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**"Small Dam Removal in Oregon
A Guide for Project Managers"**

Denise Hoffert-Hay

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Small Dam Removal in Oregon

A Guide for Project Managers

By

Denise Hoffert-Hay

December 2008

OWEB

About OWEB

The Oregon Watershed Enhancement Board (OWEB) is a State of Oregon natural resource agency that promotes and funds voluntary actions to enhance Oregon's watersheds. The agency fosters collaboration among citizens, agencies, and local interests to accomplish its charge. Such collaboration supports Oregon's statewide efforts to restore critical salmon runs, improve water quality and quantity across the landscape, and enhance the biological diversity of ecosystems.

OWEB administers a competitive grant program that annually underwrites approximately $30 million in watershed protection and restoration actions across the state. The agency also invests approximately $10 million annually to conduct research and monitoring and to provide technical assistance that relates directly to supporting successful watershed restoration and protection. These investments are vital for grounding OWEB's policies and project funding decisions in the best science available, and to the successful implementation of restoration projects.

About this guide

This is a "living" document in the sense that it is posted to the website, not printed. We have done this in recognition that small dam removal in Oregon is relatively new, and will most likely be an evolving activity. Specifically, the permitting process is fluid and ever-changing.

Therefore, to keep this guidance current and useful, our intent is to update periodically — to capture not only changing regulations, but to include new small dam removal projects subsequent to the one featured in this guide. Our hope is that as small dam removals become more numerous across Oregon that project managers will use this guide and send us their comments on how it can be improved. If you have comments to offer, photos to provide, new or different hotlinks, please send an email to: wendy.hudson@state.or.us.

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Cover photo: Peoples Irrigation District Diversion Dam, Crooked River. Photo credit: Rachel Schwindt

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Acronyms

BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practice
BiOp	Biological Opinion
CR	Conservation Recommendation
DEQ	Oregon Department of Environmental Quality
DSL	Oregon Department of State Lands
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FONSI	Finding of No Significant Impact
FTP	File Transfer Protocol
IP	Individual Permit
JRFPA	Joint Removal Fill Permit Application
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NWP	Nationwide Permit
OCMP	Oregon Coastal Management Program
ODFW	Oregon Department of Fish and Wildlife
OPRD	Oregon Parks and Recreation Department
ORI	Open Rivers Initiative
OWEB	Oregon Watershed Enhancement Board
OWRD	Oregon Water Resources Department
PRG	Project Review Group
RFP	Request for Proposals
RFQ	Request for Qualifications
SEF	Sediment Evaluation Framework
SHPO	State Historic Preservation Office, Division of Oregon State Parks
SLOPES	Standard Local Operating Procedures for Endangered Species
SOQ	Statement of Qualifications
SOW	Scope of Work
SWCD	Soil and Water Conservation District
USACE	U.S. Army Corps of Engineers, also commonly referred to as “the Corps”
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Preface

This guidebook is born out of the experiences of one dam removal project in the mid-Willamette Valley, Oregon. Going through the decision-making, regulatory, and contracting processes to implement the Brownsville Dam Removal and Flow Restoration project I often lamented that there was not a guidance document that laid out the process. My watershed council and I wrestled with some complex issues during the five years it took our project to move from idea to dam removal, and we often lacked enough information to make all the decisions that had to be made.

The Oregon Watershed Enhancement Board (OWEB) was a key funding partner for our project and was aware of the challenges we met to implement our dam removal. After our project's successful implementation in September 2007, the Regional Program Representative for the Willamette Valley, Wendy Hudson, approached me about producing a guidance document to assist other project managers and groups considering dam removal.

I am not a dam removal expert, and at the time, had worked on only one dam removal in one watershed in the Willamette Valley. But I believe my experiences in bringing together a diverse group of stakeholders, reaching consensus on dam removal, hiring a project engineer, developing a scope of work, receiving (nearly) every possible state and federal water-related permit, and implementing a dam removal are universal tasks in the current permitting and funding environment. There are things I would do differently if I had it to do over again (oh hindsight!) and I try here to capture those ideas and make recommendations to assist you in avoiding the same pitfalls.

While dam removal is currently a rare restoration project type in Oregon (three to four small dams have been removed each year in Oregon for the past several years), in the coming years as more structures reach their design life of 40-50 years, more watersheds will be faced with the decision of whether to remove or repair aging dams. To broaden the lessons learned and offer advice from projects of varying sizes and complexities, lessons learned are included throughout the guide for projects in Oregon as well as webpage links to publications, reports and news stories on Oregon dam removals (Appendix F).

If this guide does not answer all of your questions or provide you with the assistance you need, understand it is a working document. Email your comments for improvements to: hofferthay@peak.org.

Acknowledgments

Several people participated with review of this document and offered their substantial knowledge. That said, any errors or omissions are entirely my own.

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Introduction

"Small dam" or even "dam" is not specifically defined in any of Oregon's statutes or rules. The only state agency to prepare a definition — the Oregon Water Resources Department — describes a dam as "any artificial barrier (including appurtenant works) across a watercourse or valley for creating a reservoir, diverting water from a channel or creating hydraulic head that impounds or diverts the flow of water" http://www1.wrd.state.or.us/pdfs/dam_safety_guide.pdf (pg 30).

Oregon is not unique in lacking a clear definition of small dam. More than a dozen definitions are used by state and federal agencies. This lack of common vocabulary for describing small dams is attributed to the fact that every river and dam pair is unique; what is a small dam on one river can be quite a large structure on another. Rather than using a numeric metric to describe the size of a small dam, this guidance will focus on "run-of-river dams" with low head that are overtopped during winter flows, yet impound limited water during summer months. A run-of-river dam does not create an impoundment or reservoir that overtops the natural channel banks.

There are many publications that describe the impacts of dams on watersheds, and that information will not be included or re-stated in this guide. Additionally, this guidance will not address dams that are licensed by the Federal Energy Regulatory Commission (FERC) or industrial dams that were built expressly to create an impoundment in the river. Little guidance exists on removing FERC-licensed dams. However, a paper from the American Bar Association Conference is a good starting point for exploring FERC removal projects (and provides several Oregon examples). This guide also does not address how to implement ancillary projects (i.e. pump stations, water intakes, etc.) that are often undertaken in conjunction with a dam removal project. For information on installing a successful pump station project, contact the ODFW Fish Screen and Passage Program.

Why Consider Dam Removal?

Most small dams were constructed to provide economic and social benefits, including:

- Diverting or storing water for irrigation
- Diverting water for powering mills
- Storing water for log ponds at mills
- Storing water for livestock use
- Storing water for fire protection

Very few dams have been constructed in Oregon to store water for municipal use, generate hydropower, or create recreation opportunities.

As a result of changing technology and values, many small dams in Oregon have out-lived their original purpose due to changes in Oregon's economic and resource landscape. These relic dams that have out-lived their useful lives are good candidates for removal. The financial burden of maintaining an aging structure can far outweigh the benefits of keeping it. If there are any

threatened or endangered species present in the waterway, the cost of complying with the federal Endangered Species Act may outweigh the benefits of maintaining the structure. Additionally, landowner insurance costs and public safety risk may outweigh the dam's benefits. Common goals for dam removal projects include:

- Restoring habitat for anadromous and resident aquatic species
- Restoring natural flow regimes
- Improving water quality
- Removing a maintenance headache
- Removing a public safety hazard

Limitations of This Guide

Writing a guidebook about small dam removal is fraught with constraints and complications. This guide will not be able to answer every question that arises in considering, planning and implementing a dam removal project. Only five states have developed a method for evaluating dam removal or regulations to treat dam removal separately from other fill/removal type projects (American Rivers, 2006). William L. Graf, editor of the *Proceedings of the Heinz Center's Dam Removal Research Workshop (October, 2002)* laid out a series of disconnections in dam removal research that also hold true in explaining the challenges of putting together this guidance document. His headings and ideas are excerpted and re-worded here to reflect the challenges faced when preparing this dam removal guidebook.

- **The General vs. the Particular:** Each dam removal project tends to be a case study unto itself; it is difficult to generalize to all other dam projects. Where possible, this guide works to include the variety of options you may encounter when implementing your project. Dam removal is a relatively new restoration activity nationwide and in Oregon. No firm and fast guidelines specifically address dam removal projects from a regulatory perspective.

- **Small Dams vs. Large Dams:** Almost every dam removed in the United States (to date, 600 or so) has been a small dam. Small, low-head, run-of-river structures have relatively simple operations, and their effects on river hydrology are more easily understood. Large water storage dams have complicated operations and their watershed effects are similarly complex. Guidance for removing large dams does not exist in any form. This guide focuses on "small dams" because their removal is easier to implement, their number is much greater and they are more likely to be in need of repair or abandoned. Most small dams were built with a specific social or economic purpose (e.g., timber crib, fire protection, irrigation storage) and in many cases that purpose is now either non-existent or possible to meet through other means.

- **Small Rivers vs. Large Rivers:** Small streams have simpler hydrology and sediment regimes. Watershed management practices that impact small streams are more easily researched and understood. The larger the river, the more complex the system. Small streams mean fewer landowners — fewer stakeholders to educate and bring into a decision-making process. This guide is geared toward small rivers.

- **West vs. East:** Most theories of river processes have been developed for the eastern United States where the 100-year flood can be as great as 50 times the average annual flood. In the West, 100-year floods can be as little as five times the average annual flood. In Oregon, system-forming events are more frequent in the wet, west side. Dam and flood suppression effects tend to be greater in the arid east side (with the exception of the Deschutes River). Because this guide focuses on a small dam removal in western Oregon, those considering similar activity in eastern Oregon will need to examine, and possibly modify, concepts presented here and elsewhere.

- **Private vs. Public Land:** Land ownership along the shores of reservoirs and stream banks differs from eastern to western Oregon. Eastern Oregon has more publicly owned land; dam removals have the potential to impact not just local landowners, but a regional or national constituency as well. West side dams tend to be on private property; any changes in the watershed following the removal of a dam have potential for conflict due to all the individual private interests in the watershed. The decision-making processes will be different in these two regions and will require different approaches. This guide focuses on dam removals on privately owned property.

How to Use This Guide

Each chapter in this guide is a stand-alone component; if you require information just on permitting, you can go directly to that chapter. Links to web sites with summaries of the types of information you will find there are included to bring depth to some of the more complex components of dam removal. Perspectives from project managers are included in callout boxes, "Voices from the Field" to give some idea on the variability of these types of projects.

Chapter 1. Project Management

Project management is key to your project's success. A good project manager shepherds the project from start to finish, keeping the myriad details on track, providing motivation to weary volunteers (and agency staff alike), and holding close the vision of the free-flowing river. Ideally, the project manager will have the skills to manage stakeholder outreach, as well as provide project oversight — from permitting and contracting through to removing the dam. A good project manager will save your project time and money. You may have (or be!) the right person for this job on your staff already; if not, hiring this person before any other project personnel is critical.

Project Manager Work Plan Elements

The work plan can be divided into four major tasks: *1. Communication and Project Coordination; 2. Facilitation/Participation; 3. Field Work;* and *4. Research*. Each of these tasks is further divided into several sub-tasks. Some of these will not apply to your project based on its size and on the staff expertise available. For example, if you have an outreach coordinator, many of the communications pieces outlined here may be tasked to that person. This is a general work plan providing the major project components that can be tasked to the project manager.

Task 1 – Communication and Project Coordination

- Communicate in writing and through public meetings, etc., with stakeholders, the engineering firm, and the general public.
- Communicate with funding partners.
- Maintain the project schedule and timeline.
- Prepare project updates for stakeholders and funding partners.
- Prepare an engineering RFP/RFQ for procuring consultant services (Chapter 5).
- Participate in development of a Scope of Work and contract for the selected engineering firm (Chapter 5).
- Prepare project budgets.
- Review and approve project invoices from consultants.
- Maintain project records of all project communication, permits, reports, plans, etc.
- Attend conferences to present project outcomes and lessons learned.

Task 2 – Facilitation/Participation

- Facilitate public meetings for project.
- Facilitate hiring process for project engineering firm and construction firm.
- Facilitate technical team meetings.
- Prepare for and facilitate an open house for potential engineering firms to receive a tour of your project site and understand your needs (prior to submission of RFQs/RFPs – See Chapter 5).
- Facilitate project permit processes and communication between your engineering firm and agencies by initiating meetings before submitting permit applications. This may be something your engineering firm can manage, but if you have an experienced project

manager who already has relationships with the permitting agencies, that person can play a big role in moving your permits forward. Also, tasking your project manager with the permitting process, rather than the engineering firm, can save your project a lot of money.

- Develop presentations on the project status and deliver them periodically (two-three times per year) to local stakeholder groups to build and maintain awareness and support for the project.
- Facilitate Technical Team (or other oversight group) review of all engineering designs and permit applications.
- Develop/facilitate a pre- and post-dam removal monitoring process (Chapter 8).

Task 3 – Field Work

- Prepare for and lead field trips to the site for agency staff, engineering firms, other contracted resource professionals, construction firms, etc. (Chapter 4).
- Participate in any on-the-ground data collection as needed (e.g., pebble counts, survey, water quality sampling, sediment sampling, vegetation mapping, installation of monitoring equipment, etc.) (Chapter 4).

Task 4 – Research

- Assist the selected engineering firm with background data collection. This can potentially be a huge budget saver. If, for example, the project requires substantial records collecting (for flow data, historic photos, aerial photos, wetlands information, fish usage, etc.) having the project manager undertake this data collection will be less expensive than if the engineering firm handles it. If the project manager already has familiarity with the watershed, this data collection will also be much quicker.
- Research and collection of information on other dam removal projects of similar size including budgets and lessons learned.
- Research, read, and relate information on permit processes.

Chapter 2. Making the Decision

This chapter is about how to create the environment for making an informed decision. Not all public outreach processes will result in a decision to remove a dam. In some instances, the decision may be made to maintain the dam and improve fish passage, and in others the decision may be to do nothing. Using a decision-making process does not guarantee the outcome will be a decision for dam removal. This guidebook focuses on projects that pursue full dam removal.

The timeline for this stage of project development will have the greatest variability of all the project components, depending on local circumstances. Some decisions will be able to be made relatively quickly if solid data are available, goals and objectives are readily defined, and landowners support the project. Other projects may have to collect significant data to outline options to gain local community support. This stage may take anywhere from one to several years.

Several excellent resources are available to assist you in making the decision on whether to remove a dam. Rather than invent a new process, summaries of the available tools and links are provided in Appendix F.

Building Organizational Support

Your dam removal project will most likely be the most expensive, most visible, and most stressful project your group will ever undertake. It will also be the most rewarding, soul-satisfying, and ecologically significant project your group will ever undertake. The range of strong emotions and complexity that surrounds dam removal will challenge your group in ways you cannot prepare for in advance. Dam removal projects can be technically and socially challenging. To take on a dam removal project effectively, your group must build internal support for the project. Once internal support is assured, your group must implement steps to inform the larger community and gain stakeholder buy-in, explained in more detail below.

Strategies that will ease the path for your group:

- **Complete a watershed assessment or analysis** that identifies the fish passage barriers for your watershed. If dam removal is at the top of the list of priority projects, it is hard to ignore.
- **Educate your group.** Collect information on the dam's impacts to your watershed's health, especially to its aquatic resources. Take numerous field trips to the site at different times of year to see it under different conditions. Build understanding of why the dam is a problem and what the river and watershed would be like without it. If possible, invite agency fisheries staff to talk about the aquatic resources impacted by the dam. View the dam during migration when fish passage is blocked.
- **Build relationships with key partners.** Invite key agencies and funding organizations to participate in your organization's discussions about the concerns regarding the dam's impacts to your watershed. Let people see your process. Be open about what your group's ultimate goals are for the watershed and river. But be clear that compromise is part of the process to reach those goals.

- **Tough decisions require strong leadership.** Your group's chair or president must fully support the project and be ready to represent it to the community. The task ahead is difficult enough and if your group's leadership cannot support dam removal, gaining community support will be that much more challenging.

Public Outreach

When it comes to enhancing stream function and fish passage at the site of a dam, there is no one-size-fits-all community decision-making process. This can be a complex and emotional decision for a community, whose members most likely will have little or no knowledge of watershed processes and functions.

Conflict is going to be part of the decision, but that does not mean that making the decision will be impossible — it just means enough time is needed to provide outreach and education to stakeholders to outline all the concerns with the dam, true costs of maintaining the status quo, and available options. Expect a negative public reaction and be ready to respond to the expected concerns. If you end up with no opposition — great, you are that much more prepared for the next phase of the project. It may take time — years even — to build support for the project as you work through the process of gathering information and laying out the options.

Voices from the field

Denise Hoffert-Hay, Project Manager
Brownsville Dam, Calapooia River
Removed 2007

"The Calapooia Watershed Council viewed the Brownsville Dam as a significant barrier to fish passage. As a result, the council initiated a community-wide discussion on fish passage alternatives, including the feasibility of dam removal. The dam, however, created a popular swimming hole in the summer, and the Council knew that efforts to remove it would be met with community resistance.

At the same time, the dam's owners were concerned about liability issues stemming from the 40-year old dam, and so the Council sought an unbiased, third-party assessment of the dam's safety issues. In a subsequent report, the Oregon Water Resources State Dam Safety Inspector identified serious safety issues. Those issues, combined with the engineering contractor's estimate for repairing vs. removing the dam, ultimately convinced the community that the dam simply needed to be removed."

Open and frequent communication is essential to the success of this outreach process. Use the information-gathering phase as an opportunity to share information as you go. When community members come to appreciate that your group is committed to understanding the issues and working for the benefit of everyone in the watershed, they will be more likely to support the community's ultimate decision, or at least agree not to stand in the way.

There is one key component for a successful decision-making process: **Involve all key community stakeholders early and often**. Your ability to achieve community trust and consensus will depend on this successful outreach and transparent process. To identify key stakeholders, it helps to provide answers to the following questions:

- Who owns the dam?
- Who benefits from the dam being maintained and operated as it has been in the past?
- Who benefits from the dam's removal?

In terms of process, it helps to do the following:

- Involve key community leaders early in the process. Gain their support for the project. Enlist their help in getting the word out on the project.
- Provide opportunities for public meetings where there is plenty of time for discussion. If you anticipate a "tough" crowd, plan ahead and enlist support from key community members to attend and speak up in support of the project. Too often, only "squeaky wheels" attend and speak up at public meetings; supportive people either do not attend or do not want to stand up to vocal opposition. Those who want to maintain the status quo are typically more eager to be loud and negative at a public meeting.
- Be patient. The decision to remove a dam takes time to percolate through the community's consciousness. People who are initially opposed may not maintain that view once they understand all of the reasons removal is being considered and what is involved in keeping the dam.
- Ask questions to find out the reasons some people are opposed to the project. Do not presume to know the reasons people are unhappy with the proposed project. You can better allay fears if you understand what the real concerns are and perhaps you can mitigate for them in the design or implementation of the project.
- Avoid arguing and staking out your personal position on the options. If asked your opinion, be candid. State that you are personally in favor of dam removal (assuming that you are since you are reading this guide), but that you are keeping an open mind as all the information is presented.

Figure 1. Removing the flashboards from Brownsville Dam, August, 2007.

Outreach Strategies

Project scale and community needs determine which outreach strategies to pursue for the project. Some strategies are included below to give you ideas to use when designing your outreach strategy. Not all the strategies shown below will be applicable to each project. For a very small tributary dam, the level of outreach described here would not be required. But for a mainstem dam involving multiple interest groups and stakeholders, the strategies below are needed. Not all outreach needs to be provided by the project manager. The project manager can set the stage and get the right people in the room, but the people doing the talking should be the council, board, dam owners, irrigation district, etc.

- Frequent public meetings throughout the decision-making process offer stakeholders the opportunity to receive information and have a safe and facilitated exchange of ideas. They can be used to reach a large group of people when it is not realistic to have one-on-one conversations. Topics to consider for public meetings include:
  - *Watershed Functions Background*: Community education prior to exploring dam removal to describe river processes, watershed functions, how the dam is impacting the river, condition of the dam and management options.
  - *Remediation Alternatives:* Public meetings to provide the science and social costs of various alternatives designed to remediate stream function and fish passage issues at the dam.

- Questionnaires, focus groups, and surveys can be used to gather information on community opinions in a way that does not require people to speak up in a public meeting setting.

- Reach out to the people who are the community leaders and share project information by attending their meetings, rather than expecting them to attend your outreach meetings. Give presentations to community groups and members. Attend city council meetings, chamber of commerce meetings, Kiwanis, etc.

- Submit articles to the local paper to provide information on each step of the process and announcements for upcoming public meetings.

- Conduct door-to-door outreach of affected landowners (to provide information and

Voices from the field

Daniel Newberry, Project Manager
Buck & Jones Dam Removal, Applegate River watershed, removed 2005

"Through all the trials on this project, we learned several lessons that are relevant to large restoration projects with multiple participants.

- The more complicated and involved the project is, the more detailed the written agreement should be among the parties.
- Easements and other critical legal documents need to be signed prior to the fundraising for the construction phase of the project.
- On a project of this magnitude, no individual landowner should be given disproportionate decision-making authority over the outcome, or control communications with the other landowners.
- Invest more time and energy in community outreach."

Excerpted from:
http://www.switzernetwork.org/viewArticle.taf?id=50

answer questions/concerns). This is usually best done by first sending a letter out to landowners letting them know the dates and times you will be out knocking on doors so that they are not "ambushed" by your arrival on their doorstep. If no one answers, be prepared to leave an invitation to the next community meeting.

A list of available resources and tools to help you frame your decision-making process is available in Appendix F. Figure 2 below is a sample timeline based on the Calapooia Watershed Council's experiences with the Brownsville Dam.

Figure 2. Sample Timeline of Decision-Making Process

Decision Making Steps	Year 1	Year 2	Year 3
Organize separate meetings with key stakeholders (dam's owner, affected local landowners, local government) to introduce the council, its interest in remediating the dam, and its plans for reaching out to the local community.	◆		
Organize field trips to the site with natural resource professionals who work in the watershed to discuss management options, impacts of dam on fish passage, previous attempts to improve passage on the fishway, etc.	◆	◆	◆
Submit articles and press releases to local media that detail your process and information you are learning about the dam; advertise upcoming opportunities for public input.	◆	◆	◆
Use a watershed assessment. Share watershed limiting factors and recommended restoration actions with stakeholders at a community meeting.	◆		
Arrange for the State of Oregon Dam Safety Inspector to inspect the dam.		◆	
Meet with the dam's owners to request permission to seek technical assistance funding for exploring dam management options.		◆	
Prepare applications for technical assistance funding.		◆	
Use technical assistance funding to lay out all options for managing the dam including: do nothing, repair and install fish ladder, remove dam.		◆	
Develop a strategy or evaluation tool for how you will evaluate the options explored in the technical assistance grant.		◆	
Make presentations to community leaders on the dam's impacts to the watershed, process being used to make a decision about management and next steps. Indicate how the community can be involved.		◆	◆
Outline the decision-making process with the dam's owners.		◆	
Arrange for one-on-one outreach to affected property owners.	◆	◆	
Convene community meetings to allow public comment prior to the owner's decision for dam removal.			◆
Secure endorsement of the dam removal option by key community members (mayor, dam owners, letters to the editor in local paper supporting the project)			◆

Lessons Learned on Public Involvement

The Aspen Institute has a report with a very good chapter on "Lessons Learned." The lessons learned on public involvement are excerpted here:

- Recognize that public understanding and involvement are critical components of dam removal projects. The need for them does not end with the decision to remove a dam. It continues through the physical removal process and into the years following removal as the river adapts to a new condition.
- Most concerns about dam removal are based on a lack of adequate information and can be addressed by providing information. Be prepared to address misinformation in a straightforward, easy-to-understand manner. However do not assume that disputes are based on fact; it simply may not be possible to reconcile some disagreements because they are mired in emotionalism rather than logic
- Do not underestimate the degree of public concern for the potential for loss of flood control due to dam removal. Recognize that even when dams slated for removal have no flood control function, flood control and flooding are issues that must be addressed early in the planning process and throughout the design process. Provide accurate information about past flooding before and after dam construction, current flood conditions, and flooding potential (if any) following dam removal or modification.

Figure 3. Brownsville Dam, December 6, 2003 during a 2-year rain event.

Chapter 3. Enlisting Technical Support

Technical teams are often used by watershed councils and SWCDs to gain input, advice, and expertise from agency staff on complex projects. Formation of a technical team is quite variable; agency staff in the different regions of the state have varying levels of expertise and ability to commit to these projects. Gaining support for your project and chosen alternative is much easier to do in person rather than over the course of emails and individual phone conversations. Use of a technical team allows for project communication between agency staff and the engineering firm, as well as with your organization so that complexities and project details can be addressed.

It is a good idea to have a broad technical team with wide representation with the understanding that smaller working groups may convene to address specific issues as they arise. Keep a broad email and phone list that you use to keep everyone apprised of the project and its progress, but be prepared to schedule meetings and make decisions with a smaller, more focused group when appropriate to make the best use of everyone's limited time. For example, you may have a small working group that meets to work through permitting issues, one that meets to outline outreach strategy and another that meets to address monitoring.

Do not hesitate to ask for agency support early on in the process, even before you have hired a project engineer. You will need support for developing the project's scope of work, for outlining project goals and objectives, and for understanding permitting requirements. Agency representatives will generally be interested in working on a dam removal. It is a fairly new project type and something not many people have the opportunity to undertake during their career.

Technical team role and composition:

- Use a technical team for the different phases of the project including: forming the project goals and objectives, contracting with a project engineer, and providing design review. Technical team members may change for the project's different phases, but a core group of project supporters who are involved from the beginning should participate in each step of the process.
- Recruit permitting agency team members for the design development phase of the project. They will be the most pressed for time, so plan meetings and locations to best allow for their participation.
- Recruit fisheries specialists if your project involves ESA listed fish. NOAA Fisheries and ODFW support for the project will be critical for receiving permits.
- Other representatives to consider include: landowner(s), community representative(s), and local government representative(s).

Successful Technical Team Meetings

Technical team meetings are no different than other group meetings (council or board meetings, public meetings, etc.). However, in this case you are convening busy agency personnel and paying top dollar for your engineering firm's participation. Most engineering firms bill anywhere

from $100 and $180 per hour for senior level experts; hence, it is important to strategize these meetings ahead of time to make the most of people's time with the least impact to your budget.

Remember:

- If you do not have a project manager with excellent facilitation skills, a technical team member may be able to provide this service for these group meetings. Alternatively, your engineering firm may be able to provide facilitation, though at a cost.
- Send out an agenda a week or two in advance of the meeting. Ask for any feedback or additional agenda items.
- Provide any design information or handouts in advance as well. Engineered design drawings are large files, even when turned into PDF documents. Utilize an FTP site or website (if your group or engineering firm has one) for all project-related information to make it readily accessible.
- Place meeting minutes, agendas, background on the dam, data, etc., on a project web page. This will ease file transfer to provide project information to the engineering firm as well as to technical team members.

Figure 4. Members of the Brownsville Dam technical team at the dam's breaching ceremony, August 27, 2007.

Chapter 4. Getting Started

At this point in your project you have developed a public outreach strategy and recruited a technical team. Now, it is time to use the technical team to help with the tasks below that will be described in the following sections:

1. Review site background data and identify data gaps.
2. Develop project goals and objectives.
3. Prepare a funding strategy.

Review Site Background Data and Identify Data Gaps

Not all projects will require all the information below and not all projects will have this level of data available. For most dams, the list below gives you an idea of the amount of information that may be required/useful for designing, permitting and implementing your project. Information (marked with *) can be collected by the engineering firm you contract with to implement the project. Your technical team may be able to help you locate some of this information.

- Site map (USGS 7.5' topographic map)
- Site and aerial photos (including historical photos, if available)
- As-builts (plans that show how the original dam was constructed)
- Type of construction
- Dam dimensions
- Year the dam was built
- Dam operations and maintenance
- Condition of dam
- Past dam inspections/Dam safety reports
- FEMA Flood Insurance Studies (FIS)
- USGS gauge data for flow
- Geological or soils mapping available on NRCS Web Soil Survey 2.0 http://websoilsurveynrcs.usda.gov/app/
- Upstream land uses (identify the potential for contaminants to have entered the waterway and to have been stored in the sediment behind the dam)
- Presence of ESA species or state species of concern
- Existing watershed water quality issues directly up and downstream of the dam site

Voices from the field

Cindy Thieman, Project Manager
Owens Creek Dam, Long Tom Watershed
Removed 2007

"The objectives for the Owens Creek dam removal and riparian enhancement project were to:

- Expand cutthroat trout rearing and spawning habitat by 5½ miles;
- Restore normal sediment transport and hydrology to this section of Owens Creek, including deposition and scouring, meander formation, and a channel cross-section appropriate to its stream size;
- Control reed canarygrass and other invasive, non-native vegetation (i.e., cover no more than 5 percent of the riparian area);
- Increase native tree and shrub cover to 80% of riparian area; and
- Increase shade by 50 percent."

Excerpted from:
http://www.longtom.org/documents/newsletters/2007_07_ltwcnews.pdf

- Utility information – identify potential impacts to water lines, power lines, or other infrastructure that could be affected by heavy equipment entering and leaving the construction site, or by potential changes to the river's course following removal
- County tax assessor maps – identify easements that may be needed for dam removal construction
- Potential for presence of historic artifacts*
- Wetland mapping*
- Amount, particle size, and quality of stored sediment*
- Seismic refraction study*– for dams that store mostly coarse-grained material (less than 10% fines – sand, silt, clay) this technique can be used to determine depth-to-bedrock, and therefore, assist with determining the amount of stored sediment
- Stream survey* – This survey, which includes upstream and downstream longitudinal profiles and monumented cross-sections, is necessary for sediment and flow modeling of the system, as well as to establish benchmarks for pre/post-removal monitoring

Develop Project Goals and Objectives

Project goals and objectives will be required when you prepare grant applications. Discuss your project with stakeholders and frame it as you move forward. Your technical team can assist you in developing strong project goals and objectives. Goals for your dam removal might include the following:

- Restore natural ecosystem functions and processes including improved water quality, functioning stream channel morphology, natural hydrological processes, etc.;
- Restore passage for aquatic species;
- Protect and enhance existing cultural resources; and
- Remove a potential hazard and liability affecting dam owners.

Project objectives are more precise and should be measurable. They might include:

- Number of stream miles that will be accessible to aquatic species following the removal;
- Number of adult fish spawning upstream of the former dam site;
- Quantifying improvement in water quality indicators (stream temperature, pH, dissolved oxygen);
- Recruitment of gravel to downstream gravel bars for a specific distance downstream of the former dam or formation of gravel bars; and
- Amount of public open space or park area created (in the formerly impounded area that is recovered after the reservoir drawdown).

Prepare a Funding Strategy

Once you have the dam's background data and have developed project goals and objectives, you are ready to prepare a funding strategy. The funding strategy includes the project phases that you will seek to fund, potential grant sources, application deadlines and match requirements.

As of summer 2008, the best source for receiving technical assistance and dam removal implementation funding is the Oregon Watershed Enhancement Board (OWEB). However, you

will need to identify additional funding sources because OWEB requires a 25 percent in-kind or cash match. It is beyond the scope of this document to outline all available funding sources. Two good potential funding sources to investigate for your project (in addition to OWEB) include American Rivers' dam removal funding guide (published in 2002, some of its grant opportunities may be dated), and Open Rivers Initiative, administered by the NOAA Restoration Center. The latter is a competitive grant source for community-led small dam removal projects. Other potential partners for funding dam removal include state and federal natural resource agencies, local irrigation districts, and local community and fishing organizations. U.S. Forest Service and BLM can enter into cost share agreements with non-profit organizations for restoration or monitoring work if it the work has a good match with agency objectives. This is less competitive and can be obtained more quickly than a standard grant.

Phasing Your Project

Success in funding your project is best achieved by dividing it into phases. You will not know the entire cost of the project at the beginning, so separating it into phases and submitting applications for each phase over the course of the project will enable you to meet your funding needs over time. Potential project phases will depend on your project's complexity; the following four phases may not be needed by all projects, but illustrate the value of developing a phased fundraising strategy.

Phase 1. Public outreach and technical assistance to work with the community in developing and evaluating dam management alternatives and determining the preferred alternative. If your project will require a dam removal alternatives analysis, sediment analysis, sediment and flow modeling, or an archaeology study, you will need more technical assistance funding than what OWEB can provide in a single technical assistance grant. Open Rivers Initiative funding can be used for additional technical assistance and even for outreach, though only for dam removal projects.

Phase 2. Technical assistance for design and permitting the preferred alternative. This phase will need to take your project from design of the preferred alternative through its permitting costs. Because OWEB currently limits each technical assistance application to no more than $50,000, it is likely this amount will not be enough to cover your design and permitting costs. The funding cap does not exist with OWEB restoration grants, so ideally you would fold design

Voices from the field

Denise Hoffert-Hay, Project Manager
Brownsville Dam, Calapooia River
Removed 2007

"I thought our initial OWEB technical assistance grant of $40,000, which outlined the possible dam management options and provided design overview for each option, was enough to get us permits. This is where our project went sideways.

While the OWEB grant was instrumental in convincing the community that a retrofitted fish ladder was not an option (based on the cost of repairing the dam and installing the ladder), the OWEB restoration grant did not come close to covering all our technical assistance and permitting needs.

In retrospect, I was quite naïve about the permits process and the level of detail and analysis that ultimately were required. As a result, I had to be creative with our various restoration grants to eke out an additional $140,000 of engineering services."

and permitting costs into your OWEB restoration application to remove the dam. The drawback here, though, is that OWEB administrative rules prevent the release of any restoration grant funds until all permits have been received, and permits cannot be obtained until designs are close to completion. So as an alternative, Open Rivers Initiative funding can be used for design and permitting costs.

Phase 3. Project implementation to construct the dam removal. Once you've completed Phase 2, you know the cost for removing the dam. This cost can generally be covered in an OWEB restoration grant. Be sure to include in the application budget costs for continuing outreach, project management, and fiscal administration.

Phase 4. Monitoring and site restoration should also be components of the OWEB restoration grant. More is said about monitoring and site restoration in Chapter 8.

Keep in mind the following when seeking project funding:

- Work with your technical team to identify grant sources
- Keep an eye on the calendar and the grant cycles for different sources – some sources have only one deadline per year to submit applications
- Know the match requirements for each source. Be aware that some sources will not let you match their funds with match spent on project phases other than the one they fund. Also some sources have restrictions on what sources they will count as match.
- Project costs will be significantly higher with each passing year. So, if you are making a request to a grant source that will take a year or more to receive and implement, your budget needs to build in a 10-15 percent upwards adjustment ("contingency") for all categories in order to ensure adequate funding.
- Most funding sources will be eager to fund the actual dam removal. Finding funding for technical assistance and community outreach is challenging, but necessary. Where possible, work community outreach into a technical assistance grant, as well as into the restoration grant.

Figure 5. Walkway at former Brownsville Dam site

Sample Project Tasks for Work Plans

Prior to being able to submit project grant budgets for outreach and technical assistance, you will need a description of the work that needs to be completed. This may require that you have knowledge about the project that might be difficult to come by. For example, you need a solid understanding of the technical and societal issues facing the dam in order to write the grant; but in order to write the grant, you need paid staff time and expertise.

This means some level of work will go into putting the grant together prior to having funding for the project. You can work with an engineering firm that your group has worked with previously to help you outline the potential tasks and costs. Or you can develop the grant from talking to other dam removal practitioners to get their feedback on tasks and costs. The table below includes some potential tasks to get you started in planning your grant application. Your project may not require all of these, but this is a representation of the types of tasks you may seek to fund.

Figure 6. Sample project tasks for work plan

Hiring Project Engineer (your organization's staff)
Create and conduct hiring process including: forming Interview Committee, RFP/RFQ to hire engineering firm, selection criteria, etc.
Create SOW and timeline for all project staff and/or contractors.
Education and Outreach (your organization's staff)
Create MOU with dam's owner(s) that outlines roles and responsibilities for the project participants.
Create outreach strategy.
Conduct outreach to affected stakeholders. (2-6 meetings)
On-going communication with your group (watershed council, SWCD, other).
Participate in public meetings with affected stakeholders. (2-6 meetings)
Build consensus on preferred alternative.
Education and Outreach (Project Engineer)
Participate in public meetings with affected stakeholders. (2-6 meetings)
Technical Assistance (your organization's staff)
Build Technical Team. Facilitate Technical Team meetings (4 to 6 depending on project complexity).
Collect background site data (described in Chapter 4 of this guide).
On-going communication with agency staff.

Technical Assistance (Project Engineer)
Participate in Technical Team meetings (4 to 6 depending on project complexity). Incorporate feedback from these meetings into project design, timeline, etc.
Collect background site data (described in Chapter 4 of this guide).
Create a hydrologic model of the system.
Conduct topographic and bathymetric site survey (including longitudinal profile).
Collect current discharge data (may require instrumentation of the river).
Conduct pebble counts.
Conduct sediment sampling.
Conduct geomorphic survey.
Collect discharge data from historic records.
Analyze collected data.
Create reports, maps, and alternatives analysis of site options for maintaining or removing the dam.
Develop preferred alternative to the 30% design level (in order to be able to submit for a technical assistance grant for project implementation).
Develop preferred alternative to the 60% design level to submit for permits.
Prepare permit applications and all necessary accompanying data.
Prepare 90% design for final permit agency review.
Prepare 100% design.
Prepare bid and specification documents and distribute to potential contractors.
Manage bid process to select project contractor(s) for project implementation.
Provide construction oversight.
Provide any required site monitoring during construction (typically water quality sampling).
Prepare as-builts upon project completion.
Prepare final reports for funding agencies.
Technical Assistance (may require other contracted services if your engineering firm does not have this expertise)
Conduct seismic refraction study.
Conduct archaeology survey (per SHPO standards).
Conduct wetlands inventory.

Chapter 5. Hiring a Project Engineer

After you have received technical assistance funding, the next step of the process is to determine how you will hire an engineering firm to perform the work. A good, experienced engineering firm can facilitate your project design and implementation process with minimal delays. Take the time to find the firm with which you can work in the months and — for some projects — years ahead. The technical and communication skills of these professionals will be called upon every step of the way as your project moves from concept to construction. *(NOTE: Although you are removing the dam, all people you talk to about the project — including permit agencies, engineering firms, contractors, etc. — will refer to the dam removal as a "construction" project.)*

Voices from the field

Rachel Hoffman, Project Manager
Coal Creek Dam, Tillamook Watershed
Removed 2008

"Not all projects require hiring a design engineering firm. Our project used extensive technical assistance from ODFW for producing the sediment modeling necessary to apply for project permits. Our removal took place without any hired design work. The contractor demolished the dam based on experience and consultation with explosives experts."

For hiring a project engineer, you need to have a good understanding of what services are required to move your project forward. These include knowing whether you need a "design-build" engineering service or a "design-bid-build" engineering service. Once that is known, determine whether to prepare a Request for Proposals (RFP) or a Request for Qualifications (RFQ) to hire the project engineer. These different approaches are generally described in the following sections; however, they are not necessarily prescriptive for how to move your project forward. You have to take into account your project's complexity, your group's skills and expertise with hiring/managing contractors, previous experiences with contractors, and the constraints of your funding sources.

If you do not have experience with hiring contractors, you should consult with your group (watershed council, SWCD, etc.) as well as with your technical team. This can be a big decision and it frames how you move forward with the rest of the project.

Selecting the Appropriate Service

In a design-build service, the engineering firm you hire for the design also implements the project. Typically, projects with few unknowns choose to use a design-build process. For very small dams (push-up dams, earthen dams) the process for removal is straightforward. Since the project is not going out for a public bid, the design and engineering documents do not have to be as specific and rigorously defined. You have more flexibility with making changes and handling unknowns as they arise during construction. Design-build projects do not prepare bid documents and go through a bid process to hire a contractor to implement the project. This can save your project time and money if you are working with an engineering firm that has a good relationship with a reliable contractor.

In a design-bid-build service, you hire an engineering firm for the design and permitting work, it prepares bid documents, and then you go out for bid to hire a construction firm to implement the project. The advantage of this service is the flexibility in hiring the contractors to implement the designs. If you work with an engineering firm that does not have relationships with construction firms in your area, this approach is sensible. You have control then over the hiring process for the construction portion of the project. Some federal funding sources may require you to use this sequence rather than design-build. There is not one way that is better than the other; they are different and your group needs to feel comfortable moving forward with whatever decision you make understanding the limitations and strengths of each.

Typical Services an Engineering Firm Can Provide

A reputable engineering firm should be able to:

- Conduct a topographic/bathymetric survey to collect data for engineering design and map creation
- Conduct site assessment and any necessary data collection
- Create a hydraulic model, as necessary, for design and permitting
- Prepare dam removal designs that integrate your project goals and objectives while meeting regulatory requirements
- Inform the technical team on state and federal permit requirements and options
- Facilitate technical team meetings where design options are presented
- Present design options to technical team and community meetings
- Handle all technical aspects of permit applications
- Provide engineered drawings that can be shrunk to legible 8½" x 11" format
- Coordinate communication on permit applications between the various permit agencies
- Prepare a Contract Document for soliciting bids from contractors for project implementation (applies only to those projects using design-bid-build projects, which include the invitation for bids, addenda, proposal with engineered drawings, contract form and required bonds, specifications, supplemental specifications, special provisions, construction agreement, etc., used in the construction industry)
- Act as the construction administrator for on-the-ground work
- Implement the dam removal design (including all BMPs, permit conditions, etc.)
- Conduct any turbidity monitoring required under permit conditions
- Provide oversight of post-dam removal site restoration
- Possess good working relationships with permit agency staff
- Possess good landowner presentation skills

Recruiting a Reputable Project Engineer

After you have determined whether to use a design-build or design-bid-build service, you will prepare either a Request for Proposals (RFP) or a Request for Qualifications (RFQ). Each has advantages and disadvantages and there are instances where one is more appropriate than the other. These are described briefly in the following section. Again, this is a topic to discuss with your group and technical team. Your technical team can assist you in writing the RFP or RFQ, reviewing the submittals and helping you determine which firms to interview. A sample RFQ is included as Appendix B.

Preparing a Request for Proposals

In an RFP, you are requesting prospective engineering firms to prepare a proposed approach for your dam removal project. The more information you can provide to the prospective firms on the specifics of your project needs, the better they can respond to your RFP. In order for firms to do so, you will need to provide:

- A detailed description of the project and background
- Project goals and objectives
- A summary of existing data and known data gaps
- An outline of the permit process if you have already met with your agency representatives and know what is expected
- A tentative timeline of activity through to dam removal and post-project monitoring/site restoration
- A description of the role of the engineering firm and the Project Manager/Technical Team.
- Selection criteria for how the hiring decision will be made.

If there are engineers on your technical team, there may be strong ideas about how the dam removal is to take place. However, firms with dam removal experience may be able to bring a fresh approach to accomplishing project objectives. For this reason, it is important to make the decision about whether or not your RFP will specify outcomes—which allow for new approaches, or detail the full engineering specifications—as federal contracts often do.

In your RFP, request the prospective firms to attach resumes of the proposed project team and to provide you with the following:

- Detailed proposal on how they will address the dam removal and meet your project goals and objectives
- Detailed budget
- Description of past similar projects,
- List of references

To avoid potential lawsuits by contractors who do not win the bid, publish the contractor selection criteria in your RFP. Where possible, make the selection process quantitative, and state who will evaluate the RFPs.

Preparing a Request for Qualifications

Another way to structure the process is to prepare a Request for Qualifications (RFQ). If you do not have good site information to provide to prospective firms so they can respond to an RFP, or if you already have a proposed project approach, consider preparing an RFQ instead. In an RFQ, you are not requesting firms to prepare a proposed approach to your project. You are simply asking them to submit a Statement of Qualifications (SOQ) to undertake the project. You still want them to provide a description of past similar projects, references, and resumes of the project team. However, you will not ask them to submit a project proposal or detailed budget because you do not have adequate information to provide the firms in order for them to prepare a budget.

Whether you prepare an RFP or RFQ, be sure to include a deadline for receipt of materials and a page limit on submittals. Ask for resumes or curriculum vitae for only those people who will actually be assigned to work on your project, or you will be inundated with unnecessary paper. You will receive calls and questions from prospective firms, so be prepared to address these. If there are clarifications or additions to the RFP/RFQ in response to questions from prospective firms, send out an addendum so everyone submitting or potentially submitting has the same project information. You may receive questions from the prospective engineering firms that point out gaps in the information you provided in the RFP/RFQ. It is important that everyone you originally sent the RFP/RFQ to receive any updated information so they can prepare their submittal as completely as possible. One way to provide information to and answer questions from a large group of prospective firms is to hold an Open House event well in advance of the submission deadline (see below for description).

Insurance

Any contractor proposing to do construction work should maintain a robust liability insurance policy with a minimum coverage of $1 million. Consider requiring the contractor to add your organization as an additional insured for the dam removal project. This will cost extra but is well worth the risk, especially if people are injured or property is damaged during the project. The successful contractor should be required to furnish copies of these documents before the contract is signed.

Getting the word out

- **Word of mouth –** talk to other watershed councils, SWCDs, etc., to find firms that have successfully implemented other dam removal or stream restoration projects and that have a good professional reputation. Your technical team may also provide names of prospective firms. A good way to get the attention of local engineering firms is to place a bid solicitation advertisement in the legal section of the local newspaper with a mandatory pre-project site tour.

- **Host an open house and site tour** for all prospective engineering firms well in advance of the submission deadline. Include the invitation to this event in your RFP or RFQ. Request RSVPs. Make it clear in your RFP/RFQ that attendance at the Open House is not mandatory to submit SOQs or proposals; it is simply an opportunity to look at the site and get a feel for the project.

At the open house, the project manager for your group presents information on your site including: project goals and objectives, known and unknown data sets, permit requirements, watershed setting/background etc. Allow plenty of time for questions and discussion. You can invite your group (council, SWCD, etc.) and key members of the technical team if you anticipate a large number of engineering firms attending the Open House, or if you anticipate questions the project manager may not be able to address alone. Also, host a site tour for prospective engineering firms as part of the Open House that includes the dam site, potential equipment access areas to the project site, and a walk upstream and downstream of the dam to examine the reservoir and area that will be impacted by released sediment.

Selecting an Engineering Firm

After you receive the SOQs or proposals, you will need to have a screening process to review them and to determine whom to invite to an interview. Some groups will have a process or procedures in their organization's operating manual for how this occurs. Other groups will build the process as they move forward. To assist your group in framing the hiring process, the following appendices are included in this document:

Appendix C shows a decision checklist the Brownsville Dam project used to assist their interview committee in deciding which firms to interview. Appendix D is the information the project provided to the top three candidates prior to their interviews so they would come to the interview prepared. Appendix E is the questions and decisions matrix used by the interview committee during the interviews to assist in making their decision.

Figure 7. South Fork Ash Creek, Mount Fir Mill Dam, Luckiamute Watershed

Questions to ask before making the final decision

- Ask about the firm's specific services for the project components you need (i.e., engineering and design, survey, wetland delineation, archaeology survey, permit application, site restoration design, and construction). Do they have staff to complete all of these tasks or will they need to subcontract some of the work? Who is responsible for finding the subcontractors (you or the engineering firm)? The concern with the engineering firm hiring sub-contractors is the availability and quality of people hired to do the work. Hiring sub-contractors is not necessarily problematic, but you need to ask the questions about who (you or the engineering firm) will recruit and hire the necessary expertise, and if it is the engineering firm, be clear who is responsible for the quality of work received, supervision, etc.
- Ask about the firm's local knowledge of the hydrology and ecology of your watershed.
- Find out how busy the firm is and if your project will receive adequate attention especially if your project is on a tight timeline due to funding constraints, in-water work window timing, etc.
- Talk to references about the firm's performance with respect to work quality, staying within budget, innovation, meeting deadlines, communication throughout the project and follow-through on agency or client requests and requirements.

Contracting tips

- The firm you hire will have standard contract forms if your organization does not want to draw-up a contract from scratch. You should read this document carefully to make sure it contains reference to everything that is important to your group and technical team.
- If key individuals are hired for the design or construction phase of your project, provide language in the contract specifying that those individuals will be adequately involved in the project and will remain on retainer if they leave the business unless a satisfactory substitute is found.
- Look at the hourly rates. Make sure the Scope of Work prepared by the engineering firm ties hours/payment to the delivery of products and/or project benchmarks.
- Make sure the contract specifies that the contractor will haul the removed dam materials (concrete, re-bar, etc.) to an appropriate recycling center.
- If your grant sources require a percent holdback on fund releases until approval of the final report, make sure the contract includes language that spells this out.
- Make sure the contract does not have a fee clause for late payments because your grant sources will not pay them. Due to timing and availability of grant funds, sometimes payments may be delayed, and your engineering firm has to live with that.
- In the contract, include meetings at the 30, 60, and 90 percent design level to check in and assess the project designs with input from a technical team, permitting agency staff, and others.
- If there are any final reports or other project documentation required, spell out what the engineering firm will provide versus what your organization's project manager will provide.

Working With Your Engineering Firm

Selecting the right firm is the first step toward a successful project. After you have made this selection, you will work together to develop a Scope of Work (SOW) and a Project Timeline.

Scope of Work (SOW)

The SOW describes your project's goals, objectives and how those will be met. The SOW is attached to the engineering firm's contract and is the roadmap for how your project will be carried out. It describes the work and who is responsible for achieving it as well as a timeline for implementation. Use input from key members of your technical team in developing this document. Plan carefully to include all the tasks and potential tasks that will need to be accomplished to create the design and obtain permits. At the outset, provide the consultant all pertinent information about the site and the project (see the list in Chapter 4, section "Review site background data and identify data gaps").

Project timeline

The timeline lays out the elements of the SOW along with the anticipated time required to complete each element. Be sure you are aware of any time constraints including funding sources, in-water work window, and permit timing. The design process, public meetings, or permitting may take longer than you anticipate, especially if any previously unknown issues are revealed during the design process (e.g., historic artifacts, wetlands, unhappy adjacent landowners). Keep an eye on the project timeline throughout your project. This may be one of a dozen or more projects your contractors are working on. If you have timeline constraints, keep them aware of that. If deliverables are not being met on time, request a meeting right away to assess any changes that are necessary to the remaining tasks and timeline to keep the project on schedule. It is the project manager's responsibility to keep the project on schedule.

Figure 8. South Fork Ash Creek, post dam

Prevailing wage rate law, Bureau of Labor and Industries

It is beyond the scope of this guide to provide recommendations on how to address Bureau of Labor and Industries (BOLI) requirements for individual projects. The best strategy is to contact BOLI directly to receive a determination. Contact the Bureau of Labor and Industries, Prevailing Wage Rate Unit Coordinator, at (503) 731.4709, or visit the website for information on prevailing wage rates and law.

Chapter 6. Permitting

Dam removal is a significant restoration activity and the permitting process for a removal can be relatively complex. Because dam removal activities are relatively uncommon, it is important to find staff within the regulatory and consultant communities who have experience with dam removal. Permitting will be a key component of a successful project, and one area where the project manager can greatly impact the project by understanding the process and adhering to it. To help you meet this challenge, this chapter breaks permitting into three main topics:

1. Getting started with the regulatory agencies
2. Description of permits and processes
3. Creating a permit submission timeline

Getting Started with the Regulatory Agencies

The most important permitting task is to identify all the regulatory requirements at the beginning of your project. Make sure you understand every permit your project will require. Schedule a pre-application meeting with representatives from all required permitting agencies in attendance so you can outline a permit strategy. If everyone is in the room together, you might find ways to work through some of the permitting tangles that would most likely occur if you had to play phone tag with the separate agencies. On project sites with federal at-risk species, having a pre-application meeting with the U.S. Army Corps of Engineers (USACE) and NOAA Fisheries (NOAA) is even more important.

Pre-application meeting

Who to invite to the pre-application meeting depends on which permits you will need for your project and whether you have federal at-risk species in the watershed that may be impacted by the project. At a minimum, invite representatives from the following groups:

- Engineering firm doing the project design
- Local government (city and/or county, depending on where the project is located)
- Oregon Department of Environmental Quality (DEQ)
- Oregon Department of Fish and Wildlife (ODFW)
- Oregon Department of State Lands (DSL)
- Oregon Water Resources Department (WRD), if existing water rights will be impacted by the dam removal
- Oregon Watershed Enhancement Board Regional Program Representative (OWEB), if your project is funded by OWEB
- NOAA Fisheries
- U.S. Army Corps of Engineers (USACE)
- Natural Resources Conservation Service (NRCS)
- U.S. Fish and Wildlife Service (USFWS)
- Environmental Protection Agency (EPA), only for projects with special circumstances or if DEQ recommends working with EPA
- State Historic Preservation Office (SHPO)
- Landowner (if a major collaborator in the project)

Invite all the potential permit agencies listed above even if you think you do not need every permit outlined later in this chapter. It is much better to have agency staff aware of your project and let them tell you the project will not require any permits from their agency than to make an assumption that you will later find out was incorrect.

Schedule this meeting a month or more in advance to secure a date that works for the majority of invitees. It is nearly impossible to find a date to accommodate everyone, but at a minimum, you will want to make sure that the NOAA and USACE representatives can be there together. If someone is unable to attend, schedule a time to meet individually to talk through the project and gain clarification on the agency's permit process.

Your goal for the meeting is to have the group outline a permit "road map" for your project; complete with steps you need to take and the processing times. To get the most from this meeting, it is beneficial to have information available in a package for all meeting participants. If possible, this package should be supplied in advance of the pre-application meeting. At the very least, provide meeting participants with a map of the project site and a general description of the project prior to the meeting. This will allow agency representatives more time to consider potential permitting scenarios and will result in a more productive meeting. The following information should be available in the package for all meeting participants:

- Site map (including labels for dam site, proposed staging area, site access, proposed work bench, proposed erosion control measures)
- Ownership map
- Site photos
- Dam dimensions
- Year the dam was built
- Type of construction
- Dam operations
- Dam maintenance
- Condition of dam
- Amount, size classes and quality of stored sediment
- Presence (historical or current, native or introduced) of all finfish species
- Presence of ESA species or state species of concern and critical habitat in the basin
- Potential for presence of historic artifacts
- Existing watershed water quality issues directly up and downstream of the dam site
- Proposed removal method
- Proposed site dewatering plan
- Anticipated condition of the river following the dam's removal

At the meeting, your organization's project manager provides an overview of the history of the dam and fish passage concerns. The project engineer then provides an overview of conceptual ideas for meeting the stakeholder and community goals for the site. This is an opportunity for you to gain an understanding of the regulatory concerns that face your project and to listen for suggestions from the regulators for how to address them. If this is your first meeting with all the agency people in a room discussing your project, expect to spend a significant amount of time

outlining the project site and your proposed ideas. It is best to hold this meeting after a site visit to the dam. The tips below may help you understand how to work with the agencies.

Establish a relationship with the permitting agencies

Because dam removal does not fit easily into permitting requirements, be honest and up front with the permitting agencies about what you plan to do. Seek the input and assistance of the key permitting agencies (for most projects this means USACE and DSL). One of the most critical elements of successful permitting is to hold a pre-application meeting with key agency staff and project partners. Do this as soon as you and your technical team have the project well thought out (see details above).

Be especially careful to maintain good relationships with agency staff. Provide consistent information. Remember that the people who issue permits are professionals who review permit applications every day. The different permitting agencies work closely with each other and are likely discussing your application.

Staff turnover may occur at the permitting agencies you work with over the course of the year or more that your project is in development. Keep written records of your meetings and save your email communications. When possible, work with a single point of contact for each agency your project works with. This is not always possible for some projects, NOAA Fisheries, for example, may have a staff person from its engineering division, as well as someone from the Restoration Center working on the project. Usually though, one person is the primary contact. When working with more than one contact at an agency, cc each person on all communications.

Play by the rules

Even though dam removal may not fit easily into the permitting requirements, recognize that permitting is a process with an established procedure. Do not attempt to circumvent the process, and do not deviate from the process that is laid out. Understand the permitting timeline and stay within it.

Have a single point of contact for your organization

A single spokesperson and point of contact for the group applying for a permit will help avoid confusion and maintain consistency of communication. This can be either a contact from the engineering firm you contract with or the project manager for your group. This person should be the most knowledgeable about the project and be readily accessible by phone and email.

Description of Permits and Processes

This section describes the permits most likely required for your project. Do not panic — most projects will not require all of these permits. These descriptions are not meant to take the place of a conversation with the regulatory staff for your region. This information is provided as a starting point so you know what to expect as you collect information and plan your project.

Local permits

It is beyond the scope of this guide to describe the local permit process for your area of the state. The biggest differences from watershed to watershed will be county and city requirements (if the project is located with an Urban Growth Boundary area). The county and city government may not have any requirements for a dam removal project because such projects so rarely occur that no rules yet exist to cover this project type. If you are told there are no requirements, request a brief letter or email for your files that clearly states your request and their response.

- Check with the county planning department and local city government to find out if any building permits or floodway permits are required for your project.
- If you will have equipment entering and leaving the work site directly onto county roadways, contact the county roads department. An access permit may be required.

State permits

The Department of State Lands (DSL) has recently updated their Water Permits User Guide. All the information you need to know about obtaining state permits is laid out in the guide, and therefore is not re-stated here. However, the chart below outlines which permits may apply to your project and outlines the timeline you might consider for working your way through the state permitting process to make the best use of your time for keeping your project on schedule. Figure 9 is a summary for planning purposes only. Consult the Water Permits User Guide for web links to each agency and permit listed below.

Figure 9. Potential state dam removal permits

Issuing Agency/ Permit Type	Permit Description	Timeline
DSL *Removal-Fill Permit*	There are three types of removal-fill authorization: Individual Permit (IP), General Authorization (GA) or Emergency Authorization. Most dam projects will require an Individual Permit. S mall dam removal projects can qualify for the General Authorization – talk with your DSL representative. DSL and USACE utilize the same form, called the Joint Removal-Fill Permit Application (JRFPA)	Begin with a pre-submittal meeting early in the design process to identify if you qualify for a GA or an IP. For a GA, you need to submit at least 45 days prior to the start of the project. For an IP, typically up to 120 days are needed.
DEQ *401 Water Quality Certification*	A 401 Water Quality Certification (WQC) is required for dam removal projects if they involve a discharge under Section 404 of the Clean Water Act. The intent of the WQC is to provide reasonable assurance that the dam removal project will not violate state water quality standards. There is no 401 application form to submit for projects that will receive a removal-fill permit. The USACE will provide DEQ with all the application materials submitted for the Section 404 Permit. Components that DEQ reviews must be attached to the Section 404 Permit and include a site restoration plan and an in-stream work area isolation plan.	DEQ has up to a year to issue the 401 WQC. It is important to submit the USACE Section 404 Permit Application 6 to 9 months prior to the anticipated project kick-off. Shorter timeframes are possible, but not guaranteed.
DEQ *1200-C Construction Stormwater Permit*	A 1200-C Construction Stormwater National Pollutant Discharge Elimination System (NPDES) permit regulates stormwater runoff from construction activities that disturb one or more acres of land. This permit requires the preparation of an Erosion and Sediment Control Plan that incorporates Best Management Practices into construction work.	Submit to DEQ 45-60 days prior to the anticipated construction start date.
ODFW *In-water blasting permit*	Required if explosives will be used in the removal of the dam.	Typically requires 90 days to process.
SHPO *Archeological review (other name given to this process: cultural resources inventory)* *(Note: There is a federal requirement for archaeological review under Section 106 of the National Historic Preservation Act. This includes*	This can be a place your project gets tripped up if you do not address it early in the project. There is not a specific form to fill out for this review. When you submit your project's joint removal-fill permit to USACE, the Corps automatically submits it to SHPO for review. However, do not wait until you have a complete permit application to begin communicating with SHPO. In fact, it is better to clear your project with SHPO as early in the process as possible to identify any potential archaeological issues you may need to address. Submit the three required items for a determination: description of your site and project design, a USGS topographic map indicating the project area, and a map with the proposed area to be impacted by construction activities directly to SHPO for their review.	Submit your project information to SHPO as soon as you have identified the area to be impacted by construction so that any archaeological issues can be addressed. Finding and hiring an archaeologist can take some time.

Issuing Agency/ Permit Type	Permit Description	Timeline
coordinating with SHPO and federally recognized Indian tribes that have interest in the area.)	These issues may take time to resolve and may require you to hire an archaeologist to conduct a site survey and prepare a report for SHPO that documents the site's potential for historic artifacts and outlines mitigation for damage to any known or potential artifacts. Having archaeological sites at your project location is not a deal breaker for your project, but these issues will add time, complexity and expense to your project. The sooner in the process you have this identified the better. Plan to include funding for an archaeological study/review in your budget, even if you think it unlikely your project will require it.	
DLCD *Coastal Zone Management Authority Certification*	*This certification is required if your project takes place between the Oregon coast and the crest of the coast range.* DLCD reviews your project's application and all applicable materials to make sure it is consistent with the enforceable policies of the coastal management program. DLCD assists applicants on a case-by-case basis to determine the best way to demonstrate consistency with the Oregon Coastal Management Program (OCMP). Contact their office for assistance.	The Coastal Zone Management Act provides six months for the state to complete its review of consistency certifications. Consistency concurrence can be conditioned on the receipt of local or state approvals.
OPRD *Scenic Waterway Notification*	*This permit is required if your removal project is in a state-designated scenic waterway.* For projects in an Oregon scenic waterway, DSL solicits input from OPRD as part of the removal-fill permit process so the requirements of the Scenic Waterway Act are met. A special dual "Scenic Waterway Removal-Fill Permit" is issued for the project. You do not need to notify OPRD separately.	This will occur on the same timeframe as the DSL Removal-Fill Permit.
ODOT *State Highway Approach Permit*	*This permit is required if equipment will enter/exit the project site onto a state highway during the construction process.* This brochure describes the process, timelines and includes contact information for each region of the state.	This process is fairly involved and has a pre-submittal meeting, 30-day window for ODOT to respond to your application along with another 60-day window to respond if you are requested to provide clarifying information. So plan ahead.

Federal Permits and Consultations

The federal permit process is generally described here. The best way to approach the federal permit for your project is to consult with your Regulatory Permit Project Manager at the USACE early in your project development to outline a federal permitting approach. There is a lot of room for interpretation in the federal process and you will need the assistance of federal regulators in understanding what will be required for your project.

The Network of Oregon Watershed Councils has several PowerPoint presentations on-line that provide graphics and background information on the federal and state permit processes. They are a good place to start and become familiar with the terminology and agency processes.

Section 404 permitting – General process

- Dam removal projects typically require a Section 404 permit from the U.S. Army Corps of Engineers (USACE) and a Removal-Fill Permit from DSL. Although they are separate permits, you may utilize the same application form for both. This application is commonly referred to as the "Joint Removal-Fill Permit Application (JRFPA). Use the state's form since it asks for more information than the USACE form; it is the preferred form. *(Note: There are no federal application materials labeled "Removal Fill-Permit" or "Section 404 Permit." The USACE form labeled "Application for Department of the Army Permit - 33 CFR 325" differs slightly from the DSL Removal-Fill Permit form, do not use this one.)*
- There are two different designations of Section 404 permits. USACE will process your project as either a Nationwide Permit (NWP) – timeline typically 60 days, or as an Individual Permit (IP) (also referred to as "Standard Permit") – timeline typically 120 days. There is no separate form for either of these. The project will go down one of the two paths (NWP or IP) based on the work outlined in the permit and the expected impacts to the aquatic environment. Most dam removal projects will receive an IP.
- Your project may qualify for an NWP No. 27 "Stream and Wetland Restoration Activities" permit at the discretion of the USACE. The agency may choose to issue the permit for projects where the impact to the aquatic environment is anticipated to be "no more than minimal." The USACE regulatory project manager for your project will make this determination based on information in your application. There is no additional form or paperwork to provide. Being processed as an NWP versus an IP is a big advantage when it comes to the type of data and supporting information you are requested to provide. (More on this in the sediment evaluation framework section below.)

Figure 10. Coal Creek dam prior to removal

Reviews and consultations possibly required prior to receiving a USACE Section 404 permit

The information provided in this section is meant to give you an overview and background on the federal process so you understand what is involved in receiving a Section 404 permit for your project. You will not initiate these processes yourself — they flow automatically out of your Section 404 permit application. Any federal action requires these reviews. In this case, the federal action is the USACE issuing a 404 permit.

By knowing what processes your project will need to go through, you can plan enough time for your project's permits and understand how the system works. The engineering firm you work with on the project should be familiar with this process and knowledgeable about what consultations your project will require. Also, this process and the steps your permit needs to take should be clarified at the pre-application meeting you hold for the project (see section on pre-submittal meeting above). Remember, it is okay to ask your engineering firm or regulatory agencies clarifying questions about what the steps are and what is expected; they are invested in your project's success.

Biological Assessment. Biological assessments (BA) are prepared by, or under the direction of, a federal agency to determine whether a proposed action is likely to: (1) adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; or (3) adversely modify proposed critical habitat. The outcome of a BA determines whether formal consultation or a conference among federal resource agencies is necessary. [50 CFR §402.02, 50 CFR §402.12] Bottom line: If your project is not covered by a programmatic BiOp, a BA is required. The federal action agency is responsible for preparing the BA (and in this case, it would be the USACE since the federal action is issuing a Section 404 permit). However, in reality, BA preparation is often prepared by the permit applicant in the interest of time. Preparing a BA is something the engineering firm working with you would likely prepare. It can be a lengthy document and can add significant time and cost to the project (depending on site complexity).

Biological Opinion. A Biological Opinion (BiOp) is a document prepared by NOAA or USFWS after their review of the BA. This document includes: (1) the opinion of NOAA or the USFWS as to whether or not a federal action (in this case providing a permit for dam removal) is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of designated critical habitat; (2) a summary of the information on which the opinion is based; and (3) a detailed discussion of the effects of the action on listed species or designated critical habitat. [50 CFR §402.02, 50 CFR §402.14(h)] Bottom line: You do not prepare a BiOp. It is the federal agency response to any BA that you might have to prepare. The information you provide will be used in the BiOp preparation, so your cooperation and responsiveness to requests for information will be essential to a smooth process. It is important to provide as much information as possible to facilitate the issuance of a BiOp.

Programmatic Consultations. NOAA has issued programmatic Biological Opinions that cover suites of similar activities. Programmatic BiOps are streamlining tools that contain

all the same components that an individual BiOp has, and may cover small dam removals. Examples include SLOPES version IV, the Restoration Center BiOp, and a USFWS BiOp that describe best management practices (BMPs) to minimize adverse impacts to aquatic species. A project covered under a programmatic BiOp will typically have a much shorter time frame than one that requires an individual ESA/EFH consultation. The NOAA BiOps include programmatic EFH consultation as well. Contact your USACE representative to find out if your project can be covered for ESA consultation under a programmatic BiOp. Bottom line: Programmatic consultations are another way to receive ESA/EFH consultation coverage from NOAA and do not require you to prepare a separate BA document.

Endangered Species Act Consultation. Dam removal projects that affect federally at-risk species require USACE consultation with NOAA and/or the U.S. Fish and Wildlife Service (USFWS). Consultation can greatly increase the time needed to receive a 404 permit. The USACE cannot issue a permit until consultation under the ESA is complete. The consultation process is between the agencies and is not directed by the applicant or project engineer. You may be requested to provide additional information or clarification if questions arise during consultation.

Magnuson-Stevens Act Essential Fish Habitat (EFH) Consultation. Similar to the ESA, the EFH provisions in the Magnuson seek specifically to protect habitat of species that NOAA manages under Fishery Management Plans. This includes Chinook, coho, and steelhead, as well as several marine fish species. If a federal action 'may adversely affect' EFH, as determined by the action agency, it will consult with NOAA Fisheries, which can then issue Conservation Recommendations to protect EFH. NOAA Fisheries typically combines its ESA Biological Opinion (BO) and its Magnuson Act Essential Fish Habitat consultation into one single document. Therefore, we will treat these consultations as a single process, even though they are technically two different consultations.

General steps for formal federal ESA/EFH review:

1. USACE receives application for an activity in 'waters of the United States.'
2. USACE initiates consultation with NOAA Fisheries and USFWS, and provides a BA. (USACE depends on thorough information within the JRFPA application itself to prepare the biological assessment and may request additional information from you throughout the process.)
3. NOAA Fisheries and USFWS review the biological assessment and make a determination as to whether the activity will affect critical habitat and/or jeopardize the species of concern, and may apply conditions to the project.
4. Some activities may be covered under programmatic consultations such as SLOPES or the NOAA Restoration Center BiOp, but the terms and conditions in those BiOps still apply. (See sections below for more on SLOPES and BiOps.)

USACE consults with NOAA and USFWS on permit applications to ensure threatened or endangered species and their habitat are protected during dam removal. If NOAA and USFWS determine that your project will not affect threatened and endangered species, USACE will let you know and no further action of you is required. However, if either

agency determines the potential for harm, the project design and implementation plan must meet NOAA standards before DSL and USACE issue permits to the applicant. Permits may include conditions to avoid, minimize, and provide mitigation for expected impacts of the project. Conditions are designed to protect water quality, fish and wildlife and their habitats, and adjacent properties. NOAA typically issues Conservation Recommendations (CR) under the Magnuson-Stevens Act simultaneously with the Biological Opinion. These CRs are usually identical to the ESA Terms and Conditions, but may have additional recommendations specific to species that are not listed under the ESA.

(Conditions can include: using a silt fence to protect water quality from stormwater runoff at the site, using a turbidity curtain in the channel to trap and remove any fine sediments that travel downstream from the site, requiring daily inspection of all equipment operated within 150 feet of any stream or waterbody for fluid leaks before leaving the vehicle staging area, etc. The conditions are pages and pages long, but are all fairly straightforward).

National Environmental Policy Act (NEPA) Review. NEPA is a federal agency process and technically not the permit applicant's responsibility. Actions by federal agencies (including permit issuance, providing funding or providing technical assistance) require consideration of a project's potential to cause environmental and socioeconomic impacts, including direct and indirect impacts, beneficial and adverse impacts and potential cumulative impacts (42 U.S.C. 4321 et seq.). The USACE's issuance of a Section 404 permit for small dam removal automatically triggers a USACE NEPA review.

NEPA requires that an environmental assessment (EA) be prepared by the relevant agency to determine whether a proposed dam removal will have a significant effect on the quality of the environment. Depending on whether the project's impacts are considered significant, either a "Finding of No Significant Impact" (FONSI) will be issued or an Environmental Impact Statement (EIS) will have to be prepared. An EIS is a lengthy document based on an exhaustive process of public involvement, interagency consultation and environmental research and analysis, including evaluation of alternatives and selection of a preferred course of action. And while technically the action agency (again, USACE) would need to prepare the document, in practice, the applicant takes on this responsibility. Preparing an EIS will be rare for small dam removals.

Sample Environmental Assessments in Oregon
Only review these documents if you are really a glutton for punishment and have an exceedingly complex project.

Chiloquin Dam EA – Example of an environmental assessment document which was prepared for the proposed removal of Chiloquin Dam on the Sprague River in south-central Oregon, approximately 30 miles north of Klamath Falls.

Savage Rapids Dam EA – Example of an environmental assessment document and FONSI document. Site also includes links to planning stages of the project and studies prepared to inform the removal decision-making process.

NEPAnet – A federal on-line resource center with resources and guides for understanding the NEPA process. If you need an EA, this site has many user-friendly resources you can access.

Figure 11. Former Coal Creek Dam immediately after removal. The Coal Creek Dam removal project restored salmon passage to one mile of upstream spawning and rearing habitat.

Sediment Evaluation Framework (SEF) Review. If USACE is processing your project as an Individual Permit (IP), you will be required to meet SEF requirements, outlined below. If your proposed dam removal qualifies for a Nationwide Permit and it is not in a Superfund site, it is exempt from SEF review.

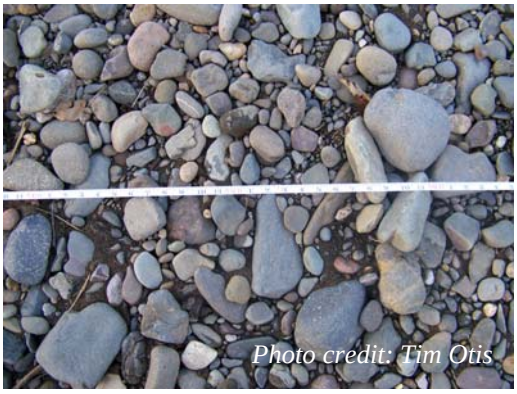
New since 2006, the SEF replaced the previous Dredged Materials Framework. The SEF manual provides a regional framework for the assessment, characterization, and management of sediments in the Pacific Northwest. The manual addresses the development of a comprehensive evaluation framework governing sediment sampling, testing, and test interpretation for determining the potential risk of in-place sediments.

Step 1 – Project Review Group evaluates the proposed dam removal. If your project will be issued an Individual Permit (IP) or Nationwide Permit (NWP) in a Superfund site, a USACE Project Review Group (PRG) reviews your project for your USACE Project Manager to determine what level of SEF your project will be required to meet. The PRG may request more information or may decide that the project is exempt from sediment analysis sampling and testing. Exemption from testing is possible if the site has less than 10,000 cubic yards of stored sediment and there are no potential sources of contamination upstream of the site.

Step 2 – Provide information. Either the project manager or the project engineering firm can provide the data collection and report preparation described here, depending on project complexity. Once the PRG has determined the project must be reviewed under the SEF, your USACE project manager will ask you to provide the following information:

- A map showing the project site location, layout, existing storm drainages and outfalls, and special aquatic sites as defined in the 404(b)(1) Guidelines.
- Current land use upstream of the dam.
- Industrial processes at or near the site and hazardous substances used/generated at these sites. Some of this information can be found at http://www.oregon.gov/DEQ/, with specific information on Environmental Cleanup, brownfields, leaking storage tanks, etc. and http://www.oregon.gov/DHS/ph/envtox/programs.shtml for information of toxic substance releases, usually one time releases or short term.
- Outfall information, such as construction year, type, flow volume (capacity), and NPDES data.
- CERCLA-listed site information. http://www.epa.gov/superfund/sites/npl/or.htm
- Spill events. These sites may provide information:
  http://www.deq.state.or.us/pubs/factsheets.htm
  http://www.fws.gov/oregonfwo/Contaminants/
- History of site ownership and land uses.
- Adjacent property use, especially those upgradient or upstream.
- Site characteristics that could affect movement of contaminants (i.e. bar scalping, instream dredging sites, etc.)
- Results of any previous sampling and/or testing.

Figure 12. Sediment stored behind Brownsville Dam



Step 3 – Project Review Group Determination. The PRG meets quarterly to review applications. One of three actions occurs: (1) The project is exempt from further testing; (2) Further testing is required; or (3) Additional clarification on the proposed work is required (e.g., methods proposed by the applicant are not clear).

Step 4 – Additional Testing. If your project requires additional information and sediment sampling and testing, the SEF manual provides very detailed instructions. Careful adherence to the provided guidance is critical for the project to move forward in a timely way. The PRG can turn the project back to the applicant and require re-testing or additional testing if the protocols outlined in the SEF manual are not adhered to.

State Certifications. For USACE to issue a Section 404 permit, the state must grant the following certifications:

- **Section 401 Water Quality Certification:** Section 401 of the federal Clean Water Act requires the Oregon Department of Environmental Quality (DEQ) to certify that the

proposed dam removal does not endanger Oregon's streams and wetlands and to confirm that the permit application meets water quality laws and standards. For information on complying with Section 401, refer to **Figure 9** earlier in this chapter.

- **Historic Resources**. In cooperation with the federal Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Office (SHPO) works with federal agencies to comply with Section 106 of the National Historic Preservation Act of 1966. This legislation permits the SHPO Section 106 Review and Compliance program to review federal undertakings (such as issuing permits for dam removal) for their impacts on cultural resources. For information on complying with SHPO requirements, refer to **Figure 9** earlier in this chapter.

Creating a Permit Submission Timeline

Once you know the permit applications you will be required to submit, the next step is to develop a timeline for when the applications must be ready for submission. To do this, it is easiest to work backwards. Begin your timeline with the end result — dam removal. Your river has a window for when in-channel work is acceptable. In-water timing guidelines have been developed by the Oregon Department of Fish and Wildlife (ODFW) to protect aquatic species. There is no paperwork you need to submit, but you will be required by your Section 404 permit to perform construction during the in-water work window, as established by the ODFW guidelines. Under special circumstances, your local ODFW district office can make exceptions to the guidelines, though it is better to plan your project well to avoid the need for an exception.

Plan enough time for the permitting process. Expect dam removal projects to take longer than other restoration projects. The fact that dam removal projects are rare in Oregon makes this a reality. More lead-time and effort should be scheduled into the permitting process to avoid delays and frustrations. Once you know the month (and year) you are aiming to remove the dam, work backwards using the "worst case" scenario for obtaining each permit to determine the earliest and latest dates for submission. For example, say you want to remove the dam in August of 2010 and it is now August of 2008. To give your project maximum time to receive permits, you have until August of 2009 to bring your design far enough along to submit. However, it is possible to receive permits in six months, so if you want to live with significant stress you could submit as late as March 2010 and still likely receive the permits, but you run the risk of having to delay the project until the following summer. The permitting process will be faster if agency staff are familiar with your project. If you have an active technical team with good agency representation and an uncomplicated project, you may not need a full year. Use Figure 13 below to get started with building your project's permit timeline. Keep in mind you have to determine the timeline for your project based on the technical team involvement that you have and decide what will be sufficient time for your project to work through the process. Plan ahead and get your application in early.

Your project timeline will also need to plan ahead to secure ODFW and NOAA staff to assist you with site de-watering during construction. You will need trained ODFW or NOAA staff on-site to assist with capture and release of aquatic species that may become stranded in pools that form as the site is de-watered. ODFW and NOAA are happy to assist you, but you need to get

on their schedule so they can plan accordingly. Plan to request assistance at least 2-3 months ahead of construction.

Figure 13. Permit Timeline Outline

Task	Timeline
Identify all necessary permits and regulatory requirements	*When to start?* As soon as you have assembled a technical team. *How long does it take to accomplish?* This step can take a month or more, especially if you are not certain which permits you need and have to wait for return calls from agency staff. If you can outline your permit requirements prior to putting together your RFP/RFQ, you can provide this information to the prospective consultants. Alternatively, you can task your consultants with outlining and implementing the permit process. However, paying consultants to handle your project's permitting process can double the cost of your engineering services contract because of all the time involved in permitting. But if you have a complex project and do not have an experienced project manager on your organization's staff, it may be worth the added expense. Just make sure you budget for it in your grant applications!
Submit to SHPO: site location on USGS 7.5″ topographic map, proposed activity, proposed project implementation timeline, legal description of the project location using TRS (township, range, section). Keep this information brief, no more than 2-3 pages total.	*When to start?* As soon as you have the project identified. *How long does it take to accomplish?* Assembling the information should take no more than a week. SHPO responds within 2-3 weeks. You do not have to know the removal method or have engineered drawings completed to submit your project information to SHPO. You just need to know you are removing the dam, where equipment will enter and access the site, where any materials will be stockpiled, etc. Basically, you need to know where the ground will be impacted so SHPO can check their database of archaeological sites and make sure you're not proposing to stockpile concrete or drive equipment across something historically significant.
Schedule a pre-submittal meeting with USACE, NOAA, DSL, and ODFW	*When to submit?* As soon as you have a 30% design from your project engineers. *How long does it take to be ready for the pre-submittal meeting?* It may take months to a year to have a 30% design, depending on project complexity. Schedule this meeting soon enough in the design process so if there are any design issues, you know it before your engineering firm has spent down all your grant funding. This is especially important for projects with ESA issues. Plan a month in advance to put the meeting on everyone's calendar. Some agency staff have extremely tight schedules.
Satisfy Sediment Evaluation Framework (SEF) requirements	*When to submit?* As soon as you know how USACE will process your application. If the agency will process your project as a Nationwide Permit (NWP), you can skip this step. If your project will be processed as an Individual or Standard Permit (IP), you will have to satisfy SEF.

Task	Timeline
Satisfy Sediment Evaluation Framework (SEF) requirements	*How long does it take to prepare the SEF materials?* This is very site dependent. Collecting the data outlined in the SEF document can be straightforward, taking a month or less, for projects in areas not impacted by upstream industrial landowners. However, dam sites with the potential for contaminated stored sediment have a 5-10–month or more process: Prepare a sampling plan (1-2 months), receive approval from the Project Review Group (PRG) on the sampling methods (1-2 months), conduct the actual sampling and receive results (1-2 months), prepare a sampling results report for the PRG (1-2 months), and receive PRG approval on the sampling report (1-2 months).
Submit the Section 404 Joint Removal Fill Permit Application (JFRA) to the USACE, USFWS and DSL	*When to submit?* At the 60% design to get the ball rolling on all the accompanying certifications and reviews. *How long does it take to receive the Section 404 permit?* This too is very project dependent. DSL can process the project as a General Authorization (GA) and turn the permit around in 30 days. The USACE can process the permit as a Nationwide Permit (NWP) and turn it around in 60 days. However, if the project does not qualify for either of these expedited processes, it can take up to 120 days to receive permits (from both the USACE and DSL). If your permit application paperwork is not complete when you submit, and USACE or DSL have to ask you for additional information, the clock resets. Request a pre-submittal review. DSL will review your application for completeness and let you know if there are any missing components so you can address concerns prior to the actual permit application submission.

Permit Preparation Tips

Now that you understand the myriad permitting and consultation requirements that may apply to your dam removal project, and you have a timeline ready that outlines when to begin each step, it is time to put your paperwork together. The project engineering firm will likely prepare most of the permit applications forms and attachments. However, the project manager for your organization can provide some assistance and a thorough review. You want to get as much right the first time when submitting the forms. Keep the tips below in mind while putting together your paperwork.

Assume that Reviewers Know Nothing About Your Project.

As you prepare your permit application, imagine you are describing the site and work to someone who has never heard of or seen your project. You deal with the details day-to-day, but the people reviewing the permit have an enormous backlog of permits they are working on. To them, this will be just another project, though perhaps more interesting than most.

Tips from the field

Be sure your engineered drawings and narrative include:

- How the site will be accessed during construction
- Where equipment staging and refueling will take place
- Where materials will be staged (wood, boulders, etc if needed for site restoration)
- How the in-work area will be isolated to prevent sediment from leaving the site and aquatic species from entering it
- How fish salvage will be accomplished
- Construction timeline
- Site restoration plan and timeline
- Best management practices that will be implemented to: control erosion and sediment transport; prevent spills from entering waterways, etc.

Figure 14. Brownsville Canal Company Vice President, Bill Nelson, with Calapooia Watershed Council Chair, Bud Baumgartner, and Council Project Manager, Denise Hoffert-Hay (with daughters in tow) signing the Joint Removal-Fill Permit prior to submission to USACE, June 2007.

Create Clear and Simple Descriptions and Drawings of the Proposed Project.
Have the engineers make the design drawings to scale with clear dimensions. Remember these may be faxed from office to office for the review process. If your project's description is not simply stated, you will be asked to submit additional information, causing delays in receiving your permit. Use the minimum number of drawings and pictures to describe your project. As of the writing of this document, USACE will only accept drawings in 8½″x11″ format. Your engineering firm will develop lovely, expensive engineered drawings at the 11″x17″ scale for use at meetings and at the construction at the site. Make sure that when the engineering firm shrinks the drawings down to the smaller size they are legible and the necessary detail is still decipherable.

Be sure to provide and discuss alternatives even though they are not your preferred approach. Make it clear why the alternatives are not appropriate and why your chosen alternative has been selected. Remember that financial considerations will be only a minor consideration (unfortunately) of the permitting agencies conducting the review.

Chapter 7. Removing the Dam

Removing the dam is the culmination of your group's hard work over the long months and years. For small dams, removing the actual concrete structure is a straightforward process. Isolating the work area and de-watering the channel are typically the most difficult tasks during removal. During the design and permitting process, your project engineering firm and permitting agencies will come to agreement on a removal method that poses the least risk to aquatic species, water quality and the upland where equipment staging will take place. Some of the more common issues are briefly discussed here; more detail and additional information can be found in Part VI of *"Exploring Dam Removal"* by American Rivers and Trout Unlimited. Another helpful resource is a report by the Aspen Resource Institute *"Dam Removal – A New Option for a New Century"*. It provides not only good advice for implementing your project, but case studies that illustrate the topics covered.

The most common removal method is to construct a cofferdam to divert flows upstream of the construction zone to a constructed side channel or through pipe around the construction zone and then back into the channel some distance downstream. This is costly and can be complicated to ensure passage for aquatic species. If prior to removal, there was upstream and downstream passage for aquatic species, you will be required to provide passage during construction. Likewise, if the stream or river is used for recreational purposes such as rafting, there may be a need to provide downstream boater passage. Human safety is a significant concern during dam removal as the project will likely attract a lot of people to the site; hence, a clear safety plan for recreational users and on-lookers must be developed.

Voices from the field
Daniel Newberry, Project Manager
The Buck & Jones Dam Removal, in the Applegate River watershed, removed 2005

"On small dams removed during low flow, using sandbags can be an inexpensive way to isolate flow from the portion of the creek where the concrete is being removed.

When industrial fire precaution levels are in effect, you will need to get a permit waiver from the relevant agency (ODF/USFS/BLM) to operate certain types of machinery after the shutdown is in effect. This is especially true for metal saws that are used to cut rebar to make the concrete easier to remove and to save rebar for recycling."

Dam removals have been implemented without using a cofferdam to divert flow. The Brownsville Dam was removed in a two-step process. Step one was to notch one side and remove entirely a 15-foot section of the 110-foot wide dam — with the river in place (work done in the channel with the river in place is referred to as "working in the wet"). This allowed the entire low summer flow to be diverted to one side of the river. Step two was to continue work on the opposite bank removing sections of the dam toward the channel's center. This was possible because the stored sediment was mostly gravel and cobble, so very few fines were disturbed during construction; fish passage was provided during construction by the notched dam; migration season for ESA-listed species was over; no redds or spawning grounds were in the project's impact area; and construction impacts were short-lived, with all instream work completed in eight days.

Most dams in Oregon have been removed using an excavator with a jackhammer attachment or a hydraulic hammer and another excavator with a bucket attachment. Some dams require the use of explosives to break up concrete that is particularly dense. This is rare and requires significant permitting time to work through all the potential hazards and impacts (as you can imagine...).

Figure 15. Buck and Jones Dam, Applegate Watershed prior to removal

If the dam stores a large component of fines, and there is a lot of uncertainty how the channel will respond following removal, it is possible to remove the dam over successive years by notching the structure and allowing sediment to gradually be released. This implementation strategy has not yet been used in Oregon.

Another removal strategy is to mine the stored sediments prior to dam removal to prevent their downstream release. This method is employed when contaminants are present in the stored sediment or release of accumulated fines will negatively impact downstream spawning habitat. Mt. Scott Creek Dam project in Happy Valley, Oregon, mined the stored sediment to prevent negative impacts to coho spawning gravels.

Most dam project contractors will haul the removed dam and other concrete to an appropriate recycling center (though you should still make sure that is specified in the contract if it will be required). Appropriate disposal sites must be found for the material from earth and rock filled structures. It may be possible to use the dam materials in the restoration of the project site if they are contaminant-free and are the appropriate-sized rock for the stream. Disposal sites may be a long distance from the project location and hauling the materials can greatly add to project costs.

To keep costs lower, explore options for using the material on-site. At the Coal Creek dam removal in Tillamook County, rather than hauling the material to a disposal site, all stored fines and dam rubble were removed and disposed of on-site.

Figure 16. Applegate River tributary following removal of Buck and Jones Dam in 2006

Chapter 8. Conducting Monitoring and Site Restoration

This guide does not provide a comprehensive overview of monitoring or site restoration. Both components have great variability based on site conditions and funding opportunities. As more dams are removed in Oregon, the need for monitoring at each removal will diminish. Since dam removal is still a relatively new restoration technique, monitoring may be required or your group may wish to conduct monitoring to demonstrate how your project goals and objectives are being met. Similarly, the need for site restoration has a high degree of variability project to project. Though with one major difference, restoration techniques for disturbed soils and streambanks are much more established. Significant resources exist to help you plan your site's restoration (if active restoration is needed). These topics are discussed in brief below.

Monitoring

Monitoring the dam site prior to, during, and following construction can be either a simple task or a complex one, depending on the site, your project goals and objectives and how much funding you have available. If you undertake a monitoring strategy, be sure to include it early in the project timeline because you will want to have some baseline information prior to the dam's removal.

Existing and soon-to-be available guidance covers the topic in much greater detail and with more expertise than is the scope of this guide. OWEB is working with Oregon State University on a Small Dam Removal Monitoring Guide that will be available in 2009 to provide guidance to determine when monitoring is appropriate, select a study design and monitoring parameters, and compare statistical and visualization techniques for reporting findings.

Several examples of dam removal monitoring efforts exist in literature (McHenry and Pess 2008, Miller and Vizcaino 2004, Casper et al. 2006, Catalano et al. 2007, Stewart 2006), as do valuable guidance documents on monitoring of river restoration activities (Roni et al. 2004). However, despite the substantial resources invested in dam removal projects, monitoring is often not required by most funding partners. Given such high costs for project implementation, monitoring dollars may be very limited or non-existent. With little data to document the changes in stream processes and the recovery of aquatic species, questions remain regarding the biotic and abiotic outcomes of dam removal. To best monitor on a budget, it is necessary to follow a prescribed plan driven by established monitoring objectives and questions, purchase inexpensive equipment, and utilize volunteer labor. A well-organized monitoring effort can both satisfy funding partners' performance evaluation requirements and contribute to the science and practice of dam removal.

The Gulf of Maine Council on the Marine Environment has produced an outstanding guide titled, "*Stream Barrier Removal Monitoring Guide*." The concepts and field methods described in it are applicable to Oregon as well. The guide outlines six critical monitoring parameters that the authors think provide fundamental pre- and post-project data for analyses to characterize the

physical, chemical, and biological changes at barrier removal sites. Most of the critical parameters can be done using minimal equipment and volunteer labor. The data collection is time-intensive, but it is not difficult to carry out. The methods and field data collection sheets for each monitoring parameter are all available on-line as stand-alone elements, allowing you to decide which parameters are best suited for your site. The methodology outlined in this document provides a practical approach for describing qualitative changes within the river following dam removal. Establishing causation that channel change is imposed by the dam may require additional sampling and statistical treatment of monitoring data. Articulate and accurate communication of findings from monitoring efforts to stakeholders is critical, as the various designs and objectives can lead to uncertainty in dam removal outcomes.

Site Restoration

Site restoration is a required component of the USACE Section 404 Permit and the DSL Removal-Fill Permit. Site restoration will greatly depend on the initial site conditions and what the anticipated post-removal river looks like. For dam removals in incised channels, site restoration focuses mostly on mitigating for impacts created by work areas and heavy equipment entering and leaving the site. For removals that dewater an impoundment and leave exposed mudflats, restoration can be either passive or active.

Determining the type of restoration greatly depends on the species present in the project vicinity. For removals that occur in a watershed with significant native vegetation upstream of the project site, the project area may be allowed to re-seed naturally. Some augmentation may be necessary to jumpstart the process, but disturbed soils and exposed sediments will likely re-vegetate naturally, with little effort on your part. For watersheds with significant populations of aggressive, invasive species upstream of the project site, more controlled introduction of native species will be necessary. Planting native vegetation and using geotextile fabric not only protects the site from erosion, but also prevents the establishment of invasive species. The degree of site restoration varies depending on site conditions and whether active or passive management is the approach. For other sites, the size of the area to be restored may be cost-prohibitive to restore (if hundreds of acres are exposed following draw-down of the reservoir). Aerially seeding could be an appropriate technique in this instance.

Voices from the field
Michael Cairns, Project Manager
Mt. Fir Mill Dam, South Fork Ash Creek
Removed 2007

"We should have budgeted a lot more money for plant establishment and maintenance. We ended up needing to pull together over 120 hours of volunteer time to go out and install tree tubes after the site had been planted. We did the best we could within our funding parameters."

For most small dam removal projects, little will need to be done except to stabilize any exposed and disturbed soils following the activities of heavy equipment operating on the site. This is typically done with geo-textile fabric and spreading a native seed mix of grasses and forbs that will quickly germinate and establish on the site to prevent any soils from eroding into the stream.

Figure 17. Demolition of Brownsville Dam commences, August 27, 2007

Project Wrap-up

When the on-the-ground work for your project is complete, you are not quite finished with the project yet. There are final reports to prepare and loose ends that must be wrapped up. In your contract with your engineering firm, you will have specified who is responsible for producing the final reports required by your funding partners. Typically, the final payments for projects will be held until these reports are completed. You do not have to be finished with the project to get started on the reports – so while the contractors are busy dismantling the dam, you can be preparing these or reminding your engineering firm to write them. One component of the project that must be prepared by your engineering firm is the as-built drawings. The as-builts are different from the engineered drawings prepared for the permitting phase, which reflect expected conditions. The as-builts show the way the project was constructed rather than the way it was designed. These drawings include changes made in the specifications and working drawings during the construction process and show the exact geometry and final project elevations. The as-builts provide a benchmark or finished point for the project. As the site changes in the months and years following removal, these plans can be referenced to know what the site looked like prior to the adjustments from storm flows.

You may decide to have a final site tour following the project's completion. Members of your technical team and local community may want to hear about the removal process (how many tons of concrete were removed, what fish were found during de-watering, etc.) and want to view the site in its new condition. This is also a good time to reflect on the project and lessons learned and glean any insights that may help ease the way for future dam removal projects. Should you remove a dam in your watershed, send your lessons learned to hofferthay@peak.org. This guide will be updated periodically at which time your lessons learned can be included.

Figure 18. Calapooia River, September 2007 immediately following dam removal.

Appendix A. Sample Request for Qualifications Advertisement

Request for Qualifications

To Provide Engineering Consulting Services for Brownsville Dam Removal

The Calapooia Watershed Council is seeking qualifications from qualified consultants to provide professional services for the removal of the Brownsville Dam on the Calapooia River. The purpose of this solicitation is to obtain consultant(s) who may be used to deliver projects funded by state and federal grant funding.

A Statement of Qualifications (SOQ) will be received until, but not after November 3, 2006.

Five (5) signed originals of each SOQ must be sealed in an envelope and mailed to the Project Manager (as indicated below).

Direct inquires to:
Denise Hoffert-Hay, Project Manager
Calapooia Watershed Council
2006 Chase Loop SW, Albany OR 97321
Phone: (541) 619-5896
Email: hofferthay@peak.org

Interested entities mailing proposals should allow normal mail delivery time to ensure timely receipt of their proposals. Any proposal received after the scheduled closing time for receipt of SOQ's will not be considered. It is the sole responsibility of the party submitting the SOQ response to ensure that the proposal is received at the designated location on or before the deadline.

All qualified consultants are invited to submit a Statement of Qualifications for further consideration.

Appendix B. Sample Design-Bid-Build Request for Qualifications (RFQ)

Brownsville Dam Removal and Calapooia River Restoration Project

Project Objective
The objective of this project is to develop a 100 percent design for the removal of Brownsville Dam and associated remedial channel stability, design a solution to provide 2.23 cfs of water to the Brownsville Canal (via a screened package pump system or gravity feed system that meets ODFW and NMFS screening criteria), and secure all necessary permits and ensure the project meets all ESA requirements. The project may include design for grade control.

Project Location
Brownsville, Calapooia Watershed, Linn County, OR, T13S, R2E, Section 33
Calapooia River, RM 36

Existing Reports/Resources
1. Seismic Refraction study for Brownsville Dam, October 2006. Prepared by Northwest Geophysical Associates. Provides data on stored sediment behind the dam and the substrate beneath the dam.
2. Detailed topographic survey, October 2006.
3. Calapooia Watershed Assessment, February 2004. Prepared by John Runyon, Biosystems, Chip Andrus, Water Works Consulting, Alsea Geospatial and the Calapooia Watershed Council.
4. Fish Passage Improvement at the Brownsville Dam Alternatives Evaluation Draft Report, August 2005. Prepared by Inter-Fluve, Inc.
5. USGS flow data from 1940-76 for station at Holley and Albany.

Overview
The Brownsville Canal Company owns a run-of-the river dam on the Calapooia River. With full cooperation from the Brownsville Canal Company, the Calapooia Watershed Council seeks engineering services to design the removal of the Brownsville Dam and restore adjacent portions of the Calapooia River. The context for this design may be outlined in three statements:

- Brownsville Dam does not provide adequate fish passage for winter steelhead and spring Chinook; both species are listed as threatened under the federal Endangered Species Act.
- Brownsville Dam is an aging structure that has reached the end of its useful life and is no longer needed for the purpose it was originally built.
- Existing water rights for 2.23 cfs for the Brownsville Canal can be met by some means other than the existing dam.

Background
The Calapooia Watershed is located in the Willamette River Valley, Linn County Oregon. The watershed encompasses 231,800 acres with 94% private ownership. The river stretches over 72

miles from its headwaters at Tidbits Mountain in the Cascades to its mouth in Albany. The City of Brownsville is at the center of the watershed at RM 33.

The Brownsville Dam, located 3 miles upstream from Brownsville was originally constructed as a wooden crib dam in the late 1880s. The diverted flow fed a three-mile–long canal that brought water to Brownsville woolen and timber mills. The wooden dam fell into disrepair and disuse by the 1940s when the mills closed and the structure blew out during a flood. The dam was rebuilt in 1967-68 with federal dollars even though it no longer served a compelling purpose or need. No commerce, flood control, or community water supply are provided by the dam.

The dam's sole purpose is to divert water (~2.23 cfs total) into the three-mile–long Brownsville Canal during the irrigation season (June-September). The City of Brownsville maintains a 1996 water right for 2 cubic feet per second (cfs) for aesthetics. There are several small (total less than 0.5 cfs total) water rights along the canal for irrigation or cattle watering. The water right needs to be met at the point of diversion near the existing dam. The dam and canal are owned and operated by the Brownsville Canal Company. Adjacent landowners fully support dam removal with the assurance that water can be maintained in the canal via another method. The dam owners and City of Brownsville have a preference for a gravity-feed design.

The Calapooia River is home to two ESA listed salmonid species: winter steelhead and spring Chinook. Both species are at risk, in part due to the presence of the Brownsville Dam. Other species present in the dam vicinity include: Pacific lamprey (a state of Oregon listed "vulnerable species"), brook lamprey, cutthroat trout, three-spine stickleback, redside shiner, speckled dace and Western pond turtles. Oregon chub is a historically present species.

Brownsville Dam dimensions/description

Brownsville Dam is a concrete structure composed of an abutment on each bank, connected by two vertical walls. The walls are 8-inches thick, 5 feet tall, and formed with reinforced concrete. They are parallel, 14 feet apart, and 110 feet long. On top of the vertical walls is a 10-inch thick structural concrete slab that spans the 14' distance between the walls. The vertical walls were backfilled with sand or gravel. In cross-section, the dam looks like an inverted, flat-bottom trough, filled with sediment. The design drawings show rock armor placed along the toe of the dam, abutment to abutment. At present, however, there is a gap in the 3-5 foot diameter rock where some rock was removed at the recommendation of the Oregon Department of Fish and Wildlife in order to improve fish passage. In this location, a cavity has formed that extends under the dam and behind the downstream vertical wall. The age and size of this cavity are unknown.

The abutments are cast-in-place concrete. The right (north) abutment is founded on bedrock, backfilled with gravel, and capped with a reinforced concrete slab. The left (south) abutment is built into the man-made levee located on the Calapooia's left bank. The left abutment consists of a formed concrete face and wing walls backfilled with soil. Two layers of steel reinforcement exist in all concrete walls and slabs. Equally spaced, inclined, slotted steel guides are attached to the crest of the dam to support wooden planks (i.e., flashboards) that are inserted and removed to raise or lower the level of the pool behind the dam. The Brownsville Canal Company installs the flashboards in late spring prior to the irrigation season. The flashboards are removed in the fall

before the fall rains, by mid-October. The flashboards are installed to raise the impoundment stage and divert water from the river into the Brownsville Canal.

Potential changes to hydrology and flooding regimes
The Brownsville Dam only impounds water during the summer months (June through September) when the flashboards are installed. The dam does not store water during the rainy season, and therefore, does not impact the Calapooia River's flood regime. During the times of year when the flashboards are not installed, the river moves right over the top of the dam and when flows are at bankfull stage, the dam is not even visible. Therefore, the impact of dam removal on the Calapooia River's hydrology and flood regime is expected to be minimal or negligible.

Amount and characterization of sediments behind the dam
The sediment behind the dam is made up of cobbles, gravels and fines that have accumulated over the years. The channel above and below the dam is a transport reach where sediment is deposited and eroded continuously during the winter rainy months. A large sediment wedge has formed upstream of the dam on the inside bend, where one would expect to find a sediment deposit on a normal inside river bend. A seismic refraction study completed in October 2006 provides additional detail on the depth-to-bedrock at three cross-sections.

Potential sources of sediment contamination within the watershed
There are no known significant sources of sediment contamination in the watershed. All salmonid spawning and rearing habitat is upstream of the dam. The Calapooia Watershed Council's watershed assessment gives a rough number of 44,500 tons of suspended sediment transported each year in the watershed. The relatively small amount of sediment trapped behind the dam is a fraction of that amount.

The Calapooia watershed above Brownsville Dam is a mixture of small, forested parcels managed for private and commercial timber production; and small, rural residential parcels managed as pasture. There is no manufacturing industry of any kind upstream of the dam

Project Description
The main objective of the project is to remove the dam to restore fish passage to the Calapooia River. Removal of the dam may involve riffle/pool construction based on information from topographical and fluvial bed loading surveys to be conducted in fall 2006. It may also include removal of large fluvial deposits (if found) that might have accumulated upstream of the dam. Water diversion, dewatering and erosion control may be required during different phases of the dam removal.

Some of the material removed from behind the dam may be used to landscape the area located between Northern Drive, a Linn County Road, and above the ordinary high-water level of the Calapooia River. The area may be restored into a day-use park, which will include site restoration and restoration planting. The park will be owned and operated by the Brownsville Canal Company unless the property is accepted by another agency, such as the Linn County Parks Department. Linn County may be contacted to provide technical oversight of and support

for the overall design and placement of material, the layout of the park, and access to the park from Northern Drive.

Permits will be required for the removal of the dam from the U. S. Army Corps of Engineers, and Division of State Lands. The project may require a Biological Assessment and ESA Consultation as part of this permit process. Other state or federal permits may be required. A road access permit for construction from the Linn County Road Department is required. Linn County Planning and Building will need to be contacted to obtain review and approval pertaining to impacts, if any, from flood runoff considerations. Linn County Road Department may be contacted to provide technical design support for signing, traffic control, and access configuration.

Consultant Scope of Work
The Consultant will provide the following:

- Design for the removal of the dam, dewatering, and erosion control. The design will include a hydraulic analysis for the removal of the dam.

- Design for the 2.5 cfs diversion of water from the Calapooia River into the Brownsville Canal.

- Complete permit applications for all required local, state and federal permits.

- Design for restoration of the area into a day-use-park, including site restoration and restoration planting. The design will also include access construction, parking, and public areas. The park design will not include restrooms.

- Preparation of engineering plans and specifications for removal of the dam, construction of a system for the ongoing diversion of water to the Brownsville Canal, and restoration of the area into a day-use park. The plan and specifications will include quantities and an engineering cost estimate. This project will be a design-bid-build sequence.

- Assist the Calapooia Watershed Council in obtaining a qualified contractor for construction.

- Provide information to the Project Manager of the Calapooia Watershed Council for presentation in meetings to the Brownsville Technical Committee, landowners, Council, and other public and agency meetings. Attend and participate in meetings when requested by the Project Manager. Integrate information obtained from the meetings into the design, as directed by the Project Manager.

- Provide engineering inspection for construction of the project.

- Provide brief monthly status reports and monthly billings to the Project Manager.

The Calapooia Watershed Council may choose to reduce the scope of work as information becomes available and the project design is developed. The Council may also choose to have portions of the work done by Council staff or other individuals, firms or agencies.

Project Timeline

The timeline for this project is tentative and subject to change based on the outcomes of the permitting and design processes. The Council prefers construction in summer 2007, but can extend the project into summer 2008 if necessary.

Milestone	**Tentative Timeline**
Complete site survey	November 1, 2006
Commence project	November 20, 2006
60% complete design	December 31, 2006
Commence permitting & ESA consultation	January 1, 2007
Permits submitted	February 1, 2007
100% complete design	April 1, 2007
Permits in hand	April 15, 2007
Advertise construction contract*	April 15, 2007
Award construction contract*	May 1, 2007
Commence construction	June 1, 2007 (start of in-water work)
Complete construction	No later than September 30, 2007

Consultant Proposal Requirements

The proposal package consists of a transmittal letter and required attachments:

- Transmittal Letter:
  - The consultant's specific experience delivering river restoration projects. Provide information and background on relevant projects that have been completed within the past 7 years.
  - Specific knowledge and experience, if any, working with watershed councils, soil and water conservation districts, and other community groups.
  - The local office that will provide service to the project.
  - The primary project engineer's experience with dam removal and construction.
  - Qualifications and relevant experience of the primary team members who will assist the primary project engineer.
  - The firm's ability to see the project constructed by summer 2007.

- Attachments:
  - Resumes of the primary project engineer and team members
  - Five client references current within the last seven years, at least two of which must be Oregon-based.

Consultant Selection Process

SOQs will be reviewed by the Brownsville Dam Technical Team, which includes representatives from the Calapooia Watershed Council (CWC), City of Brownsville, Linn County Roads Department, Oregon Department of Fish and Wildlife (ODFW), and National Oceanic and

Atmospheric Administration (NOAA). Direct all questions to the Project Manager (contact information shown below).

The Technical Team may rank the consultants. The Project Manager will notify all responding consultants no later than December 31, 2006, of the team's decision. The top-most qualified consultants will be invited to interview with the technical team and to make a presentation. Qualified consultants will be given at least five calendar days notice of their scheduled presentation.

The technical team may contact references at any time during the process.

The Calapooia Watershed Council reserves the right to accept or reject any and all of the proposals received as a result of this request. The Council is not obligated to pay any costs incurred in responding to this RFP.

Open House and Site Visit
On October 23, from 1:00-4:00 pm, the Calapooia Watershed Council will host an Open House and Site Visit to give all potential applicants the opportunity to visit the dam, speak with watershed council and canal company members, and gain additional background information to assist with responding to this RFP. Participation is optional. However, those wishing to attend must RSVP to the Project Manager no later than October 21, 2006. Please let the Project Manager know how many people will be representing your firm. All participating firms will receive a detailed agenda prior to the Open House.

Proposal Submittals
Proposals must be postmarked no later than November 3, 2006. Proposals not postmarked on the above specified date will not be considered. Faxed or emailed submissions will not be considered. The Calapooia Watershed Council assumes no responsibility for delayed or undelivered mail or express packages.

Submit 5 hard copies of proposals to:

Denise Hoffert-Hay, Project Manager
Calapooia Watershed Council
2006 Chase Loop SW, Albany OR 97321
Phone: (541) 619-5896
E-mail: hofferthay@peak.org

Submittals Deadline

Friday, November 3, 2006, by 5 pm.

Appendix C. Sample SOQ Rating Sheet

The Interview Committee used this rating sheet to evaluate RFQ's and to assist the committee in deciding which firms to interview.

Selection Criterion	Score Guide	Score
Watershed Group Experience - Highest scores go to firms with recent watershed council, soil and water conservation district or non-profit experience. Consultants with strictly private sector clients will score less.	**Score 0-5**: 5 pts for 3 or more examples, 4 pts for 2 examples, 3 pts for one example, or 2 pts for private sector only.	
Local preference - Highest scores go to consultants having an office within a 30-minute drive. Consultants with greater travel times will score less. *(This is to keep the funding local and in the watershed and minimize travel costs).*	**Score 0-5**: 5 pts w/in 30 minutes, 4 pts w/in 1 hour, etc.	
Natural resource agency permitting experience - Highest scores go to consultants who have worked with DSL and USACE to successfully obtain project permits in a timely manner.	**Score 0-15**: 15 pts for experience with permitting in Linn County and/or dam removal, 12 pts for experience elsewhere in the Willamette Valley, 9 pts for experience in Oregon, 5 pts for out of state	
Team qualifications and relevant experience - Highest scores go to consultants who form a qualified team. Key positions should include: Project engineer, hydrologist, geomorphologist, survey staff, environmental and permit staff, construction manager. One person may serve in more than one role. Qualifications should demonstrate academic achievement and certification in respective fields.	**Score 0-25**: 25 pts for having staff with 10+ years experience with all identified roles covered, 20 pts for staff everyone but survey, 15 pts for staff everyone but permitting	
Dam removal experience - Highest scores go to consultants who demonstrate past experience with dam removal projects. Marginal but not related experience will not receive as high of score. Unrelated experience will not be scored.	**Score 0-25**: 25 pts for dam removal experience in PNW, 20 pts for any dam removal experience, 15 pts for other types of river engineering projects	
Irrigation pump or other water control devices experience - Highest scores go to consultants with experience in installing solar irrigation pump systems. Experience with other flow control devices will not score as high. Firms without any pump-type experience will not earn any points.	**Score 0-10**: 10 pts for experience with installing pumps or having someone on the team with this experience. 5 pts for other flow control devices experience.	
References - Highest scores go to references that correlate to the projects indicated in the project experience section. Also, to an accurate list of references, including contact name, phone number, and project associated with the reference.	**Score 0-15**: 15 pts to firms that list references who can verify experience with dam removal and permitting success. 10 pts to firms with references that verify experience with other successful river restoration projects.	
TOTAL POINTS		

Overall positive attributes -

Overall drawbacks -

Appendix D. Interview Information

(The Interview Committee provided this information to the top three candidates prior to their interviews so they could come to the interview prepared.)

The Interview
The interview will last one hour. Interviews will take place at the Linn County Road Department office. Address is 3010 Ferry Street SW, Albany OR 97322. The office is on Hwy 99E south of Queen Ave off 34th Ave. You can get very good directions from MapQuest or Google Maps.

Your Presentation
For the first 30 minutes, you will make a presentation to the Interview Committee (see attached list for names and affiliations of committee members) on your proposed scope of work. Please do not exceed the 30-minute presentation limit.

Provide five black and white copies of your presentation and any other handouts. Copies may be stapled, but not placed in binders or folders. For your presentation, complete the attached scope of work and provide five copies of it. Add lines as necessary to the table, but be prepared to justify the additions, as well as all the information you show in the three columns.

For your presentation, a laptop and PowerPoint projector will be available. You are not required to prepare a PowerPoint slideshow; use whatever medium best suits your presentation. You may bring your presentation on a CD or on a portable drive. You are not required to prepare a PowerPoint slideshow; use whatever medium best suits your presentation.

Discussion
The final 30 minutes will be reserved for discussion and questions from the Interview Committee. Questions may focus on your presented scope of work, or on the SOQ you submitted earlier concerning previous projects/work experience. Whoever from your team is the best qualified to address these areas should attend the interview.

Questions?
Questions about the interview process should be directed to Denise Hoffert-Hay, Project Manager for the Calapooia Watershed Council. She can be reached at (541) 619-5896 or email: hofferthay@peak.org.

Brownsville Dam Removal and Site Restoration
Proposed Scope of Work
Prepared by (Your Firm)

Tasks/Subtasks	Est. Completion Date (month & year)	Est. No. of Hours	Est. Fee
Phase 1: Survey and Assessment			
Site survey			
Hydraulic analysis			
Geomorphic assessment			
Subtotal			
Phase 2: Engineering Designs for Dam and Pump Station			
Hydraulic analysis and modeling			
Dam removal design			
Dewatering design			
Erosion control design			
Diversion from river to canal design			
Subtotal			
Phase 3: Park Design			
Site restoration plan including: access construction, parking, and public areas			
Subtotal			
Phase 4. Permits			
Determine what permits and environmental assessments are required by NOAA, USACE, DSL, WRD, ODFW and Linn County.			
Prepare permit applications.			
Prepare all engineered drawings necessary for obtaining permits.			
Subtotal			
Phase 5. Construction			
Prepare a bid book to provide to potential contractors.			
Review and rank submittals from contractors. Assist the Council with obtaining a qualified contractor for construction.			
Provide construction oversight and engineering inspection for the project.			
Subtotal			
On-going tasks			
Participate in Technical Team meetings (at least 3 and no more than 6).			
Integrate information obtained from meetings into the project design.			
Provide brief monthly status reports and billings to the Project Manager.			
Subtotal			
TOTAL			

Appendix E. Interview Questions and Decision Matrix

The Interview Committee used these questions and matrix during the interviews to assist in evaluating each candidate's presentation and in making their final decision.

Name of Firm _____

Questions

1. Tell us about the Calapooia watershed and the mission of the Council.

2. Tell us about your direct, previous experience with dam removal projects (either project manager or lead engineer). Tell us about your specific role with the project, size of dam removed, size of watershed and describe how the project looks today.

3. How will you develop and then choose an alternative for meeting the existing 2.5 cfs water right?

4. Describe your timeline for the project.

5. Describe your experience with obtaining Section 404 permits in Oregon.

6. Describe your proposed budget and scope of work.

For each question, circle a number on a scale from 1-5.

1 = little understanding, missed the mark
3 = adequate understanding, a few details missing or incomplete
5 = excellent, outstanding addressed completely.

Question	**Comments**
Rate how well the candidate described the Council and its' mission. 1 2 3 4 5	
Rate the candidate's previous experience with dam removal projects. 1 2 3 4 5]	
Rate the candidate's proposed approach for meeting the existing water right. 1 2 3 4 5	
Rate the candidate's proposed timeline. 1 2 3 4 5	
Rate the candidate's experience with obtaining the Section 404 permit in Oregon. 1 2 3 4 5	
Rate how well the proposed Scope of Work meets the project goals and objectives 1 2 3 4 5	
Rate how well the project deliverables are outlined. 1 2 3 4 5	
Rate how well the proposed fee matches the complexity of the budget. 1 2 3 4 5	
TOTAL (add all numbers in right column)	

Appendix F. Additional Resources

Dam Removal Decision-Making

American Rivers, Inc. and Trout Unlimited (2002). Exploring Dam Removal – A Decision-Making Guide – This guidance document describes in detail four categories for decision-making related to dam removal: Ecological, Economic, Societal, Technical/Engineering. Each section provides a brief overview of topics useful in determining if a dam should be removed.

- Not all the issues in the guide will have direct relevance to, or major significance for, every dam removal, thereby making the guide somewhat unwieldy. It is so detailed and offers so many issues to think through, that it makes dam removal seem daunting.
- The guide does not differentiate between small and large dams, so a 3-foot tall push-up dam and a 30-foot tall concrete structure have the same sets of questions.
- The most useful section of the guide is the appendix, which provides worksheets with sets of questions that enable you to explore issues in-depth.
- If you have already reached the decision to remove a dam, the guide is less instructive since it focuses on questions to consider in making a dam removal decision. However, Part VI Technical/Engineering Issues can assist you in framing your project's next steps.

Heinz Center (2002) *Dam Removal – Science and Decision Making* – This guide is written for decision makers and focuses on three objectives:

1. How to outline the wide-ranging outcomes of dam removal, including potentially positive and negative effects and a list of issues to be addressed in the decision-making process.
2. How to define indicators for measuring and monitoring environmental, economic, and social factors related to dam management and/or removal.
3. How to provide available information sources for decision makers.

The key to implementing this decision-making strategy is the gathering of data and assessment of outcomes, which provides a view of current and potential future conditions. The guide outlines in six basic steps a general method for evaluating the dam and watershed to help you reach a decision about dam removal.

New Hampshire Department of Environmental Services [NHDES] (2003). Guidelines to the Regulatory Requirements for Dam Removal Projects in New Hampshire – This comprehensive guidance document provides dam owners, communities, regulatory agencies, and other interested parties with information about the regulatory process associated with removing a dam in New Hampshire.

NHDES has developed a permit application process specifically for dam removal projects — the only state so far to have a dam-specific permitting process. The guide is specific to projects in New Hampshire, but the steps and processes are similar to Oregon's. It provides a useful framework for planning your project once the decision to remove the dam has been made.

MDNR and MDEQ (2004). Dam Removal Guidelines for Owners. Michigan Department of Natural Resources and Michigan Department of Environmental Quality – The guide suggests issues to consider when making a dam-removal decision. Though specific to Michigan, the guide is readily transferable to Oregon because it poses only general questions to consider when making a dam-removal decision. The guidance is short (fewer than 10 pages) and very appropriate for very small structures with few complicating issues. It is the most bare bones of all the guides reviewed here.

Media Releases on Dam Removals in Oregon

Ash Creek Dam Removal – Newspaper stories with background on Luckiamute Watershed project with links to photo files and other project related stories
http://luckiamute.watershedcouncils.net/projects/ashcreek/ashcreek.html

Buck & Jones Dam Removal on Applegate River – project photos, description and video
http://www.jeffnet.org/~dnewberry/NWC/NWC_Projects_BJDamRemoval.htm

Gold Ray Dam – Article on potential removal of Gold Ray Dam on the Rogue River in Southern Oregon
http://www.mailtribune.com/apps/pbcs.dll/article?AID=/20080307/NEWS/803070320

Gold Hill Dam Removal – Articles on the removal
http://www.rvcog.org/mn.asp?pg=NR_Gold_Hill_Dam

http://www.mailtribune.com/apps/pbcs.dll/article?AID=/20080713/NEWS/807130326/-1/comm09

www.nmfs.noaa.gov/habitat/restoration/whatsnew/pdf/oregon%20dam%20removal%20with%20proper%20mayor%20quote.pdf

Owens Creek Dam Removal – Newspaper story on Long Tom Tributary dam removal project
http://www.longtom.org/documents/archive_reports/OwensCr_RGarticle_071807.pdf

Mt. Scott Creek Dam Removal – NOAA summary of this 2002 dam removal
http://conservationconference.noaa.gov/case/pdfs/or_dam.pdf

Rock Creek Dam Removal – Newspaper story on the removal
http://www.newportnewstimes.com/articles/2006/09/20/news/news01.txt

South Fork Klaskanine River Dam Removal – Newspaper story on the removal and project background (located on a tributary to the Youngs River near Astoria)
http://www.fws.gov/oregonfwo/ExternalAffairs/Topics/Documents/Daily Astorian 9_3_07 Dam removal enhances fish passage.pdf

http://www.dfw.state.or.us/news/2007/august/082007.asp

Tillamook Estuary Partnership – Background on Coal Creek Dam Removal
http://www.tbnep.org/rivers/coal.html

Applegate Partnership – Article that provides outline of challenges to community decision-making and dam removal
http://www.switzernetwork.org/viewArticle.taf?id=50

Blue Bus Creek Small Dam Removal
http://www.dfw.state.or.us/news/2007/august/082707.asp

Savage Rapids Dam Removal (scheduled for 2009)
http://www.waterwatch.org/programs/freeing-the-rogue-river/savage-rapids-dam-removal

Other Resources for Additional Information

American Rivers
http://www.americanrivers.org/site/PageServer?pagename=AR7_Guide_DamRemoval_Pubs

The Aspen Institute
http://www.aspeninstitute.org/site/c.huLWJeMRKpH/b.612701/k.65FC/Dialogue_on_Dams_and_Rivers.htm

The Heinz Center – two reports on this page, "Dam Removal Research: Status and Prospects" and "Dam Removal: Science and Decision Making"
http://www.heinzcenter.org/publications/index.shtml#majorreports

American Association of State Highway and Transportation Officials (AASHTO) report: "A Summary of Existing Research on Low-Head Dam Removal Projects"
www.trb.org/NotesDocs/25-25(14)_FR.pdf

Clearing House for Dam Removal Information
http://www.lib.berkeley.edu/WRCA/damremoval/news.html