Permitting assistance tools for bankwork projects in or near Portland Harbor

NOVEMBER 2016

Contacts on page 3 updated March 2, 2021.

State of Oregon
Department of Environmental Quality

US Army Corps of Engineers®
Portland District

PORTLAND HARBOR PERMITTING ASSISTANCE TOOLS

Overview

This document provides information and resources that specifically support project development for cleanup and bankwork within the Portland Harbor industrial setting. It is designed to help permit applicants:

- understand the agencies' permitting processes
- understand various permit requirements
- identify some potential permitting hurdles
- provide technical resources that support best practices when designing projects

The Oregon Department of Environmental Quality (DEQ), U.S. Army Corps of Engineers (Corps) and National Marine Fisheries Service (NMFS) are working together with the U.S. Environmental Protection Agency (EPA) to enhance interagency coordination when reviewing permit applications for projects proposed in or near Portland Harbor.

Applicants have the opportunity to present project concepts at monthly coordination meetings where they will receive agencies' input to use when preparing permit applications. The Oregon Department of State Lands (DSL) and the Oregon Department of Fish and Wildlife (ODFW) will be invited to attend these interagency meetings.

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Contacts on this page updated March 2, 2021. No other changes were made to the document.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

Dear Reader,

The National Oceanic and Atmospheric Administration (NOAA) appreciates this opportunity to join together with the Oregon State Department of Environmental Quality, the U.S. Army Corps of Engineers, and the U.S. Environmental Protection Agency, to announce the publication of the *Permitting Assistance Tools Package for Bankwork Projects in Portland Harbor*.

These tools are intended to help applicants who must pilot their way through the complex environmental permit process surrounding the very important work now underway to reduce the impacts of toxic contaminants present in the Portland Harbor. When used properly, these tools will guide the user toward well-integrated project designs that allow for faster, more predictable regulatory outcomes that are based on the highest quality science available.

These tools are also mindful that clean-up of the Portland Harbor will not only improve the human environment, it will also affect many non-human species as well. For example, the Harbor and the rest of the lower Willamette River provide essential habitat functions for six species of anadromous marine fish, including salmon and steelhead, that are currently listed as threatened with extinction under the federal Endangered Species Act (ESA).

Anadromous marine fish use the Portland Harbor to complete essential parts of their life history related to migration and rearing. Clean-up actions will improve the amount and condition of the aquatic habitats available in the Harbor for use by those species in terms of water and sediment quality, floodplain connectivity, and riparian condition. Many more ESA-listed species occur downstream in the Lower Columbia River and will also benefit from the Harbor clean-up. Those improvements are a central feature of NOAA's overall strategy to achieve recovery of ESA-listed species in this region.

I sincerely hope that you will take the opportunity to become familiar with the various tools presented here, including participation in the interagency forums they offer to develop strong and productive partnerships, and that you will actually use these tools as you work through the permitting process. That will help us all to be more efficient and effective as we work toward our mutual goals of healthy environment, vibrant communities, and a strong economy.

Marc Liverman, Ph.D
Willamette Branch Chief
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NOAA Fisheries West Coast Region
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Oregon
John A. Kitzhaber, MD, Governor

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To all interested parties:

The Department of Environmental Quality – Northwest Region Cleanup Program is pleased to announce the finalization of new tools to assist permit applicants performing remedial actions in Portland Harbor.

Working collaboratively with the National Marine Fisheries Service – Willamette River Branch, West Coast Region and the US Army Corps of Engineers – Portland District, Regulatory Program and coordinating with US Environmental Protection Agency – Region 10, we are jointly supporting an enhanced interagency coordination forum for permitting in Portland Harbor. The two pieces of our process include:

1. Opportunities for applicants to present project concepts at monthly staff-level interagency coordination meetings to get input from each agency toward preparing complete applications for a smooth and timely permit process.

2. The publication of a package of tools and information focused on improving the coordination of development of cleanup options and the associated permitting of bankwork proposed within or near the federally-listed Portland Harbor superfund study area of the Willamette River.

The components of this tools package are intended to assist applicants of bankwork remediation projects to better understand the permitting process and coordinate that process with proposed cleanup actions. The package is designed to assist applicants to capitalize on efficiencies between information developed for the cleanup and permit processes, overcome potential permit hurdles, integrate preferred bank design techniques that are based on proven technical resources, and receive timely permits to assist the broader cleanup goals in moving forward. While these tools are designed for use in the Portland Harbor section of the Willamette River, they can also provide assistance and guidance to similar cleanup projects in the vicinity.

On-going coordination staff-level interagency meetings are currently scheduled on the fourth Tuesday of each month. Applicant attendance to present a project concept for permitting within Portland Harbor can be arranged by contacting staff from NMFS, USACE or DEQ, as listed in the tools package. Joint meetings outside the regular schedule can also be arranged, as needed.

I hope you will take the opportunity to participate in the interagency forums and use the tools we have compiled to assist you. Please feel free to contact Alex Liverman at liverman.alex@deq.state.or.us with your questions or for assistance in using the enhanced interagency coordination process.

Sincerely,

Keith Johnson
Manager, Northwest Region Cleanup Program
Oregon Department of Environmental Quality

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
PO BOX 2946
PORTLAND, OREGON 97208-2946

December 11, 2014

Regulatory Branch

Dear Portland Harbor Cleanup Proponent:

The U.S. Army Corps of Engineers, Portland District (Corps) is pleased to make available two new resources for permit applicants who are proposing projects to address upland sources of pollution in Portland Harbor. Such projects present opportunities for enhancing water quality and aquatic habitat, but also pose unique challenges.

The first new resource for applicants is a monthly staff-level interagency meeting that allows time for permit applicants and agency representatives to discuss a proposed project, clarify goals and constraints, and identify issues and concerns. These meetings are currently scheduled on the fourth Tuesday of each month. You may arrange to attend by contacting staff from the Corps, Oregon Department of Environmental Quality (DEQ), or National Marine Fisheries Service (NMFS). Joint meetings outside the regular schedule can also be arranged, as needed.

The second new resource is a compilation of information that gives insight into the decision making process of each agency as it relates to Portland Harbor. This information will help applicants understand the permitting process, provide information developed for the cleanup and permitting processes, overcome potential permit hurdles, utilize preferred techniques and technical resources, and increase the likelihood of receiving a timely permit decision. Documents from successfully permitted projects can also be provided to assist as you develop your permit application. The package is available online at: http://www.nwp.usace.army.mil/Missions/Regulatory.aspx.

The Corps, DEQ, NMFS, and the U.S. Environmental Protection Agency (EPA) jointly developed these resources, based on practical experience with other permit applicants in Portland Harbor. The intent of these resources is to create opportunities to begin addressing critical issues early in the project design process and to better synchronize the Corps' permit evaluation (and associated consultations with NMFS and EPA) with DEQ's remedy selection process.

I hope you will take the opportunity to participate in the interagency forums and use these resources. The Corps' regulatory project manager for Portland Harbor is Mr. Michael LaDouceur. He may be contacted by e-mail at

michael.a.ladouceur@usace.army.mil or by telephone at (503) 808-4337. Please feel free to contact him with questions or for assistance in using the enhanced interagency coordination process.

Sincerely,

Shawn H. Zinszer
Chief, Regulatory Branch

Corps permit review and DEQ cleanup processes

SEE APPENDIX A – PG. 8

State and federal permit application reviews are separate but are typically conducted concurrently.

A remedy involving bankwork requires a Corps Regulatory permit. This process, from initial consultation to permit determination, may take months to a year or more. The Corps requires endangered species consultation with NMFS and DEQ 401 Certification indicating that water quality concerns are appropriately addressed.

In addition to the federal permit process, applicants must coordinate with DEQ, DSL and ODFW.

DEQ's goal is to support development and implement a remedy when clean-up action is needed. This may take months to years of investigation, option evaluation, remedy design and implementation.

While cleanup projects do not require a DSL removal-fill permit, the joint Corps/DSL permit application and the DSL fee must be submitted to DSL. DSL will coordinate with ODFW and provide requirements that must be met by the permittee. If state-owned land is involved in the project, applicants must also obtain authorization to access the land from DSL.

Corps and DEQ permit process flow charts (Appendix A) identify where opportunities might exist in the process to coordinate the clean-up and permit processes, and opportunities for efficiencies when necessary considerations overlap.

Bankwork permitting continuum

SEE APPENDIX B – PG. 9

Successful bankwork projects typically follow a similar design process, from the initial design steps to evaluating the complexities of certain design features.

Optimum project design steps include:

1. Determine project objective

2. Assessments
   a. Site
   b. River Reach
   c. Habitat
   d. Risk

3. Solution selection and evaluation
   a. Design considerations and techniques
   b. Feasibility study/upland remedy selection integration
   c. Mitigation needs
   d. Permitting considerations

The permitting considerations continuum in this guide (Appendix B) shows bankwork design features that range from the most simple, least costly and with no permit requirements to more costly techniques that

require much longer review times and more robust mitigation plans. These techniques are also described in the resources listed in this guide.

Some suggested habitat features are provided and should be considered when designing a project, particularly one that will require significant mitigation. Applicants are encouraged to evaluate a site's uses and any unused areas to identify opportunities to incorporate habitat features. Doing so can offset project impacts and allow mitigation to be built into the project.

Technical resources

APPENDIX C – PG. 10

The list of resources in this guide (Appendix C) provides information about proven design details, requirements and considerations for common streambank techniques. Each of the techniques in the permitting continuum are represented in one or more of these resources and offer excellent information on considerations such as:

- good project design steps
- problem assessment
- stream mechanics
- risk evaluation
- costs

Permit and application documents from successfully permitted projects are available upon request.

NMFS Habitat Equivalency Analysis Model & Survey Overview with draft Values Table

APPENDIX D – PG. 12

NMFS uses the Habitat Equivalency Analysis Model (Appendix D) to assess habit value for species listed under the Endangered Species Act. The HEA overview explains how inputs should be developed when using a habitat survey. Information includes:

- a table of draft values for various habitat types in Portland Harbor
- an explanation of how to read and use the table
- instructions for obtaining the model

Typical permit condition for bankwork

APPENDIX E – PG. 15
APPENDIX F – PG. 16

Programmatic permits, including the Corps' Nationwide Permit Category 13 – Bank Stabilization, list the typical conditions or requirements for restoration project bankwork. A bankwork project designed to meet these kinds of conditions and requirements will undergo a smoother review process.

Find applicable conditions outlined in Nationwide Permit Category 13 (Appendix E) and the Standard Local Operating Procedures for Endangered Species Criteria (Appendix F).

USACE PERMIT REVIEW PROCESS

USACE Permit Considerations:
- Alternatives analysis
- Mitigation
- Habitat
- Cumulative impacts
- Public interest

Pre-application Meeting and On-Going Multiagency Forum Input

Recommended and repeatable

→ Submit Application → USACE Review → Public Notice → USACE Determination → Issue Permit / Deny Permit

Interagency Coordination
- Endangered Species Act – NMFS and USFWS
- Section 106 – Tribes and SHPO
- Section 401 Water Quality Cert - DEQ
- CERCLA - EPA

PROJECT DESIGN | AGENCY REVIEW | AGENCY DECISION

DEQ CLEANUP PROCESS

DEQ Remedy Selection Considerations
- Effectiveness
- Long-term reliability
- Implement ability
- Implementation risk
- Reasonableness of cost

Site Evaluation → Preliminary Assessment / Removal Action → Remedial Investigation & Risk Assessment → Feasibility Study → Record of Decision → Remedial Design → No Further Action

PERMITTING CONSIDERATIONS CONTINUUM

LANDWARD OF ORDINARY HIGH WATER
(no permit)

- Riparian Buffer
- Internal Drains

BANK/BEACH RESTORATION
(reduce slope)

- Layback & Revegetate bank
- Reshape & Revegetate bank
- Create/enhance alcove w/plantings

BIOENGINEERED BANK STABILIZATION
(same slope)

- Planted slope
- Stringers/Coir logs
- Stakes/Layers
- Soil Reinforcements

BANK STABILIZATION
(same slope)

- Rip rap w/Roughened Toe
- Rip rap w/Wood Toe
- Live Crib Wall

BANK STABILIZATION
(increased slope)

- Crib/Gabion Wall
- Vertical Wall
- Manufactured Retention System
- Rip rap

HABITAT FEATURES (to reduce mitigation obligation and permitting difficulty **)

- Add plantings or other roughness (large wood)
- Improve vegetation in additional riparian areas
- Remove pilings or derelict overwater structures
- Remove shoreline debris
- Remove riprap at a nearby location
- Create sheltered/shallow-water habitat nearby
- Integrate habitat pilings
- Include aquatic berms
- Incorporate "habimat" on existing structure

DEQ
State of Oregon Department of Environmental Quality

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

US Army Corps of Engineers®
Portland District

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* Techniques are also described in Technical Resources
**See also, Habitat Equivalency Analysis information and USACE Mitigation Policy

LIST OF RESOURCES

Integrated streambank protection guidelines
Washington State Aquatic Habitat Guidelines Program, Washington Department of Fish & Wildlife, Washington Department of Transportation, Washington Department of Ecology – 2003
http://wdfw.wa.gov/publications/00046/wdfw00046.pdf

This guidance applies to streams of all sizes, and offers important considerations for assessing the problem, understanding the hydraulic conditions and choosing a solution. Each technique described includes information on:

- Application
- Effects
- Design
- Biological considerations (including potential mitigation)
- Risk
- Construction materials, equipment and costs
- Maintenance and monitoring

Streambank and shoreline protection
Engineering Field Handbook, Chapter 16
U.S. Department of Agriculture, National Resource Conservation Service
http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17553.wba

Provides comprehensive detailed technical design information on 37 techniques. Includes chapter list of other information in the handbook.

Streambank soil bioengineering
Technical Supplement 14I, National Engineering Handbook, Part 654– August 2007
U.S. Department of Agriculture, National Resource Conservation Service
http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17818.wba

Provides detailed technical designs and lists of additional resources for 20 techniques. Includes guidance for evaluating stream processes, risks and plantings.

Use of large woody material for habitat and bank protection
Technical Supplement 14J, National Engineering Handbook, Part 654– August 2007
U.S. Department of Agriculture, National Resource Conservation Service
http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17819.wba

Provides detailed design techniques and additional resources. Includes considerations on limitations, risk, cost, materials and design life.

Streambank armor protection with stone structures
Technical Supplement 14K, National Engineering Handbook, Part 654
U.S. Department of Agriculture, National Resource Conservation Service – August 2007
http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17821.wba

Provides detailed technical design information on ten techniques. Includes considerations on stone types, filter fabric layers, integrated plantings and habitat.

Soil Bioengineering Guide for Streambank and Lakeshore Stabilization, FS 683- October 2002
U.S. Department of Agriculture Forest Service, Technology and Development Program
http://www.fs.fed.us/t-d/pubs/pdf/fs683/cover.pdf

Provides planning and implementation information for soil bioengineering restoration projects. Chapter 5 provides detailed drawings, specifications, and methodology information for 23 techniques.

Willamette River design notebook – May 2001
City of Portland, in collaboration with GreenWorks PC, ClearWater West, Fishman Environmental Services, Inter-Fluve and KPFF Consulting
http://hdl.handle.net/1794/8601

This is a tool designed to foster creativity and innovation in developing an urban river's edge that improves conditions for fish, wildlife and people. It is focused specifically on the Lower Willamette River through the City of Portland, and offers a discussion of:

- River conditions
- Processes
- Land uses
- Habitat elements
- River bank design selection process
- Schematic drawings of 40 techniques

The notebook does not offer detailed design specifics and not all techniques are supported by the agencies.

Selected Permit Documents
Standard Local Operating Procedures for Endangered Species to administer stream restoration and fish passage improvement actions – Biological Opinion – NMFS
http://www.nwp.usace.army.mil/Portals/24/docs/regulatory/SLOPES_V_restoration.pdf

Habitat Improvement Program III funded by the Bonneville Power Administration in the Columbia River Basin in Oregon, Washington and Idaho – Biological Opinion – NMFS
http://www.nww.usace.army.mil/Portals/28/docs/regulatory/ESA%20Programmatics/HIPIII_NMFS_BiOp_03.22.2013.pdf

HABITAT EQUIVALENCY ANALYSIS MODEL

There are many aspects to the analysis of a project in a biological opinion from National Marine Fisheries Service, or NMFS. Habitat Equivalency Analysis, or HEA, is often used for one part of an evaluation. HEA is a model that allows NMFS to assess the value of habitat for species at a site listed under the processes of the Endangered Species Act, or ESA. Using HEA, NMFS compares habitat value at a site before a project is implemented with the habitat value after a project is complete. Value is measured in discounted service acre years, or DSAYs. HEA can also account for the time it takes habitats like trees in a riparian area to become fully functional by discounting the value, generally at a rate of 3% per year.

For a HEA analysis, each habitat type is assigned a value ranging from 0 to 1, with 1 being the highest and 0 being the lowest value habitat for ESA-listed species. Inputting the acreages and values associated with each habitat type present at a site before construction, the model can generate the total present habitat value of that site in DSAYs. Similarly, inputting the acreages and values associated with all habitat types planned for after project construction, the model can generate the total habitat value of the site after the project is completed. The pre-project and post-project habitat value of the site can then be compared to see if the project has resulted in a credit (post-project site has a higher habitat value than pre-project site) or debit (pre-project site has a higher value than post-project site). If construction of a project leads to a situation where the pre-project site had a higher value than the post-project site, then the debit from the HEA model can help inform the amount of mitigation that may be necessary. The HEA model can also be used to determine the habitat credit generated by a proposed mitigation project. Credits from a proposed mitigation project are compared to a project debit to see if they balance or result in additional credit, either of which indicates that the mitigation is adequate. Mitigation credits must come from the same habitat category, except that off-channel habitat credits can be applied to debits in any category because this is the primary limiting factor for salmonids in Portland Harbor. Alternatively, a project debit can be mitigated for by purchasing the equivalent DSAY credits from an approved mitigation bank.

Habitat Survey and Values Guide

NMFS will run the HEA model for each project and any proposed mitigation. A pre-project survey must be completed to determine the habitat types and acreages present at the site. This can be done by laying out transects or delineating vertical and horizontal segments of a given size and identifying dominant habitat types along the transects or within each segment. The segments should be small enough so that habitat type does not vary much within a single segment, and one habitat type is easily identifiable as dominant. Clear photographs of each segment or area are helpful as a reference and should be submitted with the habitat survey. Habitat types are listed in the attached table. If habitats are degraded or disconnected from adjacent habitats, these conditions should be documented in the survey. Projected post-project habitat types and their associated acreages can be calculated using project designs.

Note that the attached table contains values for use only in Portland Harbor. While not all habitat types have assigned values, additional values may be assigned as necessary on a project-by-project basis. In addition, pre- and post- project habitat values may be adjusted for a given project based on: the presence or absence of contaminants; the quality of adjacent habitats; or the species and life stages present and the stream where any proposed mitigation is located. “Shallow water habitat” means less than 20 feet of water depth as measured at the ordinary low water level. Shallow water habitat values listed in the table are for depths of 0-10 feet, with a second value in parentheses for depths of 10-20 feet. “Bioengineered” means the use of living and nonliving plant materials in combination with natural and synthetic support materials for slope stabilization, erosion reduction, and vegetative establishment. Treatments must fundamentally

rely on riparian plants to provide long term strength to the bank, though grading and inert materials may be used to assist establishment of planted live material.
Please contact Ms. Genevieve Angle at (503) 231-2223 or at Genevieve.Angle@noaa.gov with any questions regarding the HEA process or to request the HEA spreadsheet to experiment with the model for a pre-application stage project.

Draft HEA Habitat Values for ESA Consultation in Portland Harbor			
Habitat	**Habitat Characteristics**	**Yrs Until Full Function**	**Salmonid Value**
RIPARIAN (above ordinary high water)	naturally vegetated forest, <400 ft from active channel margin	40 [1]	0.5
	and in the historic floodplain	40 [1]	0.65
	naturally vegetated, grass/shrub	5	0.2
	and associated with historic floodplain	5	0.35
	invasive species (e.g. Himalayan blackberry)	NA	0.1
	vegetated riprap	NA	0.05
	unvegetated/paved/buildings/riprap	NA	0
ACTIVE CHANNEL MARGIN (between ordinary high water and ordinary low water)	sloped (<5:1 or 11°), unarmored and vegetated (native)	3	1
	sloped (<5:1 or 11°), unarmored and vegetated (invasive)	3	0.5
	sloped (>5:1 or 11°), unarmored and vegetated (native)	3	0.8
	sloped (>5:1 or 11°), unarmored and vegetated (invasive)	3	0.4
	sloped (<5:1), unarmored and unvegetated	1	0.8
	sloped (>5:1), unarmored and unvegetated	1	0.1
	sloped (<5:1), bio-engineered	3	0.2
	sloped (>5:1), bio-engineered	3	0.2
	Riprapped	NA	0
	sheetpile/seawall	NA	0
	Pilings	NA	1/2 value of margin type
	suspended structures over channel margins (e.g. docks)	NA	0.1
	floating structures (e.g. docks)	NA	0
MAIN CHANNEL (below ordinary low water)	shallow water, gravel and finer substrates	1	1 (0.9)
	shallow water, natural rock outcrop	NA [2]	1 (0.9)
	shallow water w. riprap/concrete/seawall in adjacent shoreline	NA	0.1 (0.1)
	shallow water with suspended structures	NA	0.1 (0.1)
	shallow water with floating structures	NA	0
	shallow water with pilings	NA	1/2 value of channel type
	deep water with natural substrates	1	0.1
	deep water with artificial substrates	NA	0.05
OFF CHANNEL	"cold" water tributary	1	1
	"warm" water tributary	1	0.9
	side channel	1	1
	alcove or slough with tributary	1	1
	alcove or slough with tributary ("warm")	1	0.9
	alcove or slough without tributary	1	0.8
	embayment (cove) with tributary	1	1
	embayment (cove) with tributary ("warm")	1	0.9
	embayment (cove) without tributary	1	0.8

NOTES: [1] achieves 80% of full function within 10 years; this time is adequate because of flood protection
[2] cannot be created
Credit for simply removing pilings is limited to 0.1 and for removing covering structures is limited to 0.5.

NATIONWIDE PERMIT CATEGORY 13

2012 USACE Nationwide Permit Category 13 – Bank Stabilization
Applicable bank-related conditions

- No material is placed in excess of the minimum needed for erosion protection;
- The activity is no more than 500 feet in length along the bank, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in minimal adverse effects;
- The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in minimal adverse effects;
- The activity does not involve discharges of dredged or fill material into special aquatic sites, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in minimal adverse effects;
- No material is of a type, or is placed in any location, or in any manner, that will impair surface water flow into or out of any waters of the United States;
- No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,
- The activity is not a stream channelization activity.
- This NWP also authorizes temporary structures, fills, and work necessary to construct the bank stabilization activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate. Invasive plant species shall not be used for bioengineering or vegetative bank stabilization.
- Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if the bank stabilization activity: (1) involves discharges into special aquatic sites; or (2) is in excess of 500 feet in length; or (3) will involve the discharge of greater than an average of one cubic yard per running foot along the bank below the plane of the ordinary high water mark or the high tide line. The permittee must also submit a pre-construction notification if the work may affect Endangered Species or the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places.
- Permittee shall include the use of bioengineering techniques and natural products (e.g. vegetation and organic material such as root wads) in the project design to the maximum extent practicable and shall minimize the use of rock, except when it is anchoring large woody debris. Non-biodegradable materials, such as plastic netting, that may entrap wildlife or pose a safety concern shall not be used for soil stabilization. Riparian plantings shall be included in all project designs unless the permittee can demonstrate that such plantings are not practicable.
- Riprap shall be clean (i.e. free of toxic contaminants and invasive species), durable, angular rock.

ENDANGERED SPECIES CRITERIA

SLOPES STU; SLOPES V Restoration; HIP III Programmatic;
and PROJECTS Restoration Programmatic Applicable project design criteria

- Other than those methods relying solely upon woody and herbaceous plantings, streambank stabilization projects should be designed and stamped by a qualified engineer that is appropriately registered in Oregon.
- Rock may not be used for streambank restoration, except as ballast to stabilize large wood.
- Without changing the location of the bank toe, damaged streambanks will be restored to a natural slope, pattern, and profile suitable for establishment of permanent woody vegetation. This may include sloping of unconsolidated bank material to a stable angle of repose, or the use of benches in consolidated, cohesive soils. The purpose of bank shaping is to provide a more stable platform for the establishment of riparian vegetation, while also reducing the depth to the water table, thus promoting better plant survival.
- Restore eroding streambanks by bank shaping and installation of coir logs or other soil reinforcements using bioengineering techniques as necessary to support the development of riparian vegetation. This may include planting or installing large wood, trees, shrubs, and herbaceous cover as necessary to restore ecological function in riparian and floodplain habitats.
- Acceptable bioengineering techniques for use either individually or in combination for restoration include: (a) Woody plantings and variations (e.g., live stakes, brush layering, facines, brush mattresses); (b) herbaceous cover, for use on small streams or adjacent wetlands; (c) deformable soil reinforcement, consisting of soil layers or lifts strengthened with biodegradable coir fabric and plantings that are penetrable by plant roots; (d) coir logs (long bundles of coconut fiber), straw bales and straw logs used individually or in stacks to trap sediment and provide a growth medium for riparian plants; (e) bank reshaping and slope grading, when used to reduce a bank slope angle without changing the location of its toe, to increase roughness and cross section, and to provide more favorable planting surfaces; (f) tree and large wood rows, live siltation fences, brush traverses, brush rows and live brush sills in floodplains, used to reduce the likelihood of avulsion in areas where natural floodplain roughness is poorly developed or has been removed and (g) floodplain flow spreaders, consisting of one or more rows of trees and accumulated debris used to spread flow across the floodplain; and (h) use of large wood as a primary structural component.
- Large wood will be placed to maximize near bank hydraulic complexity and interstitial habitats through use of various wood sizes and configurations of the placements.
- Complete all soil reinforcement earthwork and excavation in the dry. Use soil layers or lifts that are strengthened with biodegradable fabrics and penetrable by plant roots.
- Streambank restoration projects shall include the placement of a riparian buffer strip consisting of a diverse assemblage of species native to the action area or region, including trees, shrubs, and herbaceous species. Do not use noxious or invasive species.
- Do not apply surface fertilizer within 50 feet of any stream channel.
- Conduct post-construction monitoring and treatment or removal of invasive plants until native plant species are well established.