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Vicki S. McConnell, State Geologist

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OWEB GRANT 203-029

ROGUE RIVER STAKEHOLDER PROJECT PHASE 2

COMPLETION REPORT AND YEAR ONE MONITORING REPORT

By

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2004

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1.0 PROJECT COMPLETION REPORT

1.1 Project Description - Background and Project Development

On January 1, 1997, the Rogue River avulsed into a gravel pond dug by the Oregon Department of Transportation (ODOT). The area had been a dense riparian forest before the sand and gravel extraction. Prior to 1936, this same area was an active side channel of the Rogue River. Even though the gravel pit was established 150 feet from the river bank, and all vegetation was left within that 150-foot buffer, it was constructed within the historical channel of the Rogue River and within the active flood path. During the January 1997 event, the channel breached the 150-foot buffer (leave strip), removed the dense vegetation along the historic stream bank, and entered the ODOT gravel pond. Post flood channel scour and increased overbank and channel velocities resulted in a permanent redirection of the Rogue River into the ODOT pond. After the flood waters receded and temporary emergency mitigation work was completed, it became clear that additional ponds were at risk from the post-capture accelerated stream erosion rates. Following a review of environmental options, it was determined that the Rogue River channel could not be returned to its pre-1997 stream course. The Rogue River's current channel instability would have to be addressed without further channelization. The Stakeholders proposed a geomorphic solution that would allow the dynamic Rogue River to adjust within its meander belt width and would reconnect the river to its adjacent floodplain and partially abandoned meanders without the disastrous consequences of further pit capture.

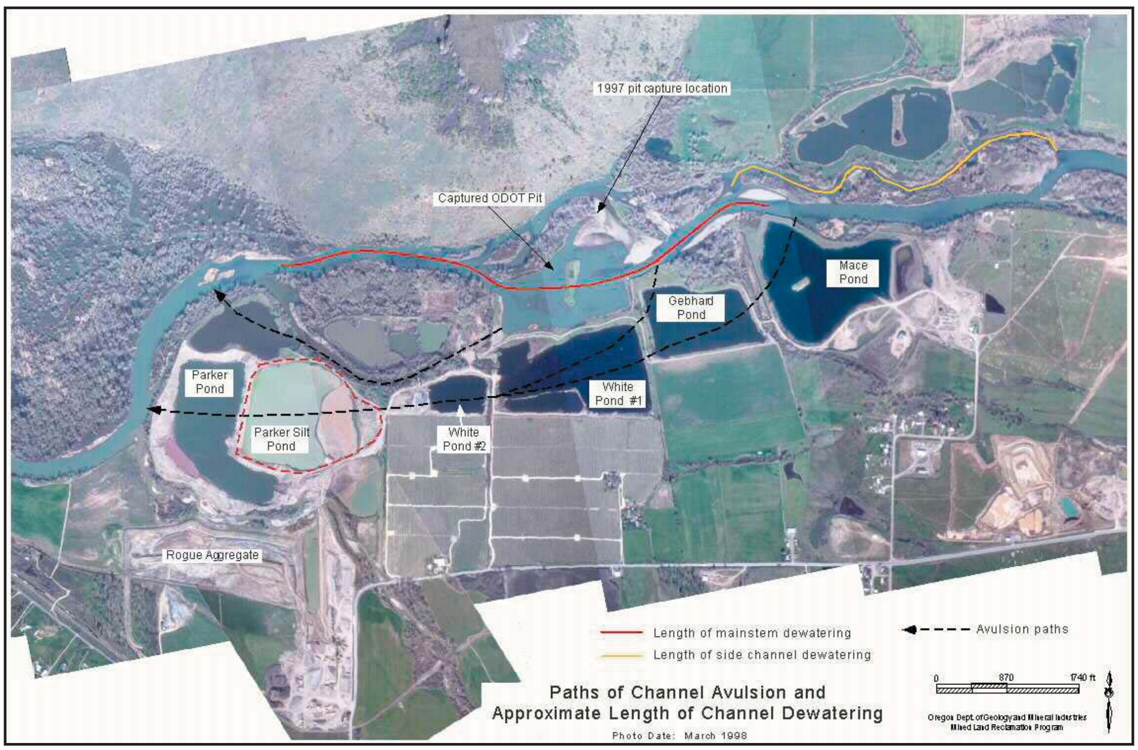


Figure 1.1. Potential Avulsion Paths.

Over the last three to four decades, as the Rogue River adjusted to peak and ordinary high-water conditions, lateral channel migration slowly progressed toward floodplain ponds dug in the same era. A consequence of the channel capture of the ODOT pond was the triggering of a "domino effect" and an increased risk of channel avulsion or pit capture of adjacent floodplain ponds. By 2000, the channel instability presented three potential avulsion paths along the three-mile project reach. Allowing the river to capture any of these other ponds would have resulted in tremendous downstream sediment loads, environmental degradation, and ultimately, the dewatering of several miles of mainstem and side-channel habitat.

The floodplain gravel ponds are a legacy left from multiple private and public entities who extracted sand and gravel for construction aggregates. A total of ~530 acres have been affected by floodplain gravel extraction and processing. Nearly a third of the disturbed areas were affected prior to state and county regulation. The remainder of the lands was cluster zoned for mining by the county and then permitted by state agencies. The dynamic channel conditions present along this reach of the Rogue River, the direction of active channel migration, and the amount of floodplain buffer required to isolate these ponds from the active channel were not clearly understood.

1.1.1 Formation of the Rogue River Stakeholder Group

Rogue Aggregates and ODOT were the two key landowners. ODOT owned the land where the river avulsion took place; Rogue Aggregates operated a series of upstream and downstream ponds at risk. DOGAMI met with Rogue Aggregates and ODOT and advised that channel instability problems could be handled using an integrated river approach to protect the river channel and develop flood management strategies. Both parties agreed to participate in a river and floodplain management plan. DOGAMI then contacted and organized all affected and adjacent landowners. The Rogue River Stakeholders Group (RRSG) was formed in June 2000. The stakeholders had to create a process and framework to address both landowner and natural resource protection issues. The initial goals of the group were to: 1) take actions to maintain existing conditions until a long-term plan could be implemented, 2) collect detailed floodplain and river channel data necessary for evaluation of plan alternatives, 3) develop a management plan, and 4) seek funding for construction.

Stakeholder members included landowners and agencies with a regulatory or natural resource protection role. Landowners include two family-owned farms, Bear Creek Orchards, Rogue Aggregates, Inc., Oregon Department of Transportation (ODOT), Oregon Department of Fish and Wildlife (ODFW), The Nature Conservancy, and the Bureau of Land Management (BLM). Agency members in the group include Jackson County Planning Department, ODFW, US Army Corps of Engineers (USCOE), Division of State Lands (DSL), NOAA Fisheries, and the Department of Geology and Mineral Industries (DOGAMI).

Others who supported the project or provided technical assistance included Bear Creek Watershed Council; Jackson County Soil and Water Conservation District; Rogue River Guides Association; Rogue Flyfishers; and Lidstone and Associates, an engineering consulting firm from Fort Collins, Colorado.

1.1.2 The Rogue River Stakeholder Group Plan

In April 2000, Rogue Aggregates contracted (initial stakeholder contribution) a geomorphic study of the affected reach of the Rogue River. This document and its recommendations served as a guidance document for the river and floodplain management plan. During the summer of

2000 and later in 2001, Rogue River Stakeholders completed detailed river data collection (multi-stakeholder contribution) and initial Phase 1 construction activity. With the information collected during these two years, the stakeholder management plan was completed (2001). The overall plan concept envisioned a geomorphically stable design, which reconnected the river to its floodplain, maintained a multiple channel condition, and allowed the Rogue River to complete future channel adjustments within the historic channel migration zone. This design concept would minimize the potential for the river to migrate outside of this zone and capture additional ponds. The three-phase restoration plan was formulated to avoid future impacts and mitigate current impacts to fisheries and water quality which have resulted from the channel capture of an ODOT gravel pond. The most significant aspect of this project is protection of the Rogue River mainstem and side channels from being de-watered by river avulsion and a chain reaction which would cause multiple pit captures. Some of these adjacent ponds are 60 feet deep. Based on the impacts resulting from the avulsion into the shallow (12 feet), state-owned gravel pond, the stakeholders were extremely concerned about additional pit captures.

The stakeholder plan and project phasing was based on areas which posed the highest risk of avulsion during normal high water. After rejection of the 2001 grant application by the OWEB review team, the stakeholders were advised that separating construction into several phases would be a good strategy for funding. The stakeholders determined that the chronic erosion of the Mace bank (relict flood berm) and the rapid lateral channel migration at the Gebhard bank (500 feet in four years) posed the most immediate critical risk to fisheries impacts and threat to the environment (see Figure 1, Potential Avulsion Paths). Therefore, after continuing failures of the banks during the winter of 2001-02, quick implementation of the plan (and acquisition of funding) became critical. Otherwise, capture of one or more of these ponds would initiate the "domino effect," redirect the channel, and cause dewatering of the current channel. It would also invalidate the data collection (described in the next paragraph) and the existing conditions hydraulic model upon which the stakeholders' plan was based.

Phase 1 work involved interim stabilization and baseline data collection. Interim stabilization included placing cobbles and quarry stone in scour holes formed in the avulsion path and removing sand to increase channel capacity at the outlet of the captured gravel pond. The baseline data collection included the completion of a hydrographic survey data collection program. In particular, the stakeholders completed 12 channel and floodplain cross sections, completed detailed surveys of channel and pond bottom contours, collected channel bed samples, made vegetation observations, and completed final velocity transects for computer model verification.

Phase 2 is the subject of this project completion report. The Phase 2 work involved:

- placing a series of four stream barbs at two locations at high risk for channel avulsion into floodplain ponds

- planting 1500 trees and 500 shrubs

- establishing hundreds of willow stakes and 100 feet of willow bundles rootwad placement at each barb

- burial of live cottonwood trees to provide bio-technical bank stability at key locations

- placing erosion mats on resloped channel banks

The Phase 3 work occurred in August 2003 and will be reported on next year.

Figure 1.2. Phase 2 Stream Barbs and Bank Stabilization (Prepared by Vaughn Balzer).

1.1.3 Site Hydrology

The Rogue River hydrology at the site is a response to snowmelt and rainfall runoff as well as releases from an upstream Corps of Engineers dam. Whetstone Creek flows into the Rogue River between the Phase 2 construction sites. Bear Creek flows into the Rogue River at the downstream edge of the project boundary.

Figure 1.3 illustrates annual peak flows at the nearest river gauge from 1906 to 1997. This gage is located about two miles downstream. The 1996 flood was the sixth largest recorded flood event. The stakeholders considered the costs and benefits of various flood return periods including the 100-year storm and concluded that the design flood for the project should be able to pass an event similar to the 1997 flood without incurring damage to the proposed structures.

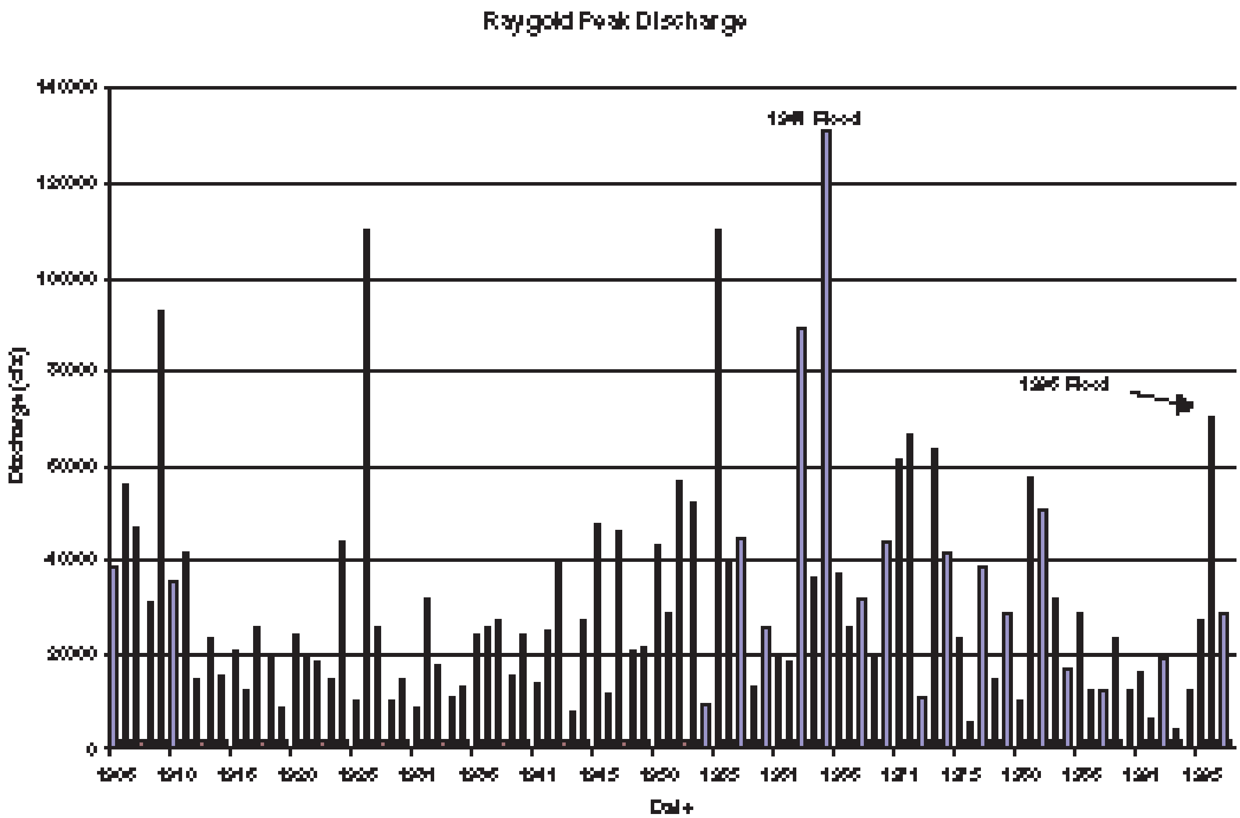


Figure 1.3. Peak Flows.

1.2 State and Federal Permitting

The stakeholders employed a strategy to ensure that their river and floodplain management plan would not only be technically feasible, but would also be permittable by the regulatory agencies in a timely fashion. Each regulatory agency was invited to become a stakeholder and to participate with the landowners in the development of the management plan. Regulatory and natural resource protection agencies that assisted the stakeholder members included Jackson County, Division of State Lands, Army Corps of Engineers (COE), Oregon Department of Fish and Wildlife and NMFS (NOAA-Fisheries).

This strategy was ultimately successful. The COE permit was the most difficult permit to obtain. Permitting assistance from the Core Team and the Implementation Team for Oregon Plan in Salem was eventually required. The USFWS temporarily delayed the approval of the DSL permit. A chronology of the application and permitting events is presented below including dialogue related to permit delays and approval. This chronology is provided in hopes of simplifying what we believe to be a difficult, and at times, a seemingly unending process that can derail time-critical construction work for restoration projects.

03/20/01 Pre-application meeting with the COE and DSL. The stakeholders presented an existing conditions hydraulic model and conceptual designs of the stakeholder plan and explained that until funding was obtained, it was not possible to complete final designs and construction drawings of the structures. To complete the construction drawings, the hydraulic modeling of the proposed structures had to be completed. The agencies reported that conceptual drawings were adequate to begin processing the application and allowed the stakeholders to supplement the application with final construction drawings after funding was obtained. Final permit application approval would depend on the review of these final drawings.

04/2001 Pre-application meeting with NMFS (NOAA-Fisheries). NOAA advised that to speed up the COE process, the stakeholders should prepare a draft biological assessment (BA) and submit it with the COE application. Frank Bird stated his project support and provided suggestions on how to proceed with the BA.

03/06/02 The COE and DSL permits were filed and supplemented with a draft BA of the stakeholder plan. Copies of the geomorphic study and the management plan completed by the stakeholders were not included in the application but offered upon request.

04/03/03 At the stakeholder meeting, a decision was made to pursue funding for the portion of the management plan pertaining to the current grant cycle. ODFW and NMFS were present at the meeting but the COE and DSL were not. During the stakeholder meeting, the NMFS representative concurred that the stakeholder management plan could be split into phases without re-applying to the DSL and the COE. Subsequent to the stakeholder meeting, the permitting agencies were informed that funds for 2003 were being pursued only for the stream barbs and therefore only half of the management plan would be permitted at this time. The decision to modify the permit submittal was based on:

- the short window of opportunity to avoid pit capture of the Mace site,
- recognition by the stakeholders that permitting of the stream barbs would be less controversial than the remainder of the project, and
- stream barb work would reduce the projected impact area by half and did not rely on the integration of other actions in the management plan to be successful.

DSL reacted to splitting the project into two separate construction periods by stating they would issue approval only for the barb construction and permit the remainder of the site later. The COE representative advised in a phone call after the meeting that the stakeholders needed to split the application filed in March into two separate applications, one for the stream barbs and one for the remainder of the management plan.

1.2.1 Division of State Lands Permit

04/09/02 Circulation of the DSL application was completed. Letters of support were received from ODFW and Jackson SWCD. The USFWS declared the project as being unacceptable. They cited concerns over geomorphic and hydrologic assumptions, endangered species issues, water rights, monitoring and maintenance details, and a general lack of sufficient detail for adequate review.

04/18/02 The stakeholders prepared a letter to the USFWS and provided the following:

- an August 2000 Geomorphic Analysis Report, completed by Lidstone and Associates, of the three-mile river reach
- details of the 10-year monitoring plan from the OWEB application
- a DOGAMI report titled "Aggregate Floodplain Mining on the Rogue River between River Mile 122.5 and River Mile 126"
- a clarifying statement that the Oregon Water Resources Department is responsible for water rights issues and not the USFWS
- an offer for a field visit and interagency meeting

In the April 18 letter to USFWS, the stakeholders also sought clarification on (1) endangered species of concern and (2) the definition of the specific hydrologic and geomorphic assumptions referenced in the letter. With their letter, the stakeholders also provided details on the construction and calibration of the hydraulic model. The stakeholders never received a response from the USFWS.

07/19/02 Subsequent to an interagency field visit on March 31, 2002, the stakeholders sent a second letter to the USFWS requesting that they withdraw their concerns or list outstanding issues that need to be addressed to enable the DSL to issue their permit. The letter also stated the following:

Since the USFWS has not responded to the April 18 stakeholder letter, DSL requested that we contact you directly to learn if the May 31 site visit satisfied your concerns for the project, or if you have outstanding issues that need to be addressed. The stakeholders are ready and willing to address issues of concern.

The project's foundation is based on the Oregon Plan for Restoration and Enhancement of Habitat for Salmon and Steelhead and if successful, will provide a new model for dealing with a variety of complex issues. To that end, various state, federal, and local agencies have been involved in the development of this project for approximately two years, and have reached consensus.

Without clarity of your concerns, significant delays in obtaining permit approvals for in-stream work are occurring. For this reason, the OWEB Grant proposal is seriously jeopardized because of the inability of the bureaucracy to move rapidly enough to solve problems. In our opinion, that is the wrong reason for a project proposal not to go forward. Therefore, with your help, we feel we can gain the clarity on the specific issues which may remain from the USFWS perspective.

The USFWS did not respond to the July 19 stakeholder letter. They withdrew their concerns on August 9, 2002, after the issue was discussed at a Core Team meeting in Salem.

1.2.2 Corps of Engineers Permit

04/30/02 The application was split in two and re-filed on April 30, 2002, with COE-Eugene. This application separated the barb construction from the remainder of the stakeholder plan (Phase 3). The Draft Biological Assessment was resubmitted but not split into two segments. Though not required as part of the application, the stakeholders offered copies of the geomorphic study and the management plan.

06/17/02 The stakeholders received a letter from the COE-Eugene stating the application could not be processed without additional information. This letter requested a copy of the geomorphic study, the stakeholder management plan, a list of adjacent landowners (previously submitted with application), and a Biological Assessment for the stream barbs only. The COE wanted a separate BA for the barbs and another BA for the remainder of the project (Phase 3). The COE also stated that final designs and construction drawings were required before the application could be processed.

06/21/02 The stakeholders responded to the COE-Eugene with a letter seeking clarification, specifically as to why they had changed their decision to not process the application until final construction drawings were submitted. This Corps decision created a predicament that the stakeholders could not address since there was no available funding to allow the completion of the hydraulic modeling and final engineering design. The OWEB review team had previously informed the stakeholders that they were reluctant to fund the project unless the stakeholders could show they were likely to get approvals to do in-stream work. The stakeholders also questioned why the COE had waited until June to request the geomorphic study and the management plan. The stakeholders sought an explanation as to why the COE did not ask for a separate BA when they requested that the project be split into two applications. The Eugene office of the Corps failed to act in a timely or consistent fashion and by so doing indicated that this regulatory office was not willing to assist the Stakeholders in the fulfillment of the project objectives.

07/03/02 After learning about the stakeholders' problems with the COE-Eugene office at a Core Team meeting, the Acting Section Chief (COE-Portland) called DOGAMI. The Acting Section chief stated that it would not be necessary to present final construction drawings before the COE application could be circulated and that it would not be necessary to split the BA into two separate documents. The Acting Section Chief referenced a pending letter to the stakeholders and offered to help if the stakeholders continued to have more problems with the field representative (COE-Eugene).

07/08/02 A letter from the COE-Eugene dated July 3, 2002, was received. Contrary to statements made by the Portland-COE office that the BA did not need to be split in two and that final construction drawings were not needed to circulate the permit, the letter from COE-Eugene stated the application was incomplete due to the stakeholders' failure to submit final construction drawings and provide a separate BA for the barbs.

07/31/02 After learning that the OWEB Southwest Review Team had ranked the grant first and that

OWEB might be able to release funds for construction prior to the rainy season, DOGAMI emailed the acting section chief at COE-Portland and asked for help with the COE field representative.

08/03/02 The acting section chief for permits emailed DOGAMI and relayed the message that Don Borda was now the section chief for permits and the issue would be handled by him. In a subsequent phone call, Don Borda advised DOGAMI that the project most likely would fit under SLOPES – the programmatic Biological Opinion which would allow the COE to issue a Nationwide permit.

08/06/02 DOGAMI met with NOAA to determine if the project would fit under SLOPES. During that meeting, it was determined that the Phase 2 work would comply with SLOPES if the stakeholder design team would incorporate Large Woody Debris (LWD) into the stream barbs and if woody riparian plantings were included around each barb.

08/08/02 COE-Eugene determined that approval in writing was required from NOAA to deviate from the standard barb spacing specified in SLOPES. Via email, NOAA advised the COE that the barb spacing was appropriate and therefore they could issue the Nationwide permit.

08/09/02 The COE permit was issued. This allowed DSL to issue their permit. The COE permit required that the bank keys must be built by August 31 and all work must be completed by September 15. Because the construction effort would require a 30-day period, the long sought and finally obtained COE permit would be useless without an in-stream work extension from ODFW.

08/20/02 The DSL permit was issued after receiving the following correspondence from ODFW:

SCHNITZER E Frank

From: HAIGHT David R
Sent: Tuesday, August 20, 2002 11:57 AM
To: LOBDELL Robert
Cc: Frank Schnitzer
Subject: RF-24977

I am writing concerning the request by Frank Schnitzer, representing the Rogue River Stakeholders Group, to extend the instream work period for their project in the Rogue River to September 30 this year. This would allow the construction of barbs adjacent to the Mace and Gebhard pits. The Oregon Department of Fish and Wildlife is not opposed to this extension. Because of the timing of obtaining the funding, it was not possible to start the work earlier. While there may be some potential of negative impacts to spawning chinook salmon by extending the work period, we feel the risk of significant negative consequences to the river and its fish populations that could result by not completing the barbs this year outweigh these potential impacts.

David R. Haight
Oregon Department of Fish & Wildlife
1495 E Gregory Road
Central Point, OR 97502
541-826-8774

1.2.3 Summary of Permitting

The net effect of federal involvement in the state and federal permits amounted to procedural delays. If the Phase 2 work were to be completed in 2002, it had to be done after the close of the in-stream work period. In-water work after the closure of the in-stream period can pose additional risk to returning fish. ODFW was forced to approve the extension because the risk of additional pit captures and channel dewatering was imminent and posed a bigger risk than extending the work period for one season. Without ODFW's in-water work extension, the delay caused by the federal permitting nexus may have resulted in a one-year construction delay, which by itself may have caused considerable loss of additional fisheries habitat. The federal permitting process may have been more meaningful had they actually provided guidance on additional resource protection measures or project improvements. However, these federal permitting delays did not result in any substantial modifications to project construction, habitat protection, or post-construction project monitoring. Although LWD was incorporated into the stream barbs, several state biologists questioned the technical merit of such a requirement, since it will be only a matter of time before fine sediment deposition between the barbs will bury the LWD, which was placed for "fish habitat."

Had the Corps' process delayed the Phase 2 construction season until 2003, the Mace bank may likely have failed. With this failure, the Mace Pit and possibly the Gebhard Pit may have been captured. With the exception of the COE (who have never conducted an on-site inspection), all of the agencies and the landowners recognized that the stream bank was rapidly failing. To put this into perspective, the winter of 2001-02 had an atypical low peak flow (peak flow of 4800 cfs recorded on 02-08-02). The peak flow for 2000-01 was also atypical and was measured at 3,410 cfs. Despite these low winter flows of 2001 and 2002, the Mace bank lost one-quarter of its remaining width (~15 feet) during the winter of 2001-02. Despite the delays associated with the Corps permitting process, Phase 2 construction (stream barbs at the Mace and Gebhard Pits) was completed in the fall of 2002. In December 2002, the stream barbs were subjected to a peak flow of 27,500 cfs with no loss of stream bank. If the stream barbs had not been built, the Mace Pit would have been captured during this peak flow event.

1.3 Project Construction

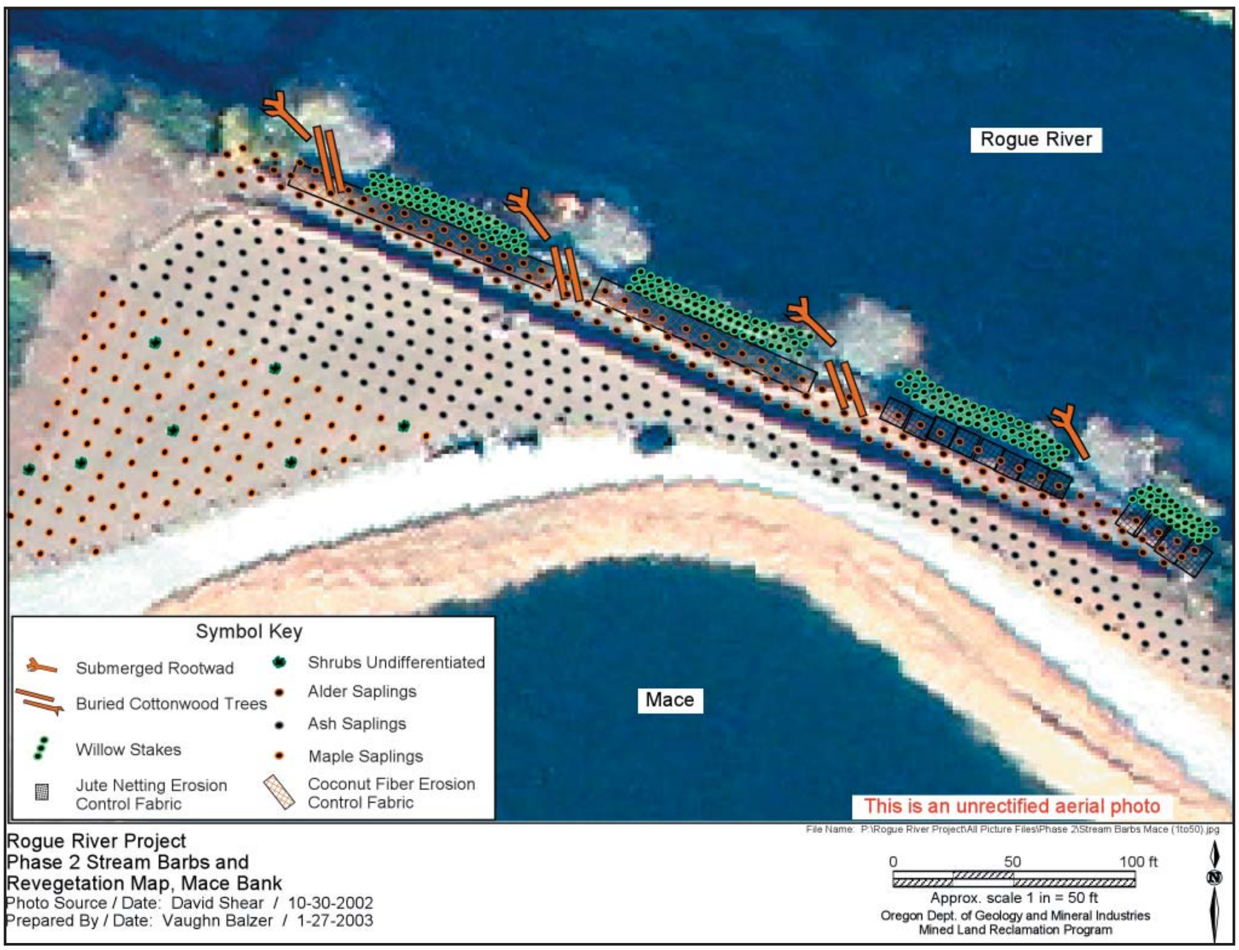
Once the OWEB Southwest Review Team ranked the Phase 2 grant application first in July 2002, the project design team commenced final designs immediately in hopes that OWEB would grant approval and COE permits could be obtained prior to the closure of the in-water work window. This proactive design effort, the subsequent approval of the OWEB funding, and the extension of the in-water work window by ODFW allowed construction to take place in the Fall of 2002. Phase 2 construction began on September 7 and was completed on September 27, 2002. Filter berms, construction sequencing (which allowed the downstream barbs to be completed first) material staging, and the careful operation of heavy equipment during rock placement, allowed the project to comply with state water quality standards for turbidity. Approximately 6000 cubic yards of well-graded angular rock was carefully placed within eight stream barbs. Each barb was oriented slightly upstream and tapered riverward to provide bank protection and promote sedimentation on the lee side of each barb. The barb length was confined to ensure that no opposite bank erosion would. The design of the barbs addressed a realignment of the channel thalweg away from the eroding bank. The project design incorporated consideration for worst-case chan-

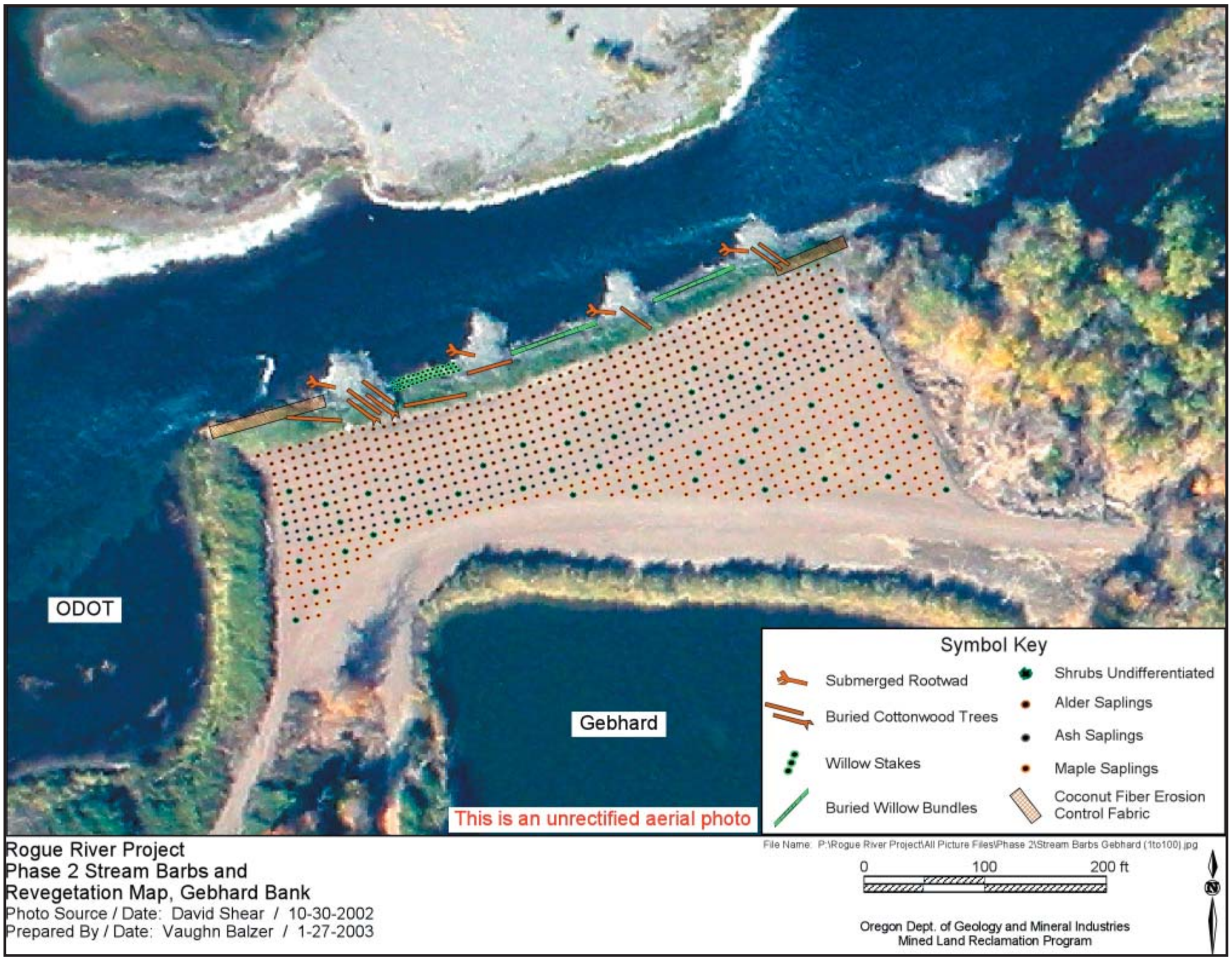
[1] Actually, this was a berm built in the 1970s and by the time this project started, the river had eroded a significant portion of it.

nel velocities as might occur during a series of design events. Rootwads, erosion mats, and willow stakes were placed and all bare areas seeded and mulched during barb construction. Floodplain plantings occurred in December 2002.

1.4 Vegetation Establishment

Biotechnical bank stabilization and riparian plant establishment on floodplain terraces occurred in two phases during the latter part of 2002. The following two revegetation diagrams illustrate the planting at each site accomplished by the stakeholders. These are followed by additional text and illustrations of the bank stabilization, planting methods, and other details.

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1.4.1 September 2002

When the barbs were being constructed, three to four rows of willow stakes on 2- to 3-foot centers were placed between the stream barbs at ordinary high water. At two inter-barb locations, willow bundles were placed where the abundance of cobbles prevented placement of willow stakes.

Mace Site: Willow staking, seeding and mulching

Mace Site: Willow staking, seeding and mulching

Gebhard Site: Construction of willow bundles.

Gebhard Site: Biotechnical bank stabilization by burial of live cottonwood trees.

Live cottonwood trees were buried in the resloped river banks in the fills above each barb and at a few locations between the barbs. The cottonwood trees were placed a short distance above ordinary high water.

For areas below the 10-year flood elevation, all slopes were seeded with winter wheat, annual rye, and alfalfa. All areas were mulched with straw. At the Mace site, coconut fiber blankets were placed on the resloped banks because of the steeper final slope angles (steeper slopes were needed here due to a narrower land mass separating river and pond). At the Gebhard site, willows, cottonwoods and the seeding were watered using a truck. By the end of September, the seeded wheat established an erosion control cover on the resloped Gebhard bank.

At the Mace site, natural moisture allowed germination and seedling establishment by mid-October. The softer bank materials at the Mace site allowed the use of longer willow stakes which contacted shallow ground water at the time of planting and did not require supplemental watering.

All of the planting and seeding that took place in September was completed with volunteer labor.

1.4.2 December 2002

On December 10, 11, and 12, 500 white alders, 500 Oregon ash, 500 big leaf maples, 150 Oregon grape, 150 ninebark, and 150 ocean spray were planted on the 10- to 25-year floodplain terraces. The ash and alder trees were ~30- to 40-inches tall in one gallon containers. The maples and shrubs were 8 inch plugs. The trees and shrubs were planted on 7- to 10-foot centers. Most of the planting holes were drilled to a depth of three feet with power augers; 100 were dug by hand. A basin was hand-dug for each tree and covered with three foot squares of roofing felt to drain moisture to the tree stem and to control competition by weeds. The roofing felt was secured in place by cobbles and erosion pins. After tree and shrub plantings, 100 pounds of crimson clover

Mace Site: After willow staking, seeding, and placement of erosion matting.

Mace Site: Tree and shrub planting.

was hand broadcast over the 3.4 acre area.

Planting labor was a combination of hired labor and volunteers. REAL Corp from Southern Oregon University was hired and they provided 20 students. Volunteers included a Cub Scout troop led by Mark Vargas, ODFW; 8 volunteers from Rogue Flyfishers; Chris Van Schaack, president of the local chapter of the Native Plant Society; Paul Kay, Bear Creek Watershed Council; David Haight, ODFW; and Frank Schnitzer, DOGAMI. Volunteer planting hours for September and December totaled 460 hours.

1.5 Description of Project Changes

No notable project changes were made compared to the original proposal. Certain actions were modified to fit field conditions. For example, the original proposal did not include bank reshaping between the barbs. To assist plant revegetation efforts, the existing steep slope was reduced and a planting bench was established to facilitate final revegetation efforts. Between several barbs at the Gebhard site, channel bank materials were composed almost entirely of 2- to 10-inch cobbles, making it very difficult to create pilot holes for planting willow stakes. At these locations, willow bundles were constructed. Erosion control mats were placed on the Mace bank as the majority of the bank sediments were silt and sands. Live cottonwood trees were buried in the fill at the head of each barb just above ordinary high-water elevation. These were field decisions and not part of the original plan.

1.6 Lessons Learned

From my position as the coordinator of the Rogue River Stakeholders and as Project Manager, I learned patience and found that all aspects of the project, save the actual construction, required far more time that one might have anticipated. First and foremost, the permitting effort was especially time consuming. Secondly, the ongoing coordination with agencies; project scheduling, sequencing of tasks, organizing of both volunteer and other sources of labor, required a considerable amount of time.

Maintaining consistency in personnel as it applies to all stakeholders and regulatory agencies is a critical factor in the smooth and successful development and implementation of the plan. Throughout the effort, the landowners, the County representatives, ODFW, the supporting Corporations and project engineers consistently attended and/or participated in the process. On the other hand, four different ODOT representatives participated with varying degrees of authority. Agency representatives from DSL and COE, the two critical permitting agencies for in-stream work, changed three times. From the period beginning June 2000 when the stakeholders formed through September 2002, three different field representatives from DSL and the COE were introduced to the project and met with the stakeholders. This caused delays and additional investments by other stakeholders.

1.7 Recommendations for More Effective Implementation of Similar Projects

In our opinion, the federal and state permitting processes are "not working" well for restoration projects and should be modified. As part of the Oregon Plan, a working model which provides that the federal agencies partner with the State in its implementation was developed. However, this working model needs to be disseminated beyond Salem. The delays in the federal permitting process endangered the implementation of this project and as such, the implementation of the Oregon Plan.

The use of MOUs or other directives to set out protocols to federal agencies for coordination and participation (including site visits) should be explored.

There should be a streamlined process for restoration and enhancement projects. These projects should not be lumped with the more typical requests for permits. Enhancement and rehabilitation projects can be much different from development projects. As such, they may have very short timelines or windows of opportunity for habitat protection (and project construction). The timing between funding and construction can also complicate a project.

A frequent explanation of why the permit action can't be completed this year is that the federal agencies are understaffed and they are too busy to get everything done. The SLOPES programmatic biological opinion was developed for "minor bank repair projects." There needs to be a programmatic biological opinion written for restoration, enhancement, and rehabilitation of floodplains and watersheds where agency-led projects meet the goals and objectives of the Oregon Plan.

The stakeholders had a difficult time obtaining native riparian species in sufficient quantities at a size needed to out-compete non-native floodplain species. The stakeholders ended up using maple plugs rather than older planting stock. This had a big effect on mortality rates and significantly increased plant maintenance efforts. Plant protectors and additional weeding to prevent lodging of tall weeds onto these small plants was/is a constant maintenance problem.

At the same time, project grant approval and permit timing make it difficult to order the plant stock needed in advance. Nurseries that provide native plant materials at a reasonable cost don't usually keep a large inventory of native riparian plants on hand because they never know if they can sell their plants. We have collected seed for Phase 3 and it is being propagated at the J Herbert Stone Nursery. They are performing a very valuable service. Funding for propagation at J Herbert Stone made available to grantees at a certain base level for SW Oregon projects dependant on projected restoration projects would be difficult since funding and project approval are not known in advance.

Finally, the timing of project grant approval and permit timing made engineering design and preparation of construction drawings difficult. This project was unique in its commitment of the project engineers and corporate partners and their willingness to provide services in a timely fashion without compensation. The complexity of the Rogue River design issues required a unique expertise and blend of geomorphologists, hydraulic engineers, reclamationists, and construction contractors. Future projects of this magnitude should consider approval of design with the in-water work window in mind.

2.0 CONSTRUCTION PHOTOS

Pre-, during, and post-construction photos are provided in this section. Two photo points were established at each construction site to provide an upstream and downstream view of the channel banks and the riparian plantings on the terraces above the channel banks. Some of the included photos were not taken from the designated photo points. The stakeholders did not collect a pre-construction downstream view of the Gebhard bank; however, post-construction photos are provided. The coordinates for the photo points are listed on the channel and stream barb survey, located in the appendix.

Gebhard Bank – Pre-construction photo at upstream view photo point. 2000

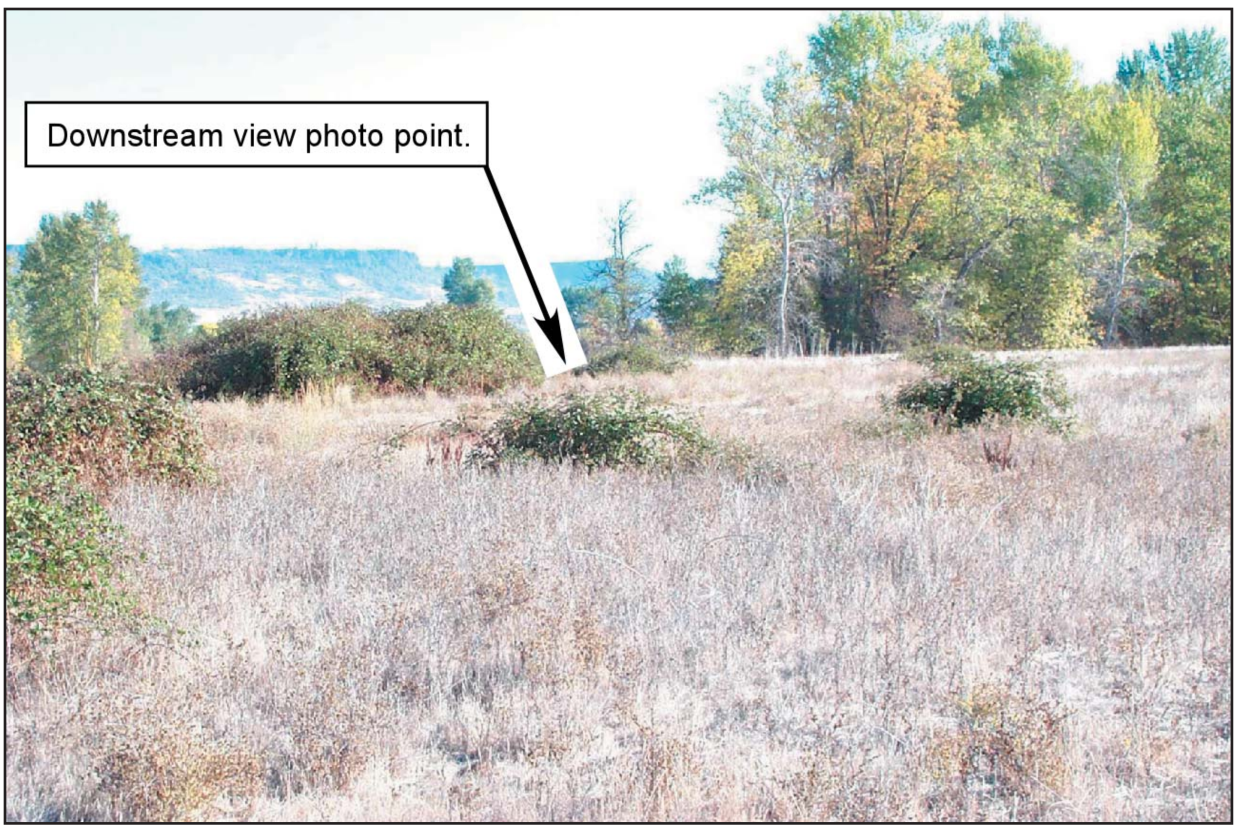
Gebhard Bank – Burial of live cottonwood trees in fill at Barb 2. September 2002

Gebhard Bank – Upstream view of placing rock for Barb 4. September 2002

Gebhard Bank – Upstream view after completion of the stream barbs. September 2002

Gebhard Bank – From upstream view photo point during December 2002 high water (barbs submerged).

Gebhard Site – Upstream view after mulching tree basins. April 2003



Gebhard Terrace – Prior to construction and riparian plantings: star thistles and blackberries. August 2001

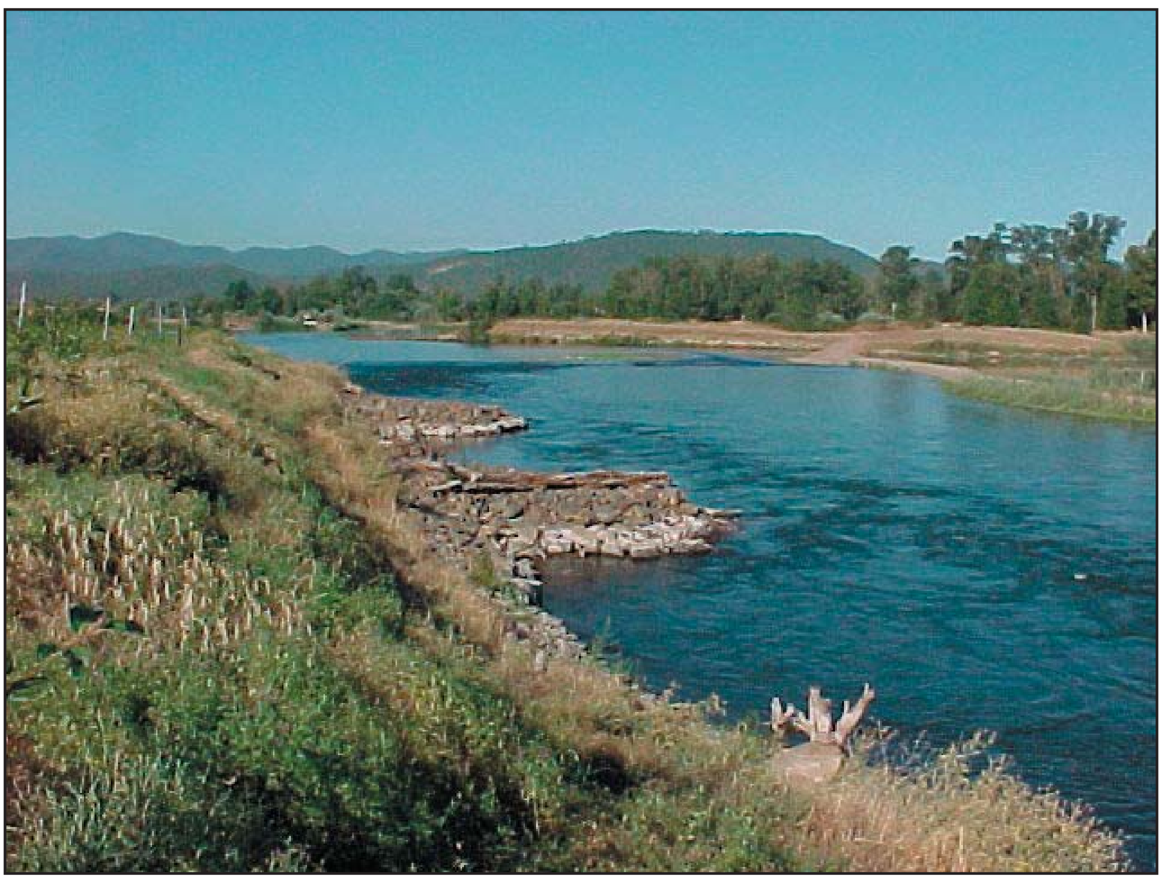
Gebhard Bank – Downstream view after seeding and mulching. September 2003

Gebhard Bank – Downstream view during December 2002 high water (barbs submerged).

Gebhard Terrace – Establishing plant protectors on maple plugs. February 2002

Gebhard Bank – Downstream view of bank and barbs. Hauling soil to re-cover willow bundles. Note: LWD rafted in during December high water. February 2003

Gebhard Bank – Downstream view of riparian plantings from photo point, mulch pile around ash tree in foreground. June 2003



Gebhard Bank – Downstream view of bank and barbs. September 2003

Mace Bank – Pre-construction upstream view. 2000

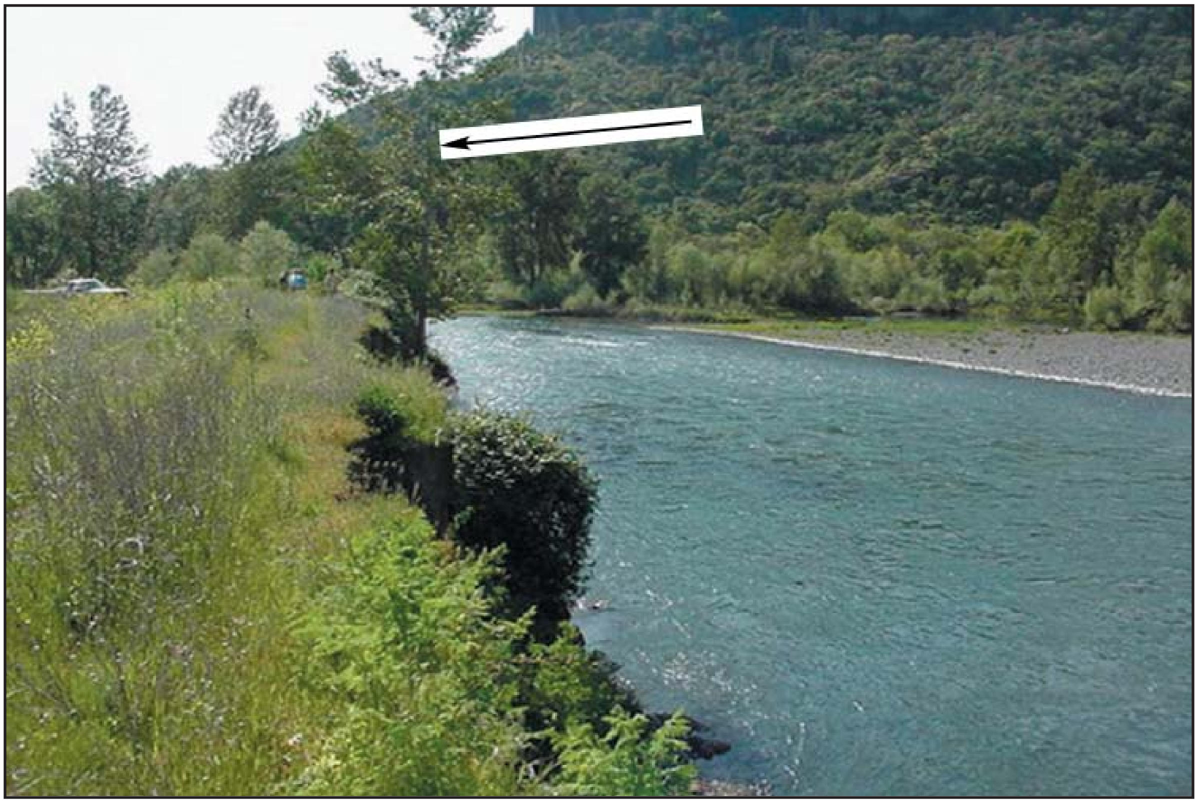
Mace Bank – Upstream view during root wad placement, note turbidity plume along bank downstream of the barb. September 2002

Mace Bank – Upstream view after seeding, mulching, and placing erosion mats.September 2002

Mace Site – Barbs partially sub-merged during high water on 12-28-02; taken from upstream view photo point.

Mace Bank – Upstream view, white alder trees in foreground. April 2003

Mace Bank – Upstream view, white alders on lower terrace; irrigation risers and Oregon ash trees on upper terrace. June 2003

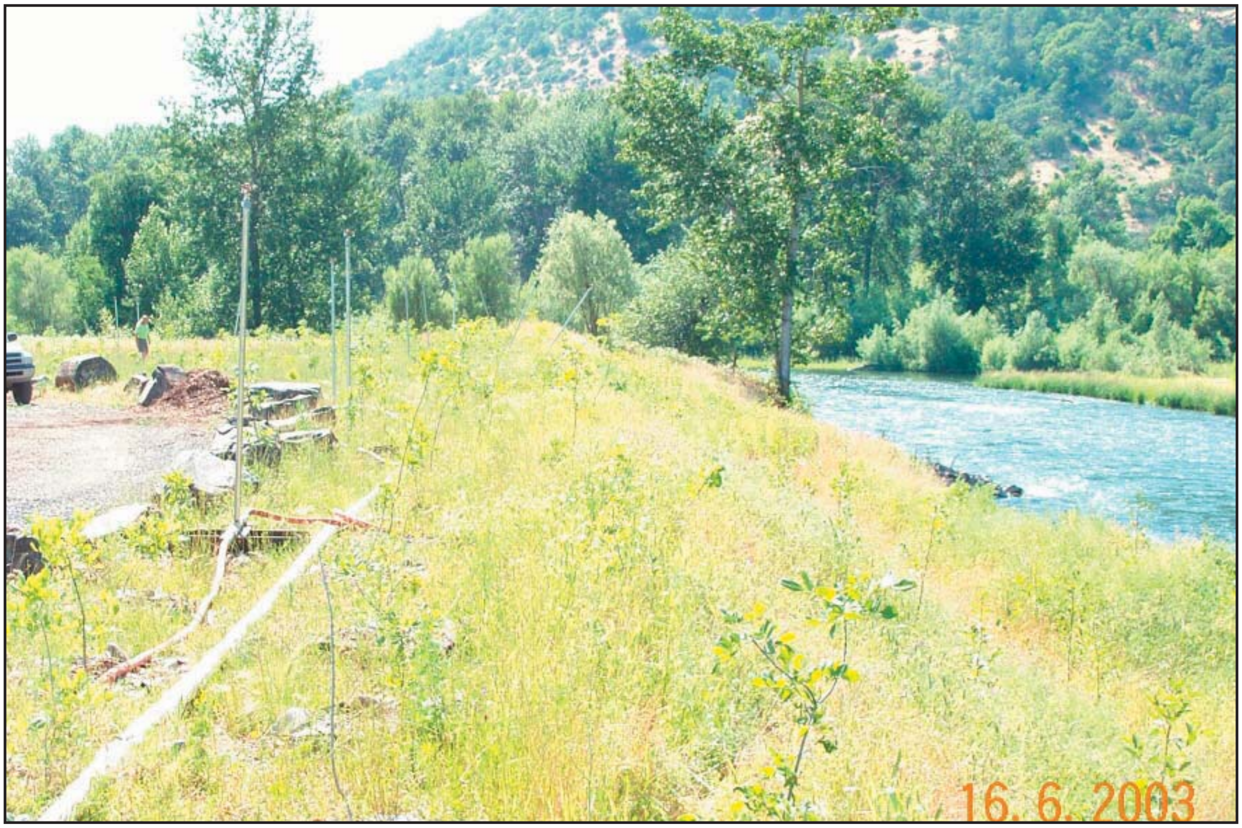


Mace Bank – Pre-construction downstream view. Note cottonwood tree on bank to the right of the stakeholders.

Mace Site – Downstream view-placing anchor rocks on root wad. September 2002

Mace Site.
Fall 2002

Mace Site – After tree planting. Winter 2003



Mace Site – Riparian plantings on upper terrace and irrigation risers. June 2003

3.0 WATERSHED RESTORATION REPORTING FORM

Read the General Directions. This form is for reporting completed projects (or completed phases of projects), not planned projects. For multi-year projects, complete a separate form for each year. You must include a map of the project. See the *Oregon Aquatic Habitat Restoration and Enhancement Guide* for descriptions of restoration treatments. Call the number below if you have questions.

1) DATE: November 5, 2003

2) This report is an UPDATE for a multi-year project ☐Yes ☒No

3) Participant and Funding Information: Fill in the appropriate boxes. Under '**organization name**', list grant programs, watershed councils, local, state, or federal agencies, SWCDs, conservation or sporting groups, job or volunteer programs, other private landowners, etc. Under **'funding amount'** write participants' **cash** (C$) and/or **inkind** (I$) contributions to the project. I$ = estimated value of *donated* materials, labor & equipment. *Use a second sheet if all participants do not fit on this cover page.*

your organization name	your name	phone number	funding amount	
Rogue River Stakeholders Group	E. Frank Schnitzer	541 967-2039x25	C$	I$
your e-mail address:	**e.frank.schnitzer@mlrr.oregongeology.com**			

landowner name	contact person	phone number	funding amount	
Vern Gebhard & Bob Mace	E. Frank Schnitzer	541 967-2039 x 25	C$	I$ 5,060

organization name or grant program	grant number (if applicable)	contact person	phone number	funding amount	
OWEB	203-029	Mark Grenbemer	541 471-2886	C$283,780	I$
Rogue Aggregates/KRC	-	Bill Leavens	541 664-8498	C$	I$207,676
Lidstone & Associates	-	Chris Lidstone	970 223-4705	C$	I$ 30,655
Whetstone Engineering	-	Matt Dusenbury	541 664-9344	C$	I$ 6,400
John's Repair	-	John Sarratt	541 664-5314	C$	I$ 1,500
High Banks Rock	-	Phil Scanlon	541-944-4800	C$	I$ 208
Bernert Nursery	-	Dave Bernert	541-682-2525	C$	I$ 600
DOGAMI	-	E. Frank Schnitzer	541 967-2039x25	C$	I$ 42,035
ODFW	-	David Haight	541 826-8774	C$	I$ 2,940
Planting Volunteers	-	E. Frank Schnitzer	541 967-2039x25	C$	I$ 4,455
Jackson County	-	Mike Mattson	541 774-6937	C$	I$ 2,500
BLM	-	Dave Henneman	541 664-4000	C$	I$ 560
4) TOTAL COST (This should equal the sum of all contributions as well as the sum of restoration activities reported in sections A-G of the form. Do not include costs for monitoring on this cover sheet):				C$283,780	I$304,589

Restoration Project Location – Attach a project location map. *Highlight* treatment areas and *label* activities.

5) STREAM NAME Rogue River TRIBUTARY OF: n/a BASIN: Rogue

6) TOWNSHIP 36 RANGE 2W SEC 15 and 16 COUNTY: Jackson

7) DOMINANT LANDUSE TYPE: ☐ forest ☐ range/pasture ☐ cropland ☐ wetland ☐ urban industrial/commercial ☐ urban residential ☐ rural residential ☒ other – agriculture and mining

Restoration Project Information

8) PROJECT NAME: Rogue River Stakeholders Group Restoration Project

9) PROJECT DATES: Start: August 2002 Completion: September 2003 (do not report planned projects)

10) SPECIES: Does this project intend to benefit specific fish or wildlife species? ☐Yes ☒No
If YES: *Which* ones?

11) PROJECT SITE SELECTION: How was restoration project selected/prioritized?
(check one box & answer associated questions)
☐ Watershed Assessment/Action Plan
☒ Other (describe *how* restoration need was identified, and *why* project *location* and *activity* were chosen)
DOGAMI evaluation of geomorphic trends and channel avulsion potential into additional floodplain gravel ponds.

12) Will the EFFECTIVENESS of the restoration project be MONITORED? ☒Yes ☐No If YES, fill out Section H

Section A: INSTREAM Activity

Instructions: Report in-channel activities designed to improve aquatic habitat conditions. ***For Fish Passage Improvements, go to Section F***. In the table, check each appropriate project activity box and fill in all details requested for that activity. Leave blank any questions that do not apply to your project. If project activity is not listed, describe the project under "Other".
If this form is being used to comply with conditions of the Portland District Army Corps of Engineers (Corps) Regional General Permit (RGP) No. 2000-001 for placement of large wood or boulders, refer to the RGP for additional reporting requirements. Photos of the completed work are encouraged for projects under the RGP. Other types of authorizations or permits may be required from DSL and/or the Corps for other types of instream activity not covered by the RGP. Mark and label clearly on a **map** the location of the project activity.

☐Yes ☒No Is this project covered under RGP no. 2000-001 for log or boulder placement?
DSL Permit Number: RF-24977

1. PROJECT GOALS: *to improve/increase stream*

__structure & complexity	__spawning habitat	__over-winter habitat	__stream flow
✓interaction w/ floodplain	__rearing habitat	__summer habitat	__fish passage
__gravel recruitment	__increase pools	✓ streambank stabilization	✓ channel avulsion; protection of main-stem, side channel, and backwater habitat

2. COST: Cash $__________ Inkind $ __________ 3. TOTAL MILES of stream treated: 1.5 miles

ACTIVITY	**DESCRIPTION** of Treatment
☐ **Large Wood Placement** *(Logs not anchored with cable, boulders, rebar, etc. -allowed to set up naturally or wedged against streambank or riparian trees)* ☐log placement associated with forestry operation (ODF21)	***key pieces*** *= logs at least two times bankfull stream width (1.5 times if rootwad attached) and meet diameter, stream size, and slope requirements outlined in the ODF/ODFW Large Wood Placement Guide)* ____total # of structures placed ☐ smaller materials were added to key pieces in structures ____total # of key pieces placed ☐rootwads attached to some key pieces ____average # of key pieces per structure source of logs:__________ **dimensions of key pieces** *(list range if necessary)* log length : __________ft log diameter: __________in *How many pieces of wood placed were at least 33 feet long AND 24" in diameter? __________ **stream characteristics where logs were placed** *(list range if necessary)* bankfull width: __________ft gradient: __________% bankfull depth: __________ft method of placement:__________ other details:__________
☐ **Boulder Placement** (not anchored)	____# of boulders placed av size _______ cu yds source of boulders__________ bankfull width: ________ft gradient: __________% bankfull depth: __________ft method of boulder placement__________
☒ **Anchored Structures**	8 and 7 # of anchored structures **structure materials**: ☒ 8 rootwads ☒ 7 live cottonwood trees **anchored with**: ☒rock/boulders ☒ alluvium
☒ **Engineered Structures**	☐ full-spanning weirs 6000 yds# materials used: angular rock – 9" to 30" pieces ☒ **deflectors** ☐ 'V' structures

☒ **Off-Channel Habitat**	☒ **Side channels: a) protected**: 4,684 feet of multiple interconnecting channels ☐ Alcoves created: a) ______# with or b) ______# without tributary/spring input ☐ Off-channel ponds created: a) ______# with or b) ______# without tributary/spring input
☐ **Instream Water Right Transfers/Leases**	*Priority date* / *Rate (cfs)* / *Type of Acquisition* / *Stream Reach/Point* / *Term (years)*
☒ **Mainstem Channel Protection**	This segment is referred to as Phase 2. A series of 4 stream barbs at 2 locations were constructed to redirect normal high water and flood flow away from floodplain mine ponds at risk for channel avulsion. This action will avoid abandonment of current mainstem and protects approx. 4000 feet of mainstem. The redirected flow is toward historical channels and the channel migration zone the Rogue has occupied for the last 80+ years.

Section B: RIPARIAN Activity

Instructions: Check (x) project goals and fill in project costs. In the table, check each appropriate project activity box and fill in all details requested for that activity. Leave blank any questions that do not apply to your project. If project activity is not listed, describe the project under "Other". Mark and label clearly on a **map** the location of each treatment area.

1. PROJECT GOALS:

__future LWD recruitment to stream ✓streambank stabilization/protection __run-off contaminant input
__future stream shading ✓decrease erosion/stream sedimentation __livestock access to stream
✓other goals: dampen overbank floodplain velocities to increase floodplain stability

2. COST: Cash $____________ Inkind $_________________

ACTIVITY	**TREATMENT AREA** **L** = length in linear stream miles; **setback** = fence distance from high water mark *(list range if necessary)*
☒ **Riparian Planting** ☐ conifer ☒ hardwood ☐ both	*(if part of hardwood conversion, report below- ODF 8)* L 1,000' riparian acres planted 3.4 acres (conifers to be planted winter 03/04)
☐ **Riparian Fencing** [for other fencing (e.g. pasture, cross-fencing) go to Section D]	FENCING NOT NEEDED – NO GRAZING L________mi setback____________ft riparian acres protected ________ acres stream characteristics where fence was constructed *(list range if necessary)* bankfull width: ____________ft bank height ___________ ft
☒ **Biotechnical Plantings Non-native Removal**	describe: Biotechnical bank stabilzation: 4 rows of willow stakes on 2'-3' centers between stream barbs. Installed over ~550 LF. Willow bundles over ~100 ft. Blackberries and star thistle removed from both sites.

Section H: Project Monitoring Activity

Use this section to describe the type of monitoring used to evaluate the progress and effectiveness of your project. Fill out all questions in the top section. Please omit monitoring costs from cover sheet totals and instead include them under this section. In the table, check (X) the boxes that apply, identify the monitoring methods or protocols used, and the frequency and duration of monitoring before and after the project was implemented. *(example 1: frequency = once per year, duration = 20 years; example 2: frequency = 2 times per month, duration = 3 years; example 3: frequency = once every five years, duration = 25 years).*

Monitoring Objectives: Evaluate utility and stability of stream bank through time. Evaluate success of planting methods and plant establishment.

Monitoring Implemented by Which Organizations: DOGAMI, Rogue Aggregates, ODFW

Best Contact Person for Monitoring Information: E. Frank Schnitzer (541) 967-2039, ext. 25

Monitoring Funded by Which Organizations: OWEB, Rogue Aggregates, DOGAMI, ODFW

Monitoring Cost per Year: **$2,380** Amount Spent to Date: **$2,265**

Monitoring Type	Monitoring Method/Protocol Used	Pre-Treatment		Post-Treatment	
		Frequency	Duration	Frequency	Duration
Physical Measures					
☐ instream habitat					
☒ -channel morphology	low elevation aerial photos	2000 aerial		annual	10 years
	channel thalweg survey	once		annual	yrs 1-5-10
	9 channel x-section survey	once		annual	yrs 1-5-10
☒ -stream barb stability	as-built surveys of structures and reshaped river bank	once		annual	yrs 1-5-10
☒ -other: bank erosion	survey bankline changes	once		annual	10 years
☒ riparian vegetation	plant count survival – by species	n/a		annual	10 years
☐ upland vegetation					
☒ stream flow	all physical monitoring will be performed after 10 yr or higher flood event				
Biological Measures					
☐ adult fish sampling					
☐ juvenile fish sampling					
☐ macroinvertebrates					
☒ other: effects of improvements on fish habitat	Qualatative assessment by David Haight, ODFW based on physical monitoring and riparian establishment	n/a	n/a	annual	yrs 1-5-10
Water Quality Measures					
☐ temperature					
☐ suspended sediment					
☐ dissolved oxygen					
☐ chemistry					
☐ fecal coliform					
☐ other					
Other Measures					
☐ fish passage effectiveness					
☐ slope stability					
☐ project inspection					
☐					

Briefly describe results to date**:**

Channel Morphology
A 27,500 cfs event occurred in December 2002, several months after construction. The stream barbs sustained no damage. A February 2003 thalweg survey demonstrated the stream bank had moved the thalweg away from the avulsion prone banks. The channel bed dropped 3’ at the Gebhard site. The material was deposited in the captured ODOT pond. At the upstream bank location (Mace), the stream barbs mobilized sand and gravel from an in-stream bar on the opposite bank. Both of these changes were part of the design objectives and will assist the river in re-establishing equilibrium channel slope conditions.

Bank Erosion
Reshaped banks were essentially unchanged. See Year One Monitoring Report.

Vegetation
See Year One Monitoring Report.

FINAL ACCOUNTING OF IN-KIND CONTRIBUTIONS*

Pre-Construction (non-DOGAMI) Baseline data, studies, permitting	$ 88,470
Construction Donated services and supplies	157,125
DOGAMI Pre- and post-construction Excluding grant writing 1201 hours @ $35 hour	42,035
ODFW Pre- and post-construction 84 hours @ $35 hour	2,940
Donations Plant establishment and maintenance	9,564
Planting volunteers 297 hours @ $15 hour	4,455
TOTAL IN-KIND	$304,589

*memos detailing type and source of each donation are located in the appendix.

5.0 YEAR ONE COMPLIANCE MONITORING REPORT: (EXHIBIT D)

5.1 Meeting Project Goals - Assessment

The project objectives from the OWEB grant application are listed here for reference. Results of the stakeholder monitoring indicate that the project objectives have been initially met. This assessment should be considered preliminary. Continued monitoring over the next ten years will provide additional data on the long-term effectiveness of the stream barb construction, the biotechnical bank stabilization work, and the riparian plantings. The year one monitoring confirms that Objectives 1, 2, 3, 4, and 5 have been met by the barb construction and the effects resulting from the December 2002 high water event. The channel thalweg and barb survey presented later in this section confirm that the stream barbs have scoured a new thalweg off their tips. At the Mace site, the barbs have begun to mobilize sand and gravel from an instream bar near the opposite bank. On-site evaluations document that deposition of sand and organic material has begun.

The stakeholders conclude that Objective 6 has been initially met by avoiding the pit capture which could have occurred during the December 2002 high water which pushed high velocity flows away from the rapidly failing bank. The velocity of the December high water was near the maximum expected in future events. However, Objective 6 is a long-term issue.

Stakeholder Project Objectives from the OWEB Application:

1. Redirect stream flow away from eroding banks adjacent to the Mace and Gebhard Ponds, induce sediment deposition, and abate channel capture of the ponds.

2. Reduce bank erosion at both locations by ~80 percent.

3. Deflect flow toward opposite bank, instream bars. Higher velocity flows against bars may mobilize bar materials to downstream captured pond. It may create additional diversity for fish habitat on the bars.

4. Create scour holes for fish habitat off the barb tips.

5. Begin process of natural bank stabilization by creating depositional areas on the downstream side of the barbs where velocity reduction zones will be created.

6. Avoid multiple pit captures and significant adverse impacts to fish and fish habitat. Multiple pit captures would initiate a new cycle of channel bed incision, channel widening, accelerated bank erosion, and channel dewatering.

Photo monitoring from the photo points was provided in the project completion report in a preceding section. This section contains a description of the required maintenance activities; monitoring details for the channel, stream bank erosion, and the riparian plantings; a summary of monitoring and maintenance costs, and a summary of public awareness and media coverage.

5. 2 Year One Maintenance Activities

All maintenance activities were related to maintaining or reestablishing the riparian plantings described in the Phase 2 project completion report. Conditions prior to plant establishment at both sites were similar. The channel banks were vertical with heights ranging from 10 to 25 feet. The areas above the vertical banks were flat. Vegetation was composed of annual grasses, star thistle, poison hemlock, and clumps of Himalayan blackberry. Consequently, controlling or out-competing the re-growth of the non-natives with native riparian species was a significant challenge. Future monitoring and reporting over the next ten years should clarify the initial success of the riparian restoration aspect of this project.

No maintenance activities were required for the stream barb structures or the channel bank slopes constructed during Phase 2 construction. A chronology of activities completed during 2003 is presented.

January: Re-establish cobbles on roofing paper and replace roofing felt (weed barriers) dislodged by wind storms.

February: Re-cover willow bundles with soil and straw exposed during the December 2002 high-water event.

April: All trees and shrubs were weeded and then mulched with wood chips donated by Jackson County. About 5 cubic feet of woodchips were placed around each tree and shrub. Work was completed by volunteers from Rogue Aggregates, High Bank Rock Products, John's Repair, Parisi and Parisi, Wilsonville Concrete, Rogue Flyfishers, Jackson County SWCD, Crater High School Ecology Lab students, a Bear Creek Watershed Council member, ODFW, Jackson County, and DOGAMI. Volunteer labor totaled 148 hours.

Gebhard Site – Straw mulch around maple seedlings. May 2002

The channel thalweg at the Gebhard site, near the entrance to the captured gravel pond, was lowered by three feet. This transported material moved a short distance into the captured reach and formed a shallow bar along the right channel margin. No changes were detected related to the mobilization of opposite bank sediments (at the entrance to the pre-1997 channel). The likely reason for this is the effective channel width, which during flooding, utilizes the current channel, the former buffer strip, and the pre-1997 channel spreads. This spreads out and reduces channel velocities in this reach.

At the Mace site, changes to the channel bed elevations on the order of one foot +/- were found. The upstream end of opposite bank bar was mobilized toward the captured pond. The amount of bar material mobilized was not surveyed. It was estimated that approximately 500 yards were moved. In the future, as more flows are deflected against the opposite bar, additional mobilization of sand and gravel is expected. Geomorphic indications are present that suggest as additional mobilization occurs on the opposite bank point bar, it may be modified into a mid-stream bar and a backwater channel may form a secondary channel on the channel bank side of the bar.

5.3 Channel Bank Erosion Reduction

The placement of four stream barbs at the Mace and Gebhard channel banks were successful in pushing the channel thalweg away from the eroding banks, creating scour holes, and mobilizing in-stream sand and gravel into the captured ODOT pond. The majority of the channel bank erosion or sediment input was occurring at the Gebhard site. The Gebhard channel bank migrated over 400 feet between 1997 and 2001. The barbs, which moved the channel thalweg away from the bank, halted this migration.

Pre-construction stakeholder surveying and mapping determined that 95,000 tons/year of sediment input was occurring in the project reach. This sediment input was occurring at three distinct locations; the Gebhard bank, the Mace bank, and the artificial island in the (captured) ODOT pond. The majority of this sediment was soil-sized particles rather than gravels. The majority of the sediment (~85,000 tons) entering the system was originating from the two sediment sources addressed in the Phase 2 work; the Mace and Gebhard channel banks. The third source, the artificial island (addressed in the Phase 3 work), contributed sediment on the order of about 10,000 tons per year or less.

In December 2002, the Phase 2 work was subjected to an early test by a high-water event soon after the trees were planted, when the river flow went from 1,370 cfs to 27,500 cfs in a three-day period. The submerged stream barbs pushed the high velocity flows away from the erosion-prone channel banks and resulted in no loss of the tree plantings. The December event and flows throughout the remainder of the year caused only minor amounts of sediment input and resulted in no changes to the channel banks.

5.4 Sediment Input at the Gebhard Site

Monitoring after the December high water and again in late spring, documented minor amounts of sediment input at the Gebhard bank. This occurred between all of the barbs. At and below ordinary high water, channel bank velocities during the 27,500 cfs event were sufficient to mobilize fine sediments left after bank re-sloping. The winnowing of the sand and silt fines off the resloped bank but with no transport of gravels, suggests the stream barbs were effective in reducing velocity flows against the bank. In terms of material transported, 10 to 20 yards (or about 20 to 40 tons) were eroded at the Gebhard site. This small amount of erosion did not result in changing the shape of the bank. Areas above ordinary high water were not affected (see following photo). Subsequent monitoring after the December event found sand and silt deposits, along with organic debris and LWD, in between the barbs.

Gebhard Site – Erosion of fine sediments between Barbs 2 and 3. Vertical bank above the gravels is formed by hay bales staked in place with rebar. April 2002

The most significant change to the reshaped banks occurred downstream of the Barb 1 at the Gebhard site. At this location, a cottonwood log partially buried in the bank was not disturbed during barb construction. The stakeholders and boaters who asked that we remove it recognized this as a problem for bank stability. The presence of the log prevented the placement of the downstream apron for Barb 1 during construction. The log deflected flow towards the bank during the December 2002 high water. It was dislodged by high velocity flows during December or January. This resulted in the most significant amount of bank erosion that the project experienced. The reshaped bank eroded vertically for a distance of about 40 to 50 feet where the flow enters the captured ODOT pond. This caused a sediment input of approximately 800 to 1000 tons.

Gebhard Bank – Prior to Phase 2 construction showing log embedded in eroding

Gebhard Bank – Barb 1. Erosion mat proved to be ineffective in protecting bank against high velocity flows deflected by log embedded in bank. September 2002

5.5 Sediment Input at the Mace Site

At the Mace bank, the high water did not initiate any changes to the channel bank line; however, at two locations, several cubic yards of fill near the head of Barb 2 collapsed and slumped down the bank. Part of this material entered the channel. The total sediment input was about one ton. This area was covered with plastic sheeting in December 2002. The problem was not caused by river flooding; it was caused by precipitation runoff concentrating in one spot on a narrow terrace created for tree establishment. It could have been avoided by spot checking the area with a level during construction. During April 2003, 95 containerized willows were planted in and around the blowout areas followed by mulching with straw.

Mace Bank – Showing blowout area prior to covering with plastic sheeting. December 2002

Mace Site – Blowout after planting containerized willows and applying mulch. May 2002

5.6 Positive Effects of the 2002 High Water

In addition to moving the channel thalweg away from the eroding banks, the flows induced sedimentation along the channel margin in between the barb structures (sand and wood debris were found on the willow bundles). Large woody debris rafted in and lodged on top of the barbs and sand and gravel were transported into the captured reach. Mobilizing the sediments into the captured pond will assist the river in reestablishing equilibrium channel slope conditions through the captured reach.

5.7 Plant Survival Monitoring

Plant survival was evaluated in June 2003. All trees were counted and the results are presented in the table at the end of this section. The shrubs were not counted. The shrubs were planted in clumps of three and appear to have a high survival rate, particularly the Oregon Grape. Long term survival will likely be dependant on the stakeholders' weed maintenance plan. Careful removal of weeds which can cover the shrubs when they lodge will be needed for the next several years. The willow stakes were not counted. Most had 2-3 foot leaders of new growth by August 2003. The appearance of foliage on the buried cottonwood logs indicates they are alive. Animal damage was minimal. This was attributed to the abundance of healthy riparian areas up and downstream and across the mainstem. Due to the close proximity of the floodplain pond, grazing ducks and geese kept ground cover low between the planted trees at the Mace site until mid-summer. Evidence that beavers were chewing on the cottonwood logs was observed. By late summer, some evidence of browsing by deer and rabbits was noted but did not cause any loss of planted species. A stem canker had affected less than a half dozen Oregon ash trees by late summer. This may have been caused by the use of old planting stock (the stakeholders could only find one source of one gallon Oregon ash trees).

Evaluation by Dr. Bruce Follansbee, river restoration plant ecologist, determined that the stakeholders have established adequate densities of willows and they are capable of surviving on their own. The willow bundles did not survive the summer of 2003. There were likely several reasons for this; they were uncovered by high water during December 2002 and then covered again in February 2003 by the stakeholders using straw bales and soil. The shallow depth makes them vulnerable to desiccation and irrigation start-up may have been too late for them. Containerized willows were placed where the bundles failed. They were planted during the spring and summer of 2003.

Dr. Follansbee also determined that the initial survival rate of the trees will, in the long-term, produce a good density of mature trees. The survival rate of the Ponderosa pine planted where there was poor survival of the maple plugs will be reported in future monitoring evaluations.

Gebhard Site – Containerized willows planted below failed willow bundle. June 2003

The stakeholders intend to irrigate the plants for one more season. Irrigation did not appear to affect the ability of star thistle to thrive within the restoration area. The seeding on the upper terraces at both sites included alfalfa. The alfalfa was slow growing through the spring. By late summer, the alfalfa began to flourish between the planted trees and as these plants lodged due to their height, they began to cover and shade out the star thistle. In addition to providing nitrogen fixation within the soil profile, seeding alfalfa as part of a restoration strategy may prove useful for partially controlling star thistle propagation. The ability of alfalfa to root to depths of 10 feet or more may allow it to persist for a period after cessation of the irrigation.

Tree Survival Rate by Species by Site Location

	Oregon Ash	**White Alder**	**Maple**
Gebhard			
Live	202	328	296
Dead	1	70	88
Survival Rate	99.5%	78.5%	70.2%
Mace			
Live	315	100	107
Dead	5	15	53
Survival Rate	98.4%	85.0%	50.0%

5. 8 Initial Project Results-Summary

The channel bank erosion rates were reduced by ~98 percent. This reduction is expected to not significantly change. Future evaluations over the next ten years will quantify this.

The plant survival rates appear adequate. Considering most of the trees were planted on spacings of 7-8 feet, this will likely produce adequate densities of mature species. The future densities of the planted shrubs will be dependant of the adequacy of the weed maintenance program. Considering the on-going situation with non-native invasion, the shrubs will probably not perform as well as the planted trees.

In terms of future flooding, events larger than December 2002 are expected. The December 2002 event was less than a 10-year flood but did submerge the barbs with about 3 feet water. Based on the hydraulic modeling completed for the Phase 2 designs, larger floods will not subject the barbs to substantially higher velocities than they have already experienced. The Phase 2 stream barbs are stable for the 1997 design flood event (53,000 cfs). The Phase 2 design conditions used velocities up to 12 feet/second. The Phase 2 modeling predicted that these velocities would occur during the passage of a 50,000 cfs flood event. This event is roughly equivalent to a 25-year flood event. During larger storms, such as the 50- or 100-year event, Gold Rey Dam causes a backwater effect and dampens flood velocities at the project site. The hydrologic conditions that change during storms up to a 100-year event are the depth of flow and the extent of flooding.

Future monitoring may quantify the ability of the stream barbs, along with the possible assistance of larger flood flows, to be a long-term solution for avoiding pit capture of the floodplain ponds.

5.9 Maintenance and Monitoring Costs

Maintenance	Donated	Grant Funds	
Containerized willows – 200	600		
Wood chips	500		
Straw mulch	300		
Equipment to move chips	600		
Labor: spread chips, weed around trees and shrubs, 141hrs @ $15	2,115		
Real Corps		240	
Irrigation system fabrication		15,392	*
Irrigation system permitting		900	
Irrigation labor		450	
Replanting containerized willows – DOGAMI	500		
Supplemental planting labor for ponderosa pine	495		
Ponderosa pine – BLM	560		
Ponderosa pine – repotting		24	
Chris Van Schaack – volunteer oversight		292	
TOTAL	$5,670	$17,298	

* The irrigation system was designed and built to allow take-down and re-installation for use on part of the Phase 3 riparian plantings. Sturdy steel risers and rainbirds were used; durable rubber hoses were used to connect water lines. After completion of the Rogue River Stakeholders Project, it will likely be available for other restoration projects in the watershed.

Monitoring	Provider	Donated	Grant Funds
As built stream barb survey and thalweg re-survey	Whetstone Engineering		2,265
Photo/plant monitoring	Frank Schnitzer		1,000
Photo/plant monitoring	Ben Mundie	1,000	
Plant monitoring	Bruce Follansbee		272
Aerial flight	DOGAMI	24	
TOTAL		$1,024	$3,537

5.10 Summary of Public Awareness or Educational Activities

5.10.1 Legislative Tours

In October 2002, DOGAMI and Rogue Aggregates organized legislative tours of the Phase 2 work which included Senator Lynn Hannon, and Representatives Susan Morgan, Dennis Richardson, and George Gilman.

5.10.2 Educational Tours

As volunteers came to help with various planting and plant maintenance tasks, they were given tours explaining why the project was developed and its importance to the Oregon Plan. Volunteers included students from Crater High School, local Boy Scouts, members of the Rogue River Flyfishers, and others.

5.10.3 Presentations

Project presentations were given to:

- The Jackson County Soil and Water Conservation District Board Meeting on January 15, 2003.
- A local, state, and federal agency roundtable meeting held by Oregon State Police in Central Point on January 16, 2003.
- The River Restoration Northwest 2nd Annual Conference at Skamania Lodge on February 4, 2003.
- The Rogue River Guides meeting in Medford on February 11, 2003.

5.10.4 Media Coverage

This project was well received by the local community. This project has received, and continues to receive, a significant amount of media attention; primarily through the efforts of local recreation groups. During the 2002 and 2003 (Phase 3) construction periods, river users have arrived by boat and expressed their interest and appreciation of the project. Newspaper articles from the Medford Mail Tribune are provided at the end of this section. The first article appeared during the August 2000 data collection, prior to the development of the stakeholder plan. The second article was written during the Phase 2 stream barb construction. Two interviews were recorded by local TV stations during this same period. Unfortunately, copies of these interviews were not obtained by the stakeholders.

During Phase 3 construction in 2003, three newspaper articles were written covering various aspects of the project. Five TV interviews were produced and shown on the local news. They included short pieces on the Phase 2 revegetation and included live coverage of our compliance by finishing the live-water work within the ODFW in-stream window. Copies of this media material are available upon request and will be provided in the Phase 3 report to be submitted next year.

Survey Screens River's New Channel
Medford Mail Tribune / Jim Craven

Frank Schnitzer, a reclamationist with the Oregon Department of Geology and Mineral Industries, takes a look at some of the erosion occurring on the Rogue River near Lower Table Rock as a result of the 1997 flood. Geologists, landowners and businesses are surveying the area to determine what can be done to prevent further damage should floodwaters return.

Potential Flood Impact Part of Study on Rogue Changes
By John Darling

During the big 1997 flood, scientists, government officials and landowners watched in awe as the mighty Rogue River jumped channel by Lower Table Rock and started flowing through an old gravel pit.

The mined-out pit was no big loss. But in its new channel, the Rogue is now aimed like a loaded gun at surrounding farmlands, Bear Creek Orchards, Rogue Aggregate gravel mining operations and riparian areas owned by the Nature Conservancy. What to do?

Under the guidance of the state Department of Geology and Mineral Industries (DOGAMI), all affected agencies, businesses and residents are surveying the new channel this week to make sure it's friendly to fish – and to see if they can stop it from clobbering the humans who live and work there should floodwaters return.

The team is surveying 10 sections of the new river channel, doing aerial mapping of the floodplain and installing water temperature recorders, said Frank Schnitzer, DOGAMI reclamationist from Albany.

No one wants to “channelize” the Rogue, such as was done with disastrous results on the Mississippi, he said. However, it’s likely they’ll install large rock “hard points” to prevent the Rogue from shifting course into orchards, riparian zones and gravel lodes to the southwest of the new channel.”

Something has to be done,” said area resident Bob Mace, who Wednesday was taxiing survey members around in his motorboat, “but Mother Nature and the Rogue are going to decide finally what happens. This is a partial fix, though.”

Inserting any material into a waterway requires a biological assessment. So the Oregon Department of Transportation, which used to mine the captured pit for highway materials, has applied with the U.S. Army Corps of Engineers and the Division of State Lands for a permit to nudge the river’s course with hard points.

Agencies are trying to create a “stable hydrologic system” that supports human activity and still works in harmony with the river’s need to access its own floodplain and the fish’s need for good habitat, said Chris Lidstone, a hydrogeologist from Fort Collins, Colo., who is retained by Rogue Aggregate.

”The old philosophy was to try and keep the river as far away from its floodplain as possible,” Lidstone said. “Now the philosophy is you look at everything from an environmental standpoint, you support the needs of fish and you try to connect the river to its plain.”

This doesn’t mean total surrender to nature’s “events,” as they call flooding. However, Lidstone must assess the option of doing nothing.

”If we do nothing, the river would back up (during the next flood), then go through Kelly Slough,” an old oxbow left from a previous river channel, then have its way with neighboring orchards and gravel miners, he said.

Many water-filled gravel pits flank the Rogue and other rivers. Some are in use and some “reclaimed,” which means gravel operators have sloped the sides, replanted the area, and left it to nature.

Agencies are trying to make these pits part of the natural fish habitat by installing rock-lined spillways between pit and river, Schnitzer said. These prevent erosion and allow fish to pass back and forth to the river.

”We’ve found that the pits benefit juvenile fish and help them grow faster. They seek calmer water out of the mainstream to forage. And the spillways have to be at a level that allows any fish to escape back into the river by June 1.

”Water thermometers will tell if temperatures before and after the pit detour are stable and healthy for fish, especially heat-sensitive salmon, Lidstone said.

Participating in the survey are Jackson County Planning, Bureau of Land Management, Bear Creek Orchards, Oregon Department of Fish and Wildlife, Division of State Lands, Oregon Department of Transportation, Rogue Aggregates, Nature Conservancy and area landowners.

Geologists go low-tech to restore Rogue River

Mark Freeman

Outdoors

◆

The willow bundles lining the bank of the upper Rogue River don't look particularly strong. Each is just a few armfuls of branches lashed together with twine and plopped atop fresh, moist dirt.

But these bundles are part of a new $1 million arsenal that geologists are using to tame a part of the upper Rogue damaged by a flood in 1997, and also to reclaim the river's famed Salmon Rock for salmon and the people who stalk them.

The willows will sprout new roots and provide stability on a streambank now getting fortified with huge rock piles and sunken cottonwood logs that, over time, will steer the river away from old gravel pits and back toward its original channel at the base of Lower Table Rock.

Mail Tribune / Mark Freeman

Chris Van Schaack, a Bear Creek Watershed Council volunteer, and state geologist Bob Houston, right, tied willow bundles Wednesday to help stabilize a Rogue River bank.

The New Year's flood five years ago turned the river away from Table Rock and sent it crashing through a series of old aggregate pits before spilling back into its original channel between Gold Ray Dam and TouVelle State Park.

If left to its own devices, the river's winter flows will continue blasting through more old pits, eventually drying up about a mile of prime riverbed that has channeled the Rogue since before the 1930s.

"If we can arrest this erosion now, it will help move the river from its current location to its historic channel past Salmon Rock," says Frank Schnitzer, a state geologist spearheading the project.

That's big news for anglers and river-lovers such as Mike

see **FREEMAN**, Page 3D

Reach reporter Mark Freeman at 776-4470, or e-mail mfreeman@mailtribune.com

Freeman

from Page 1D

Ayres, one of dozens of people who regularly fished the Salmon Rock hole in pre-flood years.

Returning stream flows past Salmon Rock would transform the hole — now just a warm-water slough used only by juvenile salmon — back into a key holding spot for adult chinook and a prime fishing spot for anglers.

"It wasn't just that we caught a lot of fish there," says Ayres of Medford. "To me, it was the aesthetics as much as anything — fishing right under the Table Rocks. It'll be good to have that back."

When completed next year, the project will cost more than $1 million, with more than half of that coming from state funds. The Oregon Watershed Enhancement Board last month gave $283,000 toward the project, while the Oregon Department of Transportation is expected to kick in more than $220,000 next year.

The remainder will come from donations of equipment, time and material from various clubs, businesses and area landowners with an interest in getting the Rogue flowing again near Salmon Rock.

Schnitzer

The actual rock is a house-sized piece of basalt that juts into the river from an underground rock formation that is most likely the base of Lower Table Rock. Decades, perhaps centuries, of flowing water carved a deep hole around the rock big enough to hide three truck-and-trailer rigs under water.

This deep, cool hole was the first main resting place for salmon once they traversed Gold Ray Dam more than two miles downstream. At one time, this made Salmon Rock so popular a chinook-fishing spot that some anglers would buy $35,000 jetboats just for the chance to fish there because walk-in access is closed and driftboat access is limited because there are no public ramps downstream of it.

But that all changed when flood water blasted through a 250-foot earthen berm and into a state-owned and abandoned gravel pit. The water then rammed through another berm before dumping back into the main channel downstream of Salmon Rock.

Since then, the river has gouged a bigger hole in the berm and built up a midstream island that cuts all flows toward Salmon Rock.

The rechanneled river dumps an estimated 100 tons of sediment annually into that stretch of the Rogue, according to a 2000 state assessment. Future floods also threaten to blast through more berms and farmland all the way to Kirtland Road, the assessment reported.

"We know that it's bad, and we know that it would get worse if we didn't do something about it," says Schnitzer, a reclamationist with the Oregon Department of Geology and Mineral Industries.

Schnitzer helped devise a plan to reroute the river by installing huge piles of large rocks, called barbs, to slow down water flows and fortify the berm. Earth movers thickened the berm, and its slopes were either planted with willows or lined with the willow branch piles.

Eventually, the berm's top will be replanted and together it will create 150 feet of new riparian vegetation.

Next year, with ODOT funding, Schnitzer hopes to dig out the island so winter high water will begin to channel back, eventually scouring a path that will carry the Rogue's summer flows again past Salmon Rock.

"It's hard to say how long it's going to take," Schnitzer says. "But it probably will take more than one flood event, and more than a few winters."

But when it does, the salmon will return to Salmon Rock. And so will Ayres.

"I think most fishermen will want Salmon Rock back," says Ayres, who has volunteered on the project. "I know I do."

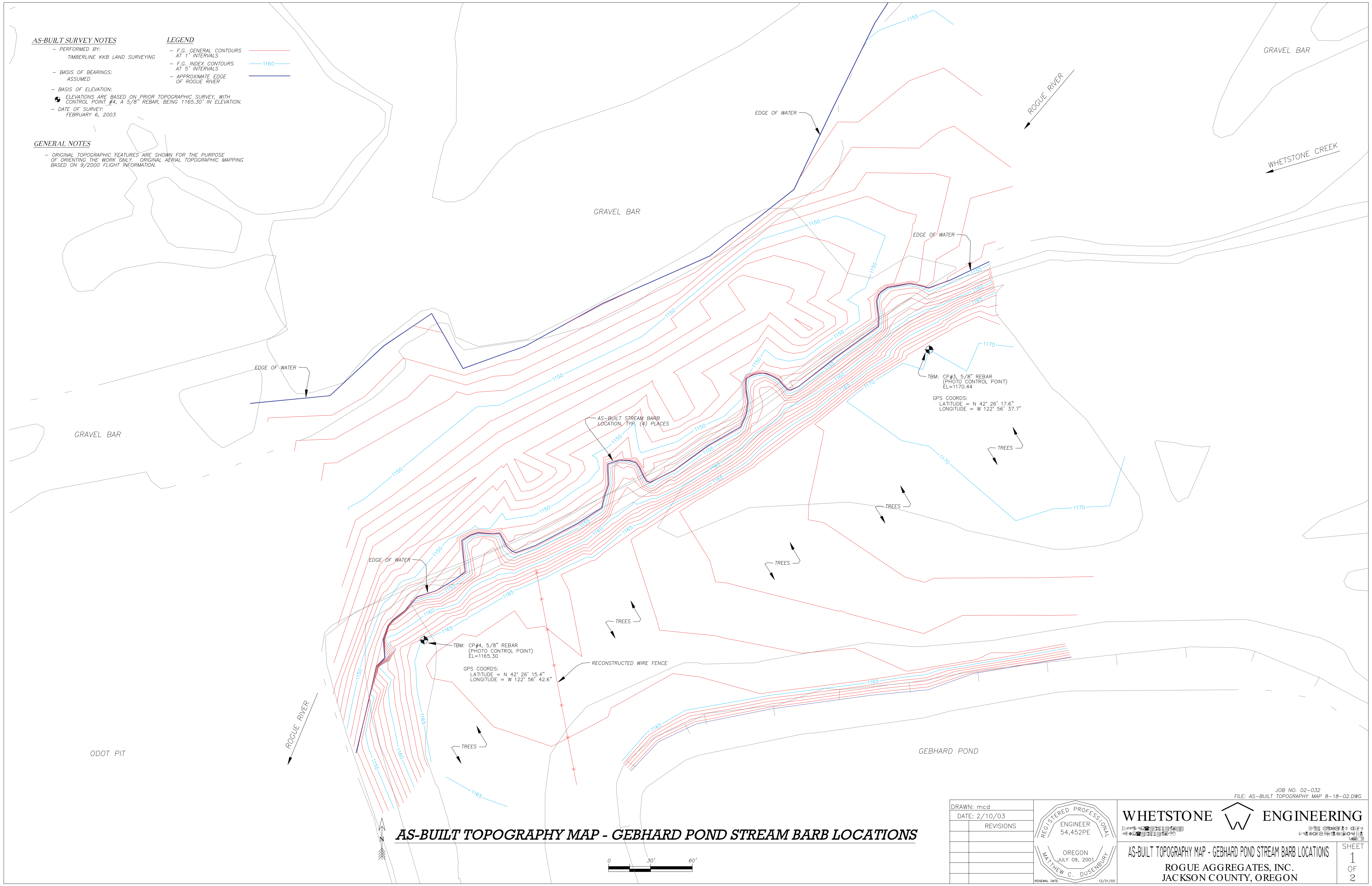
6.0 ACKNOWLEDGMENTS

This report was edited by the Mineral Land Regulation and Reclamation staff.

7.0 APPENDICES

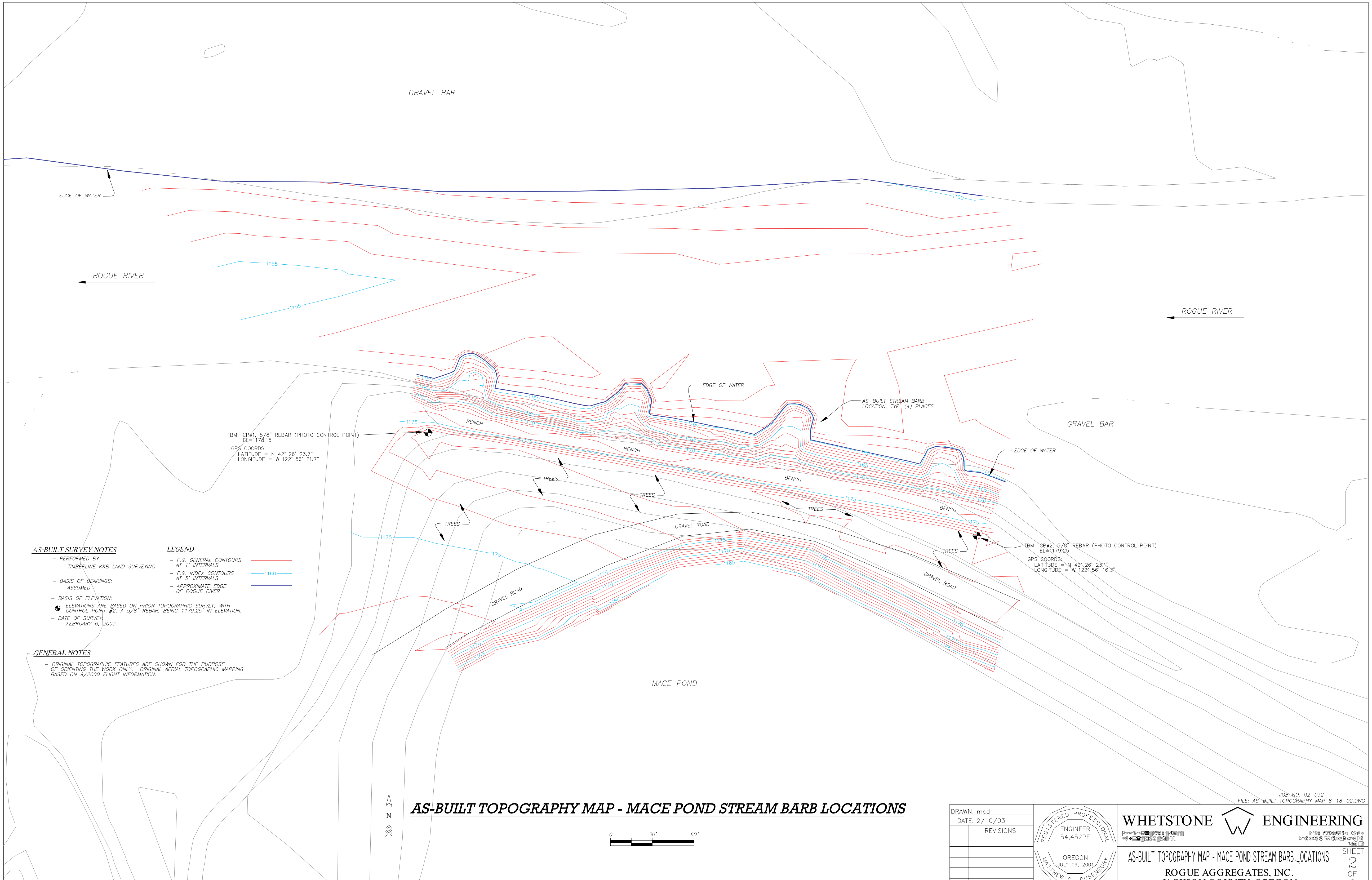
7. 1 Appendix A – Gebhard As-Built Topography Barb Locations and Bank Reshaping

Appendix A – Gebhard As-Built Topography
Barb Locations and Bank Reshaping



7.2 Appendix B – Mace As-Built Topography Barb Locations and Bank Reshaping

Appendix B – Mace As-Built Topography
Barb Locations and Bank Reshaping



7.3 Appendix C – Donation and In-Kind Contribution Details

DOGAMI Volunteer Hours

Includes hours recorded in daily logs and includes travel, meetings, field tours with permitting agencies, legislative and media tours, along with planting, plant maintenance, and hours spent installing the irrigation system. These hours were not billed to the project. The total represents a conservative calculation. In actuality not all hours were recorded in the daily logs.

Time Period	Staff		HOURS
2001		Mundie	90
		Schnitzer	215
2002	September/December Planting:	Dawn Marshall, Bob Houston, Vaughn Balzer, Ben Mundie, and Frank Schnitzer	303
	Other Hours:	Schnitzer	316
		Lynch	20
2003		Schnitzer	206
		Mundie	51
Total DOGAMI Volunteer Hours			1,201

Non-DOGAMI Volunteer Hours

A total of 297 hours was provided by other volunteers (156 hours in September and December 2002 and 141 hours in April 2003). Work accomplished included tree and shrub plantings, mulching, and weeding. Volunteers included Rogue Flyfishers, Bear Creek Watershed members, adjacent landowners, other agencies, and individuals, a Boy Scout Troop, and the Crater High School Ecology Lab students.

Pre-Construction, Non-DOGAMI Donations

Name	Donated Services	Amount
Whetstone Engineering	Surveying	$ 6,400
Knife River Corp., Inc.	Surveying/travel	4,270
Lidstone & Associates	Surveying/conceptual design	11,400
	Travel	6,655
Bob Mace adjacent landowner	Jet boat for surveying	4,000
Rogue Aggregate	Geomporphic study	36,000
	Aerial photo/mapping	13,790
	Permitting - local, state, federal	1,755
	Personnel and equipment for surveying	4,200
Total		$88,470

Appendix C – Donation and In-Kind Contribution Details (continued)

Construction Donations

Name	Donated Service/Supplies	Amount
Rogue Aggregates	Supplies – 3,955 CY @ $15/CY	$ 59,325
	Services – Earth moving equipment and operator	79,000
	Services – Water Truck	2,000
	Services – Project management personnel (Bob Hulla)	4,200
	Sub-Total	$144,525
Lidstone and Associates	Services – Labor	$11,702
	Supplies – Travel	898
	Sub-Total	$ 11,702
TOTAL		$156,227

Donations for Plant Establishment and Maintenance

Donor	**Description**	**Value**
Rogue Aggregates	Cobbles for weed barriers – 20 yards	$ 200
	988 Loader – 3 days @ $520/day	1,560
	Haul truck – 1 day @ $400/day	400
	Grader – 1 day @ $560	560
Jackson County	Wood chips (mulch) 500 yards	2500
John's Repair	Tractor with bucket – 8 hours @ $50/hour	400
	Four wheeler with dump bed – 8 hours @ $25/hour	200
Vern Gebhard	Straw mulch, September 2002	260
	Straw mulch, April 2003	300
	Tractor and seed drill	500
BLM	Pondersoa Pine propagation – 140 trees at $4/each	560
Bernert Nursery	Containerized willows, 200	600
Laborers	Johns Repair – 2 men – 20 hours	900
	High Banks Rock – 1 man – 8 hours	208
	Rogue Aggregates – 2 men – 16 hours	416
Total		$9,564