



CONSERVATION RESERVE
ENHANCEMENT PROGRAM

Conservation District
Implementation Guide

for
Washington State

Updated: June 16, 2015



Washington State
Conservation
Commission

Contents

Introduction	4
Purpose of Document:	4
Program Overview:	4
Disclaimer	5
Funding Sources	5
Process, Agency Roles and Responsibilities.....	6
Overview	6
CREP, Step-by-Step	7
Conservation District Responsibilities Summary	9
Washington State Conservation Commission Responsibility Summary	10
Farm Service Agency Responsibility Summary	11
Natural Resources Conservation Service Responsibility Summary	11
CREP Marketing and Promotion	12
Pre-enrollment.....	12
Enrollment	12
General Eligibility	13
Land Eligibility	13
Producer Eligibility	14
Easements.....	14
Contracts.....	14
Mid-contract Management	14
Re-enrollment.....	15
Quality Criteria/Buffer Functionality	16
Natural Conditions and Landowner Responsibility.....	17
Contract Timing.....	18
Rental Rates	18
Payments and Taxes	18
Practices Overview.....	19
Riparian Forest Buffer Practice	19
Riparian Hedgerow Practice	20
Grass Filter Strip Practice.....	20

Wetland Practices	21
Combined Practices	22
General Restrictions.....	22
Cultural Resources Requirements and Procedures	23
Consultation and Records Review	23
Cultural Resource Surveys	24
Cultural Resource Documents	24
Cultural Resource Dialog for CREP Project Plans	24
Additional Assistance to Facilitate and Expedite the Consultation Process.....	24
Consultation Letters and Attachments.....	24
RFO Determination and CPA-52 Preparation	25
Tracking the Consultation Process.....	25
Working with the Tribes	25
Challenging Situations.....	26
Site Preparation	26
Bank Stabilization.....	26
Wet Conditions	27
Reed Canarygrass.....	28
Feed Lots.....	29
Blackberry	30
Plant Establishment	30
Water	30
Drip Irrigation.....	31
Landscape Fabric.....	32
Weed Control.....	32
Kochia.....	32
Blackberry	33
Reed Canarygrass.....	33
Ungulate and Rodent Predation	34
Deer.....	34
Elk.....	36
Voles.....	36

Beavers..... 36
References 44

Introduction

Purpose of Document:

This document is intended to provide general guidance to assist conservation district (CD) staff with various aspects of implementing the Conservation Reserve Enhancement Program (CREP) in Washington State. Because of the program’s complexity, this step-by-step manual provides guidance for many of the actions needed to develop a CREP site from start to finish. It includes initial landowner outreach all the way through re-enrolling an expiring contract. The information within this document should be considered as guidance. Specifics may vary according to site conditions, differences in environmental conditions, local water quality and salmon recovery objectives, and agricultural activity.

Program Overview:

The primary purpose of CREP is to restore and protect riparian habitat for salmon recovery. Riparian habitat restoration can also improve stream water quality, provide instream wood structures, restore the food web, increase wildlife habitat, sequester carbon, and attenuate floods, all of which contribute towards salmon recovery and many other positive environmental and agricultural benefits.

The Washington State CREP was signed into effect in late 1998 as an [agreement](#) between the U.S. Department of Agriculture (USDA) through the Farm Service Agency (FSA) and the Washington State Governor’s Office represented by the Washington State Conservation Commission (SCC). The first landowner contract was implemented in 1999. As of 2014, there are more than 1,050 landowner contracts and about 1,500 acres of riparian buffer enrolled in CREP in Washington State.

CREP is a voluntary program that pays landowners rent, a signing bonus and the costs for establishing buffers along creeks, ditches and wetlands. Participants receive annual rental payments in return for land that is removed from production and grazing, under a 10 or 15 year agreement. CREP is not a “free” program, however. Participants are essentially being asked to grow a riparian crop instead of their usual crop in exchange for a known, fixed price, and they must contribute effort and expense to maintain the project. Once plants are established, producers bear the responsibility and cost of maintenance just as they would for their normal crop. Enhancements beyond the allowable cost caps must be paid by the participant.

There are four main practices used in the Washington CREP to accomplish riparian improvements.

1. The most popular is the **riparian forest buffer** with average buffer widths ranging from 50' to 180'.
2. **Wetland buffers** are used to protect and improve wet areas that are hydrologically connected to salmon streams.
3. **Riparian hedgerow** plantings are sometimes used along small water courses or ditches to improve shade and reduce water temperatures.
4. **Grass filter strips** may accompany hedgerow buffers where concentrated flows enter the hedgerow to improve water quality by filtering sediments and other pollutants.

In addition, the program may pay for livestock exclusion fencing, livestock watering facilities, and in the case of small streams, livestock crossings. Each of these practices is described in detail later in this manual.

Disclaimer

This document is a working document developed by and for conservation district CREP planners to share experience and knowledge that may be helpful in navigating the complexities of CREP. Conservation district technicians that may have helpful insights are encouraged to contribute to this evolving document. Contributions should be submitted to the Washington State Conservation Commission (SCC) CREP Coordinator.

This document is not intended to interpret or establish CREP policy. However, the nature of working in the program is one of matching program policies to the real world work of writing, funding and implementing riparian conservation plans. It does reflect current policies and will be updated as those policies change and new policies are implemented. Please refer to the FSA Agricultural Resource Conservation Program (2-CRP) handbook and the [contract](#) between FSA and SCC for rules and policy. Clarification can be obtained by asking [Rod Hamilton](#) with FSA or [Brian Cochrane](#) with the SCC.

Funding Sources

In CREP, landowners are reimbursed for up to 100 percent of the costs (within caps) to install approved riparian enhancement practices. FSA pays for 50 percent with cost share funds and 40 percent with a Practice Incentive Payment or PIP. The SCC pays the remaining 10 percent. In addition, FSA pays the cooperator a one-time sign-up bonus of \$100/acre. The cooperator also receives an annual rental payment for the duration of their contract (10-15 years) from FSA. This is based upon the soil types on the site. The SCC pays for maintenance of the buffers for a five (5)-year period after installation. Expiring contracts are allowed to re-enroll with FSA and receive the rental rate that is in effect at the time of re-enrollment.

Process, Agency Roles and Responsibilities

Overview

This is a brief summary of the major responsibilities of the Farm Service Agency (FSA), Conservation Districts (CDs), Washington State Conservation Commission (SCC), and Natural Resources Conservation Service (NRCS). Greater detail is found in subsequent sections of this manual.

The Conservation Reserve Enhancement Program (CREP) in Washington is a partnership between FSA and the State. FSA administers the program. CREP is a local, state-level sub-program of the nation-wide Conservation Reserve Program (CRP). Washington CREP must follow national CRP policy. However, some Washington CREP policy is set by the state FSA office. As a program partner, the SCC may weigh in on development of state CREP policy and establish policy concerning its responsibilities in the program.

FSA CRP policies are located in the Agricultural Resource Conservation Program (2-CRP) Handbook. It is available on web sites for both FSA and the SCC. The Conservation Commission has kept the 2-CRP manual updated with the latest Washington FSA Amendments, so-called *pink sheets*. The link is: <http://scc.wa.gov/crep/> (Note: this is a 1400 page document and download times may be lengthy depending on your connection). The advantage of using the electronic version of the 2-CRP manual is that it can be searched by key words.

The Conservation Commission sets policy for CREP state funding and the [reimbursable maintenance practices](#). General FSA program and policy oversight is provided by the state CREP Coordinator, State Technical Committee, individual county committees and local county office staff.

NRCS and conservation districts both have technical responsibilities for CREP. Generally district technicians have responsibility for planning and implementation of CREP projects. NRCS has technical oversight responsibility for the program but in some cases provide additional program support. Both NRCS and the conservation district sign CREP conservation plans.

Roles and responsibilities will vary somewhat between districts. Many districts share office space with NRCS and FSA so they have a different relationship with those agencies compared to those districts that are not co-located. Conservation district staff must be technically proficient in each of the eligible practices, and have a good knowledge of the program policies and compliance with the Federal Services' [Biological Opinion](#) for the Endangered Species Act. Technical design and approval for some CREP practices require specific job approval authority in NRCS.

CREP, Step-by-Step

The following is a list of steps to enroll a producer from start to finish, with roles and responsibilities assigned to each step. Obviously some steps can and will occur slightly out of sequence and some can occur concurrently, but the list represents a general outline of the process.

- 1) Producer expresses interest to FSA, NRCS, or CD.
- 2) Agencies notify each other about producer interest.
- 3) Landowner and FSA or CD partially complete CRP-2C
- 4) FSA/NRCS determines eligibility of owner, land practice and size. Calculates rental rate.
- 5) FSA determines if any undertaking will occur. If so, conducts literature search and starts 1st 30-day notification to SHPO and Tribes concerning area of potential effect.
- 6) Landowner and FSA/CD continue filling out CRP-2C.
- 7) CD/NRCS visit site to determine if a functioning buffer exists and if practices are appropriate for the site.
- 8) If buffer exists or practices not appropriate, CD/NRCS notifies FSA, who notifies producer of ineligibility using CRP-26.
- 9) If buffer does not exist and practices are appropriate, CD/NRCS GPS the site, CD provides FSA with stream length.
- 10) Producer visits FSA office and signs CRP-2C. Copies to CD and producer.
- 11) CD/NRCS work with producer to develop Conservation Plan.
- 12) NRCS reviews and approves Conservation Plan.
- 13) CD ensures Conservation Plan complete including signatures. Copies to FSA.
- 14) FSA makes cultural resources determination re: survey needed. If so,
 - a) FSA notifies producer and CD,
 - b) CD acquires list of certified archeologists from SHPO,
 - c) CD collects bids from responding certified archeologists IAW RCW contracting requirements,
 - d) CD requests CR Survey funds from SCC,
 - e) SCC approves fund request,
 - f) CD contracts with Certified Archeologist in accordance with RCW contracting requirements,
 - g) CD coordinates contractor with landowner for access ([right of way agreement](#)),
 - h) CD receives report and invoice from contractor,
 - i) CD provides invoice to SCC, report to FSA,
 - j) CD pays contractor,
 - k) SCC pays invoice to CD,
 - l) FSA completes final consultation with SHPO and Tribes.
- 15) FSA obtains producer signatures on CRP-1 and approves contract. Finish CRP-2C. Copies to producer and CD.
- 16) CD requests Cost Share funds and maintenance funds from SCC.
- 17) FSA creates form FSA848B, send to producer.
- 18) CD provides list of reputable contractors to producer.

- 19) Producer installs practice with guidance from CD and NRCS. Producer signs FSA -848B and submits bills with documentation to FSA.
- 20) FSA refers FSA848B to CD/NRCS for confirmation practice installed to standards.
- 21) CD certifies practice completion by signing form 848B.
- 22) FSA issues funds up to 50 percent Cost Share to producer, copy to CD. FSA issues 40 percent PIP if applicable.
- 23) CD sends invoices and FSA payment share info to SCC.
- 24) SCC pays State share of CS and PIP.

Begin maintenance and Mid-contract management phase

- 25) CD/NRCS reviews maintenance plan with producer.
- 26) CD provides list of reputable contractors to producer.
- 27) CD annually requests funds from SCC for maintenance.
- 28) SCC approves fund request.
- 29) CD inspects project 2x/year for first 5 years. Work with producer to ensure maintenance is completed.
- 30) CD provides maintenance invoices to SCC.
- 31) SCC pays invoice to CD.
- 32) Mid-contract management
 - a) For contracts dated May 2003 or older,
 - i) No further action (unless participant wants to do mid-contract management).
 - b) Contract dated May 2003 or later **without** mid-contract management practices
 - i) CD/NRCS conducts mid-contract management inspection.
 - (1) If buffer does not meet quality criteria, producer can apply for a cost share through County Committee, Exhibit D for State share via CD; and amends conservation plan with County Committee (CoC) approval.
 - (2) IF buffer meets criteria, no further action needed.
 - c) Contract dated May 2003 or later **with** mid-contract management practices
 - i) If buffer meets criteria, producer can apply for a waiver through County Committee.
 - (1) If buffer does not meet quality criteria, producer can apply for a cost share through County Committee, Exhibit D for State share via CD; and amends conservation plan with CoC approval.
- 33) CD provides inspection to FSA.

Begin re-enrollment phase

- 34) CD conducts re-enrollment inspections 1-2 years before end of contract.
- 35) Technician discusses needs and potential issues of re-enrollment with landowner.
- 36) FSA notifies producer and CD of pending contract expiration 6-12 months before contract end date.
- 37) Producer signs CRP-2C before current rental end date.
- 38) CD/NRCS technician reviews project and determines how much is meeting or not meeting specification.

- 39) If improvement needed, CD/NRCS technician provides estimated costs for a new plan and reviews with CoC to decide if re-enrollment is economically viable.
- a) If CoC determines re-enrollment with additional work is viable, then:
 - i) CD/NRCS technician writes a new plan,
 - ii) CRP-1 is signed,
 - iii) Cost share is the same as a new contract with maintenance.
 - b) If CoC determines re-enrollment is not viable,
 - i) FSA notifies producer of ineligibility using CRP-26.
- 40) If no improvement needed, CRP-1 signed with FSA and producer. Conservation plan, including maintenance, updated by CD/NRCS with landowner input if needed, and provided to FSA. Basically a new contract without cost share and maintenance. Mid-contract management as with a new contract.

Conservation District Responsibilities Summary

- Provide outreach to landowners to encourage enrollment in CREP. With NRCS, determine whether or not the site has a functioning buffer and determine if the site can support the practices.
- Work with FSA to facilitate enrollment, eligibility determination, cultural resource requirements, plan development and project approvals.
- Provide FSA with feet of stream bank enrolled on CRP-2C.
- Districts should make sure reimbursement funding for cultural resource activities is available in advance.
- With NRCS, work with landowners and/or FSA to develop the CRP-2.
- Work with landowners (and in some cases with NRCS) to develop a project plan also known as a conservation plan of operation (CPO).
- Ensure that the project plan and prescribed practices follow program policy and meet practice standards. Note: The project plan must include anticipated mid-term management activities and an Unanticipated Cultural Resource Discovery Plan.
- Work with NRCS, FSA and the County Committee (CoC) on plan approval. The technician should bring a plan map, cost sheet, and summary of the proposed project to the CoC meeting. Note: In some cases the landowner may be invited to the CoC meeting.
- With NRCS, develop maintenance plans with landowners.
- Provide landowners with a list of contractors who have proven competency in installing CREP practices.
- When applicable, work with the landowner and SCC grants staff on Practice Incentive Payment (PIP) loan agreements. The PIP process is described in [this document](#). A [USDA assignment of payment](#) is required, as is a [PIP advance promissory note](#), and, if appropriate, a [PIP promissory note amendment](#). Since FSA will accept no more than two

(2) assignments per program, they maintain, and districts must check for, a record of disbursements on [this form](#).

- Provide project oversight to ensure specifications are met, policies are followed and activities are in compliance with laws and regulations including the Endangered Species Act [Biological Opinion](#).
- With NRCS consultation, can certify practice completion.
- Inspect practices shortly after installation, approve payments, perform annual [status reviews](#) and complete required documentation.
- Closely monitor projects for the first five (5) years after planting.
- Submit State funding and reporting documentation as required in a timely manner. This includes, but not limited to; budget forecasts, cost share applications, voucher requests and approved invoices. Note: Expenditures must be approved prior to conducting the work.
- With NRCS, inspect CREP contracts at least once during the mid-term management period. If mid-term management is necessary, work with landowner to develop a plan and implement the practices.
- Work with FSA to re-enroll expiring contracts. Complete a status review and provide management recommendations for re-enrolled buffers. If the buffer does not meet functionality criteria, then a conservation plan must be developed to address any deficiencies. See sections on buffer functionality.
- Maintain current CREP information in the SCC State database known as the Conservation Practice Data System (CPDS).

Washington State Conservation Commission Responsibility Summary

- Along with other state agencies, contribute at least 20 percent of overall annual program costs.
 - Pay within policy caps, 10 percent of costs to install practices.
 - Pay within policy caps, all [maintenance](#) costs for 5 years starting from the date of the first maintenance invoice.
 - Provide technical assistance.
 - Pay for cultural resource records reviews and surveys on a case-by-case basis.

Note: Commitments are subject to availability of funds. District allotments and spending caps are set by the CREP manager and the Commissioners. Exceptions to the caps may be approved in extenuating circumstances. Approval by the CREP manager is needed prior to implementation.
- Conduct and pay all costs for annual effectiveness monitoring.
- Assist conservation districts with marketing efforts.
- Facilitate provisions of technical assistance in the development of conservation plans.

- Assist districts with tools and information to help planning efforts. This can include information regarding: funding, eligibility, performance, training, technical issues such as beaver control, and 2-CRP handbook requirements.
- Coordinate CREP with other state and federal programs.
- Develop budget packages for the state funding process and address questions from the Office of Financial Management (OFM) and legislative staff, including presentations to inform funders on CREP performance and funding needs.
- Provide an annual report to FSA that includes program monitoring results and program growth measurements.

Farm Service Agency Responsibility Summary

- Determine producer eligibility.
- Determine cropland and marginal pasture land eligibility.
- FSA reviews and approves all project plans.
- The County Committee (CoC) can establish additional eligibility requirements such as a minimum acreage.
- The CoC reviews and approves all CRP-1 contracts.
- Administer all approved contracts.
- Calculate total reimbursable costs eligible for planned practices.
- Make a 50 percent cost share payment along with a 40 percent Practice Incentive Payment on eligible conservation practices installed.
- Make annual rental payments, including: the normal CRP base rate, a rental incentive payment and a small maintenance stipend.
- Make a one-time Signing Incentive Payment and PIP payments.
- Hear appeals.
- As the lead agency for CREP, FSA must comply with Section 106 of the National Historic Preservation Act. This requires consultation with the Tribes and State Historic Preservation Office (SHPO). A cultural resource site survey may be required. If so FSA will notify the CD and the landowner. The CD will work with the Commission to obtain funding for the survey. Through the consultation process FSA will determine if and what mitigation measures are required to proceed with the project.

Natural Resources Conservation Service Responsibility Summary

- With CDs, provides information on CREP to producers when providing general program information and/or when providing conservation planning technical assistance.
- Responsible for the technical adequacy of all conservation plans and contracts developed for CREP.
- Work with Conservation District employees to provide technical guidance.

- Work with conservation district staff to develop an approved conservation plan and ensure that practice standards are met.
- NRCS Staff with job approval authority for practices in the plan and certified planner status reviews and signs the plan.
- NRCS will, as appropriate, participate in State-level technical determinations and policy reviews, such as evaluating soil payment rates, C/S policies, and other requirements.
- Certifies practice completion and provides documentation to FSA. May allow Technical Service Provider (contractor) or CD to do this work.
- Conducts annual status reviews on contracts where stand is not certified as established.
- Annually inspect 10 percent of all CRP projects, which may or may not include CREP projects.

A summary of NRCS CRP responsibilities can be found at this [link](#).

CREP Marketing and Promotion

Conservation Reserve Enhancement Program (CREP) marketing and promotion can be done by any of the partner agencies or other conservation organizations. This includes Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), conservation districts, and the Washington State Conservation Commission (SCC). Salmon recovery groups often help direct landowners towards districts and CREP. The level and type of marketing varies from district to district with mixed results in different districts even when using the same techniques.

Templates for marketing tools including [display sheets](#), a [notebook](#), and two brochures are found in the appendices ([Whatcom brochure](#), SCC brochure).

Pre-enrollment

Many Conservation Reserve Enhancement Program (CREP) tasks happen before a landowner enrolls. Conservation districts, Natural Resources Conservation Service (NRCS), and Farm Service Agency (FSA) work together to advise each other of potential landowners who are interested in CREP. A lot of pre-enrollment work with a landowner is a result of one-on-one outreach. Districts also outreach to target groups of landowners with assistance from the Washington State Conservation Commission (SCC). Marketing materials are available from SCC for use at plant sales, fair booths and other outreach activities. Pre-enrollment conversations with potential landowners should include discussion of project scope, FSA restrictions, cost-share amounts and caps, and expectations of landowners.

Enrollment

Once a landowner or producer decides to enroll in the Conservation Reserve Enhancement Program (CREP), application to Farm Service Agency (FSA) uses the [CRP-2C form](#), a national standard form for the Conservation Reserve Program available from the [Natural Resources](#)

[Conservation Service \(NRCS\) web site](#). District technicians usually provide information that populates the application form, including total buffer acres, acres by soil type, linear feet of buffer and estimates of cost share for prescribed practices.

Usually the district technician has worked with the applicant well in advance of submitting a CRP-2C. It saves FSA a lot of work later if the scope of the project is agreed upon before submitting the application. The applicant, however, is not locked into a project as proposed on the application and may back out any time before signing the actual CREP contract ([CRP-1](#)).

General Eligibility

The land and cooperators must both meet enrollment eligibility criteria. FSA determines land and cooperator eligibility. The conservation district (CD) technician provides FSA with information to determine eligibility based on whether the site lacks a functional buffer and whether it can support CREP practices. The results of the inspection are communicated to FSA.

Caution: a small percentage of sites throughout the state have gone into CREP even though sites were not supportive of the riparian forest buffer practice, and as a consequence, the practices struggle to meet specification or outright fail. These sites cause a lot of heartache for everyone (FSA, CDs, SCC and the landowner) as effort and funds are needlessly poured into the project to prop it up. Several struggling project sites have been held up by CREP detractors as examples of why the program doesn't work. CREP practices may not always be the best fit for a site and the planner should try to identify other programs and practices that will succeed on the landowner's property.

The FSA County Committee approves all eligibility determinations.

Land Eligibility

Land must be either cropland or marginal pastureland. Cropland must have a cropping history on file with FSA that shows in at least four (4) of the last six (6) years the land was in annual crops, summer fallow or orchards vineyards and berries in very limited circumstances. Ineligible crops include most hay crops, other perennial crops such as pulp, and pasture. Land that does not meet cropland requirements can be enrolled as marginal pastureland. Marginal pastureland is land that has the potential to support grazing. The State FSA has adopted a fairly loose interpretation of marginal pasture. Basically the land must have the potential for agriculture, but doesn't have to be currently used for agriculture. This includes most rural land.

Examples of land not eligible would be urban, industrial, and commercial forest lands. Note that once enrolled in the program, all commercial and grazing use of the buffer must end for the duration of the CREP contract to protect the riparian buffer ecological functionality.

CREP and its practices are only allowed on stream reaches that are on an approved CREP eligibility map. It is maintained by the Conservation Commission and approved by the

Conservation Commission and the Farm Service Agency State Committee. It is available on the Commission's website. Generally, eligible stream reaches must have at least one species of Pacific salmon or steelhead present and have the potential for agriculture. As migration barriers are removed, it is possible that new reaches of stream become available to anadromous salmonids and additions to the CREP stream map layer can be approved. Please see instructions in the Appendix for how to request changes to this map. CREP applications must be along approved stream reaches, so it is important to go through the map update process before enrolling the landowner. Public land is not eligible for CREP enrollment. The exception is when it is leased to a cooperator who has a lease that extends for at least the full life of the CREP contract and the site meets all other eligibility requirements. Tribal land is eligible for enrollment.

Producer Eligibility

Landowners must have ownership of their land for at least 12 months before enrollment. Operators that apply for enrollment must have operated the farm for at least 12 months before enrollment. If there is an operator on the farm, they must be provided the opportunity to participate and if they decline, FSA needs a written statement to that effect. Spouses of landowners must sign the contract.

Easements

Land with existing easements that restrict farming activity are ineligible for enrollment. However, the CREP buffer can be entered into a conservation easement after the CREP contract is signed and the CREP contract will remain in place until it expires but is not eligible for re-enrollment. FSA should review easement language to determine eligibility.

Contracts

The CREP [CRP-1 form](#) is a contract. Landowners also sign a [contract](#) with conservation districts that describes the obligations of each party for the state cost-share and maintenance funds. Districts should use the boilerplate in the template in its entirety, as omission of some sections could put the district at financial risk should a party default on their contract obligations. It is important to note that to back out of a signed CREP contract, FSA and conservation districts will pursue collection of liquidated damages whether or not there has been any reimbursement or rent payments, which will also be subject to collection.

Mid-contract Management

All Conservation Reserve Program (CRP) contracts enrolled starting in May 2003 must include mid-contract management review and, if required, revised conservation plans and cost-shared management practices. Producers with contracts approved before May 2003 may request to have mid-contract management added to their contracts. The management practices:

- Are intended to maintain or enhance stand vigor and diversity, and thus sustain wildlife, erosion and water and air quality benefits,
- Will be scheduled mid-term in the contract, typically years 4-7,
- May be scheduled more than once during the contract period,
- Should be scheduled outside the April 1- July 1 primary nesting season,
- Will qualify for FSA cost sharing equal to 50 percent of the eligible cost of the operation and 50 percent cost sharing from SCC,
- Are subject to the cost share limits,
- Will be included in the contract's conservation plan, and failure to carry them out in a timely and effective manner will be considered a contract violation unless waived by the County Committee (CoC),
- May be waived or postponed in the year scheduled if the CoC determines they are not needed,
- Shall not be postponed to, or approved for, the last 2 years of the contract period.

Mid-contract management prescribes activities that must be performed to ensure the original plant diversity, wildlife benefits, and protection of the soil and water resources are present for the life of the contract. See the mid-contract management step-by-step process described previously. A copy of the SCC mid-contract management policy is available at this [link](#).

Re-enrollment

Land that is currently under CREP contract is eligible for re-enrollment in the final year of the contract if it meets other requirements. The Signing Incentive Payment (SIP) will not be paid for re-enrollments and the new contract must be approved by the CoC before the existing contract ends. See the re-enrollment steps in the step-by-step section.

Contract re-enrollment inspections should be done with enough lead time to allow for any needed additional landowner work to be completed by or around the time of re-enrollment.

If the technician finds that significant work is needed on a contract that will be re-enrolled, they should work with the landowner to develop a conservation plan for this site. (Use the quality criteria listed below for both mid-contract management and re-enrollments.) If the plan is approved by the County Committee, FSA will pay the following: 50 percent cost share and 40 percent PIP. The state will pay 10 percent cost share. The landowner will not receive any sign-up bonuses for re-enrollment, however, they will receive the current rental rate at the time of re-enrollment. The entire project area must be re-enrolled. National FSA policy does not allow for modifying the size of the current practice in a re-enrolled contract.

In addition, the state will pay maintenance on newly planted areas for up to five (5) years after the first maintenance invoice for the replanted area. The CREP maintenance caps apply to these costs and are based upon the newly planted acreage, not the full acreage of the entire buffer. This is contingent on available funding.

Because ALL new contracts must now have a mid-contract management practice included in them, all re-enrollments must also include a mid-contract management review even though most of them will likely be waived due to the maturity of the stand by the time the mid-contract inspection occurs.

Quality Criteria/Buffer Functionality

Buffer quality and function must be evaluated with consideration given to the site specific objectives of the project and technical requirements of the program. If significant problems are discovered during inspection, then remedial action must be taken before enrollment ends. This applies to mid-contract management and re-enrollments. Typical problems include: large gaps in desired vegetation, lack of canopy cover, significant invasive plant species coverage, and greater than anticipated tree density that requires thinning. Specific guidance on riparian buffer quality criteria can be found in the [2009 NRCS Stream Visual Assessment Protocol version 2](#) and is as follows for fair-excellent conditions:

- Natural and diverse riparian vegetation with composition, density, and age structure appropriate for the site (and contract age). Enhancing plant diversity would be done only if mid-contract planting were needed for another reason, and would then be incorporated into the new planting to address two or more needs at once.
- Canopy cover of 42 percent or greater of water surface within the length of the contract site, as applied to streams that are generally wade-able, about 20' across or less, and not applied to larger streams since canopy cover over wide rivers is typically low. Consider other quality criteria along with this, such as 70 percent of the number of trees originally planted ([Pennsylvania CREP](#)). Canopy cover or number of stems of woody vegetation can include volunteer native trees and/or shrubs.
- Invasive plant species coverage of 30 percent or less.
- Natural plant community extends throughout width determined in conservation plan with gaps not to exceed 30 percent of area.
 - If the open area is a wetland or open water, it could be considered functional habitat, not a gap. **More guidance coming soon.** Technical judgment would be needed depending on site specific objectives, natural processes and desired conditions. For example, if most of the trees in the buffer were felled by beaver and there was a new wetland without any buffer around it, the site may need

work, particularly if canopy cover were an important goal to meet water temperature standards in that stream. However, if it isn't a stream listed for warm water temperatures and was lacking wetland habitat, the technical call might be that this is a functional situation.

In cases where contract management is needed to address significant problems, a remedial plan should be developed with the landowner. The practices must be those either approved for mid-contract management in the original conservation plan, or approved as an amendment to the original plan by the County Committee.

Note that slightly different criteria may need to be applied to the wetland enhancement and riparian hedgerow practice. You would rely on the same document sources to do that, such as the 2-CRP Handbook and the appropriate NRCS practice standard. Wetland projects must be functioning as a wetland, including meeting wetland hydrology criteria.

The grass filter strip practice criteria are:

- The original width must still be present
- Must not have developed areas of concentrated flow into the stream (sheet or uniform flow instead)
- Must have herbaceous vegetation that is thick and lush at the soil surface throughout in order to filter sediment and absorb nutrients.
- Invasive plants less than 30 percent and not interfering with filtering function.
- Mowing for the grass filter strip would be an acceptable mid-contract management.

Again refer to the NRCS practice standards and 2-CRP Handbook.

Natural Conditions and Landowner Responsibility

During inspections, technical staff will find issues with buffer conditions that are a result of natural processes, such as flooding, down-cutting, or beaver activity, that are not the fault of the landowner. In general, the CREP program will work with the landowner to find ways to adjust to the natural processes and re-enroll as much of the project as possible. If during an inspection, however, it is found that the riparian buffer has reduced functionality due to non-natural causes/landowner negligence or omission, the technical inspector should follow the above protocol and provide the inspection results to FSA with those findings. All inspection reports should be given to FSA regardless of the results. FSA can then decide whether or not additional action is needed or not and if so, they will communicate with the landowner. If FSA finds that the landowner violated their contract, the landowner will be responsible for costs to restore the buffer and possibly other damages. However, that decision and subsequent communication will be conducted by FSA. It is important that riparian planners/CREP

technicians establish and maintain an open dialogue with landowners throughout the life of the contract to avoid end-of-contract surprises.

Contract Timing

Conservation Reserve Enhancement Program contracts can be 10 to 15 years and start the first of the month after approval. This start time can be delayed for up to six months to allow the cooperators to receive a full rental payment that first year. All planting must occur within two years of the contract start date. A one-time, 12 month extension may be approved by the County Committee.

Rental Rates

Conservation Reserve Enhancement Program (CREP) rental rates are based upon the quality of the soil for agriculture. The rate is a weighted average of the three most common soil types within the enrolled acreage. CREP differs from the Conservation Reserve Program (CRP) and Continuous Conservation Reserve Program (CCRP) in that it offers an incentive rental payment on top of the base rental rate. Different practices have different incentive rental rates. The CP22 riparian forest buffer and the wetland practices all offer a rental incentive of 100 percent. The result is a rental payment that is double the CRP rate. The CP22 hedgerow practice has a 75 percent rental rate incentive, while the CP21 grass filter strip has a 50 percent rental rate incentive on top of the base CRP rental rate. Rent for a combination of practices is calculated as a weighted average. Any land designated as agricultural lands of significance can receive another 10 percent rental bonus.

Payments and Taxes

Rental payments are made annually, after accrual, which means they are paid following the year that the rent was incurred. The Farm Service Agency (FSA) only makes electronic payments to bank accounts. This is done within a couple of weeks after the fiscal year ends on September 30th.

All FSA Conservation Reserve Enhancement Program (CREP) payments are reported to the Internal Revenue Service (IRS) as taxable income. Cooperators may be able to deduct installation costs that they incurred to reduce the cost share income. The IRS Publication 225, Farmers Tax Guide provides useful information regarding Government funded conservation programs such as CREP, Environmental Quality Incentives Program (EQIP) and Wildlife Habitat Incentive Program (WHIP). The full publication is available on the web at this [link](#). Cooperators should be directed to consult a professional tax consultant with specific questions regarding application of taxes on United States Department of Agriculture (USDA) program payments.

Practices Overview

In Washington there are six (6) eligible core restoration practices. These are Grass Filter Strips (CP21), Riparian Forest Buffer (CP22), Hedgerows (CP22h), Wetland Restoration (CP23 or 23A within the floodplain), and Wetland Buffer (CP 30). Each of these practices is described below along with references to their respective National Resource Conservation Service (NRCS) standards. Farm Service Agency (FSA) practice numbers may or may not have a corresponding NRCS practice code. The full description of each can be found in Exhibit 11 of the 2-CRP Handbook along with a list of practice components that are fundable for each practice.

All livestock must be excluded from land enrolled in the Conservation Reserve Enhancement Program (CREP). To assist with the livestock exclusion requirement, CREP offers fencing, stream crossing, and watering facility practices. Cost share for livestock exclusion practices is only available if livestock are already present on the property. CREP funds cannot be used to fund livestock exclusion in anticipation of future livestock use. In that case, the landowner must assure and fund livestock exclusion practices.

Technicians should work to protect all aquatic resources on a property. If possible, it is best to enroll all areas where there is a resource concern to maximize environmental benefit to ensure protection and implement practices to restore degraded areas. An example of what is not environmentally sound is to exclude from enrollment stream segments to allow livestock access, unless a livestock crossing that has been permitted. The program may pay for livestock crossings on small streams.

No instream activities are allowed under CREP. If needed, they must be funded with other sources and the appropriate permits, including consultation under the Endangered Species Act (ESA), will be needed. ESA consultation has already occurred for the approved CREP practices described below. A copy of the list of Best Management Practices (BMPs) designed to reduce adverse environmental impacts resulting from the installation of CREP practices is available at this [link](#).

Riparian Forest Buffer Practice

The most common conservation practice in the Washington CREP is the CP22, which can either be the riparian forest buffer ([NRCS 391](#)) or the hedgerow ([NRCS 422](#)). You'll need to specify which CP22 is being installed when filling out the forms. The riparian forest buffer is only allowed on stream reaches that are on the approved CREP eligibility map. The map is maintained by the Washington State Conservation Commission (SCC) and approved by the SCC and the FSA State Committee. It is available on the SCC [website](#). Generally, eligible stream reaches must have at least one species of Pacific salmon or steelhead present and have the potential for agriculture. Please see [instructions in the Appendix](#) for how to request changes to this map.

The riparian forest buffer is a minimum of 50' wide and pays for a maximum average of 180' wide. The 180' maximum width is an average width so that the outer edge can be greater than 180' if that outer edge is less than 180' elsewhere in the buffer length. With rare exceptions, the buffer width should never be less than 50' and it is advisable to always try to obtain wide riparian buffers for the greatest ecological benefit. For example, a 50' wide buffer along a wide main stem river is too narrow, and the minimum for streams such as these should be much wider to meet the resource concerns.

Riparian Hedgerow Practice

The CP22 hedgerow practice follows the [NRCS 422 standard](#). It should have an average width of 15' and used only on ditches/water courses that are 15' or less in width. It should be planted with native trees and shrubs. It is optional to use conifers. The maximum stocking rate is 1,162 stems per acre. It is eligible on salmon reaches, but only on small streams 15' or less in width. It is also eligible on non-salmon reaches as long as the reach is connected to a salmon reach on the eligibility map and is 10 stream miles or less away from an eligible reach. An example eligibility assessment form is located at this [link](#).

If a hedgerow is put along a drainage ditch and maintenance or dredging is expected, that activity should be listed in the conservation plan. If regrowth is not expected naturally after a dredging or ditch cleaning activity, the landowner must restore the damaged buffer at their own expense. This should be discussed with the landowner before signup. Lastly, if dredging occurs, the spoils should not be dumped in the buffer.

Grass Filter Strip Practice

The CP21 grass filter strip follows the [NRCS 393 standard](#) with a minimum width of 20' and a maximum width of 120'. It can only be used on cropland, unless you are using it as the outer edge of a riparian forest or hedgerow buffer. For these instances, please read the combination practices section below.

Grass filter strips are NOT eligible in stream reaches that directly support salmon or steelhead, i.e. the same reaches and more that are on the CREP eligibility map. The reason for this is because filter strips do not have a woody component to contribute towards salmon habitat. Its primary purpose is to filter, remove, and minimize the input of sediment and pollutants in order to improve water quality. For that reason, they can have an important function upstream of salmon habitat to improve water quality, but can't serve as salmon habitat. Grass filter strips are eligible along perennial and seasonal non-salmon stream reaches in any 8-digit Hydrologic Unit Code (HUC) that contains at least one CREP eligible stream reach within that HUC. See page 74 of Exhibit 11 in the Agricultural Resource Conservation Program (2-CRP) handbook (page 769) for a full description of what is not a seasonal stream (won't include seeps, gullies, and other precipitation formed water bodies). The 8-digit HUC map is located on the

Environmental Protection Agency (EPA) [web site](#), as raw Geographic Information System (GIS) data on Washington Department of Ecology's web site, or in the Conservation Practice Data System (CPDS) under the Maps tab along the left side. Then select the HUC map from the legend on the right side, and zoom in to view.

Mowing is allowable to maintain the grass filter strip. However, it requires prior approval by FSA and the cooperators must pay FSA a fee to field visit the site to witness the destruction of the mowed material. The mowed material must either be destroyed or used as compost or mulch. It cannot be used for any purpose that provides financial gain or replaces a product that would normally be purchased such as animal feed or bedding.

Wetland Practices

There are three wetland practices: CP23, CP23A, and CP30. The choice of which of the three to use depends upon location and land use. The CP23 and CP23A can only be used on cropland. The CP23 is for use within the 100 year floodplain area, while the CP23A is for wetlands outside of the 100 year floodplain. The CP30 is for marginal pastureland.

Wetlands will be restored under CP23 or CP23A use the NRCS Practice Standard for Wetland Restoration, [Code 657](#). Seeding mixes for the wetland zone can be found in the 657 standard. The CP23 practice may also enroll a buffer limited to a ratio of 2 acres of buffer to 1 acre of restored wetland. Wetland areas including the buffer for sites developed under a grassland ecosystem will be seeded according to NRCS Practice Standard Upland Wildlife Habitat Management, [Code 645](#) or Restoration of Declining Habitats [Code 643](#), with a mixed stand of a minimum of 5 native species consisting of at least 3 grasses, and 1 forb. Wetland areas for sites under a woodland ecosystem will use NRCS Practice Standard Tree/Shrub Establishment, [Code 612](#). The buffer areas for woodland ecosystems can use the 612, 645 or 643 standard. If appropriate, the NRCS Practice Standard Upland Wildlife Habitat Management, Code 645 may also be included in a woodland ecosystem planting.

Marginal pasture wetland enhancement (CP30) uses NRCS Practice Standard Codes [390](#) and [391](#), Riparian Herbaceous Cover or Riparian Forest Buffer.

All of these practices can be used for wet areas that are hydrologically connected to a stream reach that is on the CREP eligibility map. The connection could be surface or ground water. It is defined as wetland moisture that comes from either the designated stream, such as during periods of high flow, or from a ground water source connected to the stream. It can't be an area that is wet from strictly precipitation. The distance between the wetland and the eligible stream reach is not specified, but should be relatively small, not miles away. The wetlands for all of these practices do not have to be certified wetlands. They do not have to be designated as a wetland by an NRCS employee with wetland determination authority. The site must be suitable and adapted to the restoration of wetland functions and values.

The CP23 and CP23A practices include the wetland itself and the buffer around the wetland. The land must meet the cropping history requirements. No water control structures can be installed with CREP funds. Funds can be used to plug or destroy drainage tiles. For the floodplain wetland practice (CP23), the buffer acreage cannot exceed 3 times the wetland acreage. For the outside of floodplain practice (CP23A), the buffer acreage cannot exceed 4 times the wetland acreage. It is up to the technician to determine the boundaries of the actual wetland versus the buffer of the wetland.

The CP30 for marginal pastureland only includes the buffer around the wetland. The cooperators cannot receive rental payment and sign-up bonus on the actual wetland, only for the buffer around the wetland. The minimum CP30 buffer width is 20' and the maximum average width is 120'. Cover can be grass, but native woody species may be added if needed for the purposes of the wetland. An example eligibility assessment form is located at this [link](#).

Combined Practices

A grass filter strip can be placed on the outer edge of either the riparian forest or hedgerow practice if there is a need to address concentrated flow. For the riparian forest buffer, the grass filter strip would be part of the 180' average maximum. It can't be in addition to a 180' wide buffer. However, for the 15' hedgerow buffer, the filter strip is 20' added to a 15' hedgerow for a total of 35' in width. Note that the landowner enrolling a 15' hedgerow with a 20' filter strip would receive more financial incentive in their rental rate if they enrolled that same 35' as a riparian forest buffer.

When practices are combined as described above, the practice is named according to the main practice, such as either the riparian forest buffer or the hedgerow buffer and the landowner receives a rental rate that applies to the highest practice rental rate in the combo. If a filter strip is part of a riparian forest buffer, the entire area is called riparian forest buffer (CP22) and the landowner receives the 200 percent rental rate. If a filter strip is added to the hedgerow buffer, the landowner receives a 175 percent rental rate and the practice is called the hedgerow buffer (CP22). In essence, the grass filter strip is included in the conservation plan, but is not part of the practice name and does not lower the rental incentive rate for the acreage enrolled. An eligibility assessment form for a wetland buffer and hedgerow is at this [link](#); an eligibility assessment form for a wetland buffer and riparian forest buffer is found at this [link](#).

General Restrictions

The Farm Service Agency (FSA) requires that no activity occurs in buffers during the primary nesting season, which spans from April 1st through July 1st. If spot treatment is needed during this time, FSA approval is needed prior to the activity.

Cultural Resources Requirements and Procedures

The Farm Service Agency (FSA), as the lead agency for the Conservation Reserve Enhancement Program (CREP), is responsible for compliance with Section 106 of the National Historic Preservation Act. The compliance process, which may take well over three months, must be completed before a CREP contract is signed. If an archeological survey is required the time period may be much longer.

Conservation districts have a role in completing some of the steps required and as essentially the project managers, need to find ways to facilitate and expedite the process. The following outline and recommendations are meant to help streamline the process while ensuring that requirements are met.

Consultation and Records Review

FSA must complete two, 30-day consultation and response periods. The first is when the State Office of Archaeology and Historic Preservation (SHPO) and affected tribes receive project information and have the opportunity to respond with any concerns. The second waiting period is to notify the SHPO and affected interests of the Responsible Federal Official (RFO) determination.

The consultation and records review process should be initiated early in the planning process, once the scope of the project and the Area of Potential Effect (APE) have been set. Normally for CREP this begins after the FSA eligibility determination. A Cultural Resource (CR) records review must be completed before the second consultation period but the first consultation period may begin without it. It is important to note that if the scope of project or the APE changes the consultation and review process must be reinitiated. The APE includes the project area and may include additional area for staging equipment and materials, and for access.

The records review is used to help the Responsible Federal Official (RFO) in making a determination as to whether a CR survey is warranted. The RFO will also consider consultation responses and other factors that might affect the likelihood of encountering a CR during project implementation. Tribes sometimes have information that is not recorded in the CR archives that were accessed during the records review. A CR survey may be strongly recommended in consultation responses.

FSA national guidelines do not call for further review if there is no known CR within 0.5 miles of the project. The RFO may allow a project to proceed without further study even though there is a CR within 0.5 mile of the project. A historic building or cemetery has no chance of being affected by the project.

FSA now has in-house capability to perform CR record reviews. FSA field offices will send the State Environmental Coordinator at the State Technical Office all projects that require coordination, including:

- Detailed project description
- Location description
- Detailed maps with the area of potential effect clearly identified

Cultural Resource Surveys

If required, the cost of CR surveys will be covered by the Washington State Conservation Commission (SCC). A bid process is required for awarding a CR survey contract. The Office of Archaeology and Historic Preservation web site provides a list of certified archeologists. Templates for bid request letter and the CR survey contract are included in the **appendix**.

Cultural Resource Documents

It is very important that information included in the consultation and records review process is complete and very thorough. Incomplete information will likely lead to delays while discrepancies are addressed. For most projects three documents are necessary; a standard **EZ-1 form** that provides project and ownership detail, a project vicinity map and a project plan map. The EZ-1 form and example CR documents are included in the appendix.

Cultural Resource Dialog for CREP Project Plans

There are three places in CREP project plans where cultural resource dialog should appear. One is a short description of CR requirements and agency roles. Another is under Section Q. of the CPA-52 where the RFO documents his or her CR determination. Finally, the plan should include an unanticipated cultural resource discovery plan, which should be provided to contractors working on the project.

Additional Assistance to Facilitate and Expedite the Consultation Process

Because of budget cuts and staff reductions FSA offices sometimes seem to be overloaded with program responsibilities. CREP is sometimes a low priority, however, Districts need to remember that cultural coordination is a FSA role. Help, in the form of gentle reminders and adherence to FSA procedures, will help ensure that time critical steps are completed in a timely manner. Be sure to keep track of when notifications and communications are going to FSA so if a particular FSA office has timeliness issues, they are documented and can be brought to the attention of the State FSA office.

Consultation Letters and Attachments

SHPO allows consultation letters to be sent to them via email without snail-mail hard copies and local tribes may allow it as well. Example consultation letters are included in the appendix.

Examples are provided for reference. Should FSA ask for assistance, districts can help develop the consultation letters, however, this is an FSA role and should be done by FSA in most cases. Be sure to document how much effort the district is expending to assist FSA when requested. Time spent helping FSA takes technical assistance funds away from other tasks necessary to complete a CREP project.

RFO Determination and CPA-52 Preparation

Districts may help edit Section Q. of the [CPA-52](#), the Rationale Supporting the Finding (no adverse effect). The supporting dialog will reference the CR records review. Select information from the records review may be included in the finding. Again, this is an FSA task; districts can help provide assistance, however, this should be done by FSA in most cases. Be sure to document how much effort the district is expending to assist FSA when requested.

Tracking the Consultation Process

Since Districts are essentially the project managers for CREP projects, it is also helpful if the District takes the lead in tracking the consultation process especially since the steps are often time critical. There are probably many ways this could be done but one that has been used is a Google Docs spreadsheet. There can be no personal identifiable information for FSA to use the web-based spreadsheet.

Working with the Tribes

It is important to understand that Indian tribes have a legal relationship with the U.S. government and its agencies. Tribes are recognized as sovereign nations. By various laws a "government-to-government" relationship and consultation process has been established between the federal government and Indian tribal governments. For CREP, the Farm Service Agency has the authority and responsibility to maintain this relationship with affected tribes.

Conservation Districts do not have this authority for CREP but may encourage FSA to develop a good working relationship with tribes to help facilitate the consultation process. A preliminary meeting with tribal officials may be a good start. One objective is to help all stakeholders understand FSA protocols for timely communication, cooperation, and response to tribal concerns. This will help achieve a mutual goal of protecting critical fish habitat.

In this process FSA needs to ensure that it is consulting with the authorized representative of the tribal government. FSA may not receive a response to a consultation letter within the 30-day comment period established under Section 106 requirements. However, FSA must seriously consider and respond to all tribal concerns whether or not they are expressed within that period. If a tribal concern is expressed after work has begun on a project FSA may choose to stop work on the project until a resolution is found.

Challenging Situations

Site Preparation

Bank Stabilization. Reduction of sediment pollution from agricultural lands and stabilizing streambanks along salmon-bearing streams are goals of the Conservation Reserve Enhancement Program (CREP) in Washington. CREP projects are typically thought of as strictly riparian zone projects, as instream work is not allowed by the program. However, some CREP projects have neglected the area immediately adjacent to the stream in favor of more suitable ground for forested buffers found at the top of eroding banks, especially because the steep banks are frequently not farmable and therefore can't qualify under CREP. Other CREP projects have planted adjacent to or within deeply incised channels that either do not establish roots sufficient to stabilize the incision or do not adequately provide habitat on stream benches that are removed from the stream itself. These projects provide fodder for those that are critical of the CREP program and insist that CREP is ineffective and/or a waste of public funds. Planners working with producers with unstable, eroding, or incised bank conditions along streams on their property must either, a) determine that the site cannot support the available practices and inform FSA that the site is not eligible, b) leverage CREP with other fund sources that allow mechanical stabilization of stream banks, using CREP to vegetate around the stabilizing features, or c) ensure that site specific conservation plans contain strategies to stabilize eroding banks vegetatively. The National Resource Conservation Service (NRCS) has published a very complete document called "The Practical Streambank Bioengineering Guide, Users Guide for Natural Streambank Stabilization Techniques in the Arid and Semi-arid Great Basin and Intermountain West", prepared by **Bentrup and Hoag (1998)**. While the document is focused on areas applicable to eastern Washington, lower water tables from bank erosion and strategies to establish vegetation on eroded stream banks will transfer to western Washington. Much of the following discussion is taken from this document.

One of the highlighted quotes in the bioengineering guide is "... excessively eroding streambanks are only symptoms of an unhealthy stream, not the true cause of the problem." A watershed approach that examines land uses and fluvial geomorphologic processes is recommended. Crop residue, grazing practices and irrigation management may be underlying agricultural causes of eroded streambanks or incised channels. Increases in impervious surfaces in urbanizing areas will also change stream hydrology to shorter, higher peak flows, which in turn increases bank erosion. **Schueler and Holland (1994)** found that as little as 10-20 percent imperviousness in a watershed alters the physical, chemical and biologic processes in streams. Once the watershed has been analyzed for underlying causes and efforts are underway to correct land use issues, site specific objectives can be developed and site specific bioengineering plans can be developed. Work with regulatory agencies early to ensure buy-in before wasting energy on solutions that can't be permitted.

Brush revetments, pole plantings, brush mattresses, fiberschines, brush layers, brush trenches, willow wattles and vertical bundles are all vegetative techniques that can be used to stabilize eroding streambanks. **Bentrup and Hoag (1998)** contains details on these techniques. A number of species, usually willow (but including alder, birch, mockorange, Wood's rose and others) are used to construct each technique and as a rule, cuttings must reach the permanent water table or capillary fringe to become established. Use Cost Share Component Codes for "SitePrep18 (\$18)" or "SitePrepX (\$101)" for western or eastern Washington, respectively, along with the appropriate trees and shrubs Cost Share Component.

Wet Conditions

Deleveling (or mounding) is a site preparation technique that is used to restore forested wetlands from wetlands that were once leveled for farming. An excavator is used to recreate a more natural undulating topography with a mosaic of swales and hummocks. Mounds are created that serve as planting sites for trees that could not otherwise become established within a wetland. Forested wetlands are a natural occurrence where trees occupy slightly elevated microsites that provide a rooting medium above the water table.

Conifers that commonly occur in Western Washington forested wetlands include western red cedar, Sitka spruce, western hemlock and shore pine. These species along with many hardwoods are tolerant of wetter conditions and periodic inundation. Most cannot survive prolonged inundation. Raised planting spots give tree seedlings the foothold they need to reestablish and become a wetland forest.

An Army Corps of Engineers (Corps) permit should not be required for deleveling. In response to an inquiry, Randel Perry with the Army Corps of Engineers stated "We have previously determined that the restoration actions in wetlands, including the "de-leveling" activities, under the CREP program would not fall under Clean Water Act Section 404 jurisdiction and a Corps permit would not be required." No fill is brought into the wetland and no excavated material leaves the wetland and deleveling may be accomplished within the normal tillage depth of no more than two (2) feet. Work on an existing farmed site should not need a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW), however, it is recommended that you work with the local WDFW Habitat Biologist to make sure they understand the scope of the project. The use of heavy equipment will likely require a cultural resources survey.

Typical specifications may call for an 18" scoop, which results in a mound that rises approximately 12 inches above the surrounding level topography. During implementation, earthwork usually exceeds specifications to compensate for slumping. A large excavator can move approximately ½ yard of material with each scoop. Additional specification language may include; Excavated areas will have slopes no greater than 5:1 and be no deeper than 2 ft.

Mounds will be no higher than 3ft. Mounded areas will be left in a smoothed condition; excavations can be left rough, as long as slopes are met.

Additional funding is usually needed to supplement CREP cost share to cover the cost of deleveling. Earthmoving required for practice establishment (EM11) at \$0.58 per cubic yard has been used. CP22 is listed as an applicable practice for this cost share component. Deleveling design specifications that have been included in CREP project plans are provided in the **Appendix**.

Wet obligate plant species. CREP sites, especially those using wetland enhancement practices, may have a need for wet-obligate plant species that are not listed in any of the cost share component descriptions found in FSA's 2-CRP, WA Exhibit 19, which contains the basis for FSA to calculate the cost share rate for the applicable practice. It's not that the plant isn't approved for use; in fact, pretty much any native species plant can be used on CREP projects if it's used appropriately. Rather, it's a question of what rate that plant species is cost shared by FSA. Depending on cost, you may be able to use Cost Share Code "TreeShrub13" (Planting trees and shrubs-all types). To add a more expensive plant to another cost share component, use the following process:

1. Send your requested plant name and cost information (from as many sources as you can find) to the CREP Coordinator at SCC;
2. CREP Coordinator will review and send to the FSA State Farm Program Chief;
3. Farm Program Chief will seek NRCS concurrence that the plant is native and appropriate;
4. Farm Program Chief will assign plant to a cost share component code and forward to the State Technical Committee for approval;
5. Once approved, Farm Program Chief will notify CREP Coordinator and the CD.

Reed Canarygrass. Reed Canarygrass (*Phalaris arundinacea L.*) is a perennial, rhizomatous cool season grass that effectively excludes other vegetation in moist soils. **NRCS (2001)** recommends that combining site preparation treatments is most effective for control because the effects are cumulative. Treatment options for riparian buffer site preparation include mowing, tillage, burning and herbicide. No biological controls have been developed for reed canarygrass.

Defoliation by mowing ideally depletes the carbohydrate root reserves of reed canarygrass. Mowing should occur when large amounts of above ground biomass is present, but before transfer to roots occurs, usually right around when the plant flowers. In response to mowing, reed canarygrass will produce more shoots as resources are diverted from rhizome growth to tillers, which are needed for photosynthesis. Mowing should be done before new growth is 4" tall so the growing points are removed and the plant is forced to produce new ones. Like

mowing, tillage kills the top growth so the below ground energy reserves are used up. Repeated treatments at two-week intervals is required, as is re-seeding with desirable species. Both mowing and tillage must have suitable ground for equipment to operate on. Burning removes residue, but does not effectively deplete root reserves, so must be used in combination with herbicides. Chemical control is limited to one herbicide, Rodeo®, a variant of glyphosate labeled for use in emergent, marginal or bank habitats where fish may be present. Timing is key to success, as an even application to actively growing plants is required. Too early in spring, and a chemical “mow” is all that is accomplished; too late and the plant has hardened off and not actively growing. Some spring applications can cause a weed shift as summer weeds normally suppressed by reed canarygrass, such as Canada thistle, are released. Like all site preparation, a desirable cover should be planted to replace the reed canarygrass.

For western Washington, use the Cost Share Component code “SitePrep16” for site preparation where reed canarygrass is present when filling out FSA forms. Eastern Washington planners should be able to use “SitePrep34” and “SitePrepX” to accomplish site preparation on reed canarygrass infested projects.

Feed Lots. Feed lots and wintering paddocks are frequently next to streams since that ground is often historically the most level. As nutrient management programs are able to move confined animal locations to areas less posing less risk to stream water quality, the former feed lot is put into CREP. Impacts to the site from hoof compaction, weed seeds in the soil seed bank, nitrogen and salts require special consideration for site preparation. Ideally, any manure on site can be removed and either stockpiled or applied to cropland at agronomic rates. In addition, removal of the top 6-12 inches of soil will remove a substantial portion of the weed seeds, salts and nitrogen. When this is not feasible, plant selection should use salt tolerant plants. Some salt tolerant trees include: Peashrub (*Caragana arborescens*), Hackberry (*Celtis occidentalis*), Hawthorn (*Crataegus*), Honeylocust (*Gleditsia triacanthos*), Rocky Mountain juniper (*Juniperus scopulorum*), Mugo pine (*Pinus mugo*), Austrian pine (*Pinus nigra*), Hoptree (*Ptelea trifoliata*), Potentilla (*Potentilla fruticosa*). Not all of these trees will be appropriate for a riparian plan. Russian olive (*Elaeagnus angustifolia* L.) and tamarix are also very salt tolerant, so maintenance in former feedlots or confined animal areas must aggressively remove these species as well as those brought into the site from foraging animals. Many weed species including bristlegrass (*Setaria viridis*), Kochia (*Kochia scoparia*), amaranth (*Amaranthus retroflexus*), lambsquarters (*Chenopodium album*), black bindweed (*Polygonum convolvulus*), and common mallow (*Malva rotundifolia*) are able to survive rumen digestion. CREP maintenance plans should be specific as to what weeds might be present and what control measures should be taken, when, and by whom.

Compaction is another challenge when working in former feedlots. Because of stored nitrogen, any de-compaction of soils to promote infiltration and/or root growth also increases the rate of transport of nitrates deep into the soil profile, often beyond the root zone. When this occurs, the risk of groundwater contamination increases. Avoid deep chiseling, augering or plowing. Disking, localized loosening with a shovel, or scarification with excavator tines may be used, but should not go deeper than 6-12 inches.

Blackberry. Oregon State University Extension Service has published an excellent guide for management of Himalayan blackberry for western Oregon riparian areas (Bennett, 2006). The most effective treatment is to mow or cut blackberry in mid-summer, allow it to grow back to 18", then spray in fall with glyphosate or trichlopyr. The reverse (spray first, mow second) is also effective, but will cost more as more chemical is required with more foliage and different spray equipment is required. Less effective strategies include mechanically removing the rootstalk, removing the rootstalk by hand, repeatedly tilling and removing the canes, and repeatedly cutting canes over multiple seasons and years. Each has obvious disadvantages compared to the preferred treatment, primarily cost, the need to completely remove the rootstalk (blackberry will resprout from rootstalks), and control of other weeds that will take advantage of the ground disturbance. Goats, fire, and infrequent mowing are not effective.

Special cost share components are on FSA forms for site preparation involving blackberry. Use Cost Share Component code "SitePrep17 (S17)" on FSA forms for projects in western Washington; code "SitePrepX (S101)" for projects in eastern Washington.

Plant Establishment

Water. CREP plantings in eastern Washington and drier areas of western Washington will require supplemental water to establish trees and shrubs. Drought conditions in western Washington may also dictate the use of watering or moisture retention strategies. FSA does not have a cost share component specific to watering, except for any watering done as part of the planting and drip irrigation, discussed below. SCC will pay for watering under the maintenance policy, within limits per acre for the first five (5) years following planting. Some other practices are presented here that may be used if installed during planting or as stand-alone maintenance, including: manual watering, porous hose irrigation, deep pipe irrigation, treeshelters, and perforated pipe irrigation. Contact the SCC CREP Coordinator to discuss how these strategies might be cost shared. Much of the information is drawn from arid land restoration methods described by Baimbridge (2002).

Manual watering can be accomplished with watering cans or jugs, hoses, or vehicles. If site conditions dictate, hand carrying two (2), three (3) gallon containers is easier than carrying one (1) five (5) gallon container. Dragging hoses through restoration sites is usually not practical. Vehicles can bring water to a site or smaller vehicles (ATVs) can distribute water to trees within

a site. Placing a polyethylene water storage tank on site is usually easier than hauling water to a site, especially if a gravity filling system can be installed to fill the storage tank. Painting the storage tanks with latex paint can reduce algae growth and sun damage to the tank.

Fast rate porous hoses designed to work at less than 7 psi made by Drip Master, AquaPore, or Moisture Master can be connected to a water bottle, water tank, or irrigation system can keep plants alive on very small amounts (0.25-0.5 gallons per month) of water. A hose is installed before or at planting time by drilling a hole to the desired depth (12") next to the plant. Porous hoses break down within two to three years, by which time supplemental irrigation may not be needed.

Deep pipe irrigation uses an open, vertical or near-vertical pipe to concentrate irrigation water in the deep root zone. Plants started with deep pipe irrigation develop a much larger root volume than other forms of irrigation. The plant is better able to survive after watering is stopped and respond better to rare summer rains. The most common form of installation is to insert a two (2) inch pipe vertically into the soil to a depth of 12-20 inches near the seedling. The pipe has 1/8th inch holes drilled 2-3 inches apart on the side nearest the plant. The pipe is left open on both ends and the top is covered with hardware cloth. Alternately, a two (2) inch pipe, up to 60 feet long on gentle slopes, can be buried horizontally at 6-12 inches depth, with an elbow at the upslope end leading to a screened inlet. Standpipes can be watered manually, or made with 1/2" diameter pipe and fitted with a drip emitter. Deep pipe irrigation has advantages over drip systems in that it does not need pressurized, filtered water; has reduced evaporation; better weed control since water is delivered to the plant root zone and not the soil surface; and less runoff. Treeshelters have pros and cons for herbivory control (see discussion below), but may be very useful for supplemental watering. They protect plants from wind water loss, and create a higher humidity microclimate compared to plants growing in the open. When treeshelters are inserted well into the ground (2-3"), water can be simply poured directly in the tube or drip emitters can be fitted through them. Calibration marks on the sides of the treeshelters can assist proper watering.

When equipment is available, perforated pipe can be installed in deep, relatively rock free, uncompacted soils. A specialized plow and roll pipe installer is used to bury the pipe in a trench 12-16 inches deep. Standpipes are placed to fill the drain pipe, similar to deep pipe irrigation systems.

Drip Irrigation. Where clean water sources are available, drip irrigation systems can be cost shared on CREP projects. Drip irrigation can be designed to irrigate individual plants or the whole site. Each system has its advantages and disadvantages. Systems that irrigate the entire site can be installed after planting and had the highest plant survival rate compared to hand watering and a drip system irrigating each plant in a study by Sound Native Plants in 2002 in

Clark County, however, weed growth between plantings was a problem and trees can get damaged during installation. Drip irrigating each plant is cheaper to install, but installation must be done before planting. Survival rates were comparable in the 2002 Clark County study. Surface emitters will encourage weed growth near each emitter since soil seeds are typically shallow compared to deep irrigation systems that deliver water to the root zone below the soil seed bank. Frequent maintenance of drip irrigation systems is required. Conservation plans should discuss who is to inspect the system, how often, and who will repair the system when problems are noted. Use Cost Share Component code Irrigation X (DI12) on FSA forms when using this practice.

Landscape Fabric. Landscape fabric is FSA cost share eligible, either as 2' x 2' squares, 3' x 3' squares or as a roll. The primary advantages of landscape fabric are that it: a) retains soil moisture, like mulch, and, b) provides weed barrier protection, reducing competition and potentially maintenance on new CREP sites.

Landscape fabric can have significant drawbacks as well that must be considered during planning and, if selected, mitigated for, including:

- Landscape fabric provides cover for rodents, primarily voles, to access and feed on new plantings.
- Landscape fabric seems to come in two qualities: weak and very strong. Weak fabric photodegrades too quickly and doesn't provide effective weed suppression. Strong fabric can girdle trees when their diameter reaches the size of the opening in the fabric and never breaks down, requiring substantial effort to remove.
- Wildlife will use rolled landscape fabric as corridors to move along, especially deer who find the combination of easy walking and tender plants ideal.
- Rolled landscape fabric limits conservation on the site to the footprint of the roll, which frequently isn't sufficient to accomplish biological objectives of creating shade and cover over the stream. Make sure the layout of the fabric rolls can meet the biologic objectives. If fabric rolls can't be laid out so biologic objectives (stream shade and riparian cover), the site may not support the practice and may not be eligible for CREP.
- Landscape fabric plantings are expensive. Carefully weigh the cost of weed control and water retention against other riparian planning choices that provide the same functions.
- Weed competition still occurs at the openings in the fabric, where light and water are both present.

Weed Control

Kochia. *Kochia scoparia*, also known as burning bush or fireweed, is an introduced annual common in rangelands and disturbed sites in arid or semi-arid climates. Uncontrolled

kochia will form a tumbleweed that can distribute seeds over a wide area. Kochia has several adaptations that make it highly invasive and capable of thriving in harsh environments, including; an extensive root system (Kochia can draw water from a cylindrical soil mass 16 feet in diameter and 8 feet deep), extended germination timing to take advantage of soil moisture when its available, germination capable under high stress conditions, tolerant of high salinity and acidic soils, exhibits alleopathy, and has become herbicide resistant to 2,4-D, triazine, auxinic herbicides, dicamba, sufonylurea, and glyphosate. In addition, kochia leaves are waxy and pubescent, making absorption of herbicides difficult. The good news is that kochia reproduces solely from seed and has no vegetative reproduction mechanisms. (Casey, 2009).

The key to controlling kochia is to keep existing plants from producing seed. Soil seed bank viability of kochia is greatly reduced within 1-2 years (Casey, 2009). All kochia management must focus on the vulnerable, young plant stages and must be repeated as germination can occur from March to September or October. Kochia has a shallow taproot when young and can be manually pulled or hoed at early growth stages. It is also most susceptible to fluroxypr when young. Light tillage can disrupt young plants by removing them from the soil. Kochia can be mowed, however, seeds will be produced from low-lying branches under the mowing height (CSU Extension, 2012). Riparian plans in areas known for kochia need to identify who will monitor the site for kochia control, and what measures will be taken when kochia is discovered.

Blackberry. As described by Bennett (2006), maintenance of blackberry resprouts is essential to successfully control blackberry and restore desired species. Even the most effective treatments to prepare the site will not completely kill all the roots and root crowns, nor eliminate seed sources. Some resprouting will occur. Until a shade canopy can be established, spot spraying or hoeing and grubbing new resprouts is required. Mulch mats can be used, but blackberry will sprout underneath the mats and as mats decay, eventually emerge. Releasing desired trees by cutting all blackberry sprouts within a 6' radius of each planted tree can also be effective. Blackberry is shade intolerant and artificial shade has been used in conjunction with other treatments, but has obvious cost drawbacks. Shade from the desired riparian vegetation is the ultimate long term control strategy. A row or two of conifers on the outside edge of the buffer, along with a vigorous shrub component closer to the stream can produce enough shade to eventually reduce the blackberry dominance of a site.

Blackberry control qualifies for mid-contract management cost share, albeit at a reduced rate (\$50/acre/yr) compared to site preparation cost share rates. Use Cost Share Component Code "MgmtChem1 (MMR1)" on FSA forms.

Reed Canarygrass. Reed canarygrass control must be deliberate, timely, and persistent. Like blackberry, shade is the ultimate long term method of control for reed canarygrass. Reed canarygrass is moderately shade intolerant and at 41 percent shade will reduce below-ground

biomass, which will make canarygrass weaker and more susceptible to competition and other treatments. Plants that develop foliage earlier in spring than reed canarygrass will be superior competitors because reed canarygrass puts on most of its growth in mid-spring. Similar to shade, mulch can also reduce dominance of reed canarygrass with plantings. Mulch materials must be heavy enough to remain in place and not be pushed up by the old vegetation. Mulch materials must not photodegrade and can provide refugia for rodents that may harm plantings the mulch is intended to protect. Rodeo® can be used, however, as with site preparation, timing is crucial to success, and since glyphosate is a non-selective herbicide, care used to make sure the plantings are not killed.

Ungulate and Rodent Predation

Deer. Deer browse damage, when excessive, can severely impact CREP plantings, causing trees to develop multiple, weak leaders, suppressing seedling height, weakening plants and increasing planting mortality, which can lead to secondary problems with invasive species such as blackberry. Deer are adaptable and adjust to deterrents such as odors, tastes, noises or lights quickly; can jump 12 feet high or 30 feet in distance; can crawl through openings as small as 7½ inches; can learn to remove bud caps to get to tender terminal buds; will test all barriers repeatedly, and will adjust persistence relative to stress and availability of other food. Available control methods include replanting, exclosures, avoidance, repellants, providing alternatives, and elimination (Koop, 2007). Like any other potential challenge, riparian plans should evaluate the potential for deer browse and include measures to reduce the impact such as selection of less desirable species, fencing, use of bud caps, repellants, providing a “food plot”, and hiding the desirable plants among undesirable species. Additionally, plans should identify who will monitor the planting for deer browse impacts, how much will be tolerated, and when specific actions will be initiated, such as replanting. [Nebraska Forestry Tech Note 72](#), titled “Reducing Deer Browse Damage”, written by Ginger Kopp in 2007 is an excellent summary of techniques including elements of a deer browse management plan and is the source for the following discussion.

Replanting alone will not result in successful re-establishment of the buffer. Replanting, (and planting in areas with high deer populations) with less desirable species coupled with another deterrent may reduce the impacts caused by deer browsing.

Fencing to exclude deer is an expensive undertaking and not generally used on CREP projects except in very unusual circumstances when other methods have failed. Wire mesh fences must be 12 feet high and secured at the bottom to prevent deer from crawling under. Slanted wire mesh or slanted fences can be effective, particularly when electrified, however, they take up more horizontal space and make vegetation control around them more difficult. Electric fences are also expensive and require frequent maintenance. Single strand polytape or polyrope

fences are only effective under light deer pressure and may be suitable for protection against migrating animals. All fences must be equipped with gates of equal deterrence. Cost/benefit should be a consideration when choosing a fence design. A fence that is 50–60 percent effective may be adequate for some situations. For example, a CREP buffer that loses 50 percent of the plantings to deer could reduce that loss to an acceptable 25 percent with the installation of an inexpensive fence that is 50 percent effective. The same fence may not be appropriate when deer predation cannot be tolerated (VerCauteren et al, 2006).

Bud caps made from paper, index cards, envelopes, waterproof paper, tin foil or plastic mesh can be made to place over terminal buds of plantings, especially conifers, when deer pressure is light but persistent. The idea is that the deer won't see the terminal bud and therefore won't eat it. Covering up to half the plants in fall is considered as effective as covering all the plants, especially the outer rows of the buffer. Trees should be at least 1½ feet tall and have a sturdy leader. Bud caps should be placed in fall and made of paper sufficient to withstand expected precipitation. Deer can learn to pull bud caps off. Vexar leader tubes are considerably more expensive, but are also more durable and can be re-used. Two repellants, both using fear as a motivator, are effective to reduce deer predation. Kopp states: "Only Plantskydd® and Deer Away Big Game Repellent® (powder form) have documented independent scientific tests showing consistent and effective decreases in deer browse damage and are the only two chemical repellent products eligible for EQIP funding under the Practice Standard Invasive Plant Species Pest Management, Code 797 in the EQIP payment schedule". Washington Department of Wildlife and Fisheries, however, recommends a home-made repellent of eggs, milk, tobacco, essential oils, and dish soap (WDFW, 2004). Timing, re-application, and weather are all important factors when using repellants for deer and other pest species.

Providing readily available, palatable forage for deer and elk can reduce pressure on CREP plantings. Two options are used: 1) a food plot away from the conservation practice is established if room permits, or 2) plants with higher palatability and CREP benefit are interspersed with less palatable and desirable plants in clumps to essentially hide the CREP plants. WDFW's "Living with Wildlife: Deer" publication has extensive lists of both palatable and relatively unpalatable plants for managing deer (WDFW, 2004). As an example, planting pine with a spruce in the same place, then loping the spruce off as trees grow, has been anecdotally reported to increase pine survival and reduce elk browse on some CREP projects.

Lastly, eliminating deer that have learned to penetrate barriers is effective, but is not without challenges. Deer teach each other where and how to find food, so eliminating the lead deer may be the only solution. In Washington, most deer (all but Columbian white-tailed deer) are classified as game animals and a hunting license and open season are required to hunt them. A property owner can, with a permit, kill a deer on their property if the animal is damaging crops,

however, whether a buffer is considered a crop in the eyes of WDFW is unclear and should be clarified with the local WDFW Fish and Wildlife Officer and Biologist.

Elk. Elk can cause browse damage similar to deer, and many of the same strategies can be employed to address elk browse damage. Planting strategies, for example should avoid preferred foods, like those listed in WDFW's "Living with Wildlife, Elk" document (WDFW, 2005). Elk differ from deer in that they will damage fences as they move from one area to another, so special consideration is provided here to address fence damage. Elk will try to go through fences rather than over them, especially if they don't see the fence. Placing branches along the top of fences, or tying survey ribbon from strands make fences more visible to elk will help them see and avoid the fence. Training elk to use a certain location is also possible. One CREP project installed a fence across an area where elk moved daily from the creek, across a pasture to woods further away from the creek. The CREP project built a new fence for the pasture to exclude livestock, and left a gap between a couple of fence posts where elk frequently crossed. After the elk became accustomed to using the opening, a long 2x8 board was placed at a low height across the opening, but high enough to keep livestock contained. The elk could see the barrier, and could jump it.

Voles . Voles can cause damage to CREP plantings by girdling seedlings. Girdling alone does not indicate voles as other animals like rabbits also girdle trees. Close inspection of the gnaw marks will be non-uniform, at various angles and patchy if caused by voles. Voles also create tell-tale surface runway systems. Voles are frequently confused with mice, which prefer seeds and grains. Voles can be controlled in many ways, however the primary means of controlling voles on CREP sites is to remove vegetation, ground cover and litter at least three (3) feet from the base of seedlings. Tree protectors can be inserted into the ground two (2) inches deep to prevent access by voles. When using landscape fabric, consider the impact of vole predation as landscape fabric provides cover from predators for voles. Perch poles at least eight (8) feet tall for raptors placed two (2) per acre can help manage vole damage, but have not been shown to reduce vole populations as the high reproductive potential of voles allows them to increase at a faster rate than predators.

Beavers.

Beavers were once eliminated from most of their range in the late 1800's and early 1900's but are now common throughout eastern and western Washington (WDFW, 2004). Beavers are an important source of disturbance in natural ecosystems and their ponds have been shown to be a desirable component of salmon bearing streams by creating sediment traps that reduce egg siltation downstream, provide juvenile rearing habitat, especially for Coho, and encourage wetland insect production that provides food for many salmon life stages. Beaver ponds have also been shown to raise water tables, thereby reducing pumping costs for farmers in areas

with beaver ponds. Beaver management should be included in every riparian plan to identify likelihood of beaver occupation, specify the allowable tolerance of the project for beaver, and direct what actions should be taken, in what order, when, by whom and costs.

Likelihood or Risk. Beavers are probably going to find a CREP project, after all, CREP builds their preferred habitat along waterways. The question is when they will move in, not if, and whether the project can tolerate them. If beavers are already in near proximity (upstream and downstream) or in the same subwatershed, assume beavers will quickly colonize a new CREP site and that plant establishment may be more challenging than without them. If beavers are in adjoining subwatersheds, the project may experience beaver moving in at some point during the life of the project and affect established plantings. If beaver are not in adjoining watersheds, likelihood of beaver impacts is low, but planners should also be prepared since any CREP project will be prime habitat for dispersing juveniles to take up residence.

Tolerance. Each project should specify a tolerance for beavers. Planners should discuss what tolerance level is appropriate for the site with the landowner during plan development. Three suggested tolerance levels are: 1) zero tolerance, 2) managed tolerance, and 3) encouraged tolerance. Zero tolerance is exactly that: no resident beavers allowed in the buffer project. Examples of these kinds of projects might be buffers where beaver activity will quickly impact infrastructure, cropland or adjoining property, Drainage Improvement District or similar projects where hydraulic conveyance is a primary stream function, perched or narrow buffers where flooding will quickly cause off-site impacts, or a temperature Total Maximum Daily Load (TMDL) exists and open water will gain heat. Zero tolerance projects will use as many preventative practices as possible, allow access for equipment to remove beaver dams if appropriate, and involve WDFW staff from the outset to ensure HPAs can be issued in a timely manner to avoid problems. Encouraged tolerance is the opposite extreme. The project location, width, topography and adjoining uses are compatible with beaver impacts like inundation, site productivity is high so that planted species can quickly replenish the trees that beavers remove, beavers are a desired component of the watershed and a temperature TMDL does not exist for the waterbody. Encouraged tolerance does have a limit however, as CREP projects cannot exceed 30 percent gaps in the canopy, so projects with encouraged tolerance for beavers will have to specify actions to take when the canopy gap threshold is reached. Managed tolerance is the middle ground and most projects should fall in this category of tolerance. Some level of beaver activity is either desirable or, conversely, won't cause excessive harm to the project or adjoining land uses. The riparian plan should specify an amount of beaver activity or impact that is allowed (e.g. one (1) beaver dam, two (2) acres inundation, 15 percent tree loss to beaver), and what actions will be taken in what order, by whom. Managed tolerance projects should also involve discussion with WDFW at the onset so instream work such as pond levelers and hand removal of dams can be performed once thresholds are exceeded.

Actions. The most important part of managing beaver damage is to take action as soon as it is evident that a beaver problem exists or is likely to develop. That means that management plans need to include surveillance monitoring assigned to someone, usually the landowner, who is responsible for initiating and communicating management actions, even if those actions are carried out by someone else. Actions can be divided into four (4) categories: 1) prevention, 2) discouragement or accommodation, 3) live trapping and dam removal, and, 4) lethal control. Prevention includes plant selection, exclusion fencing, tree caging, use of repellants (predator scents) and culvert protection. Plant selection is very important. Beaver prefer willow, cottonwood, poplar, alder, and birch as food sources. Avoid these plants in favor of sitka spruce, elderberry, cascara, osoberry (Indian plum), ninebark, and twinberry, because they are not the beavers' preferred food plants. Conifers may be girdled by beavers, which kills the conifer and stimulates growth of their preferred foods or are felled and used for dams. Use of field fence to exclude beavers from an entire site has been very effective. Four foot tall, six inch mesh, field fence is installed in a one foot deep, backfilled trench along the length and sides of the project. Alternatively, protect all plants by using wire cages or group plantings with fenced enclosures made of heavy wire field fencing. Wrapping tree trunks with wire field fence may also prevent beaver damage to established trees. Repellants have been shown to be effective in some circumstances. Plant-skydd® has been used successfully in eastern Washington. WDFW reports that "Big Game Repellent®" may also produce some success. All repellants need to be reapplied often, especially when damage is first observed, making frequent surveillance monitoring an important component of plans calling for low tolerance and prevention actions. Other repellants in the form of wolf urine and river otter odor has been shown to cause beavers to decrease foraging or abandon trails when used in mud mounds on runways (Rosell and Czech, 2000; Severud, 2011). The United States Department of Agriculture (USDA) reports success in protecting trees by painting the base with a mixture of coarse mason's sand (30–70 mil) and exterior latex paint. (The ratio is twenty ounces of sand to one gallon of paint.) The abrasive quality of the mixture may deter beaver. You can match the paint color to the tree, so it will blend in.

Culvert protection is also important. WDFW materials appropriately say that "to a beaver, a culvert probably looks like a hole in an otherwise fine dam". Beaver Deceivers®, or a variation, are V-shaped, trapezoidal, or semicircular fences of woven wire mesh placed on the culvert inlet to prevent the culvert from being plugged. Culverts in or adjacent to projects in areas of high beaver likelihood and low project tolerance should be protected to discourage beaver occupancy of the site. Information on beaver deceivers and variations are widely available on the internet and require HPA approval to install.

Discouragement or accommodation actions include planting selection, planting strategies, use of predator scents, low fences, mowing, tree protection, culvert protection and pond level

control. Again, plant selection is important. Use dense plantings of aspen, cottonwood, willow, spirea (hardhack), and red-twig dogwood because, once their roots are well established, the upper parts of the plants can re-sprout after being eaten. Overplanting trees will both shade out competing vegetation and provide extra trees for the beaver to take without impacting the project goals and also allow the project to meet practice requirements for stems per acre. Planting larger, slow growing species and adjusting plant density further away from the stream channel will reduce or accommodate predation. Along the Big Sioux River in eastern South Dakota, researchers found that 60 percent of trees were taken within five (5) meters of the stream, 19.5 percent were taken from 5-10 meters away, 14.3 percent were taken from 10-20 meters away, and only 6 percent were taken from greater than 40 meters.

Low fences (2') placed parallel and near the stream channel, will discourage beavers since they are able to get over the fence, but are unable to drag dam and food materials back to the stream. Low fences require some annual maintenance and can fail due to flood flows, so location at the two (2) or five (5) year flood frequency elevation is recommended. Mowing can also be used, and is a good strategy when invasive species pressure is high and ground is suitable. One project that was designed to be maintained by occasional mowing has experienced beavers moving in, but they did not stay long at the site. It is assumed that the lack of low cover either exposed them to predators or made the beavers feel unsafe. Like prevention actions, tree protection with heavy wire fencing and enclosure areas limit the amount of food and dam materials beavers have access to, thereby limiting their ability to colonize a site. A lesser number of tree protectors may be used depending on site specific goals. Repellants can be used once allowable beaver impact thresholds are reached.

A number of pond or water level controls can be used to limit and manage beaver impacts, especially those related to inundation. Device designs are available on the internet and include Clemson Beaver Pond levelers, Flexible Pond levelers and a combination of a deep water fences and a pipe. Note that water level control devices work only in a limited number of situations. Study the options and apply a device only if it is appropriate for the site (Langlois and Decker, 2004). Most beaver ponds should be maintained at three (3) feet of depth so the beavers will stay (if that is the objective). In cold areas, water level controls must be placed high enough so the pond won't freeze to the bottom, which would eliminate access to the winter food supply. Because they are placed instream, water level control devices require a HPA permit from WDFW. Be sure to coordinate at the planning stage of the project with WDFW if a pond level control device will be a potential action to manage beavers.

Live trapping and dam removal actions are self-descriptive. Issues around live trapping and dam removal include costs, legal status, HPA permits, and long term effectiveness. Because of its fur bearer status, dam building behavior and resulting water conservation, beavers are generally

not considered a pest until economic losses become extensive. Live trapping is a short term and last resort solution since non-trapped individuals and neighboring beavers quickly repopulate good habitats. Additionally, beavers seldom survive relocation and those that do can move great distances from their release site. A permit is required to release a trapped beaver on any property other than the one it was trapped on, which complicates matters as a suitable release site must be coordinated. Labor intensive live trapping is also costly, as a licensed trapper must be hired unless the owner is the one doing the live trapping.

Beaver dam removal is a last resort option for management except in zero tolerance situations. It also has several complicating issues. First, beavers are efficient builders and will quickly rebuild a dam or, if absent (trapped) can re-colonize a site and the problem will return in a few years. Persistent removal of small dams can cause beavers to give up and abandon a site, but this strategy takes surveillance, is labor intensive and requires a high level of commitment by the responsible party (usually the landowner or conservation district). Secondly, a HPA permit must be obtained. In emergency situations, a verbal approval from WDFW can be obtained from the WDFW Regional Office or the HPA web page. Again, be sure to involve the local WDFW Regional Office in the planning process, so delays can be avoided when the time for action is needed.

Lethal control also needs little explanation. Like live trapping, issues around lethal control include legal status and long term effectiveness. Beavers quickly re-colonize sites via reproduction since the number of kits is related to the amount of food available: more food (because there are fewer beavers) means bigger litters). Removing beavers with lethal control means more food for the remaining beavers, a vicious cycle. Again, only the landowner or a licensed professional trapper can lethally trap a beaver (lethal trapping is more effective than shooting) and a special trapping permit must be obtained.

Table 1. Beaver Management Planning for CREP. Plans should identify the risk and tolerance of beaver impacts, then contain actions that reflect those attributes.

Risk	Zero Tolerance	Managed Tolerance	Encouraged Tolerance
Low risk	Plan should focus on rapid identification of beaver activity and response. Actions including dam removal, trapping, tree caging, and predator scents should be considered.	Plan should focus on what level of activity is acceptable and what measures will be taken once that level is reached. Responsive actions to discourage or limit population size are most appropriate such as predator scents, sand/paint application, and tree cages.	Plan should focus on maintaining CREP stem counts and diversity, so responsive actions are most appropriate. Discouragement actions such as predator scents, sand/paint application, and tree cages can be applied as thresholds are neared or reached.
Moderate risk	Plan should focus on prevention actions such as exclusion fence, plant species selection, and culvert protection. Plan should call for a high level of monitoring for early detection of activity and ensuring that prevention strategies such as fences are in good condition.	This combination represents a middle ground and blend of those situations around it.	Plan should focus on limiting off-site impacts using pond level controls, culvert protection and overplanting to allow for beaver predation. Plan should include actions to take when open space threshold is reached.

Risk	Zero Tolerance	Managed Tolerance	Encouraged Tolerance
High risk	Plan should focus on prevention actions such as exclusion fence, plant species selection, and culvert protection. Animal and dam removal should also be important components of the plan. Plan should call for a high level of monitoring for early detection of activity.	Plan should include measures to accommodate some predation and inundation, yet specify methods to limit the amount of impact. Pond level controls, culvert protection, plant species selection, overplanting, low fences, predator scents, and individual tree or clump protection could be acceptable actions.	Plan should focus on limiting off-site impacts using pond level controls, culvert protection and overplanting to allow for beaver predation. Plan should include actions to take when open space threshold is reached.

Plans, especially those that are for managed tolerance may want to include an evaluation of impacts and provide appropriate responses. Table 2 provides a sample of situations with varying levels of impact linked to suggested responses.

Table 2. Beaver Management Options for CREP.

Impact	Situation	Response
Low	Beaver browsing CREP willows and cottonwoods but they are resprouting vigorously, not likely to impact CREP stocking levels now or in the future.	Monitor CREP stocking during first 5 years.
Low	Beaver dam and flooding on site but flooding is limited to channel or valleys that can accommodate higher water levels without losing many CREP trees.	Monitor flooding during first 5 years.
Low	Beaver browsing and flooding more extensive but impacts are in wetland areas that do not affect surrounding landowners and CREP participant is in favor of beaver presence.	Discuss benefits of beaver with landowners.

Impact	Situation	Response
Medium	Beaver browsing CREP willows and cottonwoods but due to heavy reed canary grass competition and seasonal high water levels, they are not resprouting vigorously, not providing shade to channel.	Consider beaver cages, fencing, high density planting and plant species selection, or a repellent product such as Plantskydd applied at temps warmer than 50F or sand/paint.
Medium	Beaver dam and flooding on site and flooding limited to the confines of the CREP buffer. Mortality of some CREP trees occurring.	Monitor flooding during first 5 years. CREP species selection should have been appropriate to wetland soils
High	Beaver browsing taking out significant number of 4+ year old CREP conifers.	Install beaver fencing, cages, repellent or sand/paint.
High	Beaver dam and flooding on site and flooding affecting adjacent cropland, pasture or infrastructure.	Consider options in the following order: 1) repellent product, such as Plantskydd or sand/paint, 2) beaver deceiver, 3) trapping, and if necessary, 4) work with local WDFW office to remove dam
High	Landowner or neighbors calling in to FSA and Conservation Commission with complaints.	Educate landowner about beaver biology, benefits and options. Explain current agency policy and options; direct back to conservation district staff.

Costs

Beaver management can be very expensive. Costs of beaver management should be anticipated before projects are installed to make sure the project is cost effective overall and that the site can support the practice. A project may not be a good CREP candidate as the riparian forest buffer practice cannot be supported at a site with a history of beaver problems. Costs for beaver management can be covered in several ways, depending on the nature of the problem and how well the plan identifies tolerance, thresholds and actions up front, so costs can be anticipated and budgeted.

SCC Maintenance Policy. SCC provides for installation of beaver fences to exclude beavers, caged tree protectors, and trapping under the [2009 CREP Maintenance Funding Policy](#). A beaver control plan is required to access maintenance funds for beaver damage ([template](#))

under development). The plan will identify control measures, include a budget for installation and maintenance, and discuss how and why the recommendations were formulated, including an evaluation of the risk and control measure thresholds. The plan must be submitted to the local conservation district board for approval, then submitted to the SCC CREP coordinator for concurrence. Some of these activities should happen at installation, but are eligible for payment as maintenance items. Maintenance funds are better spent preventing beaver problems than re-planting after beaver have impacted a site.

Mid-contract Management. Caged tree protectors are an allowed cost share activity under FSA Agricultural Resource Conservation Program (2-CRP) handbook rules. To qualify, the mid contract management process must be followed wherein an inspection is submitted to FSA, a plan is written to address findings of the inspection and the producer applies for a 50 percent cost share through the County Committee (CoC). If cost-share is approved, the Conservation District (CD) can apply for an equal cost share from the SCC using the Exhibit D process, up to the limits in the 2-CRP handbook. Beaver management strategies not covered by mid-contract management can be funded by SCC on a case-by-case basis, provided the strategies are part of the beaver control plan for the project.

United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) contract. As of this writing, SCC maintains a small contract with USDA APHIS Wildlife Services that provides for intermittent beaver management services to assist CDs with beaver removal by using the safest and most effective tools that may include live traps, conibear traps, padded leg hold traps and shooting in addition to obtaining and maintaining WDFW permits for these activities. Conservation Districts obtain these services by using USDA form 12A to obtain permission for USDA to be on the participant's land. Further instruction and the form are in Appendix XX.

References

Bainbridge, D. A. 2002. Alternative irrigation systems for arid land restoration. *Ecological Restoration* Vol. 20, No. 1. ISSN 1522-4740. March 2002.

Bennett, M. 2006. Managing Himalayan Blackberry in western Oregon riparian areas. Oregon State University Extension Service, EM 8894, reprinted February 2007. Oregon State University, 101 Ballard Hall, Corvallis, OR 97331-3606.

Bentrup, Gary; Hoag, J. Chris. 1998. *The practical streambank bioengineering guide*. Aberdeen, ID: U.S. Department of Agriculture, Natural Resources Conservation Service, Plant Materials Center.

Casey, P.A. 2009. Plant guide for kochia (*Kochia scoparia*). USDA-Natural Resources Conservation Service, Kansas Plant Materials Center. Manhattan, KS.

FSA. 2014. Farm Service Agency Handbook 2-CRP (Revision 5) with Washington State Amendments. United States Department Of Agriculture - Farm Service Agency, P.O. Box 2415, Washington, D.C. 20250.

Kopp, G. 2007. Reducing deer browse damage. Nebraska Forestry Tech Note 72. NRCS. St Paul, MN.

Langlois, S.A. and T.A. Decker. 2004. The Use of Water Flow Devices and Flooding Problems Caused by Beaver in Massachusetts (Rev. Ed.). MA Division of Fisheries and Wildlife. 18pp.

NRCS. 2001. Biology, history and suppression of reed canarygrass (*Phalaris arundinacea* L.). Technical Note Plant Materials No. 40. Prepared by Mark Stannard and Wayne Crowder. USDA-Natural Resources Conservation Service. Boise, ID. February, 2011.

Rosell, F. and Czech, A. 2000: Responses of foraging Eurasian beavers *Castor fiber* to predator odours. *Wildl. Biol.* 6: 13-21.

Schueler, T.R. and H.K. Holland. 1994. The importance of imperviousness. *Watershed Protection Techniques* 1(3): 100-111. (Also published in *The Practice of Watershed Protection*)

Severud, W.J. et al. 2011. Predator cues reduce American beaver use of foraging trails. *Human-Wildlife Interactions* 5(2):296-305, Fall 2011.

VerCauteren, K. C.; Lavelle, M. J.; and S. Hygnstrom. 2006. Fences and deer damage management: A review of designs and efficacy. USDA National Wildlife Research Center - Staff Publications. Paper 99. http://digitalcommons.unl.edu/icwdm_usdanwrc/99

WDFW. 2004. Living with wildlife: deer. Adapted from "Living with Wildlife in the Pacific Northwest" (see <http://wdfw.wa.gov/wlm/living.htm>). Written by: Russell Link, WDFW Urban Wildlife Biologist, Linkrel@dfw.wa.gov

WDFW. 2004. Living with wildlife: beavers. Adapted from "Living with Wildlife in the Pacific Northwest" (see <http://wdfw.wa.gov/wlm/living.htm>). Written by: Russell Link, WDFW Urban Wildlife Biologist, Linkrel@dfw.wa.gov

WDFW. 2005. Living with wildlife: elk. Adapted from "Living with Wildlife in the Pacific Northwest" (see <http://wdfw.wa.gov/wlm/living.htm>). Written by: Russell Link, WDFW Urban Wildlife Biologist, Linkrel@dfw.wa.gov