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September 2006
Acknowledgments
planning a well-crafted restoration project in wilderness is like putting together a complicated jigsaw puzzle—after all the pieces from several puzzles have been jumbled together and several of the pieces have been lost in the couch or sucked up in the vacuum cleaner. Writing this guide has been an exercise in furnishing all the puzzle pieces for a successful restoration project—or at least enough of them that any holes left in the puzzle won’t create a big problem.

With a deep sense of gratitude, the authors wish to thank others who assisted in the preparation or review of this guide.

For answering questions and providing invaluable support and encouragement:

Matthew Albright, U.S. Department of the Interior National Park Service, Olympic National Park

Tom Carlson, Arthur Carhart National Wilderness Training Center

Rich Haydon, M.S., USDA Forest Service, Okanogan and Wenatchee National Forests

Joyce Lapp, U.S. Department of the Interior National Park Service, Glacier National Park

Liza Prunuske, Prunuske Chatham, Inc.

Regina Rochefort, Ph.D., U.S. Department of the Interior National Park Service, North Cascades National Park

Ruth Scott, U.S. Department of the Interior National Park Service, Olympic National Park

Brian Vachowski, USDA Forest Service, Missoula Technology and Development Center

Victor Vankus, USDA Forest Service, National Tree Seed Laboratory

Sarah Walker, USDA Forest Service, Clearwater National Forest (retired)

Technical support staff from the various USDA Natural Resources Conservation Service Plant Materials Centers

For allowing the use of text or illustrations from their own publications or writings:

Carol Aubry, Ph.D., USDA Forest Service, Olympic National Forest

Jill S. Cremer, formerly USDA Forest Service, Angeles National Forest

Ellen Eubanks and Dexter Meadows, USDA Forest Service, San Dimas Technology and Development Center

Rich Haydon, M.S., USDA Forest Service, Okanogan and Wenatchee National Forests

Marin County Resource Conservation District

Laura Potash, USDA Forest Service, Mt. Baker-Snoqualmie National Forest

University of Washington Press

For help with the project and review of the draft publication:

Carol Aubry, Ph.D., USDA Forest Service, Olympic National Forest

Jayne Belnap, Ph.D., U.S. Geological Survey

Terry Carlson, M.S., USDA Forest Service, Bitterroot National Forest

Efrén Cázares, Ph.D., Oregon State University

Joy Juelson, M.S., USDA Forest Service, Okanogan and Wenatchee National Forests

Lisa Lewis, USDA Forest Service, Olympic National Forest

Karl Lillquist, Ph.D., Central Washington University

Robin Shoal, USDA Forest Service, Olympic National Forest

For compiling much of appendix B:

Amy Carlson, Bear Run Antics, Leavenworth, WA

Technical support staff from the various USDA Natural Resources Conservation Service Plant Materials Centers

A special thanks to the many researchers and restoration practitioners who have taken the time to share what they have learned so that we all might benefit.
Acknowledgments

Contents

Introduction

Chapter 1: The Context for Wilderness Restoration

1.1 Wilderness Restoration in the Past, Present, and Future

1.2 Impacts of Recreation and Similar Small-Scale Disturbances

1.3 Overview of Plant and Soil Ecology
## Contents

1.3.1g Animals ____________________________________________________________ 26
1.3.2 Ecosystem Processes ___________________________________________________ 26
  1.3.2a Hydrologic Processes ______________________________________________ 26
  1.3.2b Succession _________________________________________________________ 27
  1.3.2c Biotic Interactions ________________________________________________ 28
  1.3.2d Plant-Plant Interactions _____________________________________________ 28
  1.3.2e Plant-Soil Interactions _____________________________________________ 28
1.4 Concluding Thoughts _____________________________________________________ 29

Chapter 2: Planning for Restoration of Small Sites in Wilderness __________ 30
  2.1 Gathering the Information To Formulate a Plan ___________________________ 34
    2.1.1 Using Your Land Management Plan and NEPA ________________________ 35
    2.1.2 Using the Minimum Requirements Decision Process ____________________ 35
    2.1.3 Planning Scale and Priorities ________________________________________ 36
    2.1.4 Forming an Interdisciplinary Team ___________________________________ 37
    2.1.5 Developing a Site Assessment ________________________________________ 37
    2.1.6 Assessing Historical Human Influences ________________________________ 37
    2.1.7 Assessing Current Human Influences _________________________________ 38
    2.1.8 Problem Statements ________________________________________________ 41
    2.1.9 Scoping the Proposed Action _________________________________________ 41
    2.1.10 Selecting Management Actions To Meet Standards ______________________ 42
    2.1.11 The Minimum Tool _______________________________________________ 42
    2.1.12 Types of Management Actions ________________________________________ 43
      2.1.12a Reducing Recreational Use ________________________________________ 44
      2.1.12b Changing Visitor Behavior With Information and Education _______________ 44
      2.1.12c Intensive Site Management ________________________________________ 45
      2.1.12d Regulations and Enforcement ______________________________________ 45
      2.1.12e Regulations To Reduce Use Directly ________________________________ 46
      2.1.12f Regulations To Reduce High-Impact Behaviors ________________________ 47
    2.1.13 Passive Restoration of Damaged Soil and Vegetation ____________________ 49
    2.1.14 Active Restoration of Damaged Soil and Vegetation _____________________ 51
    2.1.15 Adjusting Management Actions: A Tale of Two Lake Basins ________________ 51
  2.2 Putting It All Together—Developing a Restoration Plan ____________________ 54
    2.2.1 Considering the Time Required for Plant Propagation ____________________ 57
    2.2.2 Research Opportunities _____________________________________________ 58
    2.2.3 Identifying Research Needs __________________________________________ 60
  2.3 Concluding Thoughts ___________________________________________________ 61
## Chapter 3: The Art and Science of Restoration

### 3.1 Developing Site Prescriptions Based on a Reference Site

- 3.1.1 Determining Reference Sites
  - 3.1.1a Choosing a Reference Site
  - 3.1.1b Identifying Undisturbed Reference Sites
  - 3.1.1c Identifying Disturbed-But-Revegetated Reference Sites
- 3.1.2 Comparing the Reference Site and the Restoration Site
- 3.1.3 Evaluating the Surface Condition of Impacted Sites
  - 3.1.3a Visual Clues for Evaluating Erosion
  - 3.1.3b Evaluating Physical Soil Crusts
  - 3.1.3c Evaluating Biological Soil Crusts
- 3.1.4 Soil-Water Relations
  - 3.1.4a Soil Texture and Pore Size
  - 3.1.4b Available Water-Holding Capacity
  - 3.1.4c Determining Water-Holding Capacity
- 3.1.5 Determining Soil Texture
- 3.1.6 Evaluating Soil Compaction
  - 3.1.6a Measuring Bulk Density
  - 3.1.6b Interpreting Bulk Density
  - 3.1.6c Evaluating Water Infiltration

### 3.2 Making Site Amendments Based on Site Evaluations

- 3.2.1 Soil Organic Matter and Mulch
- 3.2.2 Soil Nutrients, pH, and Salts
- 3.2.3 Rebuilding Damaged Soils
  - 3.2.3a Scarification
  - 3.2.3b Rebuilding Missing Layers of Soil
  - 3.2.3c Amending Altered or Depleted Soils
  - 3.2.3d Evaluating Soil Nutrients and Chemical Conditions
- 3.2.4 Application of Fertilizers or Soil Amendments
- 3.2.5 Restoring Soil Biota
  - 3.2.5a Types of Mycorrhizal Fungi
  - 3.2.5b Inoculating Plants With Mycorrhizal Fungi
  - 3.2.5c Soil Bacteria
  - 3.2.5d Restoring Soil Crusts
- 3.2.6 Solarization of Weedy Soils

### 3.3 Concluding Thoughts on Soil

### 3.4 Site Stabilization, Preparation, and Delineation
3.10.8b Initial Processing of Seed .................................................. 180
3.10.8c Hand-Processing Seed ...................................................... 181
3.10.8d Seed Storage ................................................................. 182
3.10.8e Seed Testing ............................................................... 182
3.10.8f Breaking Dormancy ....................................................... 183
3.10.8g Onsite Seeding Techniques ........................................... 184
3.10.8h Seeding Rates ............................................................. 187
3.10.9 Working With Cuttings ..................................................... 187
  3.10.9a Collecting and Handling Cuttings ...................................... 188
  3.10.9b Semihardwood Stem Cuttings ......................................... 188
  3.10.9c Hardwood Cuttings ..................................................... 188
  3.10.9d Softwood and Herbaceous Cuttings ................................ 189
  3.10.9e Root Cuttings ........................................................... 189
  3.10.9f Leaf Cuttings ............................................................ 190
  3.10.9g Leaf-Bud Cuttings....................................................... 190
3.10.10 Divisions ................................................................. 190
3.10.11 Layering ................................................................. 190
  3.10.11a Simple Layering ........................................................ 191
  3.10.11b Mound Layering ....................................................... 191
  3.10.11c Tip Layering ............................................................ 192
3.10.12 Transplanting Wildlings ................................................. 192

3.11 Transplanting, Protecting, and Establishing Native Plantings ................. 194
3.11.1 Timing of Transplanting ................................................... 194
3.11.2 Transporting Nursery-Grown Plants to the Project Location .................. 195
  3.11.2a Jelly Rolls for Protecting Bareroot Stock ................................ 195
  3.11.2b Moving Plants in Containers ........................................... 196
  3.11.2c Moving Container-Grown Plants Without the Container .................. 196
  3.11.2d Protecting Fragile Foliage ............................................. 197
  3.11.2e Moving Plants With Helicopters or Other Vehicles ....................... 197
  3.11.2f Handling Plants After They Arrive at the Project Location ............... 197
3.11.3 Transplanting Techniques ............................................... 197
3.11.4 Salvaged Materials ....................................................... 200

3.12 Plant Protection and Establishment ....................................... 201
3.12.1 Mulching ................................................................. 201
  3.12.1a Advantages and Disadvantages of Mulching ............................. 201
  3.12.1b Selecting a Mulch ........................................................ 202
  3.12.1c Comparison of Different Types of Mulch ................................ 203
3.12.2 Irrigation ................................................................. 207
  3.12.2a Water Delivery Systems ............................................... 208
4.1.4 Partnerships 229
4.1.5 National Sources for Recruiting Wilderness Volunteers 230
4.1.6 Using Professional Services 232
4.1.7 Learning From Others 232

4.2 Options for Growing Plants 332
4.2.1 Forest Service Nurseries 232
4.2.2 Plant Material Centers 233
4.2.3 Other Agency Nurseries 233
4.2.4 Contract Growers 233
4.2.5 School Horticulture Programs 233
4.2.6 Working With Contractors 234
4.2.7 General Principles for Successful Contracting 234

Chapter 5: Tools of the Trade and Other Resources 236
5.1 Software 237
5.2 Government Web Sites 237
5.3 Organizational Web Sites 238
5.4 Restoration Tools and Products 239
5.4.1 Pick Hoes or Miniature Plowshares 239
5.4.2 U-Bar Diggers 239
5.4.3 Balanced Watering Cans 240
5.4.4 Systemic Repellants 240
5.4.5 Restoration Signs 240
5.4.6 Erosion-Control Blankets 240

References 246

Appendixes 256
Appendix A–Treatments To Manage Factors Limiting Restoration 257
Appendix B–Propagation and Establishment Requirements for Selected Plant Species 263
Appendix C–Detailed Propagation Methods for Beargrass, Heather, Huckleberry, and Partridgefoot 327
Appendix D–Case Studies 337
Appendix E–Forms 359
Introduction

For the past two decades, resource managers have attempted to address the impacts caused by human actions in backcountry and wilderness areas. In some wildernesses, wilderness study areas, and national parks, these impacts are quite extensive: large areas denuded of vegetation, compacted soils, braided trails, and tree roots exposed after horses have been tied to trees. For many reasons, including water quality, soil stability, and esthetics, managers would like to prevent further impacts and help the existing impacts heal.

Wilderness management plans have addressed impacts by establishing desired conditions, indicators, and standards. Indicators such as vegetation loss, tree roots exposed, and the number of social trails are monitored to keep track of changes to the resource. Standards set limits on the amount of change that will be accepted before management action. In some wilderness areas, standards were not being met when the management plan was signed. In such situations, actions must be taken to prevent further resource degradation and to bring the resource back into compliance with standards. A number of actions are possible, one of which is physical restoration of the site. Although restoration is not necessarily the best choice in many situations, restoration can be very effective if it is done properly.

Managers across the Nation have had varying degrees of success with restoration. Some areas, such as the North Cascades National Park in Washington, have had successful restoration programs for years. The North Cascades program includes a greenhouse operation where plants are grown from seed or from cuttings that are collected on the site, carried into the backcountry, and planted. Other areas with fewer resources and less precipitation have not been as successful.

There is no textbook answer that guarantees success in backcountry site restoration. Much restoration knowledge is learned by trial and error. Many, many different techniques have been tried in one area or another, although information about these techniques may not have been passed along. This guide has been developed to facilitate information exchange. It is a compilation of the best information available from researchers and practitioners.

Purpose of This Guide

This guide was developed to provide managers with information that could help them decide whether to attempt restoration and, if so, how to go about it appropriately in wilderness. This guide will help managers share information and exchange ideas.

This guide is:

• Focused exclusively on restoration of small-scale impacts caused by human actions, such as recreation use or removal of administrative or special provisional structures (structures exempted under “Special Provisions” in section 4(d) of the Wilderness Act). Use of the word “site” in this publication refers to any number of small-scale disturbances—not necessarily a campsite.
• Based on the assumption that projects are in wilderness or backcountry settings (figure 1).

Figure 1—Dinosaur National Monument, UT.
Introduction

- Based primarily on examples from the Western United States—from the Rocky Mountains westward (figure 2). Many of the techniques and procedures apply to any environment.

Figure 2—Henry M. Jackson Wilderness, WA.

This guide is not:
- A guide to large-scale ecological restoration. Human-caused disturbances, such as mining and grazing, have occurred in wilderness at a landscape scale. Large-scale ecosystem restoration is a complex topic. Philosophical questions could be raised about such large-scale restoration in wilderness, where it might be regarded as a form of manipulation or “tram-meling.” Many large-scale applications need to be designed to meet regulations and engineering specifications that this guide does not address.
- A guide on fire suppression rehabilitation or burned area emergency rehabilitation (BAER).
- A guide to motorized tools or mechanized transportation, although these methods may be mentioned.

Special Wilderness Considerations

The Wilderness Act of 1964 set aside lands in the United States “to secure for the American people of present and future generations the benefits of an enduring resource of wilderness” to be “administered for the use and enjoyment of the American people in such a manner as will leave them [the lands] unimpaired for future use and enjoyment as wilder-ness....”

Congress further defined wilderness “as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.” Wilderness “is protected and managed so as to preserve its natural conditions and which (1) generally appears to have affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable....”

The Wilderness Act also includes special provisions allowing certain uses primarily because they existed before lands were designated as wilderness. These uses include grazing and mining.

The Wilderness Act’s mandate can pose interesting challenges for a wilderness manager who needs to manage for recreation, mining, grazing, and other activities, while keeping “man’s work substantially unnoticeable.” In some cases, impacts that occurred before lands became wilderness
threaten the integrity of the wilderness. Impacts may include vegetation and soil loss, unnecessary structures, and invasive plant populations. Where these impacts exist, managers feel an obligation to do something. Frequently, restoration is the solution that comes to mind.

Agency policies require that wilderness be managed to allow natural ecological processes to operate freely. Management actions should be the minimum necessary to preserve and protect wilderness. The Wilderness Act specifies that wilderness be untrammeled by man. It’s appropriate to ask questions such as:

- Is active revegetation of a disturbed site too manipulative?
- Is this action the minimum necessary?
- Do our actions interrupt the natural ecological processes?

Before a wilderness manager begins planning for a restoration project in wilderness, it is critical for the manager to think about the answers to these questions. Restoration does not consist simply of scarifying a site, sticking plants in the ground, and going away for the summer.

Restoration is a manipulative action that deserves a great deal of thought and planning, both to minimize the impacts to wilderness and to increase the likelihood of success. In many situations, the solution is simply to eliminate use at the site and allow the natural process of healing to occur. It is important to question your actions continually to be confident that they are the minimum necessary.

**Goals of This Guide**

- To provide guidance on developing a plan that thoroughly addresses the question of whether site restoration is the best management action and, if so, how to develop a site-specific restoration plan.
- To provide the latest information on site-specific restoration techniques, including site preparation, soil amendments, planting, mulching, and so forth.
- To explore the various methods of plant propagation both on and off the site.
- To inform managers of the documentation and monitoring required before undertaking a project and for ongoing progress reports.

**Target Audiences**

The target audiences for this guide include anyone who plans or implements site restoration in backcountry or wilderness areas or who would like to do so, including wilderness rangers, wilderness managers, resource specialists, recreation planners, or trail crew members. Anyone who reviews restoration plans or advises anyone who implements the plans would benefit from reading this guide.

**Nomenclature**

Not only common names, but also the scientific names of many plant species have been changing in recent years. An attempt has been made to determine current usage, to determine which of the species discussed in this book has a new name, and to determine whether any name used is authoritative.

One of the easiest sources for help in sorting out common and scientific names is the U.S. Department of Agriculture (USDA) PLANTS database on the Internet at [http://plants.usda.gov](http://plants.usda.gov), although this database may not be up to date for all species.