

## **R1 Native Plant Handbook**

In March 1995 Region 1 released the “Northern Region Native Plant Handbook: A Guide to Revegetation with Native Species” to provide direction for implementation of the 1993 Region 1 policy on the “Use of Vegetative Materials on National Forests” - [6 93 r1 native reveg policy.rtf](#). Since that time the Native Plant Program in Region 1 has moved forward slowly, mostly through the efforts of a few dedicated individuals on Forests and Districts throughout the Region, with guidance and support from the Regional Native Plant Coordinator. In February 2008 the national [Native Plant Material Policy](#) was released to provide direction for the use, growth, development, and storage of native plant materials. The policy helps achieve the Agency’s goals of providing for the diversity of plant and animal communities by promoting the use of genetically appropriate plant materials to rehabilitate sustainable native ecosystems resistant to invasion by non-native species and to revegetate disturbed sites to protect soil and water resources.

In order to keep Native Plant Program Coordinators and others up to date on the latest restoration/revegetation information this website has been developed as an update to the 1995 Native Plant Handbook.

### **Project Planning**

This section provides information and tools to assist in planning for plant material development, as well as determining plant material needs, costs and timelines for individual revegetation projects.

- **Acquiring and Developing Plant Materials**
  - **Seed Management Planning –**
    - USFS Region 1 Executive Summary of Plant Material Needs - [EXECUTIVE SUMMARY OF PLANT MATERIAL NEEDS REGION 1.docx](#)
    - Blank Spreadsheet for Seed Management Plans - [seed-management-plan-blank.xlsx](#). Completed Seed Management Plans are available under “[Restoration and Revegetation: R1 Seed Management Plans](#)” heading in the main Native Plant Website.
  - **Roadside Revegetation–Chapter 10**
    - 10.2.1 Collecting wild seeds (pp. 248-256)
    - 10.2.4 Nursery seed production (pp. 271-280)
    - Seed Procurement Planning – summary document of the above chapters. - [r6-seed-procurement-planning.docx](#)
  - **Propagation Costs –**
    - Current Seed and Stock Selling Prices at Coeur d’Alene Nursery - [current\\_selling\\_prices-2012.xls](#)
    - [Coeur d’Alene Nursery Special Handling and Service Charges](#)
    - Contact commercial nurseries for most current costs.
- **Revegetation Project Planning** - The [Roadside Revegetation Manual](#) outlines a four step process for planning a revegetation project and obtaining plant materials. These methods can be applied to any type of revegetation project (roadsides, stream restoration, wildlife habitat improvement, revegetation of invasive plant sites, etc.):
  - [Chapter 4](#) – Planning Phase One: Orient

- [Chapter 5](#) – Planning Phase Two: Assess Site
- [Chapter 6](#) – Planning Phase Three: Vegetation Analysis
- [Chapter 7](#) – Planning Phase Four: Integrate and Strategize
- **Revegetation Plans:** Please help us build a collection of actual prescriptions and revegetation plans (e.g., BAER Seeding Rx; Project reveg plans; etc.).
  - How to Develop a Revegetation Plan - [19-The Revegetation Plan Steinfeld.pdf](#)
  - [Blaine Road Revegetation Plan](#)
  - Sun River to Mt. Bachelor Reveg Plan - [20060325-sunriver-reveg-plan.doc](#)
- **Additional Resources:**
  - [An Introduction to Using Native Plants in Restoration Projects](#)
  - Guidelines for Revegetation of Invasive Weed Sites and Other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest (draft) - [r6-invasive-spp-reveg-guidelines-draftfinal.docx](#)
  - [Restoration Ecology Journal](#)

## Genetics

This section presents information and tools for ensuring that plant materials are genetically suited to planting site conditions, and have sufficient diversity to adapt to changing climates and other environmental stresses.

- **General:**
  - [Why do We Care About Genetics?](#)
  - [Choosing the Right Plant Materials](#)
  - [Locally Adapted Plant Materials](#)
  - [What to do if locally adapted plant material are not available](#)
- **Climate Change:**
  - [Ecological Restoration and Global Climate Change](#)
  - [Assisted colonization is not a viable conservation strategy](#) (also see related articles in this link)
  - [Rethinking species' ability to cope with rapid climate change](#)
  - [Seed supply for broadscale restoration: maximizing evolutionary potential](#)
- **Other Resources:**
  - ["How Local is Local" - A Review of Practical and Conceptual Issues in the Genetics of Restoration](#)
  - [Ecological Genetics and the Restoration of Plant Communities: Mix or Match?](#)
- **R1 Seed Transfer Zones–**
  - **Maps/lists of 3<sup>rd</sup> order HUCC used as Seed Transfer Zones in Region 1 - [R1 Native Plants 10-Year Seed Procurement Plan rev 2-12-08 mfm seed zones.xls](#)**

## Species Selection

[Chapter 6 of the Roadside Revegetation Manual](#) provides guidance and a process for selecting species to be used in revegetation. In Region 1, a list of “priority species” was compiled based on input from Forest revegetation specialists while preparing their [Forest Seed Mixes](#). Species on this list should be locally-adapted native plants that have broad ecological amplitude, are quick to establish, and can grow well on disturbed sites with little assistance from irrigation or fertilizer. When large quantities of plant materials are needed, an additional important consideration in species selection is the ability to propagate plants in a nursery or seed increase field.

- **R1 Species to Consider in Revegetation:**
  - R1 Native Revegetation Priority Species - [Region 1 Priority Reveg Spp\\_FINAL\\_WEB.xls](#)
- **Species Propagation Information:**
  - R1 Native Revegetation Plant Species Information - [r1\\_native\\_reveg\\_spp\\_info.xlsx](#)
- **High altitude Revegetation**
  - [High Altitude Revegetation Experiments on the Beartooth Plateau](#)
- **Riparian/Wetland Species**
  - [Wetland Plants: Their Function, Adaptation and Relationship to Water Levels](#)
  - [Western Wetland Flora](#)
  - [Users Guide to Description, Propagation and Establishment of Wetland Plant Species and Grasses for Riparian areas in the Intermountain West](#)
- **Species Beneficial for Invasive Plant Control:**
  - [Plant Functional Group Diversity as a Mechanism for Invasion Resistance](#)
  - “Invasion, Climate Change, and Local Adaptation: Assessing Trait Variation in Restoration-relevant Native Plants” - [AGibson\\_Proposal\\_spring2011.docx](#)
- **Additional information to help with species selection:**
  - [Native Seed Network](#)
  - [NRCS PLANTS Database](#)
  - [FEIS \(Fire Effects Information System\)](#)
  - [Simple Identification Key to Common Willows, Cottonwood, Alder, Birch and Dogwood of the Intermountain West](#)
  - [University of Montana Herbarium](#)
  - [University of Idaho Herbarium](#)

## Propagule Collection and Processing

**Information from main website on “Seed and Propagule Collecting” has been moved here. You can delete that section in the main website.**

This section provides information to help plan and obtain native plant materials. The following documents include important information, such as determining seed/propagule condition and maturity, methods of collection, collection forms/labels, and cleaning/testing/storing/transporting the collected materials. References to [Roadside Revegetation](#) offer general information on the subject while other references are provided for more detailed information or sources for collecting and processing native plant materials.

- **Seed/Berry Collection:**
  - Seed Stratification Table - [NativeStratTimes.xlsx](#)
  - [Roadside Revegetation \(Chapter 10.2.1 – Collecting Wild Seeds\)](#)
  - [Coeur d'Alene Nursery Native Seed/Sowing Due Dates](#)
  - Collecting and Processing Native Seeds and Berries - [collecting-processing-native-seeds-berries.docx](#)
  - [Native Seed Collection Guide \(R6\)](#)
  - [Low-Tech Devices for Collecting, Processing and Planting Seeds](#)
  - [Seed Photo Gallery \(SOS Program, BLM\)](#)
  - [Woody Plant Seed Manual](#)
  - [The NRCS Field Office Guide to Collecting Wildland Seed](#)
  
- **Hardwood Collection:**
  - [Roadside Revegetation \(Chapter 10.2.2 – Collecting Wild Cuttings\)](#)
  - [Coeur d'Alene Nursery Native Cutting Due Dates](#)
  - [Hardwoods \(MTDC Website\)](#)
  - [Collecting Willow, Poplar and Redosier Dogwood Hardwood Cuttings for Riparian Site Plantings](#)
  - [Native Hardwood Collection Guide \(R6\)](#)
  - [Sex and the Single Salix: Considerations for Riparian Restoration](#)
  
- **Collecting Wild Plants:**
  - [Roadside Revegetation \(Chapter 10.2.3 – Collecting Wild Plants\)](#)
  
- **Seed Quality Assessment:**
  - [Idaho State Seed Lab](#)
  - [Montana State University Seed Lab](#)
  - [North Dakota State Seed Lab](#)
  - [State Noxious Weed Requirements](#)
  - [Seed Quality Testing](#)
  - [The TZ \(Tetrazolium\) Test](#)
  - Duration of Seed Viability -[duration-of-seed-viability.docx](#)
  
- **Seed Collection Forms:**

- R1 Seed Collection Form [seed-collection-form-4-18-11.docx](#)
- **Other Information:**
  - Internet Resources for Seed Collectors - [Internet Resources for Seed Collectors.docx](#)

## Seed/Stock Nursery Production

This section provides information for determining the most appropriate type of plant materials (seed, cuttings, bareroot/container seedlings) for different species and project requirements. Also provided are guidelines for working with private growers and federal nurseries to establish seed production fields, stooling beds for hardwood cuttings, and rooted nursery stock.

- **Seed Production:**
  - [Roadside Revegetation \(Chapter 10.2.4 – Nursery Seed Production\)](#)
- **Nursery Stock Production:**
  - [Roadside Revegetation \(Chapter 6.4.3.3 – Plants\)](#)
  - [Roadside Revegetation \(Chapter 10.2.5 – Nursery Cutting Production\)](#)
  - [Roadside Revegetation \(Chapter 10.2.6 – Nursery Plant Production\)](#)
  - [Seedling Stock Types](#)
  - [Why Container Stock?](#)
  - [New Stock Types and Seedlings from Stooling Beds](#)
  - [Establishing, Culturing and Harvesting Stooling Beds](#)
  - [Producing Pacific NW Native Trees and Shrubs in Hardwood Blocks or Stooling Beds](#)
  - [Aspen Propagation: Rooted Cuttings](#)
  - [Stacked Propagation: A New Way to Grow Native Plants from Root Cuttings](#)
- **Nurseries, Plant Materials Centers and other Facilities:**
  - [Coeur d'Alene Nursery Website](#)
    - Ordering Native Plant Seedlings from Coeur d'Alene Nursery - [Ordering Native Seedling Plants.ppt](#)
  - [J. Herbert Stone Nursery Reports](#)
    - Seed yields and Plant lifespans at J. Herbert Stone Nursery - [seed-yields-lifespans-jhsn.doc](#)
  - [Lucky Peak Nursery Website](#)
  - [Aberdeen Plant Materials Center](#)
  - [Bismarck Plant Materials Center](#)
  - [Bridger Plant Materials Center](#)
  - [Pullman Plant Materials Center](#)
  - [USFS National Seed Lab](#)
  - [National Nursery and Seed Directory](#)

## Revegetation Implementation

Moved “Revegetation Plans and Techniques” info from main website here. You can delete that section from the main website.

This section provides tools and information to assist in implementation of revegetation plans.

The following sections of the [Roadside Revegetation Manual, Chapter 10](#) summarize state-of-the-art methods for site preparation and the installation and care of plant materials:

<b>Soil and Site Treatments:</b> <ul style="list-style-type: none"><li>• Fertilizers (pp. 184-194)</li><li>• Tillage (pp. 195-201)</li><li>• Mulches (pp. 201-215)</li><li>• Topsoil (pp. 215-220)</li><li>• Organic Matter Amendments (pp. 220-228)</li><li>• Lime Amendments (pp. 228-231)</li><li>• Soil Microorganisms (pp. 231-243)</li><li>• Topographic Enhancements (pp. 244-247)</li></ul>	<b>Installing Plant Materials:</b> <ul style="list-style-type: none"><li>• Seeding (pp. 301-311)</li><li>• Hydroseeding (pp. 311-326)</li><li>• Installing Cuttings (pp. 326-333)</li><li>• Installing Plants (pp. -333-344)</li><li>• Care of Plant Materials (pp. 345-357)</li></ul>
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- **Additional Resources:**
  - **Contracts and Agreements (examples can be added here):**
    - [R1 Procurement Website](#)
    - [National Grants and Agreements Website](#)
  - **Fertilizer Calculator:**
    - Fertilizer Calculator for Soil Bioengineering Applications with Native Plants - [Fertilizer Calculator\\_RRG.xlsx](#)
  - **Fire:**
    - [BAER \(Burned Area Emergency Response\)](#)
    - [Postfire Seeding for Erosion Control: Effectiveness and Impact on Native Plant Communities](#)
  - **General:**
    - [Planting Tools: An In-the-field Perspective](#)
    - [Restoring Western Ranges and Wildlands](#) - 3 volumes; provides background on philosophy, processes, plant materials selection, site preparation, and seed and seeding equipment for revegetating disturbed rangelands, emphasizing use of native species.

- [Volume 1](#)
  - [Volume 2](#)
  - [Volume 3](#)
  - [Revegetation and Restoration Planting Tools: An In-the-Field Perspective](#)
  - Grass Establishment - Lessons from Planting a High Elevation, Granitic Site - [grass-establishment-high-elev-granite-dsteinfeld.docx](#)
  - [Establishing Willows in the Summer](#)
  - [Restoration of Plant Communities with Woody Plants](#)
  - [Evaluation of Planting Time and Survivability of 16 Forbs and 2 Grass Species Native to the NW](#)
  - [Rocky Mountain Juniper \(\*Juniperus scopulorum\*\): A Native Conservation Tree for Use in the Northern Great Plains and Rocky Mountains](#)
- **Guides and Handbooks:**
  - [A Manager's Guide to Roadside Revegetation with Native Plants](#)
  - [Roadside Revegetation - An Integrated Approach to Establishing Native Plants \(PDF Version\)](#)
  - Landscaping with Natives - [Landscaping With Natives.pdf](#)
  - Maintenance of Native Landscapes (includes information on fertilizer application) - [Maintenance of native landscapes.pdf](#)
- **Invasive Plants:**
  - [Revegetation Guidelines for Western Montana: Considering Invasive Weeds](#)
  - Guidelines for Revegetation of Invasive Weed Sites and other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest - [r6-invasive-spp-reveg-guidelines-draftfinal.docx](#)
- **Riparian:**
  - [Harvesting, Propagating and Planting Wetland Plants](#)
  - [How to Manipulate Water in a New, Restored or Enhanced Wetland to Encourage Wetland Plant Establishment](#)
  - [How to Plant Willows and Cottonwoods for Riparian Restoration](#)
  - [Riparian Restoration](#)
  - [Riparian Revegetation](#)
  - The Stinger - [Stinger.pdf](#)
  - [Wetland Plants: Their Function, Adaptation and Relationship to Water Levels](#)
- **Roadsides:**
  - [Roadside revegetation of forest highways: new applications for native plants](#)
  - [Restoration of Native Plant Communities after Road Decommissioning in the Rocky Mountains: Effect of Seed-Mix Composition on Vegetative Establishment](#)

- **Seed Mix Calculator**
  - Spreadsheet for calculating PLS pounds/acre seed - [Seed Mix Calculator Herrera.xls](#)
- **Soil Treatments:**
  - [Subsoiling Promotes Native Plant Establishment on Compacted Forest Sites](#)
- **Wilderness:**
  - [Wilderness and Backcountry Site Restoration Guide](#)
- **Wood Fiber Mulch:**
  - Shredding Small Trees to Create Mulch for Erosion Control - [MTDC wood fiber mulch research.pdf](#)
  - Photos of Wood Fiber Mulch used on road cut:
    - [IMG\\_0520.JPG](#)
    - [IMG\\_0523.JPG](#)

## Monitoring

This section provides information on various methods of monitoring revegetation projects and how to determine the level of monitoring needed. Monitoring is essential to decide how the project is progressing, take corrective actions if necessary, verify regulatory standards or revegetation commitments were met, and learn which treatments are most effective. Monitoring can be as simple as field visits and taking photo points or as complex as collecting statistical data over time for analysis. The monitoring protocol selected should be determined by the objectives of the project.

- [Monitoring and Management – Roadside Revegetation \(Chapter 11\)](#) provides information to help in determining the level of monitoring needed and describes a photo point monitoring technique.
- [Monitoring Protocols – Roadside Revegetation \(Chapter 12\)](#) describes data collection techniques, statistical sampling design, and analysis methods that can be used on Excel® spreadsheets.
- [Monitoring Post-fire Vegetation Rehabilitation Projects: Current Approaches, Techniques, and Recommendations for a Common Monitoring Strategy in Non-forested Ecosystems](#)
- [Measuring and Monitoring Plant Populations](#) – a more detailed publication designed for monitoring rare plant populations but the methods described can be used for revegetation monitoring.