6	**17.2**	
McAllister	4s 12 11 400	SW/NW	7	11	4	12											**0**	7.5	**7.5**	
McAllister	4s 12 0 0100	SE/SW	12	1	4	12	0.4									19.2	**19.6**	4	**23.6**	
McAllister	4s 12 0 0100	NW/NE	2	12	4	12		5.5									**5.5**	3.3	**8.8**	
McAllister	4s 12 0 0100	NE/NW	5	12	4	12							6			5	**11**	0.9	**11.9**	
McAllister	4s 12 12 101	NE/NE	1	12	4	12										20	**20**	18.5	**38.5**	
McAllister	4s 12 12 101	NW/NE	2	12	4	12		7.5									**7.5**	19.7	**27.2**	
McAllister	4s 12 12 101	SW/NE	3	12	4	12		4.2	19								**23.2**		**23.2**	
McAllister	4s 12 12 101	SE/NE	4	12	4	12	1									5	**6**	7.5	**13.5**	0.6
McAllister	4s 12 12 500	SW/NE	3	12	4	12											**0**		**0**	
McAllister	4s 12 12 500	SE/NE	4	12	4	12											**0**		**0**	
McAllister	4s 12 12 500	NE/SE	13	12	4	12											**0**		**0**	
McAllister	4s 12 12 500	NW/SE	14	12	4	12											**0**		**0**	
McAllister	4s 12 12 500	SE/SE	16	12	4	12											**0**	1.8	**1.8**	
McAllister	4s 13 7 200	NW/NW	6	7	4	13										15.6	**15.6**	13.6	**29.2**	
McAllister	4s 13 7 200	SW/NW	7	7	4	13											**0**	5.6	**5.6**	
McAllister	4s 13 7 300	SW/NW	7	7	4	13	1									4.8	**5.8**	10.9	**16.7**	
McAllister	4s 13 7 300	NW/SW	10	7	4	13											**0**		**0**	
McAllister	4s 13 7 100	SW/NE	3	7	4	13										14	**14**	2.5	**16.5**	
McAllister	4s 13 7 100	NE/NW	5	7	4	13						18.7					**18.7**	8	**26.7**	
McAllister	4s 13 7 100	NW/NW	6	7	4	13										4.4	**4.4**	3.7	**8.1**	
McAllister	4s 13 7 100	SW/NW	7	7	4	13										3.7	**3.7**	9.2	**12.9**	
McAllister	4s 13 7 100	SE/NW	8	7	4	13								7.5		11	**18.5**	16.5	**35**	
McAllister	4s 13 7 100	NE/SW	9	7	4	13											**0**		**0**	

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McAllister	4s 13 7 100	NW/SW	10	7	4	13											**0**		**0**	
McAllister	4s 13 7 100	NW/SE	14	7	4	13										0.8	**0.8**	3.8	**4.6**	
McDowell	4s 12 10 100	SW/NE	3	10	4	12						5.3					**5.3**		**5.3**	
McDowell	4s 12 10 100	SE/NE	4	10	4	12										11.7	**11.7**	3.9	**15.6**	
McDowell	4s 12 10 100	NE/SE	13	10	4	12						7.3					**7.3**	28.7	**36**	
McDowell	4s 12 10 100	NW/SE	14	10	4	12						10.6					**10.6**	30	**40.6**	
McDowell	4s 12 10 100	NW/SW	10	11	4	12		1									**1**		**1**	
McDowell	4s 12 10 100	SW/SW	11	11	4	12		0.1									**0.1**		**0.1**	
Miller	4s 13 0 1300	SW/NE	3	7	4	13										11.3	**11.3**	1.5	**12.8**	
Miller	4s 13 0 1300	SE/NE	4	7	4	13		11								11.5	**22.5**	6.5	**29**	
Miller	4s 13 0 1300	NE/SE	13	7	4	13										8	**8**	6	**14**	
Miller	4s 13 0 1300	NW/SE	14	7	4	13										2	**2**	3	**5**	
Miller	4s 13 0 1300	SW/NW	7	8	4	13										15	**15**	14.7	**29.7**	
Miller	4s 13 0 1300	SE/NW	8	8	4	13						5		2.5			**7.5**	3.6	**11.1**	
Nordquist, Bryan	4s 12 4 0200	NE/NE	1	4	4	12										5.4	**5.4**	9	**14.4**	
Nordquist, Bryan	4s 12 4 0200	NW/NE	2	4	4	12										25.4	**25.4**	1	**26.4**	
Nordquist, Bryan	4s 12 4 0200	NE/NW	5	4	4	12										6	**6**	8.3	**14.3**	
Nordquist, Bryan	4s 12 4 0200	NW/NW	6	4	4	12											**0**		**0**	
Nordquist, Bryan	4s 12 4 0200	SW/NW	7	4	4	12											**0**	0.7	**0.7**	
Nordquist, Bryan	4s 12 4 0200	SE/NW	8	4	4	12					4.6	8.4					**13**	5.2	**18.2**	
Nordquist, Bryan	4s 12 4 0200	SE/NW	8	4	4	12											**0**		**0**	
Nordquist, Eric	4s 12 3 500	NW/NE	2	3	4	12						5				8	**13**	9.4	**22.4**	
Nordquist, Eric	4s 12 3 500	SW/NE	3	3	4	12		10.5				20					**30.5**	8.3	**38.8**	
Nordquist, Eric	4s 12 3 500	NE/NW	5	3	4	12						15.7				18	**33.7**	5.1	**38.8**	
Nordquist, Eric	4s 12 3 500	NW/NW	6	3	4	12										13.2	**13.2**	10	**23.2**	
Nordquist, Eric	4s 12 3 500	SE/NW	8	3	4	12											**0**		**0**	
Nordquist, Jim	3s 12 0 3100	SW/SW	11	34	3	12											**0**	2.3	**2.3**	
Nordquist, Jim	3s 12 0 3100	SE/SW	12	34	3	12											**0**	0.1	**0.1**	
O'Riley	4s 12 4 0900	SW/SW	11	4	4	12						11.7					**11.7**		**11.7**	
ODFW	3s 12 0 1000	SW/SW	11	33	3	12						4					**4**		**4**	
ODFW	3s 12 0 1000	SW/SE	15	33	3	12	0.5	4.5									**5**		**5**	
ODFW	3s 12 0 1000	SE/SE	16	33	3	12	2.5	16.5									**19**		**19**	
ODFW	3s 12 0 1000	SW/SW	11	34	3	12											**0**	1.3	**1.3**	
ODFW	3s 12 0 1000	SE/SW	12	34	3	12											**0**	0.1	**0.1**	
ODFW	4s 11 0 0200	SE/SE	16	2	4	11						15					**15**		**15**	
ODFW	4s 11 0 0600	NE/NE	1	12	4	11		0.3								0.5	**0.8**		**0.8**	
ODFW	4s 11 0 0600	NW/NE	2	12	4	11		8.9									**8.9**		**8.9**	
ODFW	4s 11 0 0600	SW/NE	3	12	4	11		6									**6**		**6**	
ODFW	4s 12 0 0800	NE/NE	1	5	4	12		13.5									**13.5**		**13.5**	
ODFW	4s 12 0 0800	NW/NE	2	5	4	12		3.5									**3.5**		**3.5**	
ODFW	4s 12 0 0800	NE/NW	5	5	4	12										1.9	**1.9**		**1.9**	
ODFW	4s 12 0 0800	NW/NW	6	5	4	12										0.2	**0.2**		**0.2**	
ODFW	4s 12 0 0800	SW/NW	7	5	4	12										2.9	**2.9**		**2.9**	
ODFW	4s 12 0 0800	SE/NW	8	5	4	12						15				1.3	**16.3**		**16.3**	
ODFW	4s 12 0 0800	NE/SW	9	5	4	12										3.6	**3.6**		**3.6**	

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	c.5733 Badger Cr 5/27/1893	c.46530 Badger Cr 8/8/1914	c.7865 Badger Cr 1/5/1925	c.7917 Badger Cr 1/14/1925	c.7221 Badger Cr 4/27/1925	c.46532 Badger Cr 10/21/1929	c.9529 Badger Cr 11/6/1929	c.9017 Badger Cr 6/11/1930	c.11377 Badger Cr 7/1/1932	c.46531 Badger Cr/ Badger Lk 4/12/1941	**Total Pre-1961**	c.46368 Badger Cr/ Badger Lk 3/22/1961	**Total Badger Acres**	c.51486 7/23/1968 Pine Hollow Res.
ODFW	4s 12 0 0800	NW/SW	10	5	4	12										2.9	**2.9**		**2.9**	
ODFW	4s 12 0 0800	SW/SW	11	5	4	12										13.2	**13.2**		**13.2**	
ODFW	4s 12 0 0800	SE/SW	12	5	4	12										3.8	**3.8**		**3.8**	
ODFW	4s 12 0 0800	NW/NW	6	7	4	12		3.5								17.7	**21.2**	9.85	**31.05**	
ODFW	4s 12 0 0800	SW/NW	7	7	4	12		7.2								3.2	**10.4**		**10.4**	
ODFW	4s 12 0 0800	SE/NW	8	7	4	12		2.3								0.9	**3.2**		**3.2**	
ODFW	4s 12 0 0800	NE/SW	9	7	4	12		12									**12**		**12**	
ODFW	4s 12 0 0800	NE/SE	13	7	4	12										13.9	**13.9**		**13.9**	
ODFW	4s 12 0 0800	NW/SE	14	7	4	12										7.1	**7.1**		**7.1**	
ODFW	4s 12 3 0100	NW/NW	6	3	4	12											**0**		**0**	
Pine Creek Farms	4s 12 12 300	NE/NW	5	12	4	12											**0**	0.7	**0.7**	
Pine Creek Farms	4s 12 12 300	SE/NW	8	12	4	12											**0**	16.2	**16.2**	
Price	4s 12 3 300	NE/SE	13	3	4	12		14.5				7.9					**22.4**	12.6	**35**	
Price	4s 12 3 300	NW/SE	14	3	4	12						0.3				0.3	**0.6**	0.3	**0.9**	
Price	4s 12 3 300	SE/SE	16	3	4	12						0.6					**0.6**		**0.6**	
Roads	4s 12 1	NW/SW	10	1	4	12											**0**	0.5	**0.5**	
Roads	4s 12 11	NW/NW	6	11	4	12											**0**	0.2	**0.2**	
Roads	4s 12 11	SW/NW	7	11	4	12											**0**		**0**	
Roads	4s 12 11	SW/SW	11	11	4	12											**0**	0.7	**0.7**	
Roads	4s 12 3	NW/SE	14	3	4	12										0.2	**0.2**	0.4	**0.6**	
Roads	4s 12 4	SE/NW	8	4	4	12					0.4	0.3					**0.7**		**0.7**	
Roads	4s 13	SW/NE	3	8	4	13	2.24										**2.24**		**2.24**	
Roads	4s 13	SE/NE	4	8	4	13	2.7										**2.7**		**2.7**	
Rowan	4s 12 11 500	NW/SW	10	11	4	12		9.1									**9.1**	7	**16.1**	
Rowan	4s 12 11 500	SW/SW	11	11	4	12		7.4									**7.4**	15.6	**23**	
Schrimsher	4s 12 0 1000	SW/SE	15	7	4	12											**0**	7.2	**7.2**	
Schrimsher	4s 12 0 1000	SE/SE	16	7	4	12						20				9	**29**	9.8	**38.8**	
Simmons	4s 12 11 200	NW/NW	6	11	4	12											**0**	0.5	**0.5**	
Simmons	4s 12 11 200	SW/NW	7	11	4	12											**0**	3	**3**	
Simmons	4s 12 11 300	SW/NW	7	11	4	12											**0**	7.7	**7.7**	
Stevens	4s 12 0 2300	NW/SW	10	16	4	12		2									**2**		**2**	
Stevens	4s 12 0 2300	NE/SE	13	17	4	12		11									**11**		**11**	
Griffith	4s 12 2 700	NE/SE	13	2	4	12		13.1				16.9				0.6	**30.6**	8.8	**39.4**	
Griffith	4s 12 2 700	NW/SE	14	2	4	12											**0**	8.9	**8.9**	
Griffith	4s 12 2 700	SE/SE	16	2	4	12										13	**13**	5	**18**	
Badger Ridge Cabins(Ta	4s 12 2 400	NE/NW	5	2	4	12											**0**	0.5	**0.5**	
Badger Ridge Cabins(Ta	4s 12 2 400	NW/NW	6	2	4	12											**0**	1.9	**1.9**	
Badger Ridge Cabins(Ta	4s 12 2 400	SE/NW	8	2	4	12	0.8	10.4									**11.2**	4.7	**15.9**	
Badger Ridge Cabins(Ta	4s 12 2 400	NE/SW	9	2	4	12											**0**	3.2	**3.2**	
Badger Ridge Cabins(Ta	4s 12 2 400	NW/SE	14	2	4	12											**0**	13	**13**	
B Bar K Lodge(Taylor)	4s 12 2 600	NE/NW	5	2	4	12											**0**	0.7	**0.7**	
B Bar K Lodge(Taylor)	4s 12 2 600	NW/NW	6	2	4	12											**0**	1	**1**	
B Bar K Lodge(Taylor)	4s 12 2 600	SW/NW	7	2	4	12						9.6					**9.6**	0.4	**10**	
B Bar K Lodge(Taylor)	4s 12 2 600	SE/NW	8	2	4	12	0.2	16.9									**17.1**	2.4	**19.5**	
B Bar K Lodge(Taylor)	4s 12 2 600	NE/SW	9	2	4	12		8.4								7	**15.4**	20.5	**35.9**	

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	c.5733 Badger Cr 5/27/1893	c.46530 Badger Cr 8/8/1914	c.7865 Badger Cr 1/5/1925	c.7917 Badger Cr 1/14/1925	c.7221 Badger Cr 4/27/1925	c.46532 Badger Cr 10/21/1929	c.9529 Badger Cr 11/6/1929	c.9017 Badger Cr 6/11/1930	c.11377 Badger Cr 7/1/1932	c.46531 Badger Cr/ Badger Lk 4/12/1941	**Total Pre-1961**	c.46368 Badger Cr/ Badger Lk 3/22/1961	**Total Badger Acres**	c.51486 7/23/1968 Pine Hollow Res.
B Bar K Lodge(Taylor)	4s 12 2 600	NW/SW	10	2	4	12											**0**	8.5	**8.5**	
Unknown	4s 12 10 100	NE/NW	5	10	4	12											**0**		**0**	
Unknown	4s 12 10 100	NW/NW	6	10	4	12											**0**		**0**	
Unknown	4s 12 10 100	SW/NW	7	10	4	12											**0**		**0**	
Unknown	4s 12 10 100	SE/NW	8	10	4	12											**0**		**0**	
Unknown	4s 12 10 100	NE/SW	9	10	4	12											**0**		**0**	
Unknown	4s 12 10 100	NW/SW	10	10	4	12											**0**		**0**	
Unknown	4s 12 3	SW/SE	15	3	4	12										8.9	**8.9**		**8.9**	
Unknown	4s 12 3 400	SE/NW	8	3	4	12											**0**		**0**	
Unknown	4s 12 3 600	SE/NW	8	3	4	12											**0**		**0**	
Unknown	4s 12 9	SE/NE	4	9	4	12											**0**		**0**	
Unknown	4s 12 9	NE/SE	13	9	4	12											**0**		**0**	
USA	4s 13 0 4100	NE/NW	5	18	4	13											**0**		**0**	
VanVactor	4s 12 0 1200	SW/SW	11	8	4	12						8				10	**18**	20.2	**38.2**	
VanVactor	4s 12 0 1200	NW/NW	6	17	4	12										7	**7**	5	**12**	
VanVactor	4s 12 0 1300	SE/SW	12	8	4	12		2.8								4	**6.8**	13	**19.8**	
VanVactor	4s 12 0 1300	NE/NW	5	17	4	12		4.2									**4.2**	3.2	**7.4**	
VanVactor	4s 12 0 1400	SW/SE	15	8	4	12										5	**5**	10.7	**15.7**	
VanVactor	4s 12 0 1400	NW/NE	2	17	4	12										5	**5**	1.4	**6.4**	
Wassenmiller	4s 13 0 1000	SW/NE	3	8	4	13	7.7										**7.7**		**7.7**	
Wassenmiller	4s 13 0 1000	SE/NE	4	8	4	13	7.2										**7.2**		**7.2**	
							175.5	**401.35**	**19**	**20**	**10**	**482.3**	**6**	**10**	**4**	**988.7**	**2116.85**	**1591.8**	**3708.65**	**0.6**

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	p.50066 1/3/1986 Bad.Cr&Lk 3mile & PH	Total Acres Badger Ditch	Private Rights Pre-1961 w/PH Supp	c.5764 1/7/1874 3 Mile Cr Round PR	c.5772 1889 3 Mile Cr Round PR	c.7265 6/19/1924 3 Mile Cr Round PR	c.7869 5/28/1925 3 Mile Cr Round PR	c.9506 9/6/1928 3 Mile Cr Round PR	c.10552 9/25/1929 3 Mile Cr Round PR	c.11106 5/27/1931 3 Mile Cr Round PR	c.11710 5/10/1932 3 Mile Cr Round PR	c.12335 9/14/1934 3 Mile Cr Round PR
Alsup	4s 12 1 400	SW/NW	7	1	4	12		10.6										
Alsup	4s 12 1 401	SE/NE	4	2	4	12		1										
Anderson	4s 12 9 0500	NE/SW	9	9	4	12		39.1										
Anderson	4s 12 9 0501	NW/SW	10	9	4	12		1.65										
Archer	4s 12 0 0600	NE/SE	13	3	4	12		1.6										
Archer	4s 12 0 0600	NW/SE	14	3	4	12	7.8	34.1										
Archer	4s 12 0 0600	SW/SE	15	3	4	12		8.8										
Archer	4s 12 0 0600	SE/SE	16	3	4	12	9.5	37.7										
Archer	4s 12 0 0600	NE/NE	1	10	4	12		18.2										
Archer	4s 12 0 0600	NW/NE	2	10	4	12		3.2		3.1								
Archer	4s 12 3 200	SE/NE	4	3	4	12	6	42.2										
Benzel	4s 12 0 1900	SE/SW	12	12	4	12		15.8		3.4			18					
Benzel	4s 12 0 1900	SW/SE	15	12	4	12		6.9										
Benzel	4s 12 0 1900	NE/NE	1	13	4	12		40										
Benzel	4s 12 0 1900	NW/NE	2	13	4	12		35.5										
Benzel	4s 12 0 1900	NE/NW	5	13	4	12		17.6					20					
Benzel	4s 13 0 1400	SW/SW	11	7	4	13		38.2										
Benzel	4s 13 0 1400	SE/SW	12	7	4	13		13.3		20.5								
Benzel	4s 13 0 1400	NW/NW	6	18	4	13		23.9										
Briggs	4s 12 4 0400	SE/NW	8	4	4	12	1.8	6.4										
Brittain	4s 12 11 700	SW/SW	11	11	4	12		0.2										
Bussard	4s 12 11 501	SE/NW	8	11	4	12		2.64										
Bussard	4s 12 0 1700	NE/NE	1	11	4	12	22.2	53.49										
Bussard	4s 12 0 1700	SE/NE	4	11	4	12	1	27.6		2.8								
Bussard	4s 12 0 1700	NE/NW	5	12	4	12	1	1										
Bussard	4s 12 0 1700	NW/NW	6	12	4	12	1.3	40										
Bussard	4s 12 0 1700	SW/NW	7	12	4	12	1	21.1	11.5									
Bussard	4s 12 0 1700	SE/NW	8	12	4	12		2.8	2.8									
Bussard	4s 12 2 800	SE/SE	16	2	4	12		0.7										
Cameron	4s 12 9 0100	NE/NW	5	9	4	12		2.3										
Cameron	4s 12 9 0100	NW/NW	6	9	4	12		9										
Cameron	4s 12 9 0100	SW/NW	7	9	4	12		0		0.5								
Cameron	4s 12 9 0100	SE/NW	8	9	4	12		0.4										
Cameron	4s 12 9 0200	NE/NW	5	9	4	12		2.1										
City of Wamic	4s 12 14	NW/NE	2	14	4	12		0			1							
City of Wamic	4s 12 14	NE/NW	5	14	4	12		0			11							
City of Wamic	4s 12 14	NW/NW	6	14	4	12		0			3							
Dodge	4s 13 0 1100	NE/SW	9	5	4	13		8.8										
Dodge	4s 13 0 1100	NW/SW	10	5	4	13		32.8										
Dodge	4s 13 0 1100	SW/SW	11	5	4	13		39.6										
Dodge	4s 13 0 1100	SE/SW	12	5	4	13		39.2										
Dodge	4s 13 0 1100	NW/SE	14	5	4	13		5.8										
Dodge	4s 13 0 1100	SW/SE	15	5	4	13		12.4										
Dodge	4s 13 0 1100	NE/SE	13	6	4	13		28.8										
Dodge	4s 13 0 1100	NW/SE	14	6	4	13		36.3										

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	p.50066 1/3/1986 Bad.Cr&Lk 3mile & PH	Total Acres Badger Ditch	Private Rights Pre-1961 w/PH Supp	c.5764 1/7/1874 3 Mile Cr Round PR	c.5772 1889 3 Mile Cr Round PR	c.7265 6/19/1924 3 Mile Cr Round PR	c.7869 5/28/1925 3 Mile Cr Round PR	c.9506 9/6/1928 3 Mile Cr Round PR	c.10552 9/25/1929 3 Mile Cr Round PR	c.11106 5/27/1931 3 Mile Cr Round PR	c.11710 5/10/1932 3 Mile Cr Round PR	c.12335 9/14/1934 3 Mile Cr Round PR
Dodge	4s 13 0 1100	SW/SE	15	6	4	13		37.5										
Dodge	4s 13 0 1100	SE/SE	16	6	4	13		39.2										
Dodge	4s 13 0 1100	NE/NE	1	7	4	13		39.4										
Dodge	4s 13 0 1100	NW/NE	2	7	4	13		39.7										
Dodge	4s 13 0 1100	SW/NE	3	7	4	13		8										
Dodge	4s 13 0 1100	SE/NE	4	7	4	13		8.5										
Dodge	4s 13 0 1100	NE/NW	5	8	4	13		37.7										
Dodge	4s 13 0 1100	NW/NW	6	8	4	13		36										
Dodge	4s 13 0 1100	SW/NW	7	8	4	13		7.8										
Dodge	4s 13 0 1100	SE/NW	8	8	4	13		7.6										
FDD Ranch(Dulchich)	4s 12 0 0500	SW/SW	11	2	4	12		25.5										
FDD Ranch(Dulchich)	4s 12 0 0500	SE/SW	12	2	4	12		14.1										
FDD Ranch(Dulchich)	4s 12 0 0500	SW/SE	15	2	4	12		0.9										
FDD Ranch(Dulchich)	4s 12 0 0500	NE/NW	5	11	4	12		21.4		4.8						8.6		
FDD Ranch(Dulchich)	4s 12 0 0500	NW/NW	6	11	4	12		7.5		6.2								
FDD Ranch(Dulchich)	4s 12 0 0500	SW/NW	7	11	4	12		0		2								
FDD Ranch(Dulchich)	4s 12 0 0500	SE/NW	8	11	4	12		17.2										
Fargher	4s 12 9 0300	NE/NW	5	9	4	12	2.3	9.9		0.9								
Fargher	4s 12 9 0300	SE/NW	8	9	4	12		1.3										
Frame	4s 12 9 0400	NE/NW	5	9	4	12	0.2	0.2		0.1								
Frame	4s 12 9 0400	SW/NW	7	9	4	12		0										
Frame	4s 12 9 0400	SE/NW	8	9	4	12		2.3										
818 Baker(Gramzow)	4s 12 1 500	NE/SW	9	1	4	12		19.4										
818 Baker(Gramzow)	4s 12 1 500	NW/SW	10	1	4	12		7.5										
818 Baker(Gramzow)	4s 12 1 500	SW/SW	11	1	4	12		0.5										
818 Baker(Gramzow)	4s 12 1 500	SE/SW	12	1	4	12		1.6										
818 Baker(Gramzow)	4s 12 1 500	NE/SE	13	1	4	12		11.3										
818 Baker(Gramzow)	4s 12 1 500	NW/SE	14	1	4	12		21.6										
818 Baker(Gramzow)	4s 12 1 500	SW/SE	15	1	4	12		40.3										
818 Baker(Gramzow)	4s 12 1 500	SE/SE	16	1	4	12		21.7										
818 Baker(Gramzow)	4s 12 1 700	NE/SE	13	1	4	12		9.4										
818 Baker(Gramzow)	4s 12 1 700	SE/SE	16	1	4	12		18.3										
818 Baker(Gramzow)	4s 13 0 1200	SE/NW	8	6	4	13	0.5	0.5										
818 Baker(Gramzow)	4s 13 0 1200	NE/SW	9	6	4	13	3.8	25.9										
818 Baker(Gramzow)	4s 13 0 1200	NW/SW	10	6	4	13		19.4										
818 Baker(Gramzow)	4s 13 0 1200	SW/SW	11	6	4	13		38										
818 Baker(Gramzow)	4s 13 0 1200	SE/SW	12	6	4	13		40.1										
818 Baker(Gramzow)	4s 13 0 1200	NE/NW	5	7	4	13		11.5										
818 Baker(Gramzow)	4s 13 0 1200	SE/NW	8	7	4	13		2.4										
Harvey	4s 12 2 100	SE/NE	4	2	4	12		0.25										
Hesla	4s 12 2 500	NE/NW	5	2	4	12		0.8										
Hesla	4s 12 2 500	NW/NW	6	2	4	12		9.5										
Hesla	4s 12 2 500	SW/NW	7	2	4	12		25.6										
Hesla	4s 12 2 500	NW/SW	10	2	4	12		18.7										
Iverson	4s 12 0 1500	SE/SE	16	8	4	12		0.5										

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Iverson	4s 12 0 1600	SW/SE	15	9	4	12	5.2	39	1									
Iverson	4s 12 0 1600	SE/SE	16	9	4	12	4.8	40										
Iverson	4s 12 0 1600	NE/NW	5	15	4	12	7.6	24.8										
Iverson	4s 12 0 1600	NW/NW	6	15	4	12		26.8										
Iverson	4s 12 0 1600	NE/NE	1	16	4	12		30.8										
Iverson	4s 12 0 1600	NW/NE	2	16	4	12		29.7	2.3									
Iverson	4s 12 0 1600	NE/NW	5	16	4	12	10	11										
Iverson	4s 12 0 1600	NW/NW	6	16	4	12	9	9										
Jackson	4s 12 4 0800	SE/SW	12	4	4	12	15.6	26										
Kennedy	4s 12 0 0400	SE/SW	12	2	4	12		3.6										
Kennedy	4s 12 0 0400	NW/SE	14	2	4	12		17										
Kennedy	4s 12 0 0400	SW/SE	15	2	4	12		12.8										
Kennedy	4s 12 0 0400	SE/SE	16	2	4	12		19.9										
Kennedy	4s 12 0 0400	NW/NE	2	11	4	12		19.4								5		
Kennedy	4s 12 0 0400	SW/NE	3	11	4	12		2.8										
Kennedy	4s 12 0 0400	NE/NW	5	11	4	12		3.6								1.4		
Kennedy	4s 12 0 0400	SE/NW	8	11	4	12		1.8										
Kentopp	4s 12 0 1100	NE/SW	9	8	4	12	23.6	40										
Kentopp	4s 12 0 1100	NW/SW	10	8	4	12	24.8	40										
Kentopp	4s 12 0 1100	NE/SE	13	8	4	12	6.5	20.5							18			
Kentopp	4s 12 0 1100	NW/SE	14	8	4	12	2	22.8							12			
Kinzey Estate	4s 12 4 0300	SW/NW	7	4	4	12	5	14.7										
Kinzey Estate	4s 12 4 0300	SE/NW	8	4	4	12	0.9	3.6										
Kinzey, H	4s 12 0 2900	NE/NE	1	18	4	12		8.8	6									
Kinzey, H	4s 12 0 2900	NW/NE	2	18	4	12		2.05	0.75									
Klindt	4s 13 0 2000	NE/SW	9	9	4	13	26.8	40										
Klindt	4s 13 0 2000	NW/SW	10	9	4	13	22.4	35.7										
Klindt	4s 13 0 2000	SW/SW	11	9	4	13		3										
Klindt	4s 13 0 2000	SE/SW	12	9	4	13		8.7										
Klindt	4s 13 0 2000	NE/SE	13	9	4	13		22.2										
Klindt	4s 13 0 2000	NW/SE	14	9	4	13	4.5	39.5										
Pintail,LLC & Stix,LLC	4s 12 1 301	NE/NE	1	1	4	12		2.6										
Pintail,LLC & Stix,LLC	4s 12 1 301	NW/NE	2	1	4	12		16.2										
Pintail,LLC & Stix,LLC	4s 12 1 301	SW/NE	3	1	4	12		37.6										
Pintail,LLC & Stix,LLC	4s 12 1 301	SE/NE	4	1	4	12		19.1										
Pintail,LLC & Stix,LLC	4s 12 1 301	NE/NW	5	1	4	12		9.4										
Pintail,LLC & Stix,LLC	4s 12 1 301	SW/NW	7	1	4	12		20.35										
Pintail,LLC & Stix,LLC	4s 12 1 301	SE/NW	8	1	4	12		37.2										
Lindell	4s 13 0 0900	SW/NE	3	9	4	13		25										
Lindell	4s 13 0 0900	SE/NE	4	9	4	13		15										
Lindell	4s 13 0 0900	SW/NW	7	9	4	13		8										
Lindell	4s 13 0 0900	SE/NW	8	9	4	13		8										
Magill	4s 12 0 1800	NE/SE	13	11	4	12		0									20	
Magill	4s 12 0 1800	SE/SE	16	11	4	12		0		2.8							10	
Magill	4s 12 0 1800	NW/SW	10	12	4	12		0									20	

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	p.50066 1/3/1986 Bad.Cr&Lk 3mile & PH	Total Acres Badger Ditch	Private Rights Pre-1961 w/PH Supp	c.5764 1/7/1874 3 Mile Cr Round PR	c.5772 1889 3 Mile Cr Round PR	c.7265 6/19/1924 3 Mile Cr Round PR	c.7869 5/28/1925 3 Mile Cr Round PR	c.9506 9/6/1928 3 Mile Cr Round PR	c.10552 9/25/1929 3 Mile Cr Round PR	c.11106 5/27/1931 3 Mile Cr Round PR	c.11710 5/10/1932 3 Mile Cr Round PR	c.12335 9/14/1934 3 Mile Cr Round PR
Magill	4s 12 0 1800	SW/SW	11	12	4	12		0		2.8		15					15	
Magill	4s 12 0 1800	NW/NW	6	13	4	12		3				25						
Magill	4s 12 0 1800	NE/NE	1	14	4	12		12.4										
Magill	4s 12 11 1000	NE/SW	9	11	4	12		3.35		0.25								28
Magill	4s 12 11 1000	SE/SW	12	11	4	12		18.2		4.6								
Magill	4s 12 11 1000	NW/SE	14	11	4	12		0										17
Magill	4s 12 11 1000	SW/SE	15	11	4	12		3.45		4.85								
Magill Trust	4s 13 0 1600	NE/SW	9	8	4	13		12.6										
Magill Trust	4s 13 0 1600	SE/SW	12	8	4	13		0.3										
Magill Trust	4s 13 0 1600	SW/SE	15	8	4	13		9.2										
Magill Trust	4s 13 0 1700	SW/NE	3	8	4	13		30.06										
Magill Trust	4s 13 0 1700	SE/NE	4	8	4	13		30.1										
Magill Trust	4s 13 0 1700	NE/SE	13	8	4	13		34										
Magill Trust	4s 13 0 1700	NW/SE	14	8	4	13		20										
McAllister Ranches	4s 13 6 400	SW/NW	7	6	4	13		8.2										
McAllister Ranches	4s 13 6 400	SE/NW	8	6	4	13	8	9.1										
McAllister Ranches	4s 13 6 400	NE/SW	9	6	4	13	1.7	6.6										
McAllister Ranches	4s 13 6 400	NW/SW	10	6	4	13		15.2										
McAllister Ranches	4s 12 1 601	SE/NE	4	1	4	12		10.77										
McAllister Ranches	4s 12 1 601	NE/SW	9	1	4	12		3.4										
McAllister Ranches	4s 12 1 601	NE/SE	13	1	4	12		18.7										
McAllister Ranches	4s 12 1 601	NW/SE	14	1	4	12		17.2										
McAllister	4s 12 11 400	SW/NW	7	11	4	12		7.5										
McAllister	4s 12 0 0100	SE/SW	12	1	4	12		23.6										
McAllister	4s 12 0 0100	NW/NE	2	12	4	12		8.8										
McAllister	4s 12 0 0100	NE/NW	5	12	4	12		11.9										
McAllister	4s 12 12 101	NE/NE	1	12	4	12		38.5										
McAllister	4s 12 12 101	NW/NE	2	12	4	12		27.2										
McAllister	4s 12 12 101	SW/NE	3	12	4	12	3.1	26.3		5.8								
McAllister	4s 12 12 101	SE/NE	4	12	4	12		14.1										
McAllister	4s 12 12 500	SW/NE	3	12	4	12	2.4	2.4										
McAllister	4s 12 12 500	SE/NE	4	12	4	12	22.4	22.4										
McAllister	4s 12 12 500	NE/SE	13	12	4	12	13	13										
McAllister	4s 12 12 500	NW/SE	14	12	4	12	3	3										
McAllister	4s 12 12 500	SE/SE	16	12	4	12		1.8										
McAllister	4s 13 7 200	NW/NW	6	7	4	13		29.2										
McAllister	4s 13 7 200	SW/NW	7	7	4	13		5.6										
McAllister	4s 13 7 300	SW/NW	7	7	4	13		16.7										
McAllister	4s 13 7 300	NW/SW	10	7	4	13	2.1	2.1										
McAllister	4s 13 7 100	SW/NE	3	7	4	13		16.5										
McAllister	4s 13 7 100	NE/NW	5	7	4	13		26.7										
McAllister	4s 13 7 100	NW/NW	6	7	4	13		8.1										
McAllister	4s 13 7 100	SW/NW	7	7	4	13		12.9										
McAllister	4s 13 7 100	SE/NW	8	7	4	13		35										
McAllister	4s 13 7 100	NE/SW	9	7	4	13	4.5	4.5										

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	p.50066 1/3/1986 Bad.Cr&Lk 3mile & PH	Total Acres Badger Ditch	Private Rights Pre-1961 w/PH Supp	c.5764 1/7/1874 3 Mile Cr Round PR	c.5772 1889 3 Mile Cr Round PR	c.7265 6/19/1924 3 Mile Cr Round PR	c.7869 5/28/1925 3 Mile Cr Round PR	c.9506 9/6/1928 3 Mile Cr Round PR	c.10552 9/25/1929 3 Mile Cr Round PR	c.11106 5/27/1931 3 Mile Cr Round PR	c.11710 5/10/1932 3 Mile Cr Round PR	c.12335 9/14/1934 3 Mile Cr Round PR
McAllister	4s 13 7 100	NW/SW	10	7	4	13	1.5	1.5										
McAllister	4s 13 7 100	NW/SE	14	7	4	13	1.3	5.9										
McDowell	4s 12 10 100	SW/NE	3	10	4	12		5.3		6								
McDowell	4s 12 10 100	SE/NE	4	10	4	12	19.8	35.4		4.6								
McDowell	4s 12 10 100	NE/SE	13	10	4	12		36		4.6								
McDowell	4s 12 10 100	NW/SE	14	10	4	12		40.6										
McDowell	4s 12 10 100	NW/SW	10	11	4	12		1		0.1								
McDowell	4s 12 10 100	SW/SW	11	11	4	12		0.1										
Miller	4s 13 0 1300	SW/NE	3	7	4	13		12.8										
Miller	4s 13 0 1300	SE/NE	4	7	4	13		29										
Miller	4s 13 0 1300	NE/SE	13	7	4	13	1	15										
Miller	4s 13 0 1300	NW/SE	14	7	4	13	0.3	5.3										
Miller	4s 13 0 1300	SW/NW	7	8	4	13		29.7										
Miller	4s 13 0 1300	SE/NW	8	8	4	13		11.1										
Nordquist, Bryan	4s 12 4 0200	NE/NE	1	4	4	12	3.5	17.9										
Nordquist, Bryan	4s 12 4 0200	NW/NE	2	4	4	12	3	29.4										
Nordquist, Bryan	4s 12 4 0200	NE/NW	5	4	4	12	1.5	15.8										
Nordquist, Bryan	4s 12 4 0200	NW/NW	6	4	4	12	0.1	0.1										
Nordquist, Bryan	4s 12 4 0200	SW/NW	7	4	4	12		0.7										
Nordquist, Bryan	4s 12 4 0200	SE/NW	8	4	4	12		18.2										
Nordquist, Bryan	4s 12 4 0200	SE/NW	8	4	4	12	0.8	0.8										
Nordquist, Eric	4s 12 3 500	NW/NE	2	3	4	12		22.4										
Nordquist, Eric	4s 12 3 500	SW/NE	3	3	4	12		38.8										
Nordquist, Eric	4s 12 3 500	NE/NW	5	3	4	12	1.2	40										
Nordquist, Eric	4s 12 3 500	NW/NW	6	3	4	12	15.1	38.3										
Nordquist, Eric	4s 12 3 500	SE/NW	8	3	4	12	1	1										
Nordquist, Jim	3s 12 0 3100	SW/SW	11	34	3	12		2.3										
Nordquist, Jim	3s 12 0 3100	SE/SW	12	34	3	12		0.1										
O'Riley	4s 12 4 0900	SW/SW	11	4	4	12		11.7										
ODFW	3s 12 0 1000	SW/SW	11	33	3	12		4										
ODFW	3s 12 0 1000	SW/SE	15	33	3	12		5										
ODFW	3s 12 0 1000	SE/SE	16	33	3	12		19										
ODFW	3s 12 0 1000	SW/SW	11	34	3	12		1.3										
ODFW	3s 12 0 1000	SE/SW	12	34	3	12		0.1										
ODFW	4s 11 0 0200	SE/SE	16	2	4	11		15										
ODFW	4s 11 0 0600	NE/NE	1	12	4	11		0.8										
ODFW	4s 11 0 0600	NW/NE	2	12	4	11		8.9										
ODFW	4s 11 0 0600	SW/NE	3	12	4	11		6										
ODFW	4s 12 0 0800	NE/NE	1	5	4	12		13.5										
ODFW	4s 12 0 0800	NW/NE	2	5	4	12		3.5										
ODFW	4s 12 0 0800	NE/NW	5	5	4	12		1.9										
ODFW	4s 12 0 0800	NW/NW	6	5	4	12		0.2										
ODFW	4s 12 0 0800	SW/NW	7	5	4	12		2.9										
ODFW	4s 12 0 0800	SE/NW	8	5	4	12		16.3										
ODFW	4s 12 0 0800	NE/SW	9	5	4	12		3.6										

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	p.50066 1/3/1986 Bad.Cr&Lk 3mile & PH	Total Acres Badger Ditch	Private Rights Pre-1961 w/PH Supp	c.5764 1/7/1874 3 Mile Cr Round PR	c.5772 1889 3 Mile Cr Round PR	c.7265 6/19/1924 3 Mile Cr Round PR	c.7869 5/28/1925 3 Mile Cr Round PR	c.9506 9/6/1928 3 Mile Cr Round PR	c.10552 9/25/1929 3 Mile Cr Round PR	c.11106 5/27/1931 3 Mile Cr Round PR	c.11710 5/10/1932 3 Mile Cr Round PR	c.12335 9/14/1934 3 Mile Cr Round PR
ODFW	4s 12 0 0800	NW/SW	10	5	4	12		2.9										
ODFW	4s 12 0 0800	SW/SW	11	5	4	12		13.2										
ODFW	4s 12 0 0800	SE/SW	12	5	4	12		3.8										
ODFW	4s 12 0 0800	NW/NW	6	7	4	12		31.05										
ODFW	4s 12 0 0800	SW/NW	7	7	4	12		10.4										
ODFW	4s 12 0 0800	SE/NW	8	7	4	12		3.2										
ODFW	4s 12 0 0800	NE/SW	9	7	4	12		12										
ODFW	4s 12 0 0800	NE/SE	13	7	4	12		13.9										
ODFW	4s 12 0 0800	NW/SE	14	7	4	12		7.1										
ODFW	4s 12 3 0100	NW/NW	6	3	4	12	1.7	1.7										
Pine Creek Farms	4s 12 12 300	NE/NW	5	12	4	12		0.7										
Pine Creek Farms	4s 12 12 300	SE/NW	8	12	4	12		16.2										
Price	4s 12 3 300	NE/SE	13	3	4	12		35										
Price	4s 12 3 300	NW/SE	14	3	4	12		0.9										
Price	4s 12 3 300	SE/SE	16	3	4	12		0.6										
Roads	4s 12 1	NW/SW	10	1	4	12		0.5										
Roads	4s 12 11	NW/NW	6	11	4	12		0.2										
Roads	4s 12 11	SW/NW	7	11	4	12		0		0.2								
Roads	4s 12 11	SW/SW	11	11	4	12		0.7										
Roads	4s 12 3	NW/SE	14	3	4	12	1.2	1.8										
Roads	4s 12 4	SE/NW	8	4	4	12	0.5	1.2										
Roads	4s 13	SW/NE	3	8	4	13		2.24										
Roads	4s 13	SE/NE	4	8	4	13		2.7										
Rowan	4s 12 11 500	NW/SW	10	11	4	12		16.1		13.4				10				
Rowan	4s 12 11 500	SW/SW	11	11	4	12	3	26										
Schrimsher	4s 12 0 1000	SW/SE	15	7	4	12	10	17.2										
Schrimsher	4s 12 0 1000	SE/SE	16	7	4	12		38.8										
Simmons	4s 12 11 200	NW/NW	6	11	4	12		0.5										
Simmons	4s 12 11 200	SW/NW	7	11	4	12		3		0.1								
Simmons	4s 12 11 300	SW/NW	7	11	4	12		7.7		0.7								
Stevens	4s 12 0 2300	NW/SW	10	16	4	12		2										
Stevens	4s 12 0 2300	NE/SE	13	17	4	12		11										
Griffith	4s 12 2 700	NE/SE	13	2	4	12		39.4										
Griffith	4s 12 2 700	NW/SE	14	2	4	12		8.9										
Griffith	4s 12 2 700	SE/SE	16	2	4	12		18										
Badger Ridge Cabins(Ta	4s 12 2 400	NE/NW	5	2	4	12		0.5										
Badger Ridge Cabins(Ta	4s 12 2 400	NW/NW	6	2	4	12		1.9										
Badger Ridge Cabins(Ta	4s 12 2 400	SE/NW	8	2	4	12		15.9										
Badger Ridge Cabins(Ta	4s 12 2 400	NE/SW	9	2	4	12		3.2										
Badger Ridge Cabins(Ta	4s 12 2 400	NW/SE	14	2	4	12		13										
B Bar K Lodge(Taylor)	4s 12 2 600	NE/NW	5	2	4	12		0.7										
B Bar K Lodge(Taylor)	4s 12 2 600	NW/NW	6	2	4	12		1										
B Bar K Lodge(Taylor)	4s 12 2 600	SW/NW	7	2	4	12		10										
B Bar K Lodge(Taylor)	4s 12 2 600	SE/NW	8	2	4	12		19.5										
B Bar K Lodge(Taylor)	4s 12 2 600	NE/SW	9	2	4	12		35.9										

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	p.50066 1/3/1986 Bad.Cr&Lk 3mile & PH	Total Acres Badger Ditch	Private Rights Pre-1961 w/PH Supp	c.5764 1/7/1874 3 Mile Cr Round PR	c.5772 1889 3 Mile Cr Round PR	c.7265 6/19/1924 3 Mile Cr Round PR	c.7869 5/28/1925 3 Mile Cr Round PR	c.9506 9/6/1928 3 Mile Cr Round PR	c.10552 9/25/1929 3 Mile Cr Round PR	c.11106 5/27/1931 3 Mile Cr Round PR	c.11710 5/10/1932 3 Mile Cr Round PR	c.12335 9/14/1934 3 Mile Cr Round PR
B Bar K Lodge(Taylor)	4s 12 2 600	NW/SW	10	2	4	12		8.5										
Unknown	4s 12 10 100	NE/NW	5	10	4	12		0		16								
Unknown	4s 12 10 100	NW/NW	6	10	4	12		0		3								
Unknown	4s 12 10 100	SW/NW	7	10	4	12		0		10								
Unknown	4s 12 10 100	SE/NW	8	10	4	12		0		32								
Unknown	4s 12 10 100	NE/SW	9	10	4	12		0		5.2								
Unknown	4s 12 10 100	NW/SW	10	10	4	12		0		8								
Unknown	4s 12 3	SW/SE	15	3	4	12		8.9										
Unknown	4s 12 3 400	SE/NW	8	3	4	12	0.5	0.5										
Unknown	4s 12 3 600	SE/NW	8	3	4	12	0.3	0.3										
Unknown	4s 12 9	SE/NE	4	9	4	12		0		1.2								
Unknown	4s 12 9	NE/SE	13	9	4	12		0		4								
USA	4s 13 0 4100	NE/NW	5	18	4	13		0										
VanVactor	4s 12 0 1200	SW/SW	11	8	4	12		38.2										
VanVactor	4s 12 0 1200	NW/NW	6	17	4	12		12										
VanVactor	4s 12 0 1300	SE/SW	12	8	4	12		19.8										
VanVactor	4s 12 0 1300	NE/NW	5	17	4	12		7.4										
VanVactor	4s 12 0 1400	SW/SE	15	8	4	12		15.7										
VanVactor	4s 12 0 1400	NW/NE	2	17	4	12		6.4										
Wassenmiller	4s 13 0 1000	SW/NE	3	8	4	13		7.7										
Wassenmiller	4s 13 0 1000	SE/NE	4	8	4	13		7.2										
							354.6	**4063.85**	**24.35**	**174.5**	**15**	**40**	**38**	**10**	**30**	**15**	**65**	**45**

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11		Tract	Tract					c.46829	Total	c.46368	c.46532	c.51486	c.51487		Totals				
		(1/4 of	(1/4 of		T	R	Round	10/27/1964	Water	3/22/1961	10/21/1929	7/23/1968	5/1/1975		Total	Delivered	Total	Delivered	Pine Hollow
Landowner	Tax Lot	1/4) aA	1/4) Number	Sec.	all S	all E	Prairie Pre-1961	3 Mile Cr Round PR	Right Acres	Badger Lk	Badger Lk	Pine Hollow Res	3 Mile Cr Pine Hollow		Pre-1961	acre-feet (Pre-61x2.65)	1961	acre-feet (1961x1.34)	Storage
Alsup	4s 12 1 400	SW/NW	7	1	4	12	0		10.6	5.18	3.42	8.1	8.1		10.6	28.1	0	0.0	3.7
Alsup	4s 12 1 401	SE/NE	4	2	4	12	0		1			1	1		1	2.7	0	0.0	0.4
Anderson	4s 12 9 0500	NE/SW	9	9	4	12	0		39.1			39.1	39.1		0	0.0	39.1	52.4	64.9
Anderson	4s 12 9 0501	NW/SW	10	9	4	12	0	22.75	24.4			24.4	24.4		0	0.0	1.65	2.2	2.7
Archer	4s 12 0 0600	NE/SE	13	3	4	12	0		1.6	1.5	0.1	1.6	1.6		1.6	4.2	0	0.0	0.6
Archer	4s 12 0 0600	NW/SE	14	3	4	12	0		34.1		5.7	26.3	26.3		15.2	40.3	11.1	14.9	23.7
Archer	4s 12 0 0600	SW/SE	15	3	4	12	0		8.8			8.8	8.8		5.9	15.6	2.9	3.9	6.9
Archer	4s 12 0 0600	SE/SE	16	3	4	12	0		37.7		6.4	28.2	28.2		23.3	61.7	4.9	6.6	16.3
Archer	4s 12 0 0600	NE/NE	1	10	4	12	0		18.2			18.2	18.2		6.6	17.5	11.6	15.5	21.6
Archer	4s 12 0 0600	NW/NE	2	10	4	12	3.1		6.3			3.2	3.2		6.3	16.7	0	0.0	2.2
Archer	4s 12 3 200	SE/NE	4	3	4	12	0		42.2	8		36.2	36.2		25	66.3	11.2	15.0	27.3
Benzel	4s 12 0 1900	SE/SW	12	12	4	12	21.4		37.2	21.4		37.2	37.2		23.5	62.3	13.7	18.4	31.0
Benzel	4s 12 0 1900	SW/SE	15	12	4	12	0	13.5	20.4			20.4	20.4		0	0.0	6.9	9.2	11.5
Benzel	4s 12 0 1900	NE/NE	1	13	4	12	0		40			40	40		5	13.3	35	46.9	59.9
Benzel	4s 12 0 1900	NW/NE	2	13	4	12	0		35.5	4	8	35.5	35.5		16	42.4	19.5	26.1	38.0
Benzel	4s 12 0 1900	NE/NW	5	13	4	12	20		37.6	20	4	37.6	37.6		24	63.6	13.6	18.2	31.0
Benzel	4s 13 0 1400	SW/SW	11	7	4	13	0		38.2		4	18.7	18.7		14.5	38.4	23.7	31.8	44.4
Benzel	4s 13 0 1400	SE/SW	12	7	4	13	20.5	6.2	40	7.61		33.8	33.8		24.9	66.0	8.9	11.9	23.5
Benzel	4s 13 0 1400	NW/NW	6	18	4	13	0	14.4	38.3			15	15		0	0.0	23.9	32.0	39.7
Briggs	4s 12 4 0400	SE/NW	8	4	4	12	0		6.4		4.6	4.6	4.6		4.6	12.2	0	0.0	1.6
Brittain	4s 12 11 700	SW/SW	11	11	4	12	0		0.2			0.2	0.2		0	0.0	0.2	0.3	0.3
Bussard	4s 12 11 501	SE/NW	8	11	4	12									2.64	7.0	0	0.0	0.9
Bussard	4s 12 0 1700	NE/NE	1	11	4	12	0		53.49			17.8	17.8		23.26	61.6	8.03	10.8	21.5
Bussard	4s 12 0 1700	SE/NE	4	11	4	12	2.8		30.4			26.8	26.8		29.4	77.9	0	0.0	10.3
Bussard	4s 12 0 1700	NE/NW	5	12	4	12	0		1						0	0.0	0	0.0	0.0
Bussard	4s 12 0 1700	NW/NW	6	12	4	12	0		40	3.24	14.76	38.7	38.7		18	47.7	20.7	27.7	40.7
Bussard	4s 12 0 1700	SW/NW	7	12	4	12	0		32.6	1.3	6	31.6	31.6		18.8	49.8	12.8	17.2	27.8
Bussard	4s 12 0 1700	SE/NW	8	12	4	12	0		5.6	2.8		5.6	5.6		5.6	14.8	0	0.0	2.0
Bussard	4s 12 2 800	SE/SE	16	2	4	12	0		0.7			0.7	0.7		0.3	0.8	0.4	0.5	0.8
Cameron	4s 12 9 0100	NE/NW	5	9	4	12	0	16.3	18.6			18.6	18.6		2.3	6.1	0	0.0	0.8
Cameron	4s 12 9 0100	NW/NW	6	9	4	12	0	13.5	22.5		4	4.3	4.3		9	23.9	0	0.0	3.2
Cameron	4s 12 9 0100	SW/NW	7	9	4	12	0.5	3.8	4.3			0.4	0.4		0.5	1.3	0	0.0	0.2
Cameron	4s 12 9 0100	SE/NW	8	9	4	12	0		0.4			8.3	8.3		0.4	1.1	0	0.0	0.1
Cameron	4s 12 9 0200	NE/NW	5	9	4	12	0	6.2	8.3			22.5	22.5		2.1	5.6	0	0.0	0.7
City of Wamic	4s 12 14	NW/NE	2	14	4	12	1		1						1	2.7	0	0.0	0.4
City of Wamic	4s 12 14	NE/NW	5	14	4	12	11		11						11	29.2	0	0.0	3.9
City of Wamic	4s 12 14	NW/NW	6	14	4	12	3		3						3	8.0	0	0.0	1.1
Dodge	4s 13 0 1100	NE/SW	9	5	4	13	0		8.8						7.4	19.6	1.4	1.9	4.9
Dodge	4s 13 0 1100	NW/SW	10	5	4	13	0		32.8						20	53.0	12.8	17.2	28.2
Dodge	4s 13 0 1100	SW/SW	11	5	4	13	0		39.6	0.2	11				11.2	29.7	28.4	38.1	51.1
Dodge	4s 13 0 1100	SE/SW	12	5	4	13	0		39.2		3				14.5	38.4	24.7	33.1	46.1
Dodge	4s 13 0 1100	NW/SE	14	5	4	13	0		5.8						4	10.6	1.8	2.4	4.4
Dodge	4s 13 0 1100	SW/SE	15	5	4	13	0		12.4						8.6	22.8	3.8	5.1	9.3
Dodge	4s 13 0 1100	NE/SE	13	6	4	13	0		28.8		10	28.8	28.8		10	26.5	18.8	25.2	34.7
Dodge	4s 13 0 1100	NW/SE	14	6	4	13	0		36.3		10	36.3	36.3		10	26.5	26.3	35.2	47.2

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	Round Prairie Pre-1961	c.46829 10/27/1964 3 Mile Cr Round PR	Total Water Right Acres	c.46368 3/22/1961 Badger Lk	c.46532 10/21/1929 Badger Lk	c.51486 7/23/1968 Pine Hollow Res	c.51487 5/1/1975 3 Mile Cr Pine Hollow		Totals				
															Total Pre-1961	Delivered acre-feet (Pre-61x2.65)	Total 1961	Delivered acre-feet (1961x1.34)	Pine Hollow Storage
Dodge	4s 13 0 1100	SW/SE	15	6	4	13	0		37.5	1.8		37.5	37.5		21.8	57.8	15.7	21.0	33.7
Dodge	4s 13 0 1100	SE/SE	16	6	4	13	0		39.2	4.3	20	39.2	39.2		24.3	64.4	14.9	20.0	33.2
Dodge	4s 13 0 1100	NE/NE	1	7	4	13	0		39.4	9.8	9.4	39.4	39.4		19.2	50.9	20.2	27.1	40.3
Dodge	4s 13 0 1100	NW/NE	2	7	4	13	0		39.7	10		39.7	39.7		30	79.5	9.7	13.0	26.6
Dodge	4s 13 0 1100	SW/NE	3	7	4	13	0		8			8	8		0	0.0	8	10.7	13.3
Dodge	4s 13 0 1100	SE/NE	4	7	4	13	0		8.5			8.5	8.5		6.5	17.2	2	2.7	5.6
Dodge	4s 13 0 1100	NE/NW	5	8	4	13	0		37.7						20	53.0	17.7	23.7	36.4
Dodge	4s 13 0 1100	NW/NW	6	8	4	13	0		36	10.5	20				30.5	80.8	5.5	7.4	19.8
Dodge	4s 13 0 1100	SW/NW	7	8	4	13	0		7.8						7.8	20.7	0	0.0	2.7
Dodge	4s 13 0 1100	SE/NW	8	8	4	13	0		7.6						7.6	20.1	0	0.0	2.7
FDD Ranch(Dulchich)	4s 12 0 0500	SW/SW	11	2	4	12	0		25.5	3.6		25.5	25.5		25.5	67.6	0	0.0	8.9
FDD Ranch(Dulchich)	4s 12 0 0500	SE/SW	12	2	4	12	0		14.1		10.54	13.6	13.6		14.1	37.4	0	0.0	4.9
FDD Ranch(Dulchich)	4s 12 0 0500	SW/SE	15	2	4	12	0		0.9			0.9	0.9		0	0.0	0.9	1.2	1.5
FDD Ranch(Dulchich)	4s 12 0 0500	NE/NW	5	11	4	12	13.4		34.8	10.9	17	32.6	32.6		34.8	92.2	0	0.0	12.2
FDD Ranch(Dulchich)	4s 12 0 0500	NW/NW	6	11	4	12	6.2		13.7	10.4		13.7	13.7		13.3	35.2	0.4	0.5	5.3
FDD Ranch(Dulchich)	4s 12 0 0500	SW/NW	7	11	4	12	2		2	2		2	2		2	5.3	0	0.0	0.7
FDD Ranch(Dulchich)	4s 12 0 0500	SE/NW	8	11	4	12	0		17.2			17.2	17.2		1.3	3.4	15.9	21.3	26.8
Fargher	4s 12 9 0300	NE/NW	5	9	4	12	0.9		10.8			8.5	8.5		8.5	22.5	0	0.0	3.0
Fargher	4s 12 9 0300	SE/NW	8	9	4	12	0		1.3			1.3	1.3		1.3	3.4	0	0.0	0.5
Frame	4s 12 9 0400	NE/NW	5	9	4	12	0.1		0.3			0.1	0.1		0.1	0.3	0	0.0	0.0
Frame	4s 12 9 0400	SW/NW	7	9	4	12	0	3.1	3.1			3.1	3.1		0	0.0	0	0.0	0.0
Frame	4s 12 9 0400	SE/NW	8	9	4	12	0	11.1	13.4			13.4	13.4		2.3	6.1	0	0.0	0.8
818 Baker(Gramzow)	4s 12 1 500	NE/SW	9	1	4	12	0		19.4	0.9		19.4	19.4		0.9	2.4	18.5	24.8	31.0
818 Baker(Gramzow)	4s 12 1 500	NW/SW	10	1	4	12	0		7.5			7.5	7.5		0	0.0	7.5	10.1	12.5
818 Baker(Gramzow)	4s 12 1 500	SW/SW	11	1	4	12	0		0.5			0.5	0.5		0	0.0	0.5	0.7	0.8
818 Baker(Gramzow)	4s 12 1 500	SE/SW	12	1	4	12	0		1.6			1.6	1.6		0.4	1.1	1.2	1.6	2.1
818 Baker(Gramzow)	4s 12 1 500	NE/SE	13	1	4	12	0		11.3	0.05		11.3	11.3		0.05	0.1	11.25	15.1	18.7
818 Baker(Gramzow)	4s 12 1 500	NW/SE	14	1	4	12	0		21.6	0.45	5.35	20.4	20.4		15.4	40.8	6.2	8.3	15.7
818 Baker(Gramzow)	4s 12 1 500	SW/SE	15	1	4	12	0		40.3	0.3	28	39.6	39.6		28.7	76.1	11.6	15.5	29.3
818 Baker(Gramzow)	4s 12 1 500	SE/SE	16	1	4	12	0		21.7	0.2	16.8	21.7	21.7		17	45.1	4.7	6.3	13.8
818 Baker(Gramzow)	4s 12 1 700	NE/SE	13	1	4	12	0		9.4			9.4	9.4		0	0.0	9.4	12.6	15.6
818 Baker(Gramzow)	4s 12 1 700	SE/SE	16	1	4	12	0		18.3		14.2	18.3	18.3		14.2	37.6	4.1	5.5	11.8
818 Baker(Gramzow)	4s 13 0 1200	SE/NW	8	6	4	13	0		0.5						0	0.0	0	0.0	0.0
818 Baker(Gramzow)	4s 13 0 1200	NE/SW	9	6	4	13	0		25.9			22.1	22.1		15.5	41.1	6.6	8.8	16.4
818 Baker(Gramzow)	4s 13 0 1200	NW/SW	10	6	4	13	0		19.4			19.4	19.4		1.3	3.4	18.1	24.3	30.5
818 Baker(Gramzow)	4s 13 0 1200	SW/SW	11	6	4	13	0		38			38	38		0	0.0	38	50.9	63.1
818 Baker(Gramzow)	4s 13 0 1200	SE/SW	12	6	4	13	0		40.1			40.1	40.1		37	98.1	3.1	4.2	18.1
818 Baker(Gramzow)	4s 13 0 1200	NE/NW	5	7	4	13	0		11.5		8.1	11.5	11.5		8.1	21.5	3.4	4.6	8.5
818 Baker(Gramzow)	4s 13 0 1200	SE/NW	8	7	4	13	0		2.4			2.4	2.4		0	0.0	2.4	3.2	4.0
Harvey	4s 12 2 100	SE/NE	4	2	4	12	0		0.25						0.25	0.7	0	0.0	0.1
Hesla	4s 12 2 500	NE/NW	5	2	4	12	0		0.8			0.8	0.8		0	0.0	0.8	1.1	1.3
Hesla	4s 12 2 500	NW/NW	6	2	4	12	0		9.5			9.5	9.5		0	0.0	9.5	12.7	15.8
Hesla	4s 12 2 500	SW/NW	7	2	4	12	0		25.6	6.1	18.3	25.6	25.6		24.4	64.7	1.2	1.6	10.5
Hesla	4s 12 2 500	NW/SW	10	2	4	12	0		18.7			18.7	18.7		13.3	35.2	5.4	7.2	13.6
Iverson	4s 12 0 1500	SE/SE	16	8	4	12	0		0.5			0.5	0.5		0	0.0	0.5	0.7	0.8

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	Round Prairie Pre-1961	c.46829 10/27/1964 3 Mile Cr Round PR	Total Water Right Acres	c.46368 3/22/1961 Badger Lk	c.46532 10/21/1929 Badger Lk	c.51486 7/23/1968 Pine Hollow Res	c.51487 5/1/1975 3 Mile Cr Pine Hollow		Totals				
															Total Pre-1961	Delivered acre-feet (Pre-61x2.65)	Total 1961	Delivered acre-feet (1961x1.34)	Pine Hollow Storage
Iverson	4s 12 0 1600	SW/SE	15	9	4	12	0		40	1	7	34.8	34.8		8	21.2	26.8	35.9	47.3
Iverson	4s 12 0 1600	SE/SE	16	9	4	12	0		40		6.5	35.2	35.2		16.6	44.0	18.6	24.9	36.7
Iverson	4s 12 0 1600	NE/NW	5	15	4	12	0		24.8	4		17.2	17.2		12.4	32.9	4.8	6.4	12.3
Iverson	4s 12 0 1600	NW/NW	6	15	4	12	0		26.8	5.24	7.26	24.8	24.8		12.5	33.1	14.3	19.2	28.1
Iverson	4s 12 0 1600	NE/NE	1	16	4	12	0		30.8			30.8	30.8		10	26.5	20.8	27.9	38.0
Iverson	4s 12 0 1600	NW/NE	2	16	4	12	0		32			32	32		27.3	72.3	4.7	6.3	17.4
Iverson	4s 12 0 1600	NE/NW	5	16	4	12	0		11			1	1		0	0.0	1	1.3	1.7
Iverson	4s 12 0 1600	NW/NW	6	16	4	12	0		9						0	0.0	0	0.0	0.0
Jackson	4s 12 4 0800	SE/SW	12	4	4	12	0		26			10.4	10.4		7.8	20.7	2.6	3.5	7.0
Kennedy	4s 12 0 0400	SE/SW	12	2	4	12	0		3.6		3.6	3.6	3.6		3.6	9.5	0	0.0	1.3
Kennedy	4s 12 0 0400	NW/SE	14	2	4	12	0		17			17	17		0	0.0	17	22.8	28.2
Kennedy	4s 12 0 0400	SW/SE	15	2	4	12	0		12.8			12.8	12.8		1.5	4.0	11.3	15.1	19.3
Kennedy	4s 12 0 0400	SE/SE	16	2	4	12	0		19.9			19.9	19.9		16.1	42.7	3.8	5.1	11.9
Kennedy	4s 12 0 0400	NW/NE	2	11	4	12	5		24.4	6.6		23.4	23.4		14.4	38.2	10	13.4	21.6
Kennedy	4s 12 0 0400	SW/NE	3	11	4	12	0		2.8			2.8	2.8		0.7	1.9	2.1	2.8	3.7
Kennedy	4s 12 0 0400	NE/NW	5	11	4	12	1.4		5			5	5		5	13.3	0	0.0	1.8
Kennedy	4s 12 0 0400	SE/NW	8	11	4	12	0		1.8			1.8	1.8		1.8	4.8	0	0.0	0.6
Kentopp	4s 12 0 1100	NE/SW	9	8	4	12	0		40			16.4	16.4		8.8	23.3	7.6	10.2	15.7
Kentopp	4s 12 0 1100	NW/SW	10	8	4	12	0		40			15.2	15.2		8.4	22.3	6.8	9.1	14.2
Kentopp	4s 12 0 1100	NE/SE	13	8	4	12	18		38.5			32	32		20	53.0	12	16.1	26.9
Kentopp	4s 12 0 1100	NW/SE	14	8	4	12	12		34.8		12.45	24.8	24.8		32.8	86.9	0	0.0	11.5
Kinzey Estate	4s 12 4 0300	SW/NW	7	4	4	12	0		14.7	2.5		9.7	9.7		2.5	6.6	7.2	9.6	12.8
Kinzey Estate	4s 12 4 0300	SE/NW	8	4	4	12	0		3.6		1.7	2.7	2.7		1.7	4.5	1	1.3	2.3
Kinzey, H	4s 12 0 2900	NE/NE	1	18	4	12	0		14.8	0.8	1.7	14.8	14.8		11	29.2	3.8	5.1	10.2
Kinzey, H	4s 12 0 2900	NW/NE	2	18	4	12	0		2.8			2.8	2.8		0.75	2.0	2.05	2.7	3.7
Klindt	4s 13 0 2000	NE/SW	9	9	4	13	0		40						6.2	16.4	7	9.4	13.8
Klindt	4s 13 0 2000	NW/SW	10	9	4	13	0		35.7	3.5					3.5	9.3	9.8	13.1	17.5
Klindt	4s 13 0 2000	SW/SW	11	9	4	13	0		3	1.1					1.1	2.9	1.9	2.5	3.5
Klindt	4s 13 0 2000	SE/SW	12	9	4	13	0		8.7						7	18.6	1.7	2.3	5.3
Klindt	4s 13 0 2000	NE/SE	13	9	4	13	0		22.2						3	8.0	19.2	25.7	32.9
Klindt	4s 13 0 2000	NW/SE	14	9	4	13	0		39.5	12.5					12.5	33.1	22.5	30.2	41.7
Pintail,LLC & Stix,LLC	4s 12 1 301	NE/NE	1	1	4	12	0		2.6			2.6	2.6		0	0.0	2.6	3.5	4.3
Pintail,LLC & Stix,LLC	4s 12 1 301	NW/NE	2	1	4	12	0		16.2			16.2	16.2		16.2	42.9	0	0.0	5.7
Pintail,LLC & Stix,LLC	4s 12 1 301	SW/NE	3	1	4	12	0		37.6		15	37.6	37.6		34	90.1	3.6	4.8	17.9
Pintail,LLC & Stix,LLC	4s 12 1 301	SE/NE	4	1	4	12	0		19.1	6.2		19.1	19.1		6.2	16.4	12.9	17.3	23.6
Pintail,LLC & Stix,LLC	4s 12 1 301	NE/NW	5	1	4	12	0		9.4			9.4	9.4		0.6	1.6	8.8	11.8	14.8
Pintail,LLC & Stix,LLC	4s 12 1 301	SW/NW	7	1	4	12	0		20.35	5.4	8.1	6.6	6.6		20.35	53.9	0	0.0	7.1
Pintail,LLC & Stix,LLC	4s 12 1 301	SE/NW	8	1	4	12	0		37.2		15	37.2	37.2		37	98.1	0.2	0.3	13.3
Lindell	4s 13 0 0900	SW/NE	3	9	4	13	0		25						25	66.3	0	0.0	8.8
Lindell	4s 13 0 0900	SE/NE	4	9	4	13	0		15						15	39.8	0	0.0	5.3
Lindell	4s 13 0 0900	SW/NW	7	9	4	13	0		8						8	21.2	0	0.0	2.8
Lindell	4s 13 0 0900	SE/NW	8	9	4	13	0		8						8	21.2	0	0.0	2.8
Magill	4s 12 0 1800	NE/SE	13	11	4	12	20		20			18.8	18.8		20	53.0	0	0.0	7.0
Magill	4s 12 0 1800	SE/SE	16	11	4	12	12.8		12.8			12.8	12.8		12.8	33.9	0	0.0	4.5
Magill	4s 12 0 1800	NW/SW	10	12	4	12	20		20			15.3	15.3		20	53.0	0	0.0	7.0

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	Round Prairie Pre-1961	c.46829 10/27/1964 3 Mile Cr Round PR	Total Water Right Acres	c.46368 3/22/1961 Badger Lk	c.46532 10/21/1929 Badger Lk	c.51486 7/23/1968 Pine Hollow Res	c.51487 5/1/1975 3 Mile Cr Pine Hollow		Totals				
															Total Pre-1961	Delivered acre-feet (Pre-61x2.65)	Total 1961	Delivered acre-feet (1961x1.34)	Pine Hollow Storage
Magill	4s 12 0 1800	SW/SW	11	12	4	12	32.8		32.8			32.8	32.8		32.8	86.9	0	0.0	11.5
Magill	4s 12 0 1800	NW/NW	6	13	4	12	25		28	14		28	28		25	66.3	3	4.0	13.7
Magill	4s 12 0 1800	NE/NE	1	14	4	12	0		12.4			12.4	12.4		0	0.0	12.4	16.6	20.6
Magill	4s 12 11 1000	NE/SW	9	11	4	12	28.25		31.6			31.6	31.6		28.25	74.9	3.35	4.5	15.4
Magill	4s 12 11 1000	SE/SW	12	11	4	12	4.6		22.8	10.6		22.8	22.8		10.6	28.1	12.2	16.3	24.0
Magill	4s 12 11 1000	NW/SE	14	11	4	12	17		17			17	17		17	45.1	0	0.0	6.0
Magill	4s 12 11 1000	SW/SE	15	11	4	12	4.85		8.3			8.3	8.3		4.85	12.9	3.45	4.6	7.4
Magill Trust	4s 13 0 1600	NE/SW	9	8	4	13	0		12.6						5	13.3	7.6	10.2	14.4
Magill Trust	4s 13 0 1600	SE/SW	12	8	4	13	0		0.3						0	0.0	0.3	0.4	0.5
Magill Trust	4s 13 0 1600	SW/SE	15	8	4	13	0		9.2						0	0.0	9.2	12.3	15.3
Magill Trust	4s 13 0 1700	SW/NE	3	8	4	13	0		30.06	23	28.66				30.06	79.7	0	0.0	10.5
Magill Trust	4s 13 0 1700	SE/NE	4	8	4	13	0		30.1	26.6					30.1	79.8	0	0.0	10.5
Magill Trust	4s 13 0 1700	NE/SE	13	8	4	13	0		34						0	0.0	34	45.6	56.4
Magill Trust	4s 13 0 1700	NW/SE	14	8	4	13	0		20						0	0.0	20	26.8	33.2
McAllister Ranches	4s 13 6 400	SW/NW	7	6	4	13	0		8.2	4.6		9.2	9.2		4.6	12.2	3.6	4.8	7.6
McAllister Ranches	4s 13 6 400	SE/NW	8	6	4	13	0		9.1			1.7	1.7		0	0.0	1.1	1.5	1.8
McAllister Ranches	4s 13 6 400	NE/SW	9	6	4	13	0		6.6	4		15	15		4	10.6	0.9	1.2	2.9
McAllister Ranches	4s 13 6 400	NW/SW	10	6	4	13	0		15.2	4.6		18.5	18.5		10.3	27.3	4.9	6.6	11.7
McAllister Ranches	4s 12 1 601	SE/NE	4	1	4	12	0		10.77	5.7		11.9	11.9		5.7	15.1	5.07	6.8	10.4
McAllister Ranches	4s 12 1 601	NE/SW	9	1	4	12	0		3.4			3.4	3.4		0	0.0	3.4	4.6	5.6
McAllister Ranches	4s 12 1 601	NE/SE	13	1	4	12	0		18.7			18.7	18.7		10	26.5	8.7	11.7	17.9
McAllister Ranches	4s 12 1 601	NW/SE	14	1	4	12	0		17.2			17.2	17.2		10.6	28.1	6.6	8.8	14.7
McAllister	4s 12 11 400	SW/NW	7	11	4	12	0		7.5			7.5	7.5		0	0.0	7.5	10.1	12.5
McAllister	4s 12 0 0100	SE/SW	12	1	4	12	0		23.6			23.2	23.2		19.6	51.9	4	5.4	13.5
McAllister	4s 12 0 0100	NW/NE	2	12	4	12	0		8.8	5.3		8.8	8.8		5.5	14.6	3.3	4.4	7.4
McAllister	4s 12 0 0100	NE/NW	5	12	4	12	0		11.9	6		11.9	11.9		11	29.2	0.9	1.2	5.3
McAllister	4s 12 12 101	NE/NE	1	12	4	12	0		38.5			38.5	38.5		20	53.0	18.5	24.8	37.7
McAllister	4s 12 12 101	NW/NE	2	12	4	12	0		27.2	7		27.2	27.2		7.5	19.9	19.7	26.4	35.3
McAllister	4s 12 12 101	SW/NE	3	12	4	12	5.8		32.1		15.1	24.8	24.8		29	76.9	0	0.0	10.2
McAllister	4s 12 12 101	SE/NE	4	12	4	12	0		14.1	1		13.5	14.1		6	15.9	7.5	10.1	14.6
McAllister	4s 12 12 500	SW/NE	3	12	4	12	0		2.4						0	0.0	0	0.0	0.0
McAllister	4s 12 12 500	SE/NE	4	12	4	12	0		22.4						0	0.0	0	0.0	0.0
McAllister	4s 12 12 500	NE/SE	13	12	4	12	0		13						0	0.0	0	0.0	0.0
McAllister	4s 12 12 500	NW/SE	14	12	4	12	0		3						0	0.0	0	0.0	0.0
McAllister	4s 12 12 500	SE/SE	16	12	4	12	0		1.8			1.8	1.8		0	0.0	1.8	2.4	3.0
McAllister	4s 13 7 200	NW/NW	6	7	4	13	0		29.2			29.2	29.2		15.6	41.3	13.6	18.2	28.0
McAllister	4s 13 7 200	SW/NW	7	7	4	13	0		5.6			5.6	5.6		0	0.0	5.6	7.5	9.3
McAllister	4s 13 7 300	SW/NW	7	7	4	13	0		16.7	1		16.7	16.7		5.8	15.4	10.9	14.6	20.1
McAllister	4s 13 7 300	NW/SW	10	7	4	13	0		2.1						0	0.0	0	0.0	0.0
McAllister	4s 13 7 100	SW/NE	3	7	4	13	0		16.5			16.5	16.5		14	37.1	2.5	3.4	9.1
McAllister	4s 13 7 100	NE/NW	5	7	4	13	0		26.7		18.7	26.7	26.7		18.7	49.6	8	10.7	19.8
McAllister	4s 13 7 100	NW/NW	6	7	4	13	0		8.1			8.1	8.1		4.4	11.7	3.7	5.0	7.7
McAllister	4s 13 7 100	SW/NW	7	7	4	13	0		12.9			12.9	12.9		3.7	9.8	9.2	12.3	16.6
McAllister	4s 13 7 100	SE/NW	8	7	4	13	0		35		7.5	35	35		18.5	49.0	16.5	22.1	33.9
McAllister	4s 13 7 100	NE/SW	9	7	4	13	0		4.5						0	0.0	0	0.0	0.0

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	Round Prairie Pre-1961	c.46829 10/27/1964 3 Mile Cr Round PR	Total Water Right Acres	c.46368 3/22/1961 Badger Lk	c.46532 10/21/1929 Badger Lk	c.51486 7/23/1968 Pine Hollow Res	c.51487 5/1/1975 3 Mile Cr Pine Hollow		Totals				
															Total Pre-1961	Delivered acre-feet (Pre-61x2.65)	Total 1961	Delivered acre-feet (1961x1.34)	Pine Hollow Storage
McAllister	4s 13 7 100	NW/SW	10	7	4	13	0		1.5						0	0.0	0	0.0	0.0
McAllister	4s 13 7 100	NW/SE	14	7	4	13	0		5.9			3.8	3.8		0.8	2.1	3.8	5.1	6.6
McDowell	4s 12 10 100	SW/NE	3	10	4	12	6	28.4	39.7	6	5.33	39.7	39.7		11.3	29.9	0	0.0	4.0
McDowell	4s 12 10 100	SE/NE	4	10	4	12	4.6		40	4.6		20.2	20.2		16.3	43.2	3.9	5.2	12.2
McDowell	4s 12 10 100	NE/SE	13	10	4	12	4.6		40.6	4.9	7	40.6	40.6		11.9	31.5	28.7	38.5	51.8
McDowell	4s 12 10 100	NW/SE	14	10	4	12	0		40.6	0.6	10	40.6	40.6		10.6	28.1	30	40.2	53.5
McDowell	4s 12 10 100	NW/SW	10	11	4	12	0.1		1.1	0.1	1	1.1	1.1		1.1	2.9	0	0.0	0.4
McDowell	4s 12 10 100	SW/SW	11	11	4	12	0		0.1		0.1	0.1	0.1		0.1	0.3	0	0.0	0.0
Miller	4s 13 0 1300	SW/NE	3	7	4	13	0		12.8			12.8	12.8		11.3	29.9	1.5	2.0	6.4
Miller	4s 13 0 1300	SE/NE	4	7	4	13	0		29			29	29		22.5	59.6	6.5	8.7	18.7
Miller	4s 13 0 1300	NE/SE	13	7	4	13	0		15						8	21.2	6	8.0	12.8
Miller	4s 13 0 1300	NW/SE	14	7	4	13	0		5.3			1.25	1.25		2	5.3	3	4.0	5.7
Miller	4s 13 0 1300	SW/NW	7	8	4	13	0		29.7			3.9	3.9		15	39.8	14.7	19.7	29.7
Miller	4s 13 0 1300	SE/NW	8	8	4	13	0		11.1		6.5	2.5	2.5		7.5	19.9	3.6	4.8	8.6
Nordquist, Bryan	4s 12 4 0200	NE/NE	1	4	4	12	0		17.9			14.4	14.4		5.4	14.3	9	12.1	16.8
Nordquist, Bryan	4s 12 4 0200	NW/NE	2	4	4	12	0		29.4			26.4	26.4		25.4	67.3	1	1.3	10.6
Nordquist, Bryan	4s 12 4 0200	NE/NW	5	4	4	12	0		15.8			14.3	14.3		6	15.9	8.3	11.1	15.9
Nordquist, Bryan	4s 12 4 0200	NW/NW	6	4	4	12	0		0.1						0	0.0	0	0.0	0.0
Nordquist, Bryan	4s 12 4 0200	SW/NW	7	4	4	12	0		0.7			0.7	0.7		0	0.0	0.7	0.9	1.2
Nordquist, Bryan	4s 12 4 0200	SE/NW	8	4	4	12	0		18.2	7.58	5.42	18.2	18.2		13	34.5	5.2	7.0	13.2
Nordquist, Bryan	4s 12 4 0200	SE/NW	8	4	4	12	0		0.8						0	0.0	0	0.0	0.0
Nordquist, Eric	4s 12 3 500	NW/NE	2	3	4	12	0		22.4		5	22.4	22.4		13	34.5	9.4	12.6	20.2
Nordquist, Eric	4s 12 3 500	SW/NE	3	3	4	12	0		38.8	2.9	27.26	38.8	38.8		30.5	80.8	8.3	11.1	24.5
Nordquist, Eric	4s 12 3 500	NE/NW	5	3	4	12	0		40	0.7	15	38.8	38.8		33.7	89.3	5.1	6.8	20.3
Nordquist, Eric	4s 12 3 500	NW/NW	6	3	4	12	0		38.3			23.2	23.2		13.2	35.0	10	13.4	21.2
Nordquist, Eric	4s 12 3 500	SE/NW	8	3	4	12	0		1						0	0.0	0	0.0	0.0
Nordquist, Jim	3s 12 0 3100	SW/SW	11	34	3	12	0		2.3			2.3	2.3		0	0.0	2.3	3.1	3.8
Nordquist, Jim	3s 12 0 3100	SE/SW	12	34	3	12	0		0.1			0.1	0.1		0	0.0	0.1	0.1	0.2
O'Riley	4s 12 4 0900	SW/SW	11	4	4	12	0		11.7			11.7	11.7		11.7	31.0	0	0.0	4.1
ODFW	3s 12 0 1000	SW/SW	11	33	3	12	0		4		4	4	4		4	10.6	0	0.0	1.4
ODFW	3s 12 0 1000	SW/SE	15	33	3	12	0		5			4.5	4.5		5	13.3	0	0.0	1.8
ODFW	3s 12 0 1000	SE/SE	16	33	3	12	0		19		14.14	7.9	7.9		19	50.4	0	0.0	6.7
ODFW	3s 12 0 1000	SW/SW	11	34	3	12	0		1.3			1.3	1.3		0	0.0	1.3	1.7	2.2
ODFW	3s 12 0 1000	SE/SW	12	34	3	12	0		0.1			0.1	0.1		0	0.0	0.1	0.1	0.2
ODFW	4s 11 0 0200	SE/SE	16	2	4	11	0		15		10.38				15	39.8	0	0.0	5.3
ODFW	4s 11 0 0600	NE/NE	1	12	4	11	0		0.8			0.8	0.8		0.8	2.1	0	0.0	0.3
ODFW	4s 11 0 0600	NW/NE	2	12	4	11	0		8.9		8	6	6		8.9	23.6	0	0.0	3.1
ODFW	4s 11 0 0600	SW/NE	3	12	4	11	0		6						6	15.9	0	0.0	2.1
ODFW	4s 12 0 0800	NE/NE	1	5	4	12	0		13.5		13	10.8	10.8		13.5	35.8	0	0.0	4.7
ODFW	4s 12 0 0800	NW/NE	2	5	4	12	0		3.5			3.4	3.4		3.5	9.3	0	0.0	1.2
ODFW	4s 12 0 0800	NE/NW	5	5	4	12	0		1.9			1.9	1.9		1.9	5.0	0	0.0	0.7
ODFW	4s 12 0 0800	NW/NW	6	5	4	12	0		0.2			0.2	0.2		0.2	0.5	0	0.0	0.1
ODFW	4s 12 0 0800	SW/NW	7	5	4	12	0		2.9			2.9	2.9		2.9	7.7	0	0.0	1.0
ODFW	4s 12 0 0800	SE/NW	8	5	4	12	0		16.3	4.62	10.38	16.3	16.3		16.3	43.2	0	0.0	5.7
ODFW	4s 12 0 0800	NE/SW	9	5	4	12	0		3.6			3.6	3.6		3.6	9.5	0	0.0	1.3

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11 Landowner	Tax Lot	Tract (1/4 of 1/4) aA	Tract (1/4 of 1/4) Number	Sec.	T all S	R all E	Round Prairie Pre-1961	c.46829 10/27/1964 3 Mile Cr Round PR	Total Water Right Acres	c.46368 3/22/1961 Badger Lk	c.46532 10/21/1929 Badger Lk	c.51486 7/23/1968 Pine Hollow Res	c.51487 5/1/1975 3 Mile Cr Pine Hollow		Totals				
															Total Pre-1961	Delivered acre-feet (Pre-61x2.65)	Total 1961	Delivered acre-feet (1961x1.34)	Pine Hollow Storage
ODFW	4s 12 0 0800	NW/SW	10	5	4	12	0		2.9			2.9	2.9		2.9	7.7	0	0.0	1.0
ODFW	4s 12 0 0800	SW/SW	11	5	4	12	0		13.2			13.2	13.2		13.2	35.0	0	0.0	4.6
ODFW	4s 12 0 0800	SE/SW	12	5	4	12	0		3.8			3.8	3.8		3.8	10.1	0	0.0	1.3
ODFW	4s 12 0 0800	NW/NW	6	7	4	12	0		31.05	3.5		31.05	31.05		21.2	56.2	9.85	13.2	23.8
ODFW	4s 12 0 0800	SW/NW	7	7	4	12	0		10.4		7	10.4	10.4		10.4	27.6	0	0.0	3.6
ODFW	4s 12 0 0800	SE/NW	8	7	4	12	0		3.2		2	1.4	1.4		3.2	8.5	0	0.0	1.1
ODFW	4s 12 0 0800	NE/SW	9	7	4	12	0		12		8.95	12	12		12	31.8	0	0.0	4.2
ODFW	4s 12 0 0800	NE/SE	13	7	4	12	0		13.9			13.9	13.9		13.9	36.8	0	0.0	4.9
ODFW	4s 12 0 0800	NW/SE	14	7	4	12	0		7.1			7.1	7.1		7.1	18.8	0	0.0	2.5
ODFW	4s 12 3 0100	NW/NW	6	3	4	12	0		1.7						0	0.0	0	0.0	0.0
Pine Creek Farms	4s 12 12 300	NE/NW	5	12	4	12	0		0.7			0.7	0.7		0	0.0	0.7	0.9	1.2
Pine Creek Farms	4s 12 12 300	SE/NW	8	12	4	12	0		16.2			16.2	16.2		0	0.0	16.2	21.7	26.9
Price	4s 12 3 300	NE/SE	13	3	4	12	0		35	4.36	18.04	35	35		22.4	59.4	12.6	16.9	28.8
Price	4s 12 3 300	NW/SE	14	3	4	12	0		0.9		0.3	0.9	0.9		0.6	1.6	0.3	0.4	0.7
Price	4s 12 3 300	SE/SE	16	3	4	12	0		0.6		0.6	0.6	0.6		0.6	1.6	0	0.0	0.2
Roads	4s 12 1	NW/SW	10	1	4	12	0		0.5			0.5	0.5		0	0.0	0.5	0.7	0.8
Roads	4s 12 11	NW/NW	6	11	4	12	0		0.2			0.2	0.2		0	0.0	0.2	0.3	0.3
Roads	4s 12 11	SW/NW	7	11	4	12	0.2		0.2	0.2		0.2	0.2		0.2	0.5	0	0.0	0.1
Roads	4s 12 11	SW/SW	11	11	4	12	0		0.7			0.7	0.7		0	0.0	0.7	0.9	1.2
Roads	4s 12 3	NW/SE	14	3	4	12	0		1.8			0.6	0.6		0.2	0.5	0.4	0.5	0.7
Roads	4s 12 4	SE/NW	8	4	4	12	0		1.2	0.7		0.7	0.7		0.7	1.9	0	0.0	0.2
Roads	4s 13	SW/NE	3	8	4	13	0		2.24						2.24	5.9	0	0.0	0.8
Roads	4s 13	SE/NE	4	8	4	13	0		2.7						2.7	7.2	0	0.0	0.9
Rowan	4s 12 11 500	NW/SW	10	11	4	12	23.4		39.5	13.5	9	39.5	39.5		32.5	86.1	7	9.4	23.0
Rowan	4s 12 11 500	SW/SW	11	11	4	12	0		26	4.5	2.9	23	23		7.4	19.6	15.6	20.9	28.5
Schrimsher	4s 12 0 1000	SW/SE	15	7	4	12	0		17.2			7.2	7.2		0	0.0	7.2	9.6	12.0
Schrimsher	4s 12 0 1000	SE/SE	16	7	4	12	0		38.8	3.78	16.22	38.8	38.8		29	76.9	9.8	13.1	26.4
Simmons	4s 12 11 200	NW/NW	6	11	4	12	0		0.5			0.5	0.5		0	0.0	0.5	0.7	0.8
Simmons	4s 12 11 200	SW/NW	7	11	4	12	0.1		3.1	0.1		3.1	3.1		0.1	0.3	3	4.0	5.0
Simmons	4s 12 11 300	SW/NW	7	11	4	12	0.7		8.4	0.7		8.4	8.4		0.7	1.9	7.7	10.3	13.0
Stevens	4s 12 0 2300	NW/SW	10	16	4	12	0		2						2	5.3	0	0.0	0.7
Stevens	4s 12 0 2300	NE/SE	13	17	4	12	0		11						11	29.2	0	0.0	3.9
Griffith	4s 12 2 700	NE/SE	13	2	4	12	0		39.4	9.24	20.76	39.4	39.4		30.6	81.1	8.8	11.8	25.3
Griffith	4s 12 2 700	NW/SE	14	2	4	12	0		8.9			8.9	8.9		0	0.0	8.9	11.9	14.8
Griffith	4s 12 2 700	SE/SE	16	2	4	12	0		18			18	18		13	34.5	5	6.7	12.9
Badger Ridge Cabins(Ta	4s 12 2 400	NE/NW	5	2	4	12	0		0.5			0.5	0.5		0	0.0	0.5	0.7	0.8
Badger Ridge Cabins(Ta	4s 12 2 400	NW/NW	6	2	4	12	0		1.9			1.9	1.9		0	0.0	1.9	2.5	3.2
Badger Ridge Cabins(Ta	4s 12 2 400	SE/NW	8	2	4	12	0		15.9	10.4		15.1	15.1		11.2	29.7	4.7	6.3	11.7
Badger Ridge Cabins(Ta	4s 12 2 400	NE/SW	9	2	4	12	0		3.2			3.2	3.2		0	0.0	3.2	4.3	5.3
Badger Ridge Cabins(Ta	4s 12 2 400	NW/SE	14	2	4	12	0		13			13	13		0	0.0	13	17.4	21.6
B Bar K Lodge(Taylor)	4s 12 2 600	NE/NW	5	2	4	12	0		0.7			0.7	0.7		0	0.0	0.7	0.9	1.2
B Bar K Lodge(Taylor)	4s 12 2 600	NW/NW	6	2	4	12	0		1			1	1		0	0.0	1	1.3	1.7
B Bar K Lodge(Taylor)	4s 12 2 600	SW/NW	7	2	4	12	0		10	2.1	7.5	10	10		9.6	25.4	0.4	0.5	4.0
B Bar K Lodge(Taylor)	4s 12 2 600	SE/NW	8	2	4	12	0		19.5	16.9		19.3	19.3		17.1	45.3	2.4	3.2	10.0
B Bar K Lodge(Taylor)	4s 12 2 600	NE/SW	9	2	4	12	0		35.9	8.4		35.9	35.9		15.4	40.8	20.5	27.5	39.4

Updated Spreadsheet from Larry Toll's Original Spreadsheet

Updated 3/1/11		Tract	Tract					c.46829	Total	c.46368	c.46532	c.51486	c.51487		Totals				
Landowner	Tax Lot	(1/4 of 1/4) aA	(1/4 of 1/4) Number	Sec.	T all S	R all E	Round Prairie Pre-1961	10/27/1964 3 Mile Cr Round PR	Water Right Acres	3/22/1961 Badger Lk	10/21/1929 Badger Lk	7/23/1968 Pine Hollow Res	5/1/1975 3 Mile Cr Pine Hollow		Total Pre-1961	Delivered acre-feet (Pre-61x2.65)	Total 1961	Delivered acre-feet (1961x1.34)	Pine Hollow Storage
B Bar K Lodge(Taylor)	4s 12 2 600	NW/SW	10	2	4	12	0		8.5			8.5	8.5		0	0.0	8.5	11.4	14.1
Unknown	4s 12 10 100	NE/NW	5	10	4	12	16		16						16	42.4	0	0.0	5.6
Unknown	4s 12 10 100	NW/NW	6	10	4	12	3		3						3	8.0	0	0.0	1.1
Unknown	4s 12 10 100	SW/NW	7	10	4	12	10		10						10	26.5	0	0.0	3.5
Unknown	4s 12 10 100	SE/NW	8	10	4	12	32		32						32	84.8	0	0.0	11.2
Unknown	4s 12 10 100	NE/SW	9	10	4	12	5.2		5.2						5.2	13.8	0	0.0	1.8
Unknown	4s 12 10 100	NW/SW	10	10	4	12	8		8						8	21.2	0	0.0	2.8
Unknown	4s 12 3	SW/SE	15	3	4	12	0		8.9						8.9	23.6	0	0.0	3.1
Unknown	4s 12 3 400	SE/NW	8	3	4	12	0		0.5						0	0.0	0	0.0	0.0
Unknown	4s 12 3 600	SE/NW	8	3	4	12	0		0.3						0	0.0	0	0.0	0.0
Unknown	4s 12 9	SE/NE	4	9	4	12	1.2		1.2						1.2	3.2	0	0.0	0.4
Unknown	4s 12 9	NE/SE	13	9	4	12	4		4						4	10.6	0	0.0	1.4
USA	4s 13 0 4100	NE/NW	5	18	4	13	0	0.2	0.2						0	0.0	0	0.0	0.0
VanVactor	4s 12 0 1200	SW/SW	11	8	4	12	0		38.2		8	38.2	38.2		18	47.7	20.2	27.1	39.8
VanVactor	4s 12 0 1200	NW/NW	6	17	4	12	0	0.7	12.7			12.7	12.7		7	18.6	5	6.7	10.8
VanVactor	4s 12 0 1300	SE/SW	12	8	4	12	0		19.8	2.8		19.8	19.8		6.8	18.0	13	17.4	24.0
VanVactor	4s 12 0 1300	NE/NW	5	17	4	12	0	1.6	9	4.2		9	9		4.2	11.1	3.2	4.3	6.8
VanVactor	4s 12 0 1400	SW/SE	15	8	4	12	0		15.7			15.7	15.7		5	13.3	10.7	14.3	19.5
VanVactor	4s 12 0 1400	NW/NE	2	17	4	12	0	6.5	12.9			12.9	12.9		5	13.3	1.4	1.9	4.1
Wassenmiller	4s 13 0 1000	SW/NE	3	8	4	13	0		7.7						7.7	20.4	0	0.0	2.7
Wassenmiller	4s 13 0 1000	SE/NE	4	8	4	13	0		7.2						7.2	19.1	0	0.0	2.5
							432.5	**148.25**	**4666.31**	**426.15**	**654.72**	**3470.7**	**3471.3**	**0**	**2573.7**	**6820.305**	**1591.8**	**2133.012**	**3543.183**