National InterAgency Wilderness Conference
Preson, Arizona • May 17-21, 1993
Conference Co-Sponsored by

Bob Marshall Level
Carsonite International Corporation, Carson City, Nevada
Ducks Unlimited, Inc., Phoenix, Arizona
Grumman Data Systems, Bethpage, New York
Jones & Stokes Associates, Inc., Phoenix, Arizona
The Wildlands Project, Tucson, Arizona

Arthur Carhart Level
Arizona Public Service Company, Phoenix, Arizona
National Outdoor Leadership School, Lander, Wyoming
Natural Areas Association, Mukonago, Wisconsin
Old Town Canoe, Old Town, Maine
Patagonia, Ventura, California
San Juan National Forest Association, Durango, Colorado
Wilderness Management Correspondence Course, Ft. Collins, Colorado

Howard Zahniser Level
CEHP, Inc., Washington, DC
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Power Bars, Berkeley, California
Summit Hut, Tucson, Arizona
Westward Look Resort, Tucson, Arizona
Wilderness Watch, Missoula, Montana

Morris Udall Level
Basket & Beads, Bozeman, Montana
Bausch & Lomb, Overland Park, Kansas
Bob's Bargain Barn, Tucson, Arizona
Country Suites, Tucson, Arizona
Crown Enterprises, Leesburg, Virginia
Eagle Creek, San Marcos, California
Dr. John Hendee, Moscow, Idaho
Jontom, Grangeville, Idaho
Metro Tucson Convention & Visitors Bureau, Tucson, Arizona
Osa Graphics, Phoenix, Arizona
Phoenix Rock Gym, Phoenix, Arizona
PUR Water Filters, Minneapolis, Minnesota
International Wilderness Leadership Foundation/WILD, Ft. Collins, Colorado
Teva Sport Sandals, Flagstaff, Arizona
Tucson Electric Power Co., Tucson, Arizona
University of Idaho, Moscow, Idaho
University of Montana Wilderness Institute, Missoula, Montana
Wise Use Movement, Seattle, Washington
Conference Session Handbook for A Renaissance in Wilderness Stewardship

Westward Look Resort
Tucson, Arizona, May 17-21, 1993

Sponsored by
USDI Bureau of Land Management, Fish and Wildlife Service,
National Park Service,
USDA Forest Service, and Society of American Foresters C-7 Wilderness Workgroup

Conference Steering Committee
Jim Barnett, NPS; Dave Harmon, BLM;
Kathy Hiett, NPS; Jeff Jarvis, BLM; Steve Knox, BLM;
Tom Kovalicky, SAF; Ken Mahoney, BLM;
Dave Redman, USFS; Dick Reid, SAF; Alan Schmierer, NPS;
Pat Spoerl, USFS; Dick Steinbach, USFWS;
Jerry Stokes, USFS; Meg Weesner, NPS
As was indicated to invited presenters in their original instructions (attached), this Technical Session Handbook was not intended to be a peer-reviewed proceedings. Whenever possible, presenters supplied a synopsis of their paper as an electronic file; some were scanned into electronic files from hard copy. Although some minor editing was done during the formatting and compiling process, presenters are responsible for content and accuracy. The purpose of the Handbook is to reduce the distraction to registrants of taking session notes, and to ensure a means of distributing this information to interested persons unable to attend this Technical Session.

Opinions expressed are the presenters' and do not necessarily reflect positions of their agency, university, or organization. The use of any trade, firm, or corporate names in this Handbook is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U.S. Department of Interior National Park Service, Bureau of Land Management, Fish and Wildlife Service, or U.S. Department of Agriculture Forest Service of any product or service to the exclusion of others that may be suitable.

Compiled by:
Alan C. Schmierer
Cathy Butler

May 1993
Division of Natural Resources & Research
Western Region, National Park Service
600 Harrison Street, Suite 600
San Francisco, CA 94107-1372
HANDBOOK for A RENAISSANCE IN WILDERNESS STEWARSHIP
May 17-21, 1993 Tucson, Arizona

Instructions for Submitting a Synopsis of Papers & Posters

A conference Handbook will be compiled and distributed to all pre-registered participants; it will also be available for mail order by those who cannot attend the sessions. This Handbook is not a peer-reviewed symposium proceedings. Minor formatting or editing may be done in the compilation process, but you have responsibility for the accuracy and clarity of your submittal.

POSTER SYNOPSIS: If your poster (panel, video, brochure, etc) is selected for showing, you may choose one of two formats to summarize your presentation. If visual impact is important, submit a camera-ready copy, black and white, ≤3 sheets, 8½ x 11 size. Or, if you prefer to summarize your poster in text (ie, describe video project or panel exhibit), then follow the instructions for papers below.

PAPER SYNOPSIS: All plenary and concurrent session speakers and panelists must provide a comprehensive synopsis of their remarks, as follows:

- Minimum 2 to a maximum 4 pages (single-spaced) plus ≤2 pages of contacts/references; a 1992 submittal is attached for an example. Double-spaced text is unacceptable.
- The preferred format is IBM compatible diskette in WordPerfect 5.1 or 5.0 (if unavailable, then Apple/Macintosh version Word Perfect, Microsoft Word, or other word-processing saved as a text-only file can be used). Label your diskette accordingly and mail via protected envelope.
- If neither software are available, then provide a camera-ready, quality original (only 10\pi or 12\pi Elite characters per inch, with one line space between paragraphs) so we may laser-scan it into an IBM compatible WordPerfect file in order to complete the compiling process.
- Brief abstracts are not suitable for meeting the objectives established for the Handbook.
- The Chicago Style Manual and Websters Unabridged Dictionary are the standard references.

AUTHOR CREDIT/REFERENCE: The heading on your first page must duplicate the title per conference agenda for your presentation. Also indicate your name (for multiple authors, list presenter first), position, agency or affiliation, Wilderness unit, telephone, and DG or cc:mail address.

DEADLINE: Must be received no later than 4/16/93; earlier submittals welcomed.

SUBMIT TO: Alan Schmierer, 1993 Wilderness Conference Handbook Compiler
Division of Natural Resources and Research {mail address per above}
Telephone – (415) 744-3959 FAX – (415) 744-3932
c:mail address – WRO-Resource Management
Westward Look Resort, Tucson, Arizona, May 17-21, 1993

INTERAGENCY WILDERNESS CONFERENCE/SAF-BLM-FWS-NPS-USFS

"A Renaissance in Wilderness Stewardship"

MONDAY MAY 17

Vigas Room

8:00-6:00 Continuous Registration

Canyon Room

10:30-11:30 Steering Committee and Moderators Meeting

Santa Catalina Room

12:30-1:00 Wilderness Panorama and Interpretive Prelude

1:00-1:15 Introductory Remarks--The Three Themes and Why; Primary Conference Objectives (Share the Vision) [Jeff Jarvis, Conference Chair]

"COMMON GROUND" PLENARY PRESENTATIONS:
{MODERATOR: Tom Kovalicky, SAF}

1:15-2:00 CG1 History of Passage of the 1964 Wilderness Act
Dick Costley, USFS Retired

2:15-3:00 CG2 Conflict and Compatibility in Resources Protection: The 1964 Wilderness Act and NHPA, ARPA, ESA--What Has Precedence in Managing Wilderness Resources? Are These Competing Mandates?
William H. Rodgers Jr., School of Law, University of Washington

3:00-3:30 BREAK

3:30-3:35 Interpretive Interlude

3:35-4:00 CG3 Interagency and Bioregional Partnerships in Wilderness Stewardship
Hal Salwasser, University of Montana-Missoula
(Monday Continued)  

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:00-4:25</td>
<td>CG4 Social Context for Partnerships, Motivations, and Concerns about Wilderness Stewardship</td>
</tr>
<tr>
<td></td>
<td>Gary Machlis, University of Idaho-Moscow</td>
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<tr>
<td>4:25-5:00</td>
<td>General Q&amp;A [first all-group discussion forum; ≥ 3 wireless microphones]</td>
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<tr>
<td>5:00-5:10</td>
<td>Interpretive Interlude</td>
</tr>
<tr>
<td>5:15-5:45</td>
<td>Post Conference Field Trips Meeting</td>
</tr>
<tr>
<td>5:15-7:00</td>
<td>DINNER [Self Inflicted]</td>
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</table>

Board and Canyon Patios

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>6:45-7:45</td>
<td>Wilderness Friend Mixer [Icebreaker sponsored by Carsonite International., Inc.]</td>
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</table>

Santa Catalina Room

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<th>Time</th>
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<tbody>
<tr>
<td>7:45-8:30</td>
<td>Rita Cantu [Wilderness Songs and Stories]</td>
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Canyon Room

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<th>Time</th>
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<tbody>
<tr>
<td>9:00-10:00</td>
<td>Contest Photos Posting</td>
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TUESDAY MAY 18

Vegas Room

<table>
<thead>
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<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:00-3:15</td>
<td>On-Site Registration</td>
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Santa Catalina Room

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:45-7:55</td>
<td>Interpretive Interlude</td>
</tr>
<tr>
<td>7:55-8:00</td>
<td>Introductory Remarks [Jeff Jarvis, Conference Chair]</td>
</tr>
</tbody>
</table>

CONFERENCE THEMES PLENARY PRESENTATIONS SERIES:
(MODERATOR: Paul Weingart, SAF)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:30</td>
<td>WRp1 Wilderness Restoration: Use of Minimum Tool in Revegetation or Alien Plant Control</td>
</tr>
<tr>
<td></td>
<td>Jeff Marion, Virginia Polytechnic, Department of Forestry</td>
</tr>
<tr>
<td>8:30-9:00</td>
<td>CWp1 Managing Wilderness, Cultural Resources, and Cultural Diversity</td>
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<tr>
<td></td>
<td>Loretta Neumann, CEHP, Inc.</td>
</tr>
<tr>
<td>9:00-9:30</td>
<td>EcP1 Emerging Challenges: Adjacent Land Uses, Day Use, Outfitters, and Access for the Disabled Wilderness Visitor</td>
</tr>
<tr>
<td></td>
<td>Steve Morton, USFS, Northern Region, Wilderness and Outfitter Specialist</td>
</tr>
<tr>
<td>9:30-10:00</td>
<td>BREAK</td>
</tr>
</tbody>
</table>
1ST TRACK OF CONCURRENT SESSIONS:

10:00-12:00 Three Tracks of Concurrent Sessions [All are 25 minute talk + slides, 5 minutes Q&A; and/or moving to other sessions

WRC1
{MODERATOR: Wes Henry, NPS} [Saguaro-Palo Verde Room]

10:00 J.Haley, Arid Lands Restoration in Lake Mead National Recreation Area Backcountry

10:30 R.Hanter, On-site Restoration Techniques in Remote Mountainous Areas of the Pacific Northwest

11:00 J.Murphy, The Significant Role of Backcountry Horsemens in Wilderness Restoration Projects

11:30 G.Yeager, Eradicating Rush Skeleton Weed from the Juniper Dune Wilderness with Herbicides

CWC1
{MODERATOR: Jerry Stokes, USFS} [Canyon Room]

10:00 D.Siegel, From the Past to the Present: The Cultural Environment in Wilderness, An Agency Perspective on Emerging Role & Responsibilities

10:30 R.Knudson, Wilderness, Cultural Resources, and the Public Trust: Making It Work

11:00 D.Cole, Trends in the Socio-Demographics of Wilderness Visitors

11:30 F.Secakuku, Managing Wilderness, Cultural Resources, and Cultural Diversity

ECC1
{MODERATOR: Keith Corrigan, BLM} [Ocotillo-Cholla-Acacia Room]

10:00 G.Hansen, Outfitting-Guide Partnership Training

10:30 D.Taylor, Blurring Boundaries: Twelve Years Reflection on Limiting Adjacent Land Use Impacts on Hawaiian Wilderness

11:00 P.Cangemi, The ADA and Wilderness: Managers Options for Recognizing Myths and Acting on Truths

11:30 Mark Pearson, Prioritizing acquisition of Nonfederal Inholdings in designated Wilderness Areas

LUNCHEON (11:45-1:15)
{MODERATOR: Dave Cherry, NPS}

12:20-12:25 Interpretive Interlude

12:25-12:55 ADDRESS by Dave Foreman, Chair, Wildlands Project

12:55-1:05 Q&A

1:05-1:15 [reconvening]

PLENARY SESSIONS continued:
{MODERATOR: Doug Mullins, USFWS}

1:30-2:30 CG5 Agency Servicewide Initiatives & Programs for Wilderness: Restoration, Cultural Resources and Emerging Challenges

BLM Keith Corrigan, Chief, Wilderness Branch

FWS Rob Shallenberger, Chief, Refuges

NPS Jack Davis, Associate Director, Operations

USFS John Twiss, Chief, Wilderness Program Leader
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
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<tr>
<td>2:30-3:00</td>
<td>CG6 We're Not Alone Anymore--Responding to Significant Non-Federal Agency Wilderness Activities</td>
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<td></td>
<td>Denise Meridith, BLM, Eastern States Director</td>
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<tr>
<td>3:00-3:30</td>
<td>BREAK</td>
</tr>
<tr>
<td>3:30-4:30</td>
<td>CG7 International Perspectives on Wilderness Stewardship</td>
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<td></td>
<td>Vance Martin, WILD: N. Latitudes</td>
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<td></td>
<td>Joe Quiros, The Nature Conservancy: S. Mexico</td>
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<tr>
<td>4:30-5:00</td>
<td>Round Table Q&amp;A [all of Tuesday's 8 plenary presenters; [all-group discussion forum; ≥ 3 audience microphones]</td>
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<tr>
<td>5:00-5:10</td>
<td>Interpretive Interlude</td>
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**Evening Options:**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>7:00-9:00</td>
<td>Agency Meetings [informal, optional]</td>
</tr>
<tr>
<td></td>
<td>Canyon Room--National Park Service</td>
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<tr>
<td></td>
<td>Cholla-Acacia Room--U.S. Forest Service</td>
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<td></td>
<td>Ocotillo Room--U.S. Fish &amp; Wildlife Service</td>
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<td>Saguaro-Palo Verde Room--Bureau of Land Management</td>
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**WEDNESDAY MAY 19**

**Vigas Lawn Tent**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>6:00-7:00</td>
<td>CONTINENTAL BREAKFAST</td>
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**Main Parking Lot (Departing):**

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>7:00-2:00</td>
<td>Field Trips</td>
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**Canyon Room**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>2:00-5:00</td>
<td>Poster Sessions</td>
</tr>
<tr>
<td>4:00-5:00</td>
<td>Presenters Attend Their Posters</td>
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<tr>
<td>2:00-6:15</td>
<td>Photo Contest Voting</td>
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**Board and Desert Rooms**

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>2:00-5:00</td>
<td>Trade Exhibits</td>
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</table>

**Board and Canyon Patios**

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>5:00-6:15</td>
<td>Wilderness Friend Mixer [Icebreaker sponsored by Carsonite International., Inc.]</td>
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</tbody>
</table>
[Wednesday Continued]

**BANQUET (6:25-7)**
*MODERATOR: Tom Kovalicky, SAF*

- 7:00-7:45 ADDRESS by Ted Turner, CNN, [Sponsored by Grumman Data Systems]
- 7:45-8:15 Q&A
- 8:15-9:00 Conference Recognition, SAF C-7 Working Group comments, Legislative Update, etc.

**THURSDAY MAY 20**

**Desert Site**
- 6:00-6:45 Wilderness Friend Fun Run

**Santa Catalina Room**
- 7:45-7:55 Interpretive Interlude
- 7:55-8:00 General Remarks [Jeff Jarvis, Conference Chair]

**CONFERENCE THEMES PLENARY PRESENTATIONS SERIES II:**
[Provide for differing perspectives than Series I; and draws upon field trip; and; Moderator insert "partners" example]:
*MODERATOR: Bill Halvorson, NPS, UA-CPSU*

- 8:00-8:30 **WRp2** Wilderness Restoration: Use of Minimum Tool in Revegetation or Alien Plant Control
  Peggy Olwell, Center for Plant Conservation, Missouri Botanic Garden

- 8:30-9:00 **CWp2** Managing Wilderness, Cultural Resources, and Cultural Diversity
  Andrea Kaus, University of California-Riverside/UCMEXUS

- 9:00-9:30 **ECp2** Emerging Challenges: Adjacent Land Uses, Day Use, Outfitters, and Access for the Disabled Wilderness Visitor
  Tom Ritter, Superintendent, Sequoia-Kings Canyon National Park

- 9:30-9:45 Interpretive Interlude

- 9:45-10:15 BREAK
{Thursday Continued} **2ND TRACK OF CONCURRENT SESSIONS:**

10:15-5:45 Three Tracks of Concurrent Sessions [All are 25 minutes talk + slides, 5 minutes Q&A and/or moving to other sessions; 27]

**WRc2** (MODERATOR: Alan Schmierer, NPS) [Saguaro-Palo Verde]

10:15 L. Watkins, Defining the Minimum Tool for Removing Tamarisk (Tamarix spp.) from Wilderness

10:45 B. Lester, Managing North Cascades National Park’s Revegetation Program


**CWc2** (MODERATOR: Denise Meridith, BLM) [Canyon Room]

10:15 K. Schamel, The Boundary Waters Canoe Area Wilderness—The Reality of Managing Heritage Resources in a Legislated Wilderness

10:45 J. Gallagher, Preserving the Heritage of Wilderness Areas

11:15 G. Throop, Managing Historic Structures in Pacific Northwest Wilderness Areas

**ECc2** (MODERATOR: Joe Mazzoni, USFWS) [Ocotillo-Cholla-Acacia Room]

10:15 G. Ellison, Management of Outfitters on the Arctic National Wildlife Refuge

10:45 B. Worf, The Proper Role for Outfitters and Guides in Wilderness

11:15 D. Willis, Wilderness First! Access, Outfitters, and Guides Somewhere Down the List, Depending (and if You’ve Got Two Good Feet, Doggone It, Use’em)

**Vegas Lawn Tent** LUNCHEON (11:45-1:15) (MODERATORS: Wilderness Friend, Ltd.)

11:45-11:50 Interpretive Interlude

11:50-1:05 Raffle, Silent Auction, Photo Contest Awards

1:05-1:15 [reconvening]

**Concurrent Sessions (Continued)**

1:15 R. Brown, Revegetation of High Elevation Disturbed Wilderness Sites: Implications for Minimum Tool Choice and Future Research Needs

1:45 J. Asher, Alien Plant Invasions: Increasing Impacts to the Integrity of Ecosystem Health in Wilderness

2:15 J. Flood, Contracting Is a Successful Option in Wilderness Restoration!

1.5: D. Chavez, What Are the Perceptions and Expectations of Urban-Proximate Wilderness Users?

1.5: G. Cummins, Reconciling Archaeology, Paleontology, and Native American Values with Wilderness in the Land Management Planning Process

1.5: S. Fisher, Resolving the Conflict Between the Wilderness Act and the American Indian Religious Freedom Act

1.5: L. Propst, Protecting Saguaro National Monument Wilderness Resources in the Face of Urban Expansion

1.5: B. Moon, Adjacent Land Use Issues at Joshua Tree National Monument: A Case Study of the World’s Largest Landfill

1.5: D. Owen, Day Use Patterns, Impacts, and Wilderness Management Strategies on the Appalachian Trail

2:45-3:15 BREAK

BREAK

BREAK
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>3:15</td>
<td>Thursday, Concurrent Sessions (Continued)</td>
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<tr>
<td></td>
<td>L. Thompson-Clark, Wilderness Management and Adjacent Land Usage in the National Wildlife Refuge</td>
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<tr>
<td>3:45</td>
<td>B. Tippett: Managing Wilderness Relative to American Indian Perspectives and Cultural Values</td>
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<tr>
<td>4:15</td>
<td>C. Nalle: Understanding and Responding to Day Use in Wilderness</td>
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<tr>
<td></td>
<td>S. Ulrich: Subsistence Uses and Native Americans</td>
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<td></td>
<td>D. Lange: Subsistence - A Different View of the Border: The White Mountain Syndrome</td>
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<tr>
<td>5:00</td>
<td>DINNER [Self-served]</td>
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<tr>
<td>7:30</td>
<td>EVENING GROUP DISCUSSIONS</td>
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<tr>
<td>MODERATOR: Martha Hahn, BLM</td>
<td>Tech Transfer: “How to use what I learned at home” [Prepare Action Lists/Mail Management]</td>
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<tr>
<td>MODERATOR: Phyllis Moreland, BLM</td>
<td>CW DISCUSSION. Out after Conference to all Registrants]</td>
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</tbody>
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**FRIDAY MAY 21**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>8:15</td>
<td>CONCLUDING PLENARY SESSIONS</td>
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<tr>
<td>MODERATOR: Margaret Petersen, USGS</td>
<td>Round Table; all 9 concurrent session moderators [plenary &quot;feedback&quot; summary of significant highlights from each Tuesday and Thursday module]</td>
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<tr>
<td>8:20</td>
<td>General Remarks [Jeff Jarvis, Conference Chair]</td>
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<td>9:15</td>
<td>General Q &amp; A [final all-group discussion forum; 23 microphones]</td>
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<td>Time</td>
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<tr>
<td>9:45-10:15</td>
<td>BREAK {Collect Evaluations}</td>
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<tr>
<td>10:15-10:45</td>
<td>CONCLUDING ADDRESS by Honorable James Kolbe (R-Arizona)</td>
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<tr>
<td>10:45-11:15</td>
<td>Q&amp;A</td>
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<tr>
<td>11:15-11:45</td>
<td>Wrap-Up [All Conference Steering Committee Members]</td>
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<td></td>
<td>Hand out flyers 1994 Interagency 30th Anniversary Conference</td>
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<tr>
<td>11:45-12:00</td>
<td>Concluding Interpretive Interlude</td>
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<tr>
<td>12:00</td>
<td>Adjourn...Safely Travel Home!</td>
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</tbody>
</table>

**FRIDAY ↔ SUNDAY**

Optional: Field Trips
# TABLE OF CONTENTS

## Poster Presentations

<table>
<thead>
<tr>
<th>Presenter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carr, Deborah S.</td>
<td>2</td>
</tr>
<tr>
<td>Digregorio, Lee.</td>
<td>2</td>
</tr>
<tr>
<td>Duriscoe, Dan.</td>
<td>3</td>
</tr>
<tr>
<td>Gray, Robert H.</td>
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</tr>
<tr>
<td>Johnson, Louise.</td>
<td>4</td>
</tr>
<tr>
<td>Kramer, John.</td>
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<tr>
<td>Lacy, Lynn.</td>
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<td>Majeski, Carol.</td>
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<tr>
<td>Miller, Melanie.</td>
<td>6</td>
</tr>
<tr>
<td>Rocchio, Judith E.</td>
<td>8</td>
</tr>
</tbody>
</table>

## Presentations for a Common Ground

<table>
<thead>
<tr>
<th>Presenter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrigall, Keith.</td>
<td>10</td>
</tr>
<tr>
<td>Costley, Richard J.</td>
<td>10</td>
</tr>
<tr>
<td>Davis, Jack.</td>
<td>12</td>
</tr>
<tr>
<td>Machlis, Gary E.</td>
<td>15</td>
</tr>
<tr>
<td>Martin, Vance G.</td>
<td>17</td>
</tr>
<tr>
<td>Meridith, Denise.</td>
<td>19</td>
</tr>
<tr>
<td>Quiroz, Joseph R.</td>
<td>20</td>
</tr>
</tbody>
</table>
Rodgers, Jr., William 21
CONFLICT AND COMPATIBILITY IN RESOURCES PROTECTION: THE 1964 WILDERNESS ACT AND THE NATIONAL HISTORIC PRESERVATION ACT (NHPA), ARCHEOLOGICAL RESOURCES PROTECTION ACT (ARPA), AND THE ENDANGERED SPECIES ACT (ESA)—WHAT HAS PRECEDENCE IN MANAGING WILDERNESS RESOURCES? ARE THESE COMPETING MANDATES?

Salwasser, Hal. 22
INTERAGENCY AND BIOREGIONAL PARTNERSHIPS IN WILDERNESS STEWARDSHIP.

Shallenberger, Robert. 23
U.S. FISH AND WILDLIFE SERVICE INITIATIVES AND PROGRAMS FOR WILDERNESS.

Twiss, John. 24
U.S. FOREST SERVICE INITIATIVES AND PROGRAMS FOR WILDERNESS.

Wilderness Restoration: Use of Minimum Tool in Revegetation or Alien Plant Control

Asher, Jerry. 26
ALIEN PLANT INVASIONS: INCREASING IMPACTS TO THE INTEGRITY OF ECOSYSTEM HEALTH IN WILDERNESS.

Barnett, James J. 29
WILDERNESS REVEGETATION AT ORGAN PIPE CACTUS NATIONAL MONUMENT.

Brown, Ray. 31
REVEGETATION OF HIGH ELEVATION DISTURBED WILDERNESS SITES.

Chapman, Dolly B. 34
ROLE OF TRAIL MAINTENANCE/CONSTRUCTION IN WILDERNESS RESTORATION: JOHN MUIR CASE STUDIES.

Flood, Joseph. 36
CONTRACTING IS A SUCCESSFUL OPTION IN WILDERNESS RESTORATION!

Haley, Jennifer S. 38
ARID LANDS RESTORATION IN LAKE MEAD NATIONAL RECREATION AREA BACKCOUNTRY.

Hanbey, Russell D. 39
ON-SITE RESTORATION TECHNIQUES IN REMOTE MOUNTAINOUS AREAS OF THE PACIFIC NORTHWEST.

Lange, Dave. 41
EXOTIC VEGETATION MANAGEMENT IN GLACIER NATIONAL PARK.

Lester, William L. 44
MANAGING NORTH CASCADES NATIONAL PARK’S REVEGETATION PROGRAM.

Marion, Jeffery L. 46
WILDERNESS RESTORATION: WHAT ROLE DOES IT PLAY IN MANAGING RECREATIONAL IMPACTS?

Murphy, Jim. 49
THE SIGNIFICANT ROLE OF BACK COUNTRY HORSEMEN IN WILDERNESS RESTORATION PROJECTS.

Olwell, Peggy. 51
ARE REINTRODUCTION GUIDELINES COMPATIBLE WITH “MINIMUM TOOL” REVEGETATION IN WILDERNESS?

Radke, William R. 57
BIODIVERSITY MANAGEMENT ON A “SINGLE-SPECIES” NATIONAL WILDLIFE REFUGE—RESTORING CRITICAL HABITAT USING WILDERNESS MANAGEMENT CONCEPTS.
Watkins, Lynn M.  58  
DEFINING THE MINIMUM TOOL FOR REMOVING TAMARISK (TAMARIX SPP.) FROM WILDERNESS.

Yeager, Gary.  61  
ERADICATING RUSH SKELETON WEED FROM THE JUNIPER DUNES WILDERNESS WITH HERBICIDES.

**Managing Wilderness, Cultural Resources, and Cultural Diversity**

Chavez, Deborah J.  63  
WHAT ARE THE PERCEPTIONS AND EXPECTATIONS OF URBAN-PROXIMATE WILDERNESS USERS?

Cole, David N.  64  
TRENDS IN THE SOCIO-DEMOGRAPHICS OF WILDERNESS VISITORS.

Cummins, Gary.  67  
RECONCILING ARCHAEOLOGY, PALEONTOLOGY, AND NATIVE AMERICAN VALUES WITH WILDERNESS IN THE LAND MANAGEMENT PLANNING PROCESS.

Fischer, Stephen E.  70  
RESOLVING THE CONFLICT BETWEEN THE WILDERNESS ACT AND THE AMERICAN INDIAN RELIGIOUS FREEDOM ACT.

Gallagher, Joseph G.  72  
PRESERVING THE HERITAGE OF WILDERNESS AREAS.

Kaus, Andrea.  74  
MANAGING WILDERNESS, CULTURAL RESOURCES, AND CULTURAL DIVERSITY: WILDERNESS THROUGH THE EYES OF THE BEHOLDER.

Knudson, Ruthann.  78  
WILDERNESS, CULTURAL RESOURCES, AND THE PUBLIC TRUST: MAKING IT WORK.

Nagel, Carlos.  81  
A DIFFERENT VIEW OF THE BORDER--THE WHITE MAP SYNDROME.

Neumann, Loretta.  83  
WILDERNESS AND CULTURAL RESOURCES: ARE THEY FINALLY COMING TOGETHER?

Schamel, Kathleen M.  86  
THE BOUNDARY WATERS CANOE AREA WILDERNESS—THE REALITY OF MANAGING HERITAGE RESOURCES IN A LEGISLATED WILDERNESS.

Secakuku, Ferrell.  89  
MANAGING WILDERNESS, CULTURAL RESOURCES, AND CULTURAL DIVERSITY.

Siegel, David N.  91  
FROM THE PAST TO THE PRESENT: THE CULTURAL ENVIRONMENT IN WILDERNESS, AN AGENCY PERSPECTIVE ON EMERGING ROLES AND RESPONSIBILITIES.

Throop, E. Gail.  94  
MANAGING HISTORIC STRUCTURES IN PACIFIC NORTHWEST WILDERNESS AREAS.

Tippeconnic, Bob.  97  
MANAGING WILDERNESS RELATIVE TO AMERICAN INDIAN PERSPECTIVES AND CULTURAL VALUES.

Ulvi, Steve.  97  
SUBSISTENCE USES AND NATIVE ALASKAN PERCEPTIONS OF WILDERNESS.
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging Challenges—Adjacent Land Uses, Day Use, Outfitters, and Access for the Disabled Wilderness Visitor</td>
<td></td>
</tr>
<tr>
<td>Cangemi, Phyllis.</td>
<td>102</td>
</tr>
<tr>
<td>THE ADA AND WILDERNESS: MANAGERS OPTIONS FOR RECOGNIZING MYTHS AND ACTING ON TRUTHS.</td>
<td></td>
</tr>
<tr>
<td>Elison, Glenn W.</td>
<td>103</td>
</tr>
<tr>
<td>MANAGEMENT OF OUTFITTERS ON THE ARCTIC NATIONAL WILDLIFE REFUGE.</td>
<td></td>
</tr>
<tr>
<td>Galland, John.</td>
<td>105</td>
</tr>
<tr>
<td>WILDERNESS AND ACCESSIBILITY: A VISITOR’S PERSPECTIVE.</td>
<td></td>
</tr>
<tr>
<td>Hansen, Gregory F.</td>
<td>107</td>
</tr>
<tr>
<td>OUTFITTER-GUIDE PARTNERSHIPS AND TRAINING.</td>
<td></td>
</tr>
<tr>
<td>Lester, William L.</td>
<td>109</td>
</tr>
<tr>
<td>UNDERSTANDING AND RESPONDING TO DAY USE IN WILDERNESS.</td>
<td></td>
</tr>
<tr>
<td>Moon, Robert L.</td>
<td>111</td>
</tr>
<tr>
<td>ADJACENT LAND USE ISSUES AT JOSHUA TREE NATIONAL MONUMENT: A CASE STUDY OF THE WORLD’S LARGEST LANDFILL.</td>
<td></td>
</tr>
<tr>
<td>Morton, Steve.</td>
<td>113</td>
</tr>
<tr>
<td>A RENAISSANCE IN WILDERNESS STEWARDSHIP: FOUR EMERGING CHALLENGES.</td>
<td></td>
</tr>
<tr>
<td>Owen, Donald J.</td>
<td>116</td>
</tr>
<tr>
<td>DAY USE PATTERNS, IMPACTS, AND WILDERNESS MANAGEMENT STRATEGIES ON THE APPALACHIAN TRAIL.</td>
<td></td>
</tr>
<tr>
<td>Pearson, Mark.</td>
<td>120</td>
</tr>
<tr>
<td>PRIORITIZING ACQUISITION OF NONFEDERAL INHOLDINGS IN DESIGNATED WILDERNESS AREAS.</td>
<td></td>
</tr>
<tr>
<td>Propst, Luther.</td>
<td>121</td>
</tr>
<tr>
<td>PROTECTING SAGUARO NATIONAL MONUMENT WILDERNESS RESOURCES IN THE FACE OF URBAN EXPANSION.</td>
<td></td>
</tr>
<tr>
<td>Ritter, J. Thomas.</td>
<td>123</td>
</tr>
<tr>
<td>EMERGING CHALLENGES IN WILDERNESS MANAGEMENT.</td>
<td></td>
</tr>
<tr>
<td>Taylor, Dan.</td>
<td>127</td>
</tr>
<tr>
<td>BLURRING BOUNDARIES: TWELVE YEARS REFLECTION ON LIMITING ADJACENT LAND USE IMPACTS ON HAWAIIAN WILDERNESS.</td>
<td></td>
</tr>
<tr>
<td>Thompson-Olais, Laura.</td>
<td>132</td>
</tr>
<tr>
<td>WILDERNESS MANAGEMENT AND ADJACENT LAND USES ON CABEZA PRIETA NATIONAL WILDLIFE REFUGE.</td>
<td></td>
</tr>
<tr>
<td>Willis, Dave.</td>
<td>134</td>
</tr>
<tr>
<td>WILDERNESS FIRST ACCESS, OUTFITTERS, AND GUIDES SOMEWHERE DOWN THE LIST, DEPENDING (AND IF YOU’VE GOT TWO GOOD FEET, DOGGONE IT, USE ‘EM.</td>
<td></td>
</tr>
<tr>
<td>Worf, William A.</td>
<td>136</td>
</tr>
<tr>
<td>THE PROPER ROLE FOR OUTFITTERS AND GUIDES IN WILDERNESS.</td>
<td></td>
</tr>
</tbody>
</table>
Poster Presentations
The National Wilderness Preservation System (NWPS) has grown significantly larger since its creation in 1964. In addition, the need for scientific information has become more critical to developing sound wilderness management practices. The NWPS provides many unique research and management opportunities and challenges. Whether managing to minimize recreation use impacts or maximize recreation experiences, monitoring for regional air quality, or planning for prescribed fire regimes, a basic understanding of natural processes and human impacts is essential for sound management practices. Wilderness resources also provide baseline information for better understanding of ecological patterns, processes, and the dynamics of natural change. Educating the public about the values and appropriate uses of wilderness continues to be a major mission for the natural resource profession. Education and training of wilderness professionals, as well as evaluation of the effectiveness of management actions is needed to improve the stewardship of the wilderness and wildland resources. To meet these scientific and managerial challenges there exists a need to bring together diverse disciplines and interests to develop solutions in a manner that combines managerial experience with research expertise.

Work was begun on the Aldo Leopold Wilderness Research Institute (WRI) concept in July, 1992 after the Congressional hearings for the Wilderness Management Bill (H.R. 4325) introduced by Rep. Bruce Vento (D-MN). The charter has gone through three phases of development with the assistance of many individuals representing a wide variety of entities (Federal agencies, conservation groups, and universities). The mission of the WRI is to obtain and provide information necessary to sustain wilderness resources in an ecologically and socially sound manner for the present and future. The WRI will: conduct and expend wilderness research, integrate and coordinate research efforts on or about NWPS lands, develop and implement innovative technology transfer methods, and provide technical assistance in national and international wilderness-related education.

The structure and function of the WRI is oriented around the belief that the best and most efficient way to act as stewards of the NWPS is to integrate wilderness research and management efforts across agency and organizational boundaries. This has led to the decision that an important criterion in locating the WRI is to be in close proximity to the Arthur Carhart National wilderness training center in order to provide the maximum interface between wilderness researchers and managers. Also, to provide input on the needs of the entire NWPS, an interagency steering committee will be formed to work with both the WRI and the National Wilderness Training Center. It will consist of two representatives from the Forest Service, Bureau of Land Management, National Park Service, and Fish and Wildlife Service. The committee will meet as needed to identify management needs for research and other high priority wilderness and wildland research topics, and develop a wilderness network. Periodic workshops are planned to coordinate the input and involvement of non-federal wilderness research centers as well.

The WRI has two program areas: Research and Application. The Research function will bring together scientific expertise from within and outside the agency to produce state-of-the-art knowledge about wilderness and ecosystem issues. The WRI will address a full range of wilderness management issues in four broad topic areas: (1) recreation and non-recreation uses; (2) physical, ecological, and social impacts on the wilderness resource; (3) monitoring the NWPS; and (4) developing decision-making useful for wilderness management and education. The Application function will have the lead in coordinating and integrating wilderness research and management efforts. This integration effort includes transferring research findings into wilderness management through a variety of techniques, providing an information feedback loop between management and research, and developing partnerships with private interests, conservation organizations, colleges and universities, governmental agencies, and other organizations. As part of its coordination efforts, the Application program will develop and maintain a comprehensive wilderness library.

The WRI will be formally dedicated in Missoula, Montana on August 21, 1993. Following the dedication, the WRI staff will work to get both program areas functioning as well as to assemble its steering committee. Once these basic tasks are accomplished, the WRI will be a resource available to the entire wilderness community, including the Forest Service, Bureau of Land Management, National Park Service, Fish and Wildlife Service, and other federal agencies, state agencies, universities, and interest groups. It is planned that the Institute's first major undertaking will be related to developing a strategic, comprehensive inventory and monitoring system for wilderness lands.

The San Mateo Canyon Wilderness (SMCW) contains 40,000 acres nestled within the Santa Ana and Sante Margarita Mountains in southern California. Primary features of the SMCW are the many canyons that support intermittent and perennial streams that support a wide variety of riparian vegetation. Gently rolling meadow areas bordered by Coast Live Oak groves are present...
and serve as a welcome contrast to the many acres of steep slopes and mixed chaparral. Most of the major drainages and meadow areas are accessible via the 70-mile trail network.

Located within a one hour drive of the densely populated cities of Los Angeles and San Diego, this island of Wilderness is surrounded by encroaching residential neighborhoods and urban growth. Primary management challenges are related to easy access to the Wilderness by users and to some degree a lack of understanding of wilderness ethics. This poster is a visual summary of the emerging management challenges, as a result of urban pressure, and our efforts to keep the “wild” in Wilderness. Management STRATEGIES will develop from an analysis of EFFECTS; thus, the integrating concept of EFFECTS will be presented in two categories: “EFFECTS to the wilderness experience” and “EFFECTS to the land”.

WILDERNESS CAMPFIRE WOOD AVAILABILITY—AN ALTERNATE APPROACH TO MANAGEMENT. Den Duniscoe, Biological Technician, Sequoia & Kings Canyon National Parks, Three Rivers, CA (209)565-3722

A basic common-sense approach to managing the collection of dead end down wood for campfires in wilderness has been stated as: “wood fires will not be allowed where consumption of fuelwood exceeds production”. This statement may be modified somewhat to allow natural decomposition and/or burning of dead end down wood. Where investigation of the fuelwood production rate in the areas of a subalpine lake basin of Kings Canyon national Parks that are commonly used by wilderness campers, rates are estimated based on regression models of age/dbh and dbh/volume relationships, integrated over the entire stand. Consumption of down wood by campers was estimated based on previous work and 1992 visitation records for the area. It was found that about 1.3 m³/ha/yr (18.7 ft³/ac/yr) of wood is produced in this predominantly lodgepole pine stand, while about .14 m³/ha/yr (2.0 ft³/ac/yr) would be consumed, if wood fires were allowed, or about 11% of production.


The U.S. Department of Energy’s Hanford Site was established along the Columbia River in the 1940’s to produce plutonium for nuclear weapons during World War II. Ironically, the Site has also served another purpose. By virtue of its large size (1,450 km² [560 mi²]) and conservative use of undeveloped land, it has provided a sanctuary for plant and animal populations that have been eliminated from, or greatly reduced on, surrounding agricultural areas. The Hanford Site serves as a refuge for those species that are either not tolerated on farmlands (e.g., mule deer, Odocoileus hemionus; elk, Cervus elaphus; and black-tailed jack rabbits; Lepus californicus); or else the composition and stand structure of wild plant communities is more suited to them (e.g., long-billed curlew, Numenius americanus; chukar partridge, Alectoris chukar; Swainson’s hawk, B. regalis; and sage sparrow, Ammospiza belli).

The Columbia River both upstream and downstream of the Site, and much of the adjacent land, have experienced severe human-induced alterations during the past four decades, mostly from the construction and operation of a series of hydroelectric dams, increased agricultural activities, and the use of river water for irrigation. The Hanford Reach of the Columbia River is its only unimpounded segment in the United States upstream of Bonneville, and first dam upstream from the river’s mouth. The Hanford Reach and its islands serve as a refuge for migratory waterfowl of the Pacific flyway and a migration route for up-river runs of chinook (Oncorhyncus tshawytscha), coho (O. kisutch), and sockeye (O. nerka) salmon, and steelhead trout (O. mykiss). Chinook salmon and steelhead trout also spawn in the Hanford Reach. Land bordering the Hanford Reach has attracted native wildlife that rely on shoreline habitats for nesting (e.g. Great Basin Canada goose, Branta canadensis mossii; great blue heron, Ardea herodias) and provides isolation and perches for other birds (as for wintering bald eagles, Haliaeetus leucocephalus). Bald eagles congregate along the Hanford Reach in the fall and winter to feed on the spawned-out carcasses of salmon and on wintering waterfowl. This paper describes Hanford Site biota with emphasis on fishes and other animal wildlife that are currently surveyed as part of a continuing environmental monitoring and research program.
WILDERNESS ROAD OBLITERATION AND RESTORATION. Louise Johnson, Impacts Mitigation Specialist, Yosemite National Park, CA (209)372-0478

Over a hundred miles of abandoned roads exist in the wilderness and non-wilderness zones of Yosemite National Park. Some road segments and fire roads are used as trails, while others have been listed or nominated to the National Registry of Historic Places in accordance with federal historic preservation legislation, and others have been abandoned. None of these roads are being maintained.

The lack of proper maintenance on these roads can lead to potentially severe erosion problems resulting in overall environmental degradation. Because some non-maintained roads are within the wilderness boundary, they cannot be maintained with normal road maintenance equipment appropriate for the task, thus trail crews have attended to maintenance needs with shovels, a method completely inappropriate for the magnitude of the problems encountered. Therefore, all abandoned roads in Yosemite are being inventoried for historical significance and resource impacts and a priority list of roads to be obliterated and restored is being compiled.

The preferred restoration technique for roads that are no longer needed and causing erosional problems is outsloping, or recontouring to blend with the surrounding topography. The method is usually implemented with heavy equipment which is appropriate for the task ("minimum tool"). This is generally done using an excavator and/or a bulldozer, retrieving sidecast road fill, then topsoil, and placing it against the cut slope. Outsloping and excavation of stream crossings allows for complete landscape restoration. It returns restored road areas to naturally functioning hydrologic systems, setting the stages for restoration of the native biologic ecosystem.

To prevent erosion and to continue the use of old roads as trails, a slightly different type of road obliteration technique can be implemented. A trail tread is left on the newly recontoured slope. The result is the ten to fifteen foot roadbed is obliterated and a three to four foot trail tread is retained. Normal trail maintenance techniques are then possible. Road segments which have been designated under federal historic preservation legislation are evaluated for documentation, saving of significant features, and restoration of remaining road elements.

LEAVE NO TRACE. John Kramer, Wilderness Ranger District, Gila National Forest, New Mexico (505)536-2250

The Leave No Trace display is an educational tool for raising the public's awareness of wilderness camping techniques and fostering appropriate land ethics while visiting Wilderness and backcountry areas. It is usually seen during various community activities such as: conservation events, environmental meetings, or anniversary celebrations. A display is set up where visitors walk through a make-believe campsite and see appropriate wilderness ethics being practices (such as stove to help conserve firewood, shovels to carry out trash, light shovel to help with personal sanitation, plenty of processed feed for horses or mules to reduce damage to soil or vegetation).

THE BEYOND WILDERNESS PROGRAM. Lynn Lacy, Del Norte Ranger District, Rio Grande National Forest, CO (719)657-3231

The Rio Grande National Forest has created the "Beyond Wilderness Program" as a means of dealing with the increasing recreational use in the Wilderness through dispersing recreation. We noted that, while visitation to designated Wilderness is on the increase, other wildlands within the Rio Grande National Forest remain scarcely used. Included in these low-use areas are semi-primitive non-motorized and semi-primitive motorized zones, specifically designated by Recreational Opportunity Spectrum analysis as an opportunity for primitive recreational experiences. The "Beyond Wilderness Program" is designed to utilize ROS management strategies already in place in these semi-primitive areas.

The "Beyond Wilderness Program" serves several purposes: (1) provides a recreational alternative to wilderness which ultimately reduces use and impact, (2) disperses recreation to areas already designated for primitive recreational use, (3) serves as a tool for Travel Management in that the Districts will know which trails are being highlighted end can plan and prioritize trail maintenance; and (4) with lower recreational use in the Wilderness, USFS staff is free to spend more time on other important aspects of wilderness management.
IMAPS OF URBAN ENCROACHMENT: EMERGING CHALLENGES IN WILDERNESS PLANNING AND MANAGEMENT. Carol Majeske, Land Management Planning Specialist, Prescott National Forest, 344 S. Cortez, Prescott, AZ 86303 (602)445-1762; Dr. R03FO9A; and Dr. Glenn Haas, Dept. of Recreation Resources, Colorado State University, Ft. Collins, CO 80523 (303)491-6591

In addition to those wilderness areas specifically designated by Congress to provide benefits to cities and their residents, many wilderness areas that were at one time located further from cities are now confronted with problems related to urban encroachment—or what has recently been termed the urban/wildland interface. This can be attributed to two factors: (1) the increased land spread of metropolitan areas (Shands, 1991), and (2) the continued growth of non-metropolitan forest and wilderness counties (Rudzitis & Johansen, 1989). These trends have important implications for all areas in the National Wilderness Preservation System. In addition to those areas already faced with urban encroachment due to their geographic proximity to urbanized areas, in the future it is likely that even more remote wilderness areas will contend with subdividing of land adjacent to the boundary and impacts from urban influences.

A recent study identified attributes, issues, and management trends of urban interface wilderness areas; and compared the intensity of issues with the population of the adjacent city (Majeske, 1993). Managers of 36 wilderness areas located within 10 miles of a U.S. Bureau of Census designated urbanized area (UA) completed a questionnaire regarding resource issues, adjacent land use trends, management techniques, and government landowner relations. Urban proximity impacts these interface wilderness areas with noise from aircraft overflights, land subdivision adjacent to the boundary, degradation of scenic vistas, air pollution, crime, and other issues. Wilderness recreation is characterized by heavy day use and nontraditional activities. The urban interface limits opportunities for the use of prescribed fire in wilderness due to difficulty protecting adjacent property, smoke management, and lack of public acceptance for the use of fire as a management tool. Insufficient budget and staff causes problems for wilderness managers in responding to urban interface issues.

Some interface issues were serious problems for managers regardless of the size of the adjacent city. Other issues increased in intensity as the UA population increased. The most notable trends were (1) as UA population increased, the total intensity of all urban interface issues affecting a given wilderness area increased, (2) problems with local government intensified, (3) subdividing of land adjacent to the wilderness boundary increased, and (4) adjacent landowner-related problems intensified. These trends have serious implications given that the urban interface wilderness areas were found to have a complex landowner's patterns adjacent to the boundary consisting of city, county, state, and federally-owned land. In addition, 86% of the study areas are also partially bordered by private land. Wilderness areas reporting the most urban interface issues tended to have multiple adjacent landowner's jurisdictions and to be bordered by private land.

This overlapping of jurisdictions should force wilderness management agencies, government, and private landowners into a continuous relationship with one another; but this was not necessarily the case. Although many areas have established cooperative arrangements for fire protection, search and rescue, and wildlife management, only eight study areas (22%) have formal intergovernmental processes in place whereby wilderness management activities are coordinated with state and local government. Most wilderness managers are not consistently involved in adjacent land use planning.

Urban interface wilderness managers believe that housing development is the most incompatible adjacent land use; and favor open space, parks, and zoning for agriculture or forestry as more compatible with wilderness management objectives. Local government officials must recognize that wilderness areas provide many benefits to cities and should become involved in wilderness management activities and support adjacent land use planning that is more compatible with wilderness. Wildland/urban interface trends make it necessary for wilderness managers to formalize communications with local government and private landowners, become involved in local land use planning, and to give more emphasis to public education.

Federal wilderness managing agencies would benefit by:

1. hosting an interagency wilderness/urban interface conference to bring together land managers and urbanized area planners and political leaders;
2. supporting the establishment of intergovernmental commissions;
3. providing training opportunities in urban and land use planning for wilderness managers;
4. establishing a planning team with expertise in land use issues who could work with local government and wilderness managers to implement planning solutions in areas which are threatened by urban encroachment;
5. developing innovative model planning solutions and a method for sharing those solutions among urban interface wilderness managers and local government officials;
6. developing public information materials for adjacent landowners, land developers, and urban residents addressing the wilderness concept, unauthorized trails, exotic plant species and landscaping, visual quality, stray pets, fertilizer/herbicide use, septic systems, and wilderness fire;
7. developing new fire management techniques for urban interface wilderness areas;
8. taking more aggressive steps to develop air quality monitoring programs for urban interface wilderness areas;
9. developing a method, such as a geographic information system (GIS), for monitoring land use adjacent to wilderness throughout the NWPS to identify areas of urban encroachment and land subdivision.
REFERENCES


CHALLENGES FOR FIRE MANAGEMENT IN BUREAU OF LAND MANAGEMENT WILDERNESS Melanie Miller, Fire Ecologist, BLM, National Interagency Fire Center; Carl Gossard, Fire Staff Specialist, BLM, Oregon State Office; Ken Mahoney, Wilderness Program Coordinator, BLM, Arizona State Office (602) 650-0238

Introduction Wilderness management is relatively new within the Bureau of Land Management (BLM). BLM lands were not included in the original Wilderness Act of 1964. The passage of the Federal Land Policy and Management Act in 1976 gave BLM authority to study its lands and make recommendations to the President about the suitability of lands for inclusion in the National Wilderness Preservation System. To date, 1.6 million acres of wilderness in nine western states have been designated on BLM land. Arizona is the only state so far where Congress has passed statewide legislation for BLM managed wilderness. BLM manages 1.4 million acres of Arizona wilderness in 47 units. Legislation in various stages of preparation would designate wilderness on BLM lands in other western states. Until designation, those areas established as wilderness study areas are to be managed in such a way as to not affect their eligibility to be included in the National Wilderness Preservation System.

BLM wilderness includes many ecosystems and vegetation types that are poorly or not previously represented within the National Wilderness Preservation System. BLM will face unique opportunities and challenges in managing fire in these different habitats and types. The poster depicts examples of Arizona wilderness that demonstrate some of these opportunities and challenges.

Trigo Mountains Wilderness, Sonoran Desert, Yuma District The 30,300 acre Trigo Mountains Wilderness is about 25 miles north of Yuma, Arizona. It includes 14 miles of the Trigo Mountains ridge line characterized by sawtooth ridges and steep-sided canyons and is heavily dissected by washes. Vegetation cover is sparse because sites are dry and rocky. Low fuel loading and high fuel discontinuity have prevented fire from playing a significant role in the development and maintenance of ecosystems in this area.

Mount Logan Wilderness, Ponderosa Pine/Pinyon-Juniper Woodland, Arizona Strip District The 14,650 acre Mount Logan Wilderness is 45 miles south of Colorado City, Arizona. It is an area of geologically recent volcanic activity with features of basalt ledges and e large colorful, naturally-eroded amphitheater known as Hell’s Hole. Fire has been excluded from the Mount Logan area for over 100 years resulting in high density ponderosa pine stands, high loadings of dead, woody fuel and extremely thick litter and duff layers. Pine stands were logged many years ago and thinned in the mid-1970’s before wilderness designation. Thinning slash was left in place, compounding the fuel problem. Wildfire in these areas has the potential to kill all overstory trees. The wilderness management plan has addressed actively managing fuels within the area. Thinning slash is piled manually for winter burning. Several low intensity, low severity broadcast burns are needed to reduce woody fuels and duff to a level that would allow prescribed natural fire.

Needles Eye Wilderness, Sonoran/Chihuahuan Desert, Phoenix District The 8,760 acre Needles Eye Wilderness is about 20 miles southeast of Globe, Arizona. The Mescal Mountains trend northwest across the center of the area forming a spectacular striped dip-slope of Paleozoic limestone over 4,300 feet high. The Gila River slices through the range in three 1,000 foot deep canyon segments. A dense and entangled riparian zone covers the narrow river channel. Several slickrock canyons bisect the area while winding to the river. Desert riparian ecosystems provide great plant and animal diversity. These areas are critical for the survival of local wildlife species and migratory birds. Fire is uncommon in riparian and saguaro cactus dominated ecosystems. Fire can be carried into the riparian community from the desert grasslands above when the base of a sotol plant burns off and the plant becomes a rolling firebrand. Although many riparian plant species reestablish after fire, recovery of the vegetative structure may take a long time. How should fire that may impact one of these rare riparian habitats be managed?

Grand Wash Cliffs Wilderness, Mohave Desert, Arizona Strip District The 37,030 acre Grand Wash Cliffs Wilderness is 36 miles south of St. George, Utah. Filled with rugged canyons, scenic escarpments, miles of towering cliffs and sandstone buttes, the wilderness marks the transition zone between the Colorado Plateau and Basin and Range Provinces. Vegetation is a mixture of Mohave Desert shrubs, annual grasses and pinyon-juniper woodland. Fire did not play a significant role in Joshua tree/blackbrush...
communities in the Mohave Desert as native annual vegetation was rarely continuous enough to carry fire. Invasion of the exotic annual grass red brome has provided a more consistent source of fine fuels. In years of precipitation favorable to red brome germination and establishment, fuel loading is high enough to support large wildfires. These fires convert the native Mohave Desert vegetation to an annual grassland. Joshua trees are killed by repeated high intensity fire, and blackbrush is eliminated by burning. Without management action, much of the Mohave Desert in northwest Arizona will lose its cover of native vegetation. Management options include vegetation restoration and an increased level of fire protection to limit fire size. Native vegetation could be established through planting in islands that serve as seed sources for adjacent areas. Maintaining the competitive advantage of native species over red brome also requires careful grazing management.

Creosote bush is also a dominant species in this and other desert shrub and southwestern shrubsteppe ecosystems. It is considered to be an invader species in southwestern desert grasslands. The expansion of creosote bush has been attributed to both fire suppression and overgrazing, decreasing the competitive ability of grasses and the amount of fine fuel. While young creosote plants are susceptible to fire, mature stands often have inadequate fuel to carry fire. Questions remain about the ecological role creosote bush plays in the Mohave Desert plant community. Is it a natural dominant species of a desert plant community or an invader on a site that used to contain a much higher percentage of native grasses and forbs? What native species occur in association with creosote bush on these sites and how well are they adapted to fire?

**Upper Burro Creek Wilderness, Desert Grassland, Phoenix District** The 27,440 acre Upper Burro Creek Wilderness is 60 miles southeast of Kingman, Arizona. The wilderness contains an expanse of basalt mesas and desert grassland found on the rolling upland surfaces. This desert grassland is dominated by sideoats grama, big galleta, and three-awn. How is the natural role of fire determined in an area with no trees or shrubs from which the record of past fires can be read? Dry lightning occurs in this area, and because vegetative cover is fairly continuous, it is assumed that naturally ignited fires have happened. Fire caused mortality of these grass species has been observed, but the plant community has recovered. This moderate degree of plant adaptation to fire suggests that fire may have been fairly infrequent. If it is accepted that naturally ignited fires used to occur in this grassland, then reintroducing fire would be a component of wilderness management. Is this area large enough with adequate barriers to fire spread that some use of prescribed natural fire is possible? Is prescribed burning the preferred alternative because of other constraints? If management ignitions are desired to maintain a natural vegetative character, how often should this area be burned and what weather and moisture conditions are required?

**Eagletail Mountains Wilderness, Sonoran Desert, Phoenix District** The 100,600 acre Eagletail Mountains Wilderness is 65 miles west of Phoenix, Arizona. The wilderness includes 15 miles of the Eagletail Mountains ridge line, Courthouse Rock to the north, Cemetery Ridge to the south and large desert plains in between. Any surface disturbance of the desert pavement can permit establishment of herbaceous vegetation that can carry a fire.

**Aravaipa Canyon Wilderness, Riparian, Safford District** The 19,410 acre Aravaipa Canyon Wilderness is 120 miles southeast of Phoenix, Arizona. The wilderness includes the 11 mile long Aravaipa Canyon. Within the 1,000 foot canyon walls, seven species of native desert fish, desert bighorn sheep and over 200 species of birds live among shady cottonwoods along the perennial waters of Aravaipa Creek. Does fire or flooding play the primary role in rejuvenation of mature riparian vegetation?

**Wabayuma Peak Wilderness, Ponderosa Pine/Chaparral, Phoenix District** The 40,000 acre Wabayuma Peak Wilderness is 20 miles southeast of Kingman, Arizona. The wilderness is dominated by the 7,601 foot Wabayuma Peak. A series of massive ridges that extend from the peak in a semicircle to the north, south and west plunge nearly 5,000 feet to the desert floor below. This extensive elevation change accommodates a broad spectrum of ecosystems. A mixture of Sonoran and Mohave Desert vegetation is found in the lower elevations while ponderosa pine can be found on the mountain summits. Can fire resume its natural role in these stands without any other management activities?

**Conclusion** The BLM's wilderness program is presently in a period of transition. Wilderness inventories and suitability studies have been completed and recommendations on wilderness designation have been made. In addition to the 66 designated wilderness areas that BLM manages in nine western states, there are 745 wilderness study areas covering 28.6 million acres being managed by BLM so as to preserve their eligibility for inclusion in the National Wilderness Preservation System. Wilderness management and fire plans have been completed on a small number of designated wilderness areas and plans are under way for others. The questions and challenges outlined above must be addressed in the planning process so that the proper management of fire, whether by prescribed natural fire, fire use or fire exclusion, is tailored to the needs of the ecosystems found in BLM wilderness.
WILDERNESS MANAGEMENT OF AIR RESOURCES IN THE CENTRAL SIERRA. Judith E. Rocchio, NPS, Regional Air Quality Program Coordinator, Western Regional Office, San Francisco, CA 94107 (415)744-3872; DG J.Rocchio: R05A; Lucinda J. McKee, Forest Hydrologist/Air Coordinator, Inyo National Forest, California

This poster paper will focus on adjacent land use threats and related management strategies for wilderness air resources, using an example in the central Sierra Nevada. The Limits of Acceptable Change (LAC) planning process (Stankey et al, 1985) is used to incorporate air resources management into wilderness planning. The major air pollution threats to wilderness resources in the Sierra are ozone and visibility reducing pollutants such as, nitrogen oxides, hydrocarbons and particulates. The sources of major concern for these pollutants in California are industry, agricultural burning and automobiles. In 1992 the state’s driving age population increased by 400,000 people. The projected increase by the year 2000 is 3.3 million. Madera and Mariposa, two Sierra foothill counties in California, are on the list of top ten fastest growing counties. The exceptional growth of these rural counties so near National Forest and National Park boundaries presents new challenges for protecting wilderness air quality. Four wilderness areas in the central Sierra, the John Muir, Ansel Adams, Dinkey Lakes, and Monarch, are combining their wilderness management strategies in a coordinated effort to produce unified direction. This coordinated effort is used as an example for incorporating air quality into the LAC wilderness planning process.
Presentations for a Common Ground

As of 5/11/93, presentation synopsis not received.

HISTORY OF PASSAGE OF THE 1964 WILDERNESS ACT. Richard J. Costley, USFS, Retired, Sarasota, FL (813) 377-6677

What I have to say on the history of the Wilderness Act will be very personal, very subjective remarks based almost wholly on my memory and interpretation of what I saw, heard and learned of the Forest Service's involvement in that history during the 36 years I worked for it.

The possibility of so administering a part of a national forest as to limit its full development and wise use was not part of the conceptual package that led to the creation of the national forest system. This was clearly spelled out in the marching orders of the newly hired, on-the-ground administrators, the first generation of "forest rangers." It is important to understand what attracted that original field force to their new jobs. To many it was the "untamed" primitive nature of the land, its wildness. They sought those jobs to escape living in areas which they saw as overcrowded and still growing. They joined the Forest Service in order to get away from it all. Many of them, when they landed on their new jobs, made a simple but important discovery; they liked the still undeveloped landscapes on which they were going to live and work the way they were. My father, one of the original rangers, summed it up when he said, "I just had to live and work -- while it was still possible -- in a place which was still like God made it."

Many who discovered they liked their new district as it was when they first saw it did not want to see it change. So they asked, "why not administer some of this land in such a way as to keep it as it is -- wild?" There was little philosophical justification behind the questions. The motivation was emotional. Possibly visceral is a better word. Still, that is how and where the seminal thinking that eventually resulted in a Forest Service wilderness ethic got started; on the ground by the people working there.

There is little documentary evidence supporting the above. But as early as 1913 -- when the forest Service was but eight years old -- one of the early "rangers" (who had become a Forest Supervisor in New Mexico) was advancing a proposal that some national forest areas be administered as wilderness hunting areas. That was Aldo Leopold. About the same time Arthur Carhart, the Forest Service's first landscape architect, when directed to help plan the development of still undeveloped areas in Colorado and the border lakes area in Minnesota was making the then unorthodox recommendation that these areas not be developed at all, that they be kept as they were -- wild.

Today Leopold and Carhart are commonly looked upon as the two original visionary architects of national forest wilderness. It was my privilege to be acquainted with both of them, Leopold as my major professor while I was pursuing a PhD, and Carhart as a work collaborator. Nothing should detract in any way from the reputation they are now afforded as shapers of Forest Service wilderness ideals and strategies. They deserve it -- all of it. But because of that reputation there are now some who seem to think that they must have been struggling alone in their effort, that they succeeded in spite of the Forest Service. This is not true!

Would the District Foresters in Albuquerque and Denver, and their principal advisors, have favorably acted upon such unorthodox recommendations if they had not for some time been considering the ramifications of some such possibility? Of course not! More and more of the original young "rangers" who had liked the environment of their first jobs as originally encountered it, and who wanted to keep it that way, were now moving up career ladders to positions closer to policy making ones. The Forest Service was slowly getting ready for ideas such as those of Leopold and Carhart. These two, both of whom were almost compulsive writers, and very skillful ones, simply left the best paper tracks. Their contributions are documented.

Before long the Service's acceptance of a responsibility for wilderness preservation began to grow, and it did so fairly rapidly. The first national forest wilderness area -- the Gila -- was so designated in 1924. It, and Carhart's recommendations in Denver, were generally seen by the public and the Forest Service as good steps forward, and soon the Chief Forester was telling the world so. Only three years after the Gila action an inventory of all major national forest roadless areas was underway. A couple of years later new regulations provided for the creation of a nationwide system of Primitive Areas. Known as the L-Regs, their
principal thrust was to encourage that the use of resources in the designated areas be limited, and that access, transportation and living conditions in them be kept primitive. There was little else. The results of the L-Regs were soon recognized as pretty weak stuff. It was then that the third of the commonly accepted architects of national forest wilderness came under the spotlight. If Leopold and Carhart were the ones who had the wilderness vision, the ones who crafted a wilderness creed and wilderness scripture, Robert Marshall was the highly effective missionary in spreading the gospel of wilderness according to Leopold and Carhart. And a new and important element in his message was the need to strengthen the L-Regs.

Bob Marsh led the Forest Service in formulating a new and much stronger basis for the identification and administration of national forest wilderness by replacing the L-Regs with the new U-Regs. Issued in 1939 they had real teeth and left little doubt that the Forest Service was really getting serious about protecting national forest wilderness. But, by 1939 the country was on the brink of a World War and concern over wilderness took a back seat to other and overriding public policy issues.

After the war there was a rapid reawakening of public interest in wilderness. Some were not pleased with what they saw as prospects for the future. There was particular concern over whether the primitive areas were going to be able to run the gauntlet of a re-evaluation as to whether they would qualify for reclassification as wilderness without the serious risk of boundary changing and downsizing. Another concern was the rapid expansion in post-war demands for national forest commodity resources and commercial uses. To some these demands were seen as a real threat to national forest wilderness-type areas. More and more frequently the comment was heard, "what one administrator can do another administrator can undo." To many it seemed clear; if national forest wilderness was to be assured of a stable future, it needed some kind of statutory basis.

At this point Howard Zahniser, as Executive Director of the Wilderness Society, surfaced as one of the really important wilderness spokesmen of the time. Zahniser, the fourth of the real architects of the wilderness system, was totally honest and forthright, and a gentleman in every sense of the word, but he soon became a most skillful and effective legislative in-fighter. Early in the 1950's the Bureau of Reclamation announced plans to dam the upper Green River in the Dinosaur National Monument. Dinosaur was an obscure, little known area in easter Utah and adjacent Colorado about which most Americans had probably never heard. But it was part of the National Park system. And never before had the accepted sanctity of the National Park System been so threatened by a proposed government action.

The preservation organizations of the country closed ranks and joined forces in a way they had never been able to before. And Howard Zahniser emerged as a major strategist and leader in the five year battle to prevent the dam which was to follow. Knowing that it would be able to stir up little support for a program to "save" little known Dinosaur, the campaign focused on convincing the public, and Congress, that the planned invasion of Dinosaur was really a threat to the whole National Park System, a national system in which all Americans -- even members of Congress -- had a stake.

The dam for Dinosaur was stopped. In the process of doing it the campaigners became super skillful experts in using the media to launch and successfully pursue a national campaign. And members of Congress who would never have made the effort to protect Dinosaur, discovered a whole new and promising constituency. Having launched, and won, an important national campaign the preservation organizations were primed and ready for another one.

To Howard Zahniser and his associates the time -- the midfifties -- was now ripe to launch a nationwide campaign promoting legislation for a statutory national wilderness system. At a National Conference on Parks and Open Space in Washington he formally called for such legislation. His proposal caught the attention of Senator Hubert Humphrey of Minnesota who asked for a draft bill. Zahniser called other preservation organizations into the picture and soon a draft was ready for the senator. Finally, in 1956 Humphrey (and eight other senators) introduced the first serious proposal for statutory wilderness. Similar bills soon appeared in the House of Representatives.

The first bills were not acceptable to any of the federal agencies, and they were vigorously opposed by the commodity interests. So, over a period of almost eight years 65 more bills were introduced in one or both houses. Twenty of them passed, in one version or another. While the bills were under consideration six public hearings were held in Washington and 12 were held in the field. From these over 6000 pages of hearing record were accumulated. Finally, a bill passed the Senate in 1963 with only 12 votes against it. In 1964 a companion bill passed the House with but one member opposing it. Conferences soon resolved minor variations between the two bills, and on September 3, 1964 President Johnson signed the Wilderness Act of 1964 -- 40 years after the designation of the Gile Wilderness Area.

The first major effort of the bill's backers was to shape a law within which the federal agencies felt they could operate. Soon it was generally conceded that some wilderness bill would eventually be agreed upon, and passed. After that the major activity revolved around efforts of the commodity interests to keep the legislation as weak and ineffectual as possible. The future of existing administrative wilderness was never in issue. It was assumed that it would become instant wilderness. Also wilderness use and administrative guidelines were never a real problem because most of the bills simply endorsed those which the Forest Service had adopted after 40 years of field testing.
Undoubtedly the major issue was over how existing primitive areas were to be re-evaluated for possible inclusion as wilderness in the final system. Should the Executive Branch be allowed a certain period of time in which to make the decision administratively? Or should such an administrative decision be subject to a congressional veto, or should a firm affirmative action of Congress be required for any change in the system?

What to do about mining was also a major issue. Were the Mining Act of 1872 and the Mineral Leasing Act of 1920 to remain a cloud over the ability of the Forest Service to protect national forest wilderness? The Humphrey bill would have banned all expansion of mining in areas created under the Act. It was soon clear that Congress would not buy such an outright ban. So, for nearly eight years the wilderness supporters and the miners argued the issue with the wilderness supporters consistently giving more ground than the miners.

There were other facets of the legislation about which there was strong disagreement:

- Early proposals provided for a Wilderness Commission (later a Council) made up of the federal agencies and selected citizens. The agencies never saw a convincing reason for another level of decision-making.
- There were troublesome questions of the future of livestock grazing in wilderness. Livestock organizations were always conspicuous among those perceived of as anti-wilderness.
- There were difficult questions about such matters as aircraft landing rights; permissible means of transportation, structures, uses, administrative practices, etc.

What was the position of the Forest Service while the legislation was under consideration? The answer was not clear cut. Many of us thought we were doing a pretty good job; that congress would let us alone so that we could get it done. Still, we could not help but see the rapidly mounting pressures on the resources for which we were responsible. We knew that if those pressures continued to grow our primitive and wilderness areas would become increasingly at risk. More than once in our mounting concern and frustration someone was bound to say, "there ought to be a law." Still, all of us -- from the top levels down -- were apprehensive about seeing our freedom to make responsible multiple use decisions compromised.

It is safe to say that while the Forest Service did not endorse the Humphrey bill, there was general acceptance of its basic thrust, and that it, or one like it, might be helpful and could be endorsed, if the details were such that we could continue to redeem our responsibilities as stewards of all the national forest resources. After the proposed Wilderness Council was dropped, after a requirement that mining would depend upon a presidential finding, and after there was included a provision that during a specified time interval primitive areas which did not meet wilderness area qualifications could be declassified, the Forest Service became part of, and participated in, the movement for the creation of a statutory wilderness system.

During all of the years that the legislation was under consideration countless suggestions were offered. A few were accepted, but many were not. And, almost all of them were compromised in some way. And the result? The Wilderness Act of 1964, full of frustrating inconsistencies and contradictions, is an imperfect act. Still, it is one of the most important pieces of conservation legislation of the century.

I have sometimes heard those inconsistencies resulting from compromises characterized as accidental or unfortunate. I certainly agree that many of them are unfortunate. I do not think that many -- if any -- of them are accidental. A few, but not very many concessions were made by the federal agencies. Most of the significant concessions were made by the backers of the legislation. Why? The facts are simple. Without those concessions there would have been no Wilderness Act of 1964.

At the time the Act was passed many of its exhausted and battle scarred supporters were very discouraged. They felt they had given up too much. But -- had they? Really? The National Wilderness Preservation System created by the Wilderness Act of 1964 started out with only a little more than nine million acres. One must ask -- even with the imperfections of the Act -- how many million acres are there in the Wilderness System today?

NATIONAL PARK SERVICE INITIATIVES AND PROGRAMS FOR WILDERNESS RESTORATION, CULTURAL RESOURCES, WILDERNESS ORGANIZATION, AND RELATED CHALLENGES. Jack Davis, Associate Director, Operations, 18th & C St. NW, RM 3116, Washington, DC 20240 (202)208-5211

Introduction Since passage of wilderness act in 1964, Congress has designated 42 units encompassing 39.1 million acres on lands managed by the National Park Service. This is more than 40% of the total land managed by the Service, as appropriate, a higher total than for any other land management agency. At the current time the majority of this acreage is in Aleske. In addition, more than an additional 30 million acres is either recommended to Congress for Wilderness Designation or under study.
for consideration as wilderness. By policy the Service manages recommended wilderness and study areas as if they were wilderness, trying to prevent any degradation until final decisions are made by Congress. That means over three-quarters of the national park system is managed as wilderness. Clearly, the NPS is the largest manager of wilderness in the nation.

Yet wilderness management is not a high profile activity on Park Service lands; the heavy use in the front country and in some backcountry areas tends to be most visible and typically receives priority in the competition for manpower and funding. As the Service does not allocate areas outside wilderness to consumptive uses as do the Forest Service and Bureau of Land Management, the designation as wilderness is generally regarded as providing additional protection by removing areas from consideration for intensive visitor use and development as well as limiting how those activities are carried out. Indeed, many in the Service probably do not make a critical distinction between wilderness and non-wilderness in the larger natural parks. No staffing or funding is assigned specifically to wilderness management under our accounting system, and visitor use in designated wilderness is much the same as in other backcountry areas.

Though the Service's program is low-key and typically integrated with programs at the park level, I can, along with the representatives from the other agencies, say that positive things are happening. I am very pleased that we have made progress in working more closely with the other agencies on a wide variety of issues. I am encouraged that when it comes to wilderness, those of us from different agencies can speak a similar language and understand each other. This is good for the National Park Service and augers well for the betterment of the National Wilderness Preservation System. Another positive trend is the consolidation of wilderness into better defined management units. For example, in Glacier, Sequoia-Kings Canyon, and North Cascades National Parks, most if not all designated wilderness has been consolidated into single ranger districts. I think this will contribute to improved wilderness management as well as a higher visibility for Wilderness within the Service.

I would now like to speak briefly to the topics of this conference—wilderness restoration, cultural and historic resources, and emerging challenges—and give you an idea of our perspective and where we may be heading. I will spend most of my time on the emerging challenges since they loom largest on the horizon at the current time.

Wilderness Restoration and Use of Minimum Tool We have made some significant progress in revegetation, with good examples in the Pacific Northwest Region and Western Region. Programs developed at Mt. Rainier, Yosemite, Olympic, Joshua Tree, North Cascades and elsewhere over the last 20 years have yielded major plant propagation breakthroughs giving the capacity to raise or transplant subalpine and arid lands species previously found difficult or impossible to grow. Redwood, Grand Teton, Organ Pipe, and Yosemite have perfected excellent road eradication protocols. Joshua Tree's Center for Arid Lands Restoration is often called upon to advise other federal, state, and local agency restoration efforts. Mt. Rainier and Yosemite have training videos. Regional Vegetation Committees have been active in the Western and Pacific Northwest areas; their respective Regional guidelines will be evaluated as to how best to revise and merge them to create a Service-wide guidance document.

Regarding alien plant control in wilderness, terrific gains against seemingly insurmountable odds (over 40 alien species are established) have been made at Hawaii Volcanoes and Haleakala, particularly due to aggressive fencing projects to limit feral pig and goat activity (curtailing seed spread and destruction of soil and vegetation). Based on an integrated research and management program, these parks have found that the "minimum management" necessary combines a sound inventory/monitor protocol, mechanical plant removal, limited herbicide use, and helicopter supported logistics; biocontrol development efforts have been underway for several years as well. In Thursday's concurrent sessions we will learn about Glacier's integrated Pest Management approach to curtailing spotted knapweed and leafy spurge. Since the mid-1970s, Everglades has been limiting wilderness encroachments of aggressive alien species such as melealeuca and Brazilian pepper; featuring both the "surgical" use of herbicides by the staff and an extensive interagency coordinating effort at the bio-regional level (formation of an Exotic Plant Pest Council) has led to the park obtaining $1.6 million for control work, since 1984, from State agencies.

For both revegetation and alien plant control in Wilderness, the challenge now is to keep these highly successful programs going and to expend them throughout the Service; they have survived on short-term project funds, state grants, and volunteer labor—hardly an ideal situation. In the future, Interagency coordination, especially among the federal agencies, can be expected to become more and more pivotal. An example I commend you to emulate is the cooperation evident in the Sonoran desert among Organ Pipe National Monument, Cabeza Prieta Refuge, two BLM districts, the US Air Force, the Tohono O'Odham Nation, and several entities in the Pinacate area of neighboring Mexico; there the Superintendent has marshalled an excellent team-work approach to dealing with cross-jurisdictional Wilderness concerns ranging from Sonoran pronghorn and Lesser Long-Nose Bat & E concerns, agricultural drawdown of groundwater, trespass livestock, and long-term monitoring of sensitive ecosystems.

There is no guiding consensus on what constitutes the "minimum tool" for accomplishing these dual wilderness restoration objectives... and I think this consensus must be generated. Doubtless the few examples I cited strike some of you as extreme. But the times are extreme. Does it make sense to permit a Wilderness area to become degraded due to lack of monitoring and subsequently to try and remove persistent plant pests through hand-grubbing? Or does it make sense to train Wilderness Rangers to observe biotic conditions and trends, and to respond aggressively to pioneering stands of plant pests in an efficient, expedient manner to prevent their establishment? I look forward to hearing what discussions ensue after the presentations this week from Peggy Olwell and Jeff Marion and the concurrent sessions on this wilderness restoration-minimum tool situation.
**Cultural and Historic Resources**  Both prehistoric and historic settlement of areas now designated as wilderness have left an historical record in the form of structures, archeological sites, and artifacts, that may contain important information about the history of the area and about the use of the land by past and contemporary populations. Such information may be valuable in making resource management decisions by helping us to understand the dynamics of human interactions with the natural environment.

Our management obligation to cultural resources in a wilderness area is to identify and evaluate these resources, take the preservation of these resources into account in the planning process, and to take actions that do not adversely affect these resources. In the process of meeting these obligations, there are some logistical and site problems to be faced, notably a more active fire protection program to protect significant cultural resources, completing archeological inventories and excavations within primitive tool and non-motorized constraints; maintaining historic structures and sites without motorized or mechanical equipment or transport (and not using that as a justification to neglect or remove significant cultural resources for that area); maintaining the integrity of archeological and ethnographic collections and records that may be vital to interpreting and understanding past human influences or impacts on the area related to current management.

**Emerging Challenges**

To address emerging challenges, I would like to pose a series of questions that we need to answer soon, especially in light of the probable reintroduction to Congress of H.R. 4326, the National Parks and Public Lands Wilderness Management Act. While we don’t have answers yet, but I will share some of my thinking on these challenges.

1. **What can the Park Service do to improve Interagency coordination on Wilderness Management issues and problems?** Where we share common boundaries and problems, we need to do a better job acting in concert. The national wilderness coordinators from the four agencies meet informally already, but it is time to develop more formal Interagency Coordination mechanisms to tackle some of the more difficult issues and problems that confront all of us. 

2. **How can the Park Service improve its national level of leadership in Wilderness Management?** I have noted with interest that the Forest Service is inaugurating a National Wilderness Council and a National Wilderness Working Team. These concepts have merit; they may be useful models for the Park Service to consider in improving its wilderness program leadership. With so much of the acreage of the Park Service managed as Wilderness, almost every staff needs to be involved, and coordination mechanisms are vital in making this happen. In any event, in future budgets we will seek funding for expanded staffing in Washington and Regional Offices to improve Wilderness Program leadership.

3. **How can the Park Service increase the visibility of wilderness and backcountry management’s role and importance within the Service?** It seems to me that we first need to explore the visibility issue via the budget process. Wilderness and Backcountry management is a key component of several key budget subactivities – Visitor Services (Ranger Activities), Interpretation, Resources Management, and Maintenance. Is there a way to highlight wilderness and backcountry within each subactivity? I think we need a special budget initiative that would highlight wilderness yet be integrated into the regular budget subactivities.

4. **How do we get better guidance out to field personnel on wilderness management and planning?** If funding is available in FY 1994, we will form a Workgroup of field personnel who will be charged with the responsibility of developing draft guidelines on Wilderness Management and Planning. We also look forward to working with the other agencies in the development of an Interagency Wilderness Planning Module, and hope that product will directly assist our efforts to improve field guidance.

5. **How do we improve wilderness training and awareness for NPS management and staff?** We have several possibilities for doing this. First, we will define the nature and extent of our participation in the Forest Service’s new Arthur Carhart Wilderness Training Center. I was pleased to hear that a forthcoming wilderness planning training module will be developed with Interagency input. There is real merit to the Center since it would let us utilize our own training staff and facilities while encouraging an Interagency approach and cross-fertilization of ideas in the development process. Second, we will decide how to support and make better use of the award-winning Interagency Wilderness Correspondence Course, internal workshops, and Leave No Trace Master’s Training courses.

6. **What should be the nature and extent of a Wilderness Education Program for the National Park Service?** What are we doing in this area and how well are we doing it? Those are the questions we need to ask first. I suspect that we can do a better job in this area and get the message to alot more people. We will carefully answer this question in the near future. I would like to note that at the encouragement of several parks (Yellowstone, Glacier, Grand Teton), we will be exploring with the National Parks Foundation and the National Outdoor Leadership School the possibility of developing a wilderness low impact use video.

7. **How should the National Park Service get wilderness resource management expertise/knowledge/research to the places on ground where it is needed?** Here again we must decide on the nature and extent of our participation in the Forest Service’s Aldo Leopold Wilderness Research Institute. It has been proposed to be an Interagency facility, and we will...
decide how active our role will be. If we do participate, we will also need to address how this facility will interface with the new National Biological Survey and what support will be available through them.

8. How will the National Park Service address Handicapped Access to Wilderness? While Section 507(c)(1) of the Americans with Disabilities Act affirms that nothing in the Wilderness Act is to be construed as prohibiting the use of a wheelchair in a wilderness area by an individual whose disability requires use of a wheelchair, it also indicates that no agency is required to provide any form of special treatment or accommodation, or to construct any facilities or modify any conditions of lands within a wilderness area in order to facilitate such use. We will need better guidance to help us find the most effective ways to balance the intent of both Acts while providing the highest level access with the lowest level impact on the environment.

9. How will the National Park Service manage high day use areas and deal with human waste problems? The Park Service needs to provide leadership in this arena—more than any other agency. Parks have not been able to adequately address incredibly high use levels on certain trail systems and campgrounds on the fringe of NPS wilderness and backcountry areas. We have serious problems that require serious attention. We will explore how to more effectively use an existing interagency taskforce on human waste.

10. How will the Park Service address the unique problems of wilderness management in Alaska? Alaska has always brought us lots of challenges, and the future seems to hold more of the same. Along with ongoing problems, there are significant increases in ecotourism traffic, possible scientific (volcanic) drilling in Katmai’s Valley of Ten Thousand Smokes, and consideration of changes to mountain climbers for more of their own rescue costs on Denali.

11. How will the Park Service address issue of Aircraft Overflight noise and its interference with the natural quiet at many park areas? Park Service studies are coming to an end on this subject and we are preparing recommendations and a Report to Congress on the subject. But the problem seems to be spreading. Legislation has recently introduced to control aircraft overflights in the Hawaii parks; many of the Colorado Plateau parks are especially vulnerable to impacts, and complaints from other parks such as Glacier and the Great Smokies have yet to be addressed. As the world becomes noisier, we increasingly recognize natural quiet as one of the major values of wilderness in National Parks.

THE SOCIAL CONTEXT FOR PARTNERSHIPS, MOTIVATIONS, AND CONCERNS ABOUT WILDERNESS STEWARDSHIP. Gary E. Machlis, NPS, Sociology Project Leader, Cooperative Park Studies Unit, University of Idaho, Moscow, ID 83843 (208)885-7129; and Dan Ritzman, CPSU/UI; Department of Forest Resources, Moscow, Idaho 83843

Introduction. As the 21st century begins, the issues surrounding wilderness in the United States shift from allocation (how many acres and where) to stewardship (how to maintain those acres). Stewardship of land, whether it be farmland, parks, reservations, military bases, urban open space, suburban yards or wilderness does not take place in isolation from the wider context of American society. To us as Americans, land matters. We know it offers security, wealth, meaning and power. Whether it be sheep ranchers and farmers in the 1840’s gunfighting over Idaho range land, Bloods and Crips street fighting over Los Angeles turf, or the USFS and the NRDC court fighting over wildlife habitat, land is a source of pride and passion in American culture.

Hence, wilderness management is not an independent activity. It is inextricably entwined with our history, culture, economy, politics and faith. How this broader, social context will influence wilderness stewardship, and the consequences for wilderness managers, is the subject of this essay.

The essay is organized around a set of “predisposing factors”. These are conditions that have significant influence upon the policy and management alternatives for using public lands. Five predisposing factors are described: (1) demographic change, (2) shifting public values, (3) a transformation in American politics, (4) the expansion of public involvement, and (5) new authority claims by the scientific community. The implications of these trends to wilderness stewardship are described, along with a series of predictions as to how wilderness might be managed in the next millennium.

The Five Predisposing Factors

1. Demographic change: The first predisposing factor is the dramatic demographic change that is occurring in the American west. In the past 50 years, the population of the western United States has grown from 10 million to 50 million people; its proportion of the total U.S. population has tripled. Population densities have increased near timberland, parks and wilderness areas. Growth in counties adjacent to wilderness areas is significantly higher than the national average. For example, the 20 counties including and surrounding the greater Yellowstone ecosystem, if combined, would represent the fastest growing state
in the country.

The shift in numbers is associated with a change in the age structure of the population—as a nation we are aging, and areas in the west (such as the southwestern states) are attracting significant proportions of retirees. The ethnic composition of the general U.S. population is in flux, as people of color make up a larger proportion of the total population than in the past. California, for example, is expected to be the first state (excluding Hawaii) to have its white population be less than a majority, sometime around the turn of the century.

The implications are significant. Increased densities will lead to higher demand for wilderness use and growing ecological impacts from development adjacent to wilderness ecosystems. Political balances of power will change, as the east loses seats in Congress and the west gains new districts. The age shift will be reflected in the kinds of wilderness activities that are pursued, particularly in the accessible front country. The ethnic diversification is likely to modify the cultural meaning of wilderness in American society, and to confront managers with a plurality of wilderness use styles and preferences.

2. Shifting public values: The second predisposing factor is the shifting values of the American people. A long-term view of public concerns puts current environmentalism in perspective. From the 1950's on, the issues of economy, employment, and war dominate the American consciousness, with occasional periods of interest in environmental affairs. And while some public opinion polls show heightened interest in preserving wilderness, widespread consensus as to how to steward these resources is not apparent. The lack of consensus is particularly strong in rural communities, though urban Americans are also divided. A variety of movements in resource management, such as the USFS's New Perspectives program, or the attempted shift from timber to tourism underway in the Pacific Northwest, are essentially attempts to reflect or exploit the multiple values currently claimed for public lands. The range of candidate values is extraordinary. For example, recent proposals for the Frank Church-River of No Return Wilderness in central Idaho range from "gridding" the wilderness with roads to immediate removal of all outfitter caches. Idaho's 20-year struggle to finalize its wilderness designations is an example of how diverse values lead to conflict over land.

A values shift is also taking place within the federal agencies that manage public wilderness. Partly reflective of which political party is in power, and partly due to the change in personnel that has occurred since the 1970's, the values held within these agencies are being rethought and revised. The change can involve struggle within administrations and agency leadership, employee revolt (witness AFSEE), legislation and redirection of agency budgets.

The implications are complex. Public value for wilderness may climb in the near-term. The long-term outlook is less clear, as the consequences and costs of wilderness stewardship become more apparent, and other pressing issues (unemployment, deficit reduction, health care, social justice, defense, and so forth) take precedence. Agreement as to the specific values (and hence appropriate uses) of wilderness is unlikely, except among the ideologically committed or opposed. It is even less likely that wilderness values will be stable over time, given the willingness of Americans to change their minds. Within wilderness management agencies, the lack of consensus may both energize new ways of thinking and paralyze effective action, as one administrative generation dialed out (retires) and another takes over leadership responsibilities and fluxes its new-found bureaucratic powers.

3. A transformation in American politics: The third predisposing factor is a transformation in politics. The post-war politics of American civic institutions bears little resemblance to the efficient and polite democracy of our grade-school textbooks. The contemporary democratic regime (regardless of party) is significantly different from politics as practiced in previous historical periods. For example, the formation of "iron triangles", composed of agency, legislative and special interest groups, has extended far beyond the military-industrial complex that Eisenhower warned the nation about over 35 years ago.

In addition, political action committees (authorized after Watergate) have dominated election funding and bought influence and votes. Special interest politics has grown explosively. For example, in 1961 there were 365 registered lobbyists in Washington DC; in 1987 there were 23,011. Congressional rules have changed, with less emphasis on seniority and home rule (the political faith that locals know best). Party affiliation and loyalty has declined. "Watch-dog" organizations increasingly evaluate politician's voting records according to narrow ideological concerns. Single-issue groups compete for and demand the attention of policy-makers.

The implications are significant. Wilderness management in the next century will take place under a democratic regime characterized by growing special interest influence and increased power of the "iron triangles" of bureaucrats, politicians and lobbyists. Adversarial struggles for privilege will predominate, rather than shared commitment to civic responsibility. A period of corruption similar to public land management at the turn of the previous century is likely; the current generation will find its own Teapot Dome.

Most importantly, previously technical decisions (such as boundaries and resource management practices) will increasingly be redefined by interest groups as political decisions, so these groups can then demand participation. In counterbalance, non-governmental organizations (from nationals such as the Wilderness Society to local "friends" groups) will emerge to monitor the
government's management of wilderness, though these organizations will compete among themselves for funds, members, influence and control.

4. The expansion of public involvement: The fourth predisposing factor is the continual expansion since the 1960's of public involvement in public land management. Since World War II, there has been a steady erosion in the power of the technical professional class: decisions that used to be made by the forester on horseback now require public involvement hearings and comment periods. The Endangered Species Act is an instructive case relevant to wilderness. From the establishment in 1966 of the USFWS's Committee on Rare & Endangered Species (without the required statutory authority), to the 1969 Endangered Species Conservation Act, the 1973 Endangered Species Act and its 1978, 1982 and 1988 amendments, the role of public input has been steadily expanded. In addition, public involvement in resource management has increasingly used the courts, including a now standard mix of restraining orders, deminimus settlements, lawsuits, and harassing countersuits.

Again, the implications are complex. The increase in public involvement in wilderness decisions is not necessarily a counter force to the special interest politics just described, as it is relatively easy for special interests to co-opt the public process and claim legitimacy. The erosion of technical spheres of control, as wilderness managers move from decision-makers to technocrats acting out public decisions, is likely to be initially rejected by the expert class of wilderness professionals that has been created since the 1970's. The courts will reluctantly but forcefully intervene when left no legal alternative, injecting an additional and inexperienced partner into wilderness management. Finally, graduates of professional training programs are unlikely to have the necessary socio-political skills to operate effectively in the emerging new style of shared power.

5. New authority claims by the scientific community: The final predisposing factor has to do with the changing role of science in America. Prior to the Manhattan Project that built the atomic bomb, scientists in the United States were largely impotent when it came to policy-making. Since then, the scientific community has begun a 45-year expansion of its authority claim. Examples related to wilderness include conservation biology (where leading scientists call for political advocacy as a scientific responsibility), "new forestry" (where scientists are involved in management of forest habitats), and schemes such as ROS (recreation opportunity spectrum) or LAC (limits of acceptable change) that inject social science concepts into resource policy.

In some cases, the scientific claims for authority may result in refined wilderness management, as usable knowledge is translated into practical insights. In other cases, scientists will likely find themselves relegated to roles as "organizational pests", and viewed that way by managers. How far scientists can advocate wilderness policy and maintain their credibility is unclear, as is the benefit of creating an expert class of "ecological mandarins" with power over public wilderness resources. In addition, there is a documented rejection of science by large numbers of Americans, witnessed by such indicators as the growing creationist movement, an eroding faith in high technology, and increasing Congressional impatience with the scientific community. Impacts upon the authority claims of "wilderness scientists" are unclear but real.

Conclusion: These predisposing factors will have a significant influence on the stewardship of wilderness resources in the United States. The meaning and value of wilderness stewardship is likely to be challenged in the 21st century. If concern for wilderness remains isolated within a cadre of professionals, aficionados and current users, its fate is uncertain. If wilderness is not made relevant to the wider American public, to the citizens of South Tucson, Miami's "Little Hvena", St. Maries, Idaho, Worcester, Massachusetts and East Harlem, its survival is not assured. The same democracy that established the wilderness system can dissolve it.

As in most cases of American public policy, abstract philosophies, scientific theories and absolutist ideologies will not be critical to the decisions that must be made, though their believers may wish it so. Rather, like the issues of environmental risk, AIDS prevention, homelessness, health care and international diplomacy, the critical questions will be: Who benefits, who loses, and who has power? For wilderness stewardship, it is not clear whether to be enthused or saddened by that prediction.


INTRODUCTION The historic formula has always been the same: more people = greater demand for land and resources = diminishing wildlands. Internationally, this simplistic but accurate rendering of the wilderness conservation dilemma has been focused largely in tropical areas, where wide spread poverty has made the formula even more potent.

Over the last several years, however, northern wildland issues have begun to emerge on the international agenda. An interesting aspect of this new issue is that the arctic end sub arctic areas are sparsely populated, with little population growth. But threats
to the circumpolar environment and wildlands are rapidly increasing. Therefore, threats to arctic wildlands needs to be re-defined in relationship to the traditional model.

This presentation will discuss briefly the type of conditions which are threatening the arctic wilderness (terrestrial and marine), will summarize the state of new initiatives which respond to the need for northern environmental and cultural integrity, and illustrate how the 5th World Wilderness Congress will address these issues.

IMPORTANT CONSIDERATIONS

1. **Wilderness Area** - The northern circumpolar region contains the most wilderness area of any other region outside of the Antarctic: (McCloskey and Spalding, 1987) 41% (21,322,000 sq km) of the world's remaining wilderness are in tundra communities, of which some 8,000,000 square kilometers are in the northern circumpolar nations. An additional 9,000,000 square kilometers of wilderness also exists in these nations in habitat other than tundra.

2. **Sensitivity of the Ecosystem** - After any type of environmental stress, the recovery time of these fragile northern areas are often measured in centuries rather than years.

3. **Indigenous Peoples** - Many distinct groups of indigenous peoples live in the circumpolar region, and each cope with the usual range of environmental problems as well as with complex cultural and sovereignty issues. Solutions lie in uniquely crafted sustainable development strategies that can integrate subsistence harvesting with commercial off-take of living resources. This is the core issue for wilderness conservation around the globe, and the fragility of the northern ecosystem in the face of increasing pressures raises urgent biological and ethical questions when we consider the future of indigenous circumpolar communities.

**THREATS TO THE ARCTIC** The most serious immediate threats to the Far North are commercial, posed by the actions of those who view the area as a frontier to either exploit or to use as a dumping ground:

1. **Pollution and Toxicity** - Because of the flow of global air and sea currents, and northern rivers, the Arctic is a convergence point for many toxins that are generated elsewhere: heavy metals and organic contaminants (PCBs) are transported by rivers, atmosphere, and ocean currents, and directly affect wildlife and fish populations. Radioactivity is a major problem, and is mostly related to activities of the former USSR;

2. **Energy Production** - Threats related to this industry arise both from pollution and from habitat destruction. Oil production and transport are often cited by the press as the most imminent threat to the Arctic, especially in America as it relates to the long-standing battle over the Arctic National Wildlife Refuge. Hydroelectric power is the big issue in northern Canada, focused on the on-going James Bay hydroelectric projects (Diamond, 1991).

3. **Over-Exploitation of Living Resources** - This issue is most evident in the commercial fisheries in the Barents Sea and the northern Bering Sea. Also, marine mammals are a growing concern. The most volatile current issue concerns Norway's decision to resume commercial whaling in May, 1993.

**A NEW ARCTIC AGENDA** Our concern for northern wilderness issues must integrate with numerous new approaches which include:

1. **Arctic Environmental Protection Strategy** - The so-called Rovaniemi Accord, a Finnish initiative agreed in 1991, involves Ministers from the eight Arctic countries assisted by indigenous groups, the UN and others. One important result, stemming from the universally recognized need for more and better research, is creation of the Arctic Monitoring and Assessment Program (AMAP).

2. **Northern Forum** - Formed in 1991, this involves regional (rather than national) government leaders, the private sector, universities, and special interest groups from 14 different Arctic regions.

3. **Arctic Environmental Strategy** - Canada’s 1991 national response to the issues, and one of the cornerstones of Canada's "Green Plan".

4. **Various Indigenous Initiatives** - Among others, these include both new and old organizations such as: Inuit Circumpolar Conference; Association of Small Peoples of the Northern Soviet Union; Nordic Sami Council;

5. **Wilderness Act (Finland, 1991)** - Of particular interest to our wilderness concern is the Wilderness Act legislated by the Finnish Parliament in February 1991. This is both the newest, national wilderness legislation in the world, and is also the only national legislation outside of the United States that is specifically named the "Wilderness Act." Encompassing some 1.5 million hectares of state-owned wilderness, this initiative states that "the basis for wilderness
conservation lies in a coordination of the traditional means of livelihood and the interests of forestry and recreation* (Ministry of Environment, Finland, 1991).

5TH WORLD WILDERNESS CONGRESS (5thWWC) The 5thWWC will convene in Norway, 24 September - 10 October, 1993, under the theme of Wild Nature and Sustainable Living in Circumpolar Regions. It will serve as a focal point for integrating sustainable development and conservation initiatives around the core issue of safeguarding wilderness and wildland values in the circumpolar region. Following the pattern of previous Congresses, the 5thWWC will be structured so that general topics (Global and circumpolar) are addressed in the plenary, while specific theses are the focus for working/technical sessions.

General Topics - Include introducing the wilderness concept to circumpolar countries which have no such specific designation; compatibility of wilderness with exploitation of living resources; an inventory of wild rivers of the north; sustainable development options in the north; opportunities for protection of circumpolar wilderness; and more.

Working/Technical Sessions - Ecotourism; Arctic wildlife - conflicts in management; the whaling issue; Traditional indigenous knowledge and modern resource management; the idea of the Wild; and strategies for protecting the Arctic wilderness. Of interest to Americans is International Wilderness Allocation - Management and Research, co-chaired by Dr. John Hendee and Vance Martin, in which will be included much of the American inter-agency input, in addition to that which is presented by agency chiefs from the plenary platform.

CONCLUSION The northern circumpolar region is a vast, sparsely populated area, containing much of the world's remaining wilderness outside of the Antarctic. It has a fragile, sensitive habitat that recovers slowly from stress and degradation, yet is the recipient of a great deal of pollution and toxicity that originates in other regions and is transported to the Arctic on atmospheric, ocean, and river currents. The majority of the region's inhabitants are indigenous people, yet there are several different and conflicting world views that impact it. As a result of these and other factors, this region is perhaps more imminently suited than any other to specific regional, national, and international efforts to strictly limit certain types and amounts of human disturbance. It could also be a unique case for demonstrating wilderness protection that integrates the self-reliant activities of its aboriginal peoples.

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Prestrud, Pål, 1992, personal communication.

WE'RE NOT ALONE ANYMORE--RESPONDING TO SIGNIFICANT NON-FEDERAL AGENCY WILDERNESS ACTIVITIES. Denise Meridith, BLM, Eastern States Director, 7450 Boston Blvd., Springfield, VA 22153 (703)440-1700

No synopsis for this presentation was requested; speaker agreed on 5/10/93 to replace M. Finley (Responding to Cloud Seeding, Fish Stocking, and Other Significant Non-Federal Agency Wilderness Activities).
THE WILDERNESS IMPERATIVE ABROAD. Joseph R. Quiroz, Co-Director, Mexico Country Program, The Nature Conservancy, 2255 N. 44th St., #100, Phoenix, AZ 85008 (602)220-0490/FAX602-225-0541

Wilderness management in the United States is based on a number of important assumptions. The first is that legislation and due process of law will regulate human activities on natural ecosystems that have been identified as having value to society. A second is that the society has a sense of ownership of these lands and will provide for their protection through its government agencies. In addition, the public concern is so great that privately supported non-governmental organizations have proliferated that stand ready to critique and assist the government agencies.

In most parts of the developing world, these assumptions cannot be made. In fact, while many complete watersheds outside the United States contain all of the qualities by which we would define wilderness, and many have even been declared "protected areas", society has provided little toward the protection of these sites. Although it is exquisitely provocative, the reasons, traditions, and history for this lack of attention to the management of natural resources are material for another forum. Today's discussion will be about the action that can be taken to protect the last great places that serve as some of the world's most important reservoirs of genetic diversity, sinks of atmospheric carbon, windows into ecosystems that are untrammeled, and, perhaps most important to us personally, the hope we have for our children. We are speaking of the remaining wilderness in the Earth's tropical zone.

In addressing the management of wildlands, we are reminded that the quality of wilderness is subjective. Antarctic ice cores clearly record that lead became remarkably more abundant in the Earth's atmosphere in the very year that the first smelter began to operate in England at the beginning of the Industrial Revolution. Since then, we have increased our human footprint to include the contribution of over six billion tons of carbon dioxide into the atmosphere each year. We know that over ninety percent of the Earth's biological diversity is found beyond our national borders. While our immediate objectives may be local, our mission as natural resource managers is one of protecting the integrity of the remaining ecological systems wherever they occur.

Despite the international outrage expressed over the loss of resources in the tropics, the rate of deforestation continues with depressing results. Population and poverty have been popularly iniminated as the most significant threats to natural resources, with consumption by the developed world seen as the fuel that promotes non-sustainable extraction of even more resources, yet there is little agreement on how they may be addressed effectively. A number of models for natural resource management in the tropics have been tried by agencies and organizations based in the developed world. We have bought land, funded research, built infrastructure, trained managers and transferred technology. While there have been modest gains in select sites around the world in more effective utilization of resources, watershed management for the protection of biological diversity is still in its infancy. Yet it is through that infancy that the natural resource managers of the developed North stand to learn a great deal from our colleagues in the tropical South.

Achieving conservation success, whether on land we designate as wilderness or for intensive human occupation, means balancing the needs of people with the environment's capacity to sustain future generations. It may be argued that the challenge of managing natural resources in the developing world is not in the elimination of human use from the land, but in finding ways in which the natural resources can be forever conserved while providing for appropriate and sustainable use by the people who live there. In fact, we do ourselves a great disservice to prescribe that as a solution for only the developing world. The heart of conservation is to discover the tolerance limits of natural ecosystems to human pressure, and to develop activities that are compatible with the long term management of the ecosystem. The best activities are those in which the human community derives continuous benefit from a natural resource system maintained in its most ecologically complete and healthful condition.

The Nature Conservancy's experience in Latin America shows that there are two major challenges facing the conservation community in the next decade. First we must provide the capacity for long term management of natural resources in concert with the human needs of those resources, and second, we must build a structure that will provide the incentives needed to manage those resources. The Nature Conservancy and its Latin American partners have been building local on-the-ground management delivery capability for several years with remarkable success. In many countries, we have also helped build the financing machinery that makes continuous, effective management possible.

While it would be irresponsible to suggest that the problem can be easily solved by changing a few rules, experience shows that by altering some conditions of the marketplace, particularly access to markets and product values, there is a significant change in the interest taken by local people to protect natural resources. Attendant to increased prosperity among local populations is decreased fecundity. One can only speculate about the effect of widespread local empowerment, but a very likely result is widespread increase in the quality of life. It may also mean a significant decrease in the quantity of consumption for many of us in the more developed nations as products that reach us bear a reflection of their true cost of production.
In the third world, wilderness management assumes new feces that must be created to fit the society, the economy, the culture, and of course the landscape. As managers, we must work no less diligently to protect the ecological components of wildness, but the challenge goes far beyond the study and stewardship of natural communities. Our imperative in this profession is to look beyond our local responsibilities, to advocate the basic life processes that sustain us, and to find alternatives to land management practices that reap benefits to a few in the present while promising impoverishment for many in the future. That future, of course, belongs to our progeny.

CONFLICT AND COMPATIBILITY IN RESOURCES PROTECTION: THE 1964 WILDERNESS ACT AND THE NATIONAL HISTORIC PRESERVATION ACT (NHPA), ARCHEOLOGICAL RESOURCES PROTECTION ACT (ARPA), AND THE ENDANGERED SPECIES ACT (ESA)--WHAT HAS PRECEDENCE IN MANAGING WILDERNESS RESOURCES? ARE THESE COMPETING MANDATES? William H. Rodgers, Jr., University of Washington, School of Law, 530 Condon Hall, Seattle, WA 98105 (206)543-5182

I. Understanding How Laws Are Made

A. Proper Metaphors
   1. Laws of Geology (accumulation)
   2. Laws of Biological Evolution (Darwin's Worms, Pendes' Thumbs, Peacocks' Tails)
   3. Contemporary Chaos Theory (staring points, the unexpected, Jurassic Park)
   4. Laws of Entropy (decline over time)

B. Lawmakers as Self-Interested Maximizers (public choice and game theory)
   1. The Glue of Consensus
      a. process proliferation (NEPA, NHPA, ESA)
         i. consultation
      b. goals statutes (ESA and legal eloquence, absolutism end ARPA (herein of the Clean Water Act)
      c. more study
      d. the myth of compatibility and the nonzero-sum ("compatible" uses and the National Wildlife Refuge Administration Act; Senator Hubert Humphrey and the Wilderness Act: "None of them (the commercial interests) will suffer damage", insignificant environmental damage and insignificant losses of archeological resources).
      e. the benefits of redundancy (Compare Rohlf & Hannold at 258 (goals of Wilderness Act: "preservation of wildlands, protection and maintenance of natural areas for uses such as recreation and scientific research, and accommodation of local and commercial interests") with 1993 NAS Study on Land Acquisition (better connections in managing for conservation, use of natural areas to establish scientific baselines to judge effects of human actions, reconciliation with inholders).

   2. The Evidences of Betrayals (of sleepers, skewers, and surprises; Tellico Dam, NEPA, ESA); Rodgers (illusive sell-out; 1470as(f) of ARPA exempts from the federal trafficking provisions persons who have "an archaeological resource which was in the lawful possession of such person prior to October 31, 1979"; but one cannot be in "lawful possession" of an archaeological resource that has been taken illegally from Federal property).

II. The Features of Laws Made in This Way

A. Ambiguities and Half-Laws
B. Preadaptations (e.g., Wilderness Act anticipated the preservation of biological diversity; Wilderness Act and ESA supplement NEPA that is read to be strictly procedural).
C. Maladaptations (e.g., "archaeological resource" has features that are frozen in time; exclusion of "feces").
D. Serendipitous, Unexpected, and Historic Conflicts (Wilderness/mining, logging, snowmobiling, motorized boats, hydro-development, nonnative [alien] species)
   1. System-tolerant (tufa-plovers-brine shrimp at Mono Lake; cultural resources in Wilderness areas)
   2. System-Threatening (pine beetles v. red-cockaded woodpeckers)
III. Administering the Laws

A. Biting-the-Bullet: Making Decisions
   1. System Definition (the Exxon Valdez Solution)
   2. Heroic Behavioral Assumptions (the pesticides example)
   3. Leave-it-to-Later
   4. Convenient Precedents (United States v. Diez, 368 F.Supp. 856 (D. Ariz. 1973), rev’d 499 F.2d 113 (9th Cir. 1974)).

B. Biting-the-Banana: Avoiding Decisions by perpetuating the Myth of Compatibility

IV. Conclusion

REFERENCES


INTERAGENCY AND BIOREGIONAL PARTNERSHIPS IN WILDERNESS STEWARDSHIP. Hal Salwasser, Chair, Dept. of Coop. Forestry, University of Montana, Missoula, MT (406)243-5566; Boone & Crockett Office (406)542-1888

As of 5/11/93, presentation synopsis not received.

22

**Introduction** Since passage of the Wilderness Act in 1964 Congress has designated 75 wilderness units encompassing nearly 20.7 million acres on Fish and Wildlife Service lands. This includes more than one of every five acres under Service control. Another 24 areas totalling over 2 million acres have been recommended by the President and await action in Congress. Our reviews of non-wilderness lands in Alaska refuges is continuing and it seems likely that several million acres may be added in that State when the process is completed.

The passage of the Arizona Refuges Wilderness Act in 1990 added over 1.3 million acres on 4 refuges to the Wilderness System, and these were the first additions on FWS lands since passage of the Alaska Lands Act in 1980. Today over 90% of our designated wilderness is in Alaska; those in the lower 48 are relatively scattered and small with a few notable exceptions.

Wilderness management has generally been considered to be a low profile activity on Service lands. Wildlife refuges, which contain all but one of the Service's wilderness units, are managed in accordance with the statutes governing such areas and the Wilderness Act is generally regarded as providing additional protection as well as limiting how some activities may be carried out. No staffing or funding is assigned specifically to wilderness management, and public use activities in wilderness areas generally match those on other parts of a particular refuge, with obvious exceptions (motorized use, etc.).

However, even though the program is low profile, activities and initiatives do occur and positive things are happening. We in the Division have developed a more active interagency coordination role in recent years, we are currently revising and expanding our policy guidance for wilderness managers, and an air quality monitoring strategy currently being finalized will provide additional protection for our class I areas. We are also working closely with the other agencies in the development of the Wilderness Training Center and the Wilderness Research Institute in Missoula and are encouraged by its interagency emphasis. I believe all of these will contribute to our own effectiveness and will definitely benefit those who utilize the wilderness resource.

The topics of particular interest at this years Interagency conference concern wilderness restoration, cultural and historic resources, and emerging challenges. I would like to briefly address each of these to give you an idea of our perspective in the Service and where we are headed.

**Wilderness Restoration** Our newly revised draft guidance addresses restoration mainly in terms of wildlife habitat restoration and maintenance. The policy states that habitat manipulation may be accomplished as long as it does not degrade the wilderness character of the area, or if it corrects adverse impacts caused by previous human activities. For example, rock checks may be used to restore watersheds where deteriorated soil conditions caused by human use has created a serious threat to wilderness values. The first priority for such activities will usually be outside wilderness areas, but this may not always be possible. The removal of debris that impedes fish movement may also be permitted if such is needed to preserve a component of the wilderness resource. Hand or aerial seeding of native species may also be permitted to restore natural plant communities where natural revegetation is inadequate to protect the soil or hydrology. Several examples will help demonstrate these and other practices. A unit-specific Wilderness Management Plan is specified in the new policy as required before such activities are permitted. The continued maintenance, deterioration, or elimination of other human-related structures is also covered in the new guidance.

**Cultural and Historic Resources** If the establishing act for the particular wilderness area does not contain guidance on the management of such resources, they must be evaluated as to their historical significance and utility for accomplishing wilderness or refuge purposes. Management must also consider the guidelines and implementing regulations of the National Historic Preservation Act of 1966, the Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990 when evaluating the usefulness and significance of such facilities. Structures determined to be historically significant generally must be retained, or removed only in accordance with the terms of these acts. Maintenance is accomplished using the minimum tool concept if such is required and the use of native materials is encouraged to make any structures as unobtrusive as possible. Again, a unit Wilderness Management Plan will specify how cultural and historic resources are to be handled, and Alaska Lands Act exceptions and existing defense facilities add extra wrinkles which must be considered. The cultural diversity of today's users will also be discussed.

**Emerging Challenges** A number of issues are being addressed as we move forward with our wilderness program. Accessibility for those with disabilities will likely emerge as an issue on some areas in the near future. Recent results of a survey done by Wilderness Inquiry, Inc. for the National Council on Disability indicate that our areas have few facilities to offer the disabled visitor and these needs will doubtless change as society changes.

Non-conforming uses on adjacent lands is an issue on areas such as the Moosehorn wilderness in Maine where clearcuts abut our wilderness boundary, as is deteriorating air and water quality caused by outside sources, such as power generators near the Cape Romain wilderness in South Carolina and the Chassahowitzka wilderness in Florida. Fishing and hunting guides in Alaska present a unique challenge and we are addressing it on our refuge wilderness areas as described in more detail in a paper later this week.

23
Earlier this year the Service released the draft document entitled "Refuges 2003 - A Plan for the Future of the National Wildlife Refuge System". This programmatic EIS describes how we propose to deal with these and other issues on refuges over the next decade. Comments on the draft are due by June 14, 1993 and the final document should be available by fall.

U.S. FOREST SERVICE INITIATIVES AND PROGRAMS FOR WILDERNESS RESTORATION, CULTURAL RESOURCES, AND RELATED CHALLENGES. John Twiss, USFS, Wilderness Program Leader, Washington DC (202)205-1422

As of 5/11/93, presentation synopsis not received.
Wilderness Restoration: Use of Minimum Tool in Revegetation or Alien Plant Control
ALIEN PLANT INVASIONS: INCREASING IMPACTS TO THE INTEGRITY OF ECOSYSTEM HEALTH IN WILDERNESS.

Jerry Asher, BLM, Research Coordinator, Oregon-Washington State Office, Box 2865, Portland, OR 97208 (503)280-7368

PURPOSE This paper will seek to explain: (1) Noxious weeds (hereinafter called weeds) are increasing rapidly on disturbed and undisturbed lands, including wilderness, (2) Inventories to assess the location and magnitude of weed infestations are lacking, and (3) Prevention of weed spread, combined with early detection and eradication of small infestations is urgently needed for most designated wilderness and wilderness study areas (hereinafter called wilderness).

WILDERNESS, BIODIVERSITY, ECOSYSTEM HEALTH AND WEEDS BLM policy dictates that wilderness be managed to ensure that natural ecosystems and ecological processes continue to function naturally (USDI 1981). Similarly, management for biodiversity and ecosystem health are paramount management goals. Weeds violate those goals. If a vegetative community is functioning well, the soil, air, water and animal components of the ecosystem usually will function well also. Therefore, healthy native vegetative communities are the foundation upon which an enormous amount of wilderness values rest. The single greatest threat to this native vegetation is the rapid spread of weeds.

UNDERSTANDING THE RAPID EXPANSION OF WEEDS Weeds, primarily from Eurasia, began entering in earnest to western rangelands in the 19th century. In Eurasia these species were generally not invasive because they evolved with a natural complement of insect predators, plant pathogens, fungi and competition from other plants. However, in the process of entering this country these plants were released from those natural enemies and consequently have potential to dominate some locations with dramatic impacts to natural values.

Weeds prefer disturbed sites such as trail heads, trails, wildlife bed-grounds and campgrounds. Well managed land is the best defense against the spread of weeds. However, recent literature, many observations, and my pictures make it clear that weeds also commonly invade relatively undisturbed communities. "Several exotic noxious perennial weeds, including spotted, diffuse and Russian knapweeds, leafy spurge, and yellow starthistle, are moving into excellent condition stands of native vegetation" (Herris 1991). Tyson and Key (1988) reported that spotted knapweed invaded and reproduced in rough escape communities in Glacier National Park. Forcella and Harvey (1983) documented Eurasian weeds dominating relatively undisturbed grasslands in Montana. "Several exotic weeds will invade undisturbed climax communities and can become significant components of a community" (Bedunah 1992). While discussing the ecological equilibrium of native communities, Bedunah also noted: "that the introduction of exotic plants can throw this balance off, possibly forever."

Kummerow (1992) stated that: "knapweed and leafy spurge crowd out native species, and like human populations, knapweed can increase exponentially beginning slowly, then doubling and redoubling. " Many of these exotics also show significant competitive advantage over natives. In the absence of predators, immune systems or other biological control mechanisms adapted to counteract these species, populations of some exotics have exploded" (Monnig 1992). The absence of natural fire processes in wilderness could be causing environmental conditions that are more conducive to weeds. Knapweeds are spreading in natural area preserves in Washington, especially where soils have been excavated by burrowing animals but also where soil disturbance is absent. "This trend is particularly disturbing in high condition range sites. It is anticipated that invasion and spread of knapweeds will pose increasing ecological problems to preserve managers in the next decade" (Schuller 1992).

The Nature Conservancy reports the invasion of noxious weeds into many undisturbed bunchgrass communities in their Garden Creek Preserve in Idaho (Hill 1993). "Speculation by local land managers that dyers weed could eventually exist on most of the Cache National Forest in Utah, including the Mt. Naomi Wilderness Area, is supported by the fact that the weed was observed on 55 of 60 possible land cover types" (Dewey 1991).

Weeds are spread by vehicles, humans, horses, livestock, wind, water, and a wide variety of wildlife. For example, birds spread weed seed and leafy spurge is being spread by elk and deer in the Naomi wilderness area in Utah (Steve Dewey 1993). Elk have been reported to eat knapweed seedheads (Lange 1993). It also has been shown that over 13% of spotted knapweed seeds pass undamaged through the digestive tract of mule deer (Wallender 1992). Ground squirrels were observed carrying knapweed seed heads into their burrows (Lang 1993).

EXAMPLES OF WEED INCREASES Noxious weeds probably are expanding slower into wilderness areas than other federal lands. However, it is important to recognize the expansion of weeds in adjacent lands. The presence of weeds on adjacent lands increases the probability of seed transport into wilderness areas. For example, BLM conducted an evaluation of its noxious weed program which indicated that weeds increased from 2.5 million acres in 1985 to 6 million acres in 1991. Those are only estimates because inventories are lacking but they are considered conservative. Recognizing that weeds typically increase at 14% per year if unchecked, the increased infestation rate on BLM land is now approximately 2000 acres per day -- "an explosion in slow motion."

Spotted knapweed, first reported in Montana in 1920, has increased to over 4 million acres. Similarly, there are over 600,000 acres of leafy spurge in Montana. During the last 30 years, leafy spurge has increased from 200,000 acres to over 1 million acres in North Dakota. In Idaho, rush skeleton expanded from 40 acres in the early 1960's to over 4 million acres today! Also in Idaho, yellow starthistle increased during the last 30 years from just a few small patches to over 300,000 acres and a ten-fold increase
is predicted (Callihan 1991). In SE Washington, yellowstar increased from approximately 1000 acres in 1954 to over 140,000 acres today (Roche 1993). Since 1977, yellow starthistle went from 1 million acres in California (mostly n. Calif.) to over 10 million acres today. Oregon is surrounded with large infestations of yellowstar so it is no surprise that it is expected to expand rapidly in Oregon unless much more weed management is applied (Isaacson 1992).

Weed experts in university weed science departments and state departments of agriculture in 10 western states helped me prepare a slide presentation to increase awareness about weeds. All these people were in agreement that weeds are spreading rapidly on rangeland and in some areas exponentially. I have not been able to find anyone, knowledgeable in weeds, who disagrees, and wilderness areas are no exception. Additionally, weeds are quite capable of invading areas with low precipitation. For example, during the last 40 years squarrose knapweed increased from one acre to over 140,000 acres near Tintic Junction, Utah in an annual precipitation zone of as little as 6 to 8 inches. Another example of a more recent arrival to wilderness areas is sulfur cinquefoil which was discovered in Montana several decades after leafy spurge and spotted knapweed. It is currently in an exponential expansion phase (Rice 1993). While we don't know how invasive new species will be, new weeds are arriving yearly at the rate of nine new species per state per year (Old 1992).

**SOLUTIONS** The challenge of controlling weeds may seem overwhelming but so would range management or wilderness management if viewed "everywhere all at once." However, on a watershed or management unit basis, with Integrated Weed Management (IWM), reaching weed management goals can be quite reasonable -- especially in wilderness areas where weeds usually are not yet severe. Examples from many areas, too numerous to discuss here, show that prevention and control techniques can be effective.

IWM includes: (1) Prevention through education, awareness, and training to reduce or stop the spread of weed seed by people, horses, livestock, hikers, etc.; (2) Restoring sites most susceptible to weeds with native plants; (3) Developing inventory and monitoring strategies to detect new infestations; (4) Controlling or eradicating small infestations with "minimum tool" concept using grubbing or handpulling where appropriate, and herbicides if necessary, combined with biological control; (5) Restoring controlled areas, where necessary, to help prevent re-invasion; and (6) Monitoring effectiveness of control efforts.

Hand pulling/grubbing can only go so far and herbicides are required on some sites to prevent the spread of weeds to other, much larger, areas. Herbicides are used in some National Parks and the USFS and BLM use herbicides in many wilderness areas. For example, the BLM Shoshone, Spokane and Riverside districts use herbicides in wilderness with the full concurrence of conservation organizations who have visited the sites and understand the necessity. Biological controls offer promise for long term suppression of some noxious weeds and substantially more investments are needed now. However, many experts in weed management offer cautious optimism. "Biocontrols, everyone's ultimate hope for effective weed control might slow, but will not prevent the spread of weeds. Biological controls work best on large weed concentrations and worst on isolated patches. Weeds in wilderness areas are poor candidates for biological control because of their (so far) isolated nature" (Kummerow 1992).

Every state has federal, state, county, university and private people quite knowledgeable about how to prevent and control noxious weeds (see attached "Contacts"). The "Guidelines for Coordinated Management of Noxious Weeds in the Greater Yellowstone Area" (USDI--USDA 1992), provides almost all the information needed for an effective program. To utilize this expertise and information, a long term, consistent, and focused weed management program is essential. The all important prevention, education, training, detection, and control activities, will require almost full time attention by someone at the district level. Because all management activities are involved in the spread of, and are negatively impacted by weeds all activities could share the funding for a weed management position.

Some weeds, like spotted and diffuse knapweed or yellow starthistle, are relatively easy to control if they are in newly established small patches. However, it is nearly impossible to remove significant patches of leafy spurge that are over three years old. Therefore, it is essential to treat small infestations of leafy spurge to keep it from producing seed that can be carried to other areas. It is critical in the successful control of new weed infestations to minimize the time interval between introduction and detection (Mack 1988). "After weed infestations reach a 'critical mass' they are uncontrollable in any practical sense" (USFS EIS 1993).

**SUMMARY** Noxious weeds are clearly moving fast in both disturbed and undisturbed lands. They can have a profound influence on the value of wilderness to future generations. To protect this value, aggressive control efforts are needed immediately where weeds are at the "now or never" stage and similarly, in areas where weeds are just arriving or are expected in the near future. Prevention plans must be developed before the easy/cheap opportunities are missed. Inventories, in wilderness and adjacent lands, are urgently needed to assess the potential for weed spread.

Weed management plans are needed for all areas to facilitate an organized, long term effort. By the way, we don't need to do it all ourselves. There are "small armies" of people willing to help, especially with inventories and some hand pulling. As user groups, conservation organizations, and agency people see themselves as both part of the problem and the solution, a cooperative, enthusiastic atmosphere will prevail.
I will end with a quote from Gordon Ash, wilderness ranger at Big Prairie in the Bob Marshall wilderness, who recently noted that, "We don't know how far weeds will go in here, but if we don't get after them quickly, we are going to find out!"

REFERENCES


CONTACTS FOR NOXIOUS WEEDS EXPERIENCE AND EXPERTISE

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WILDERNESS REVEGETATION AT ORGAN PIPE CACTUS NATIONAL MONUMENT. James J. Barnett, NPS, Chief of Resources Management; Bruce L. Losher, Biological Technician; Francis Klitsch, Biological Technician. Organ Pipe Cactus National Monument, Ajo, 85321 AZ (602) 387-7662 ext. 7110.

Introduction. Organ Pipe Cactus National Monument, established in 1937, is located in southwestern Arizona and is geographically near the center of the Sonoran Desert. The Monument encompasses 330,689 acres. On October 26, 1976, the United Nations Education, Scientific and Cultural Organization (UNESCO) recognized and designated Organ Pipe Cactus National Monument as a Biosphere Reserve. The primary significance of the Monument is the perpetuation of a sample of the Sonoran Desert. Although the Monument includes only a small portion of the vast Sonoran Desert, it preserves many elements of that ecosystem.

Contributory Events. Three significant events between 1976 and 1978 initiated the idea of a revegetation program at Organ Pipe Cactus National Monument. These events included the 1976 Mining in the Parks Act, elimination of livestock grazing in 1978 and the designation of 95% of the Monument as wilderness in 1978.

In September 1976, Congress passed the Mining in the Parks Act. Under this law, existing mining claims within Organ Pipe Cactus National Monument were presumed abandoned if not recorded with the Secretary of the Interior by September 28, 1977. A "validity report" from the Western Regional Office dated August 23, 1978, listed a total of 161 claims that were registered with the Superintendent by the deadline date. Engineering reports indicated that none of these recorded, unpatented mining claims were valid. This effectively voided mining related activities within Organ Pipe Cactus National Monument. Remnants of the mining era remain on the landscape, however. Over 400 mining holes, scrapes and shafts have been recorded. In addition, miles of roads were created to assist with mining activities.

Cattle had initially been introduced into the Monument as early as 1898, with the coming of Father Eusebio Francisco Kino, but there were no significant cattle enterprises before 1912. The intensity of grazing increased in the mid-1900's. One family, the Grays, established several small ranches that operated from 1919 through 1976. With the passing of the last member of the Gray family
in 1975, and the removal of approximately 2000 head of Gray cattle, the ranching era came to a close. Deterioration of natural resources from years of intensive grazing was apparent in many areas. Accelerated erosion, loss of vegetation structure and diversity, and miles of roads remained on the landscape.

Public Law 94-429, signed in 1978, designated 312,600 acres as wilderness and 1240 acres as potential wilderness within Organ Pipe Cactus National Monument. The National Park Service has a responsibility to manage backcountry, which includes wilderness areas, to provide recreation and to preserve resource values. At the time of designation, more than 85 miles of unpaved roads became off-limits to vehicles. These roads were left from mining, ranching and related historic activities. Road scars of this nature are extremely visible and were easily mistaken for active roads or parking areas. Unfortunately, the roads also proved to be quite a temptation for off-roading recreation enthusiasts, and this use further impacted the sensitive desert resource. The roads were initially closed by means of 4' x 4' x 8' wooden barriers near ground level, engraved with the words, "Wilderness Area, Vehicles Prohibited" or "Road Closed, Natural Restoration Area". This was sufficient to keep most park visitors from driving on the roads, but a few people simply drove around the barriers and continued to use them. It was clear that the only way to insure that no one would drive in these areas was to make them impossible to find. Primitive roads were removed from the official park map. It became the objective of resource managers to "camouflage" the entrances of the roads in order to deter their continued use. This was to be accomplished by revegetating portions of the roadways which were visible from the developed and legitimately utilized areas of the Monument. This activity became the genesis of the revegetation program at Organ Pipe Cactus National Monument.

Revegetation Program. The Resources Management staff began growing native plants in a makeshift nursery near Monument headquarters in 1979. There was little literature available on growing native desert plants in a nursery situation at that time, and the project was conducted largely by trial and error for the first few years. Initially, cacti and other drought resistant species were utilized, due to the ease with which they could be propagated, as well as the minimal care they required upon transplanting into the field. The survival rate was relatively high, but the objective of "camouflaging" the roadways was not being met. It became clear that a linear strip of cacti in an environment consisting primarily of creosote bush (Larrea tridentata), brittlebush (Encelia farinosa), triangle-leaf bursage (Ambrosia deltoidea) and other shrubs did little to hide the roads.

Thus the staff began efforts to propagate many of these native shrubs. Fortunately, the trial and error methods used in the nursery enjoyed early success towards this end. During the summer of 1988, a new nursery and greenhouse complex was completed at the Sonoran Desert Biosphere Center, located within one mile of the park headquarters. The solar heated greenhouse is equipped with a misting system, temperature and humidity controls and advanced lighting techniques. The nursery has shade control and drip irrigation capabilities.

The program has relied primarily on volunteer labor. It has enjoyed one volunteer's care and dedication since near its inception. This individual's extensive background in horticulture and arboriculture has helped to establish a small but viable program. In 1992, 1,117 hours of volunteer time were donated to the revegetation program. In 1988, the revegetation program expanded beyond just revegetating abandoned roads. Nursery-grown plants have been used to stabilize soil in erosion areas, as well as to reclaim other disturbed areas in and outside the designated wilderness. Efforts in 1989 and 1990 concentrated on the revegetation of abandoned roadways, of which only 50% have been completed, as well as other disturbed areas, including three monitoring well sites on the Monument's southern boundary. In addition, due to construction in the headquarters/residential area, many plants were salvaged and placed in holding areas for future planting.

A major revegetation effort, funded by the Federal Lands Highway Program, was initiated in 1991 to restore the natural landscape following a significant road improvement project. This road, while not in the designated wilderness, is bounded by some of the most pristine Sonoran Desert wilderness in the Monument. The long term goal of this project is to restore the road prism to the pre-construction condition as quickly as possible. Maintaining the vegetative integrity along the Ajo Mountain Drive will help stabilize the roadway, and at the same time promote the beauty so many people enjoy in the Sonoran Desert.

Further revegetation activities have included restoration of lands impacted by vandalism and vehicular accidents, replacement of non-native plants in the landscaping of residential areas in the Monument, and mitigation of the disturbances caused by on-going maintenance and construction activities. Today, the program is experimenting with new, cost effective means with which to reclaim the remaining abandoned road scars. Replacement of poached tree species such as ironwood (Olneya tesota) and mesquite (Prosopis velutina) is another direction being considered.

At present, the revegetation program at Organ Pipe Cactus National Monument utilizes containerized stock of native plants propagated at the Sonoran Desert Biosphere Reserve Center nursery and greenhouse facility. The primary revegetation plant types are pioneering perennials (i.e. L. tridentata, E. farinosa, A. deltoidea and Atriplex sp.) and fast-growing cacti (i.e. Opuntia sp.). The major factor to be overcome in disturbed and impacted areas of the Sonoran Desert has been found to be soil compaction. Whenever possible, soils are mechanically scarified to a depth of up to 30 centimeters to break up compaction and aid in water percolation. This also acts to create a suitable micro-habitat for other volunteer seeds to germinate. Experiments have begun at Organ Pipe Cactus to find techniques for introducing seed onto disturbed sites to enhance restoration without the use of containerized stock. Mechanical disruption of the external seed coat has been one factor studied in these experiments. Removal
of the natural vernish found on several desert seed types may eliminate some dormancy agents and enhance rapid germination on site. Restoration in areas of designated wilderness will require the use of low-impact, low-maintenance, and rapid stabilization techniques in order to conform to the spirit and mandate of wilderness.

There is much that remains to be learned about the delicate relationship between desert plants and their environment. The revegetation program at Organ Pipe Cactus National Monument continues to explore new methods and techniques for restoring damaged areas in the Sonoran Desert environment, as well as to help preserve the beauty and wonderment of this fascinating land. The objective of the revegetation program at Organ Pipe Cactus National Monument is to restore and maintain impacted lands to a prior natural state. By rehabilitating disturbed areas, revegetation can restore ecological habitat, prevent soil erosion and further environmental damage, as well as preserve the natural aesthetic quality of the area.

REFERENCES


CONTACTS FOR ARID LANDS REVEGETATION PROGRAMS/PLANNING

DESERT RESTORATION TASK FORCE - Lea Jackson, Research Ecologist (Desert Restoration Task Force Coordinator). The Desert Botanical Garden, Phoenix, AZ. The Desert Restoration Task Force is an informal network of revegetation professionals, academics, commercial seed businesses and private individuals who share an interest in desert restoration, including urban or rural areas affected by development, mining, agriculture, grazing, or desertification. Some members are actively involved in revegetation as a commercial enterprise or as a volunteer, some are studying the ecological requirements of desert shrubs or developing useful germplasm for revegetation projects; while others are involved in land and water policy. The purpose of the Task Force is to foster communication through annual field trips to revegetation sites, and to facilitate networking by offering a list of names, addresses and key interests to others who enquire about restoration in the Southwest.

Jayne Belnap, Revegetation Ecologist, Canyonlands National Park (801)259-7164
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REVEGETATING SEVERE DISTURBANCES IN HIGH ELEVATION WILDERNESS AREAS: IMPLICATIONS FOR MINIMUM TOOL CHOICES AND FUTURE RESEARCH NEEDS. Ray Brown, USFS, Project Leader, Disturbed Land Rehab Research Unit, Forestry Sciences Lab, 860 N. 1200 E., Logan, UT 84321 (801)752-1311

INTRODUCTION. The integrity of high elevation ecosystems is indispensable to a growing and vibrant society in the end to semiarid region of the western United States. Mountain masses collect and store winter snow accumulations and regulate the flow of water in streams and rivers throughout the spring and summer seasons. In large measure, the quantity and quality of water available for agriculture, industry, and metropolitan needs hinges on the condition of watersheds at high elevations throughout the West.

With the advent of modern technology, however, many high elevation regions that were recently considered pristine "back country" are becoming severely disturbed as the result of rapidly expanding human activities such as recreation, road construction, mineral exploration, mining, and other uses. The consequences of disturbance in such areas include loss of water quality as soil erosion causes accelerated sedimentation of streams, rivers, and lakes; deterioration of site productivity; loss of wildlife habitat; and overall decline in aesthetic appeal. In many mountainous regions disturbances expose metal sulfides (e.g., pyrites) that oxidize to form extremely acidic soil material that can contain toxic concentrations of heavy metals. Acid water drainage from such disturbances commonly results in the destruction of adjacent and down-slope plant communities, and may lead to the loss of aquatic habitat in streams, rivers, and lakes.

31
Factors Limiting Successful Revegetation. If left untreated, disturbances at high elevations are frequently self-perpetuating and expand in size with accelerating erosion over time. Revegetation is essential to minimize the effects of these disturbances and to restore stable native ecosystems and over-all watershed values. However, conventional revegetation techniques developed at lower elevations in milder climatic zones have been found to be unsuccessful for disturbances at high elevations. Short cool growing seasons, strong winds, frequent frost activity, and a limited pool of adapted plant species severely complicate revegetation efforts. These factors, combined with the impacts of disturbance, dictate the use of specialized techniques that have been designed for the unique conditions of high elevation lifezones.

Goals of Revegetation. Successful revegetation goals include: 1) surface protection that minimizes erosion; 2) amelioration of limiting conditions for the establishment of a plant cover; 3) optimize natural succession; and 4) establishment of conditions that ultimately lead to site reclamation through the development of plant communities commensurate with local ecosystem dynamics. Although complete restoration of a severely disturbed ecosystem is probably not possible within the time-frame of normal human lifespans, the initiation of natural succession by revegetation suggests that ecosystem development may ultimately be achieved. The implementation of ameliorative cultural treatments on disturbances, in addition to moderating the effects of limiting soil conditions, offers the opportunity to manipulate site conditions so that revegetation initiates succession at a more advanced stage of development. Hence, knowledge of successional processes in affected ecosystems at high elevations is essential to successful long-term reclamation and, ultimately, restoration.

Principles of High Elevation Revegetation. Reclamation research during the last two decades has led to the development of several promising techniques specific for the unique conditions of high elevation disturbances. Although the more general principles of revegetation (e.g., contouring and shaping, nutrient enhancement, seeding and planting methods, and surface mulching) developed at lower elevations pertain to successful revegetation at high elevations, the more subtle aspects of timing, species selection, and micro-environmental concerns often determine the difference between success and failure in disturbed subalpine and alpine lifezones.

1. Species Selection. Perhaps the single-most important principle of successful revegetation for high elevation disturbances is selection of adapted plant species. Adapted species are those capable of completing their entire life cycle on a site, that are able to sustain long-term survival, growth, and reproduction. The most promising method of identifying adapted plant species for revegetation is to study natural successional processes on local old disturbances such as road cuts and fills, natural landslides, and similar areas. Research suggests that reclamation success at high elevations will be improved when mixtures of species are planted that represent the spectrum of lifeforms (grasses, forbs, shrubs, etc.) and physiological characteristics of the native flora in an area. Species mixtures containing both early- and late-seral species provide a broad range of colonizing capabilities and physiological tolerances that can more successfully withstand catastrophic events such as insect infestations, drought, and disease. Most adapted species for subalpine and alpine disturbances have broad ecological amplitudes, high reproductive rates, and are aggressive colonizers on disturbed sites. Although adapted species for high elevations are rarely available commercially, they typically produce large quantities of collectible seeds.

2. Characterizing Soil Properties. Before revegetation is initiated, soil physical and chemical properties and characteristics of the disturbed area should be analyzed. Limiting soil properties such as heavy metals, acidity, nutrient deficiencies, low water holding characteristics, and others should be identified by a reputable soil testing laboratory. Soil samples should be collected from the rooting zone over a broad area representative of the site.

3. Scheduling Revegetation Installation. Revegetation scheduling at high elevations is extremely critical. Research suggests that in northern latitudes, seeding and soil amendments should be applied as late in the growing season as possible so that cold temperatures prevent germination and growth until the following spring. In general, the installation of revegetation at high elevations should coincide with natural seed maturation and dispersal periods. Fall-season revegetation ensures that seeds will receive cold stratification requirements (if any), and that transplants and amendments will be in-place when conditions are suitable for germination and the initiation of growth the following spring when snowmelt occurs. Spring and summer revegetation attempts can be catastrophic at high elevations because optimum conditions are generally only transitory. Soil surface drying is often accompanied by wide shifts in temperature and other conditions, and accessibility to the site can change within short periods of time.

4. Contouring and Shaping. Contouring and shaping of the surface are essential if the site has very steep unstable slopes, sharp ridges, deep depressions that might accumulate water, exposed toxic soil materials, or deep erosion rills. Reshaping should minimize surface soil erosion, yet result in similar slopes, aspects, and contours as natural conditions. Within wilderness areas this may imply substantial hand-labor to modify irregular topographic surfaces, raking, and other operations. Ideally, this operation should attempt to expose the better growing materials while burying the least desirable soils, reduce erosion, and optimize slope conditions that approximate natural conditions.

5. Ameliorative Cultural Treatments. Depending on the results of soil testing (2. above), liming, fertilizing, and organic matter incorporation may be required to ameliorate limiting soil conditions on the site. Lime may be required to adjust soil Ph if metal sulfides are present, or in situations where soil Ph is lower than 5.0. Lime enhances nutrient availability, and lowers the solubility
of toxic chemicals. Organic matter incorporation may be needed to enhance nutrient and water holding characteristics of severe disturbances, and is effective for complexing otherwise available toxic metals in the soil. Fertilizing is often essential to enhance nutrient availability within the rooting zone, especially on severe disturbances where erosion has displaced natural developed soils. Although highly site-specific, normally N, P, and K are required in a balanced quantity.

6. Seeding and Planting Seeding and planting are practices of applying plant materials to the disturbed site to improve plant establishment, enhance colonization, and advance successional development of the revegetation community. Seeding of a mixture of different lifeforms and species should be performed using uniform broadcasting at a rate of about 250 to 1000 seeds m⁻², the higher rates being used on more severe disturbances. These should be raked into the surface soil lightly to cover the seeds to about 1 cm depth to ensure contact between seeds and soil particles, and to retard surface drying. Packing the surface will promote water transfer between soil and seeds. If species requiring light for germination are used, seeds should be broadcast separately after other species are seeded and raked-in. Transplanting may be used on small critical sites where seeding is impractical or impossible due to steep slope conditions, and in areas where species diversity enhancement is required.

7. Surface Mulching A light layer of surface mulch of straw or dried native vegetation will retard surface frost activity, reduce evaporation, and wind and water redistribution of seeds and fine soil particles. Care is needed to apply only enough surface mulch to lightly cover the surface; a general rule-of-thumb is to apply surface mulches at rates that permit the soil surface to remain slightly visible through the individual fibers of mulch used following its application. Surface mulches may need to be secured with string or nylon netting to minimize wind re-distribution following application.

8. Assessment and Management Any proposed work site should be monitored for several years following revegetation to assess the relative success and failure of the various species seeded or transplanted on the disturbance. In addition, control of human and animal impacts may be essential on critical areas until plant establishment and completed phenological development are achieved. Re-seeding and planting together with re-fertilization may be required for several years on particularly difficult sites to enhance plant development until nutrient cycling can sustain self-replacement of the various floristic components of the revegetation community.

Conclusions and Future Research Needs Although the principles of revegetation presented here have been described for high elevation ecosystems, these principles are equally applicable at all elevations in virtually all disturbed settings. In addition, although some of the principles (for instance, contouring and shaping) may appear to require mechanized equipment inappropriate for use in Wilderness areas, numerous acceptable alternatives may be available. Our research work unit has applied these principles using hand tools and human labor within Wilderness areas as well as other backcountry regions where the use of mechanized equipment was impossible, and have experienced excellent results. Native seed has been harvested on adjacent undisturbed areas by hand-stripping, and native straw and organic matter was raked from adjacent communities and hand-applied to the disturbed site. Native duff, grass straw, and other organic debris was applied to the surface of the disturbance and raked in by hand in place of using commercial fertilizer and lime as needed soil amendment. The organic debris complexes metals and provides an excellent nutrient base to enhance plant seeding establishment and development on such disturbed sites. Surface mulches of native grass straw can then be stabilized with rock or loose soil material from the site. The native duff and other organic material carries significant amounts of native seed, and may contribute to species diversity and richness of the revegetated site.

Additional research is needed to better understand the long-term dynamics of ecosystem restoration following revegetation as affected by the physiological tolerances of adapted species, successional processes, nutrient cycling, soil development and weathering, and interactive effects of mycorrhizal and N-fixing symbionts. More knowledge is needed about the relative effectiveness of various revegetation techniques for controlling erosion, for initiating succession, and for sustaining plant community development and biodiversity on disturbed lands.

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THE ROLE OF TRAIL MAINTENANCE AND CONSTRUCTION IN WILDERNESS RESTORATION: JOHN MUIR WILDERNESS CASE STUDIES. Dolly B. Chapman, USFS, Trail Crew Supervisor, Inyo Natl Forest, 873 N. Main St., Bishop CA 93514 (619)873-2461

Introduction: A Wilderness trail must serve to protect the land, as it provides access, and the best solution for a trail problem is usually also the best solution for the resource. First, the trail must be laid out where the users want to go. Most trails have come to exist through need for access and use; more "use trails" will develop if we design and build trails which are inappropriate. Next, we must construct and maintain the trail to withstand whatever level of use it is subject to. Any trail can be built to resist erosion, though the cost may be high for some routes. We cannot conserve money or Wilderness resources by building trails away from the routes that travelers want to use, even though it may cost less initially. Finally, I have found it best to use materials which can be gathered "on site" and to use simple tools to accomplish backcountry trail work, regardless of whether or not we are limited to them by regulations.

Thus, it has become clear to me and to many of my colleagues in the High Sierra, that the objectives of "trail work" mirror some of the objectives of "Wilderness restoration": to prevent and repair damage from erosion, to limit the area impacted, and to use methods and tools most compatible with Wilderness.
Preventing and Repairing Damage From Erosion: Trail "maintenance," meaning regularly scheduled repair of trails and not just cleaning waterbreaks and clearing away loose rocks, is the best way to prevent erosion damage. There are many cases where a long stretch of trail has fallen apart due to poor placement of, or lack of waterbreaks. Good trail maintenance crews learn to recognize and repair these types of drainage problems before any damage occurs.

Sometimes, poor design or lack of maintenance causes trails to become so deeply rutted that we find it impossible to divert water from them. In these cases a "rip-rap" tread (a carefully laid cross between cobblestone and rock steps) can be built in the old trail scar. Rip-rap absolutely resists erosion, even on the steepest grades. It provides much better footing, where there may have been exposed slickrock and boulders; and it fills the trail rut, which may have been cutting into the water table and robbing fragile vegetation of moisture.

Causeways are elevated trails filled with crushed rock that can be built to provide a firm, dry tread across boggy meadows and wet places. A properly built causeway allows some water to seep through it, and includes open, step-across drains at low spots where water will need to flow. Causeways are an excellent solution for trail-rutted meadows when re-routing is impractical.

Limiting Area Impacted: Trails should serve to limit the area that travelers impact. In many cases, building a trail re-route doubles that area. Re-routes are beneficial only if: (1) the new route is a route that will be used, (2) the new location will allow us to design a better trail not subject to the same conditions that allowed the present trail to deteriorate, and (3) there is time, money, and material available for the crew to repair and rehabilitate the old trail scar.

In many cases, travelers continue to use an old trail, or "short-cut" a new re-route. The only way to keep travelers on a trail is to build it where they want it. Some of the worst trails are already built along the best routes available, and re-routing them will only duplicate the problem. Though it is always possible, by using explosives, to put a new trail in an impossible looking place, a trail across blasted rock is subject to freeze-thaw action and can become treacherous as its tread breaks into loose, angular blocks. Furthermore, it may be just as expensive to thoroughly rehabilitate the old trail scar as it would have been to make it a good trail, and it is poor stewardship to simply abandon it. Many abandoned trails continue to erode, to upset natural drainage patterns, and to deposit sediment in streams and lakes. These problems should be fixed even though the trail may be "deleted from the trail system." It is often much less expensive and better for the resource, to repair the existing trail than to build another.

Materials and Methods Most Compatible with Wilderness: Aside from questions of the appropriateness of non-native materials and machinery in the wilderness, there are several practical reasons to insist that backcountry workers use native materials and primitive tools to accomplish their work.

Backcountry conditions will always dictate that trail/resource workers be flexible and innovative, no matter how well we handle logistics. The best trail workers I know take great pride in their self-sufficiency; they can solve almost any problem with fiber tape, baling wire, or a good meal; and they can fix any trail/resource problem with simple tools and native materials. Machines inevitably break down and need parts; crosscut saws and sledgehammers may be slow, but they always run. It gets expensive to try to supply a backcountry crew with just the right amount of culverts, or fence stakes, or geo-textiles. There have been too many cases where the "extra" material was left in the Wilderness. Rocks and soil and logs are on site, ready to use; and ingenious crewmembers can use them to solve any problem.

For some projects, there is no practical way to avoid using machinery, or explosives, or man-made materials, but their use often distracts a crew from the real business of working with the land.

Conclusion: More and more people (especially workers in the field) are seeing trailwork as an important aspect of Wilderness restoration work. Trail workers are considering all the effects that trails (old and new) will have on the Wilderness resource, and trail projects are being integrated with other restoration projects. Trail crews and Wilderness restoration crews can use many of the same tools and techniques to accomplish their work, and they can develop their skills further and increase their efficiency by working together. Most importantly, the net impacts (and costs) of trails will be reduced if we design, build, and maintain them as tools for Wilderness protection.

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CONTRACTING IS A SUCCESSFUL OPTION IN WILDERNESS RESTORATION! 

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Introduction: My partner, Kari Gunderson, and I provide Wilderness Ranger Services in the Mission Mountains Wilderness (MMW) on the Flathead National Forest, Region One, United States Forest Service. For decades we have been the eyes, ears, and hands for the Swan Lake Ranger District in charge of managing the MMW. We provide information and education to the public through on-site personal contacts and through off-site Wilderness Restoration, Education, and Management Programs to all interested publics. Using minimum tool techniques, we open and maintain 65 miles of wilderness system trails. During the 1984 and 1985 field seasons, we collected bio-physical and social data for a comprehensive inventory database. In 1985 we implemented a comprehensive monitoring program for the MMW. Data collected during the initial inventory and re-inventory process measured the changes in biophysical conditions that were degrading the wilderness resource. Decisions were made to begin restoration of some heavily impacted sites where soil erosion was causing or had potential for causing water quality degradation. Some campsites exceeded standards to the degree where they were no longer in compliance with the provisions of the "Wilderness Act of 1964." "Wilderness is recognized as an area where the earth and its community of life are untrammeled by men" and "protected and managed so as to preserve its natural conditions."

Why contract? We have reached a period in resource management when it has become more difficult than ever to ask resource professionals to tackle another responsibility to an already over-booked workload. With the state of rapidly developing and changing "Ecosystem Management Perspectives" there is increasing demand from individuals with specific expertise. Along with contracted expertise, agency interdisciplinary teams are essential to guide the process, ensuring all aspects within the project are taken into consideration, and the best possible outcome is reached. A team management approach will ensure the vast amount of information and technological advancements are incorporated and synthesized into ecosystem restoration. The primary advantage to contracting comes from the agency thoroughly planning and asking the question "what is it we want to accomplish?" From this process goals and objectives can be clearly defined in quantifiable terms with evaluation criteria established. I'm confident in saying we are able to provide the best wilderness ranger services in the nation. I say this not because we're better, more knowledgeable or care more than other wilderness rangers.

It's because our entire field season is spent in the wilderness and the two of us are responsible for 74,000 acres. A Forest Service Wilderness Ranger is typically responsible for 150 thousand plus acres and is often part of a temporary work force. Also, we operate under a Forest Service solicitation that draws specific direction from the wilderness management plan and under our contract the plan has been fully implemented. We have a combined work experience of 30 years in Recreation and Wilderness Management. We have lived adjacent to the MMW for the past 17 years and have developed a working relationship within our community-drawing in local volunteers to help with restoration projects. Most importantly, 100% of the dollars set aside for our contract are spent on the ground in the wilderness.
Who benefits? The resource benefits through increased expertise, attention and care. As contractors we have a vested interest in not only completing our tasks within the specific contract, but to continue forging ahead in developing new strategies to address old problems. Local communities benefit through long term local employment. Agencies benefit through the development of partnerships which help to break down barriers in how we communicate and come together on issues that have been difficult in the past. Kari and I have been told numerous times by visitors that they’re glad we’re still here and feel assured we have a long term commitment to the public and wilderness. Another major benefit to agencies is training. With an increasing number of personnel shifting from other disciplines into wilderness management, we feel we have provided a lot of guidance and suggestions in managing the MMW. Many people we work with are advancing their careers towards supervisory level positions. We try to expose these individuals to as many aspects of wilderness as possible realizing they may become important decision makers in the future. Agencies working together on projects with the public creates increased trust and a better understanding of the agency and their mission.

Can you afford NOT to contract? Currently government has been asked to streamline the way they do business and at the same time become more efficient in fulfilling their mandates. At a time when reduced budgets are more the norm than the exception, the result is often fewer field personnel to get the job done. The Forest Service has contracted out their road building, tree harvest and tree planting to the private sector. Why not wilderness restoration? It takes considerable time to coordinate, train, supervise, and evaluate volunteer projects. Wilderness restoration of impacted campsites and trails is a concern of many users and certainly has been identified as management priority in wildernesses across the United States. The level of restoration research and advancements are staggering. By employing services of a wilderness restoration expert you will receive state-of-the-art knowledge and support in implementing effective strategies. Agency involvment is a MUST during this process! The essential component of wilderness restoration is technology transfer from the contracted experts directly to agency staff. Agency investments need to be made both in personnel and funding. Research has documented long term commitment will be needed for successful completion of restoration projects. We can’t expect a century of human caused impacts to be easily remedied in a short period of time.

Summary:
1. Contracts with well defined goals, objectives and specific cost estimates and time tables have the best chance for implementation when funding constraints prevent the hiring of agency personnel.
2. Contractors can be utilized on an "as needed" basis to provide consultation in arriving at the "Desired Future Conditions" in wilderness.
3. Contracting wilderness restoration projects frees up resource professionals to better address other responsibilities.
4. Agencies can no longer exist in a vacuum and need to pull all available information in to make the best decisions for preserving wilderness.
5. During a time of limiting budgets and increasing demands on wilderness, the need for a combined effort of public and agency expertise has never been more important in reaching our goals to plan, implement, monitor and evaluate restoration programs.

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ARID LANDS RESTORATION IN LAKE MEAD NATIONAL RECREATION AREA BACKCOUNTRY. Jennifer S. Haley, NPS, Vegetation Branch Chief, Lake Mead National Recreation Area, 601 Nevada Highway, Boulder City, NV 89005 (702)293-8951

The Lake Mead National Recreation Area, a 1.5 million acre unit administered by the National Park Service, has nearly 600,000 acres of land that meets the criteria for designation as wilderness and another 115,000 acres that potentially meet the criteria. Most of the park lies within the Mojave Desert, however, over 150,000 acres of land on the Shivwits Plateau is in the Great Basin Desert. Over forty springs are located within the recreation area boundaries. Rainfall over much of the park averages about four inches a year and summer temperatures can reach 120 degrees F.

During its history, the park land has suffered numerous impacts resulting in various degrees of site disturbance. Historical impacts in many remote areas of the park include mining, grazing, and abandoned roads associated with these activities. Common disturbances today include illegal off-road vehicle use, invasion of springs by alien plant species and habitat damage due to feral burros.

A review of ecological features of the Mojave Desert proves that the desert is a very fragile and complicated system in terms of restoration needs. Many of the soils within the park are protected by cryptobiotic or microfloral crusts consisting of mosses, lichens, algae, and fungi. When undisturbed in the desert, these crusts play an important role in soil stabilization, water relations, seed catchment and germination, and protection of the native annual seed bank.

Many soils within the park are protected by desert pavement which is a stone-covered surface on alluvial terrain. Mature desert pavement not only protects the underlying nutrient rich soil from erosion but also reduces runoff, increases infiltration, and retards evaporation. Desert pavement is often covered with desert varnish which is a dark brown to black ferromanganese coat that forms on exposed rock surfaces in arid regions around the world. Archeological evidence indicates that it takes 3,000 - 5,000 years to form a visible coat of varnish and 10,000 or more years to form heavy coats of varnish. Disturbance of these varnished rocks result in the exposure of the light unvarnished surfaces.

Disturbances to the soils result in soils compaction, increased erosion, loss of soil structure, increased bulk density, and decreased plant establishment. Soil disruptions also result in the loss of protective devices including cryptobiotic crusts, desert pavement, and the related safe-sites for seed catchment, emergence, and establishment. Rates of soil regeneration are so slow in arid regions that soils lost may not be replaced for many centuries. To complicate matters further, plant succession on disturbed areas in the desert has not been well studied. However, it appears to generally be a slow process and does not follow predictable successional steps. In addition, germination requirements and transplanting techniques for many desert plants are undetermined.

Spring communities in the park present different ecological principles and restoration needs. Spring systems are highly valued because they provide water to wildlife and support a vegetation community that is unique in the Mojave Desert. Typically, they support a small area of wetland vegetation usually between 0.5 and 5 acres in size. Unfortunately, most of the springs in the park have been highly impacted. Historic impacts include alterations and diversions of spring flows to support mining operations, range improvements to supply water to cattle, recreational development, and over-utilization by burros.

The most significant impact to springs at Lake Mead, however, is invasion of the exotic species tamarisk (Tamarix spp.). Tamarisk is a non-native tree introduced from Eurasia. Seeds are dispersed by wind and seedlings readily out-compete native species. Tamarisk impacts wildlife by directly drawing down surface water levels and by forming physical barriers to animal access. Many agencies and researchers have tried various methods of tamarisk removal. The use of herbicides or heavy equipment appear to be the only effective means of removing this species.

What constitutes a "minimum tool" in arid lands reclamation is greatly complicated by these limiting ecological factors. Our program of site reclamation and research at Lake Mead seeks constantly to refine successful propagation techniques and work processes (including cooperating with other established nursery programs such as that at Joshua Tree National Monument). Ongoing reclamation projects and future projects include reclamation of illegal and abandoned roads, reclamation of abandoned mines, and large scale range improvements on thousands of acres of depleted rangelands. Several spring restoration projects are on-going and include tamarisk removal using herbicides and revegetation with plants grown from locally collected seed. Research includes cryptobiotic crust inoculation studies, germination studies, and an evaluation of succession on disturbances throughout the park.
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ON-SITE RESTORATION TECHNIQUES IN REMOTE MOUNTAINOUS AREAS OF THE PACIFIC NORTHWEST. Russell Drew Hanbey, NATIVE SON RESTORATION, 710 Belmont Place E. #306, Seattle, WA 98102 (206) 860-1732

The Cascade and Olympic Mountain Ranges are dramatic features of the Northwest landscape. They shelter three National Parks, six National Forests and numerous tracts of state, county and private land. The ranges are noted for their deep forests, alpine meadows and snowly peaks. Vertical rise for both ranges moves from sea level to over 3,200 meters atop Mt. Rainier. In between lie three forested zones, temperate, cool temperate, and subalpine. It is within these three zones that the work of the restorationist is focused.

The practice of restoring damaged lands in secluded areas of the mountainous Northwest has presented backcountry workers with exceptional challenges since initial efforts began soon after passage of the Wilderness Act of 1964. Those of us functioning as wilderness field workers for both the Forest Service and National Park Service recognized the need to begin restoration of pristine sites as both an ethical and management obligation.

Decades of abuse from horses, humans and grazing animals has created opportunities for restoration in nearly every accessible pristine tract. Areas most severely impacted are the meadow communities and subalpine parklands of western Washington, Oregon and British Columbia (1,500 to 2,500 meters). Also included are many timberline and middle elevation sites (168 to 1,500 meters) that have housed an endemic variety of lakeside, streamside, and tree clump campsites along with remote resource management agency facilities, such as shelters, helipads and corrals.

Typical impacts included 50-100% removal of vegetative cover, and a modification of plant species composition in regrowth and border areas. Site degradation has also led to disturbances to wildlife and soil micro-organisms, soil compaction, removal of soil organic content, consequent erosion and inability of soil to support plantlife.

Initial efforts were rudimentary and isolated. Impact assessment and people management were the priorities. Restoration was not acknowledged as a major component, and continues today to be considered a luxury item in many agency budgets. However, numerous small scale projects have been undertaken and this work provides the basis for the current body of knowledge.

Early initial efforts took place at the Sunrise area of Mt. Rainier National Park (by John Dalle-Molle and Joe Van Horn), Cascade Pass in North Cascades National Park (by Joe & Margaret Miller and Dale Thornburgh), Image Lake, Glacier Peak Wilderness (by Wendy Walker, Ben Engebright and Bernie Smith), and various locations in Olympic National Park (by Ed Schreiner and Ruth Scott).

Embryo efforts were comprised of such techniques as simple seeding, plug transplants, and the spreading of jute netting. These attempts in the 1970's to repair severely damaged terrain were experimental in nature, but led to successful refinements in the next decade where solid, durable work has taken place in Cascade Pass, Snow Lake of the Alpine Lakes Wilderness, Tipsoo Lake in Mt. Rainier Park, and other locations too numerous to list.
What we have learned is that restoration work in geographically challenging areas, especially in subalpine zones and above, requires a long term commitment (some projects are in their 25th year), resourcefulness, and strong personal involvement by the practitioners in conjunction with the sponsoring agency. Extreme weather, a limited growing season, stability and fragility of the terrain, issues of genetic integrity and biodiversity, and physical remoteness are all mitigating ecological factors that complicate restoration in these backcountry areas. Consequently, subtle on-site techniques, along with off-site greenhouse propagation programs, have become the dominant treatment methods. These techniques have replaced massive re-landscaping with mechanized equipment and reliance on non-native soils, amendments, and agronomic plant species.

On-site approaches typically rely on localized resources to prepare, vegetate and manage a site. These approaches have improved in sophistication as horticulture, landscaping, bioengineering and other disciplines have been tapped for their knowledge. Current practices use site stabilization, native landscape design, on-site propagation techniques, and ongoing site maintenance systems. Off-site propagation programs are not uncommon, but are inherently expensive, time/labor consuming, and logistical headaches.

It has been found that disturbed sites in mountainous terrain will respond to horticultural techniques. Once a site has been stabilized using traditional erosion control techniques, such as check dams and willow brush layering, then the work of soil preparation and naturalizing begins. Occasionally, commercial mulch matting is used to secure a site and provide protected growing conditions. Natural mulching is preferred. As the site preparation takes place, an eye toward naturalizing the site should occur. Utilizing nearby "reference communities" lends itself to the process of visual and physical duplication of a restoration site that is ecologically similar to nearby terrain.

Installing rocks, logs, and other indigenous debris while the site is prepared helps create planting areas, and naturalizes and stabilizes the site. It also enhances the long term ability of the area to capture seeds, provide shade, retain moisture, and protect plants from both wind and trampling. These larger landscape features comprise the foundation of a multi-dimensional approach to remote site restoration that goes beyond simple installation of early successional plants.

The acquisition of plant material is easily the biggest challenge in backcountry restoration work. This becomes uniquely problematic with the need to maintain the genetic purity of plants used in designated wilderness areas. An acceptable "collection radius" for propagative materials needs to be established.

Early efforts at restoration relied on the use of transplants from nearby areas. Though currently used in a selective way, field transplants from nearby, undisturbed zones, are discouraged. What is not dismissed is the use of plants recovered from nearby work projects. This is equally true for soil salvaged from these sites, which might result from new trail construction or campground development. Reusing soil from these soil banks has proven to be effective in both Yellowstone and Yosemite National Parks as dormant seeds and soil organics are saved through the process of soil salvage. Additionally, plugs of perennials taken from plant recovery operations can be divided on the spot to increase the number of propagules in a given area.

The dependence on early successional plants as the sole plant variety is giving way to plant combinations involving small shrubs such as Vaccinium ovalifolium (Oval Leaf Huckleberry) and Spiraea douglasii (Douglas Spirea) and small trees such as Pseudotsuga menziesii (Douglas Fir), Abies amabilis (Pacific silver fir), and Thuja plicata (Western Red Cedar). These have been shown to respond to root pruning as a method for improving transplant survival, just as similar species have done for decades in commercial nursery operations. Tip and branch layering deciduous species have shown great promise as on-site sources of upright plant material that are genetically identical to indigenous species. Initial success with direct planting of 1-0 and 2-0 plugs (derived by Silvicultural program from local seed sources) was also achieved by Mt. Baker District Backcountry Supervisor Alan Schmierer (end speaks also to the success and desirable cost-sharing to be marshalled from interdisciplinary teamwork).

Seeding on-site under sheets of plastic has shown to be effective in a variety of rugged and remote locations. This procedure was developed at North Cascades National Park by Bill Lester in 1988 and provides an exciting alternative to the low to non-existent growing rates of seeds randomly broadcast on scoured soil. In this procedure, the practitioner spreads seed from pioneer species plants collected on-site, covers them with 4 mil. plastic, and monitors moisture and circulation as seedlings emerge.

Plant and site maintenance after restoration efforts is a major concern. Current systems include temporary wetting systems, natural mulching, shading and wind barriers, and people management programs.

Currently, backcountry restoration in the western mountainous slopes of the Northwest is a line item in the budget of the Park Service. Though limited, the funding provides staff, supplies, and greenhouse support for most projects. Within the Forest Service, restoration is often attached to larger recreation projects or emergency allocations such as flood management. An especially effective Forest Service subalpine rehabilitation project is the Heather Meadows complex surrounding the Mt. Baker ski area in the Mt. Baker-Snoqualmie National Forest. Trails coordinator, Scott Paul, has been very successful in diverting trail construction monies into related seed collection, plant salvage, and trailside rehabilitation efforts.

On-site restoration practices in remote and sensitive areas are still in an infancy stage as a paradigm for overall success. Selective pruning, composting, soil seed banks, plant rotation, air layering of evergreens, soil solarization, and on-site, self-contained seed
EXOTIC VEGETATION MANAGEMENT IN GLACIER NATIONAL PARK.  
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INTRODUCTION: Glacier National Park (GNP) is a rugged, mountainous preserve of 1,013,595 acres characterized by spectacular topography, active glaciers and unique biotic communities. It is recognized as one of the world's most significant natural areas, and represents a component of the Northern Rocky Mountain ecosystem. The park is located at the center of one of the largest wild ecosystems of the Rocky Mountain chain—an internationally significant location from the standpoint of scientific, aesthetic, and conservation values. Native plants are an important natural resource in national parks. The Park is the meeting ground for species representing five major floristic provinces, including the Northern Rocky Mountains, Great Plains, arctic-alpine, Pacific slope and boreal.

The backcountry of Glacier refers to Park lands that are essentially undeveloped or natural in character, at least 250 feet from established roadways and developed areas and are located in the Park's natural zone. This encompasses the areas within Glacier that are proposed by Park management to be included in the National Wilderness System as provided for by the Wilderness Act of 1964 and are managed as such. This totals approximately 963,155 acres or 95% of the Park.

One threat to the integrity of the Glacier ecosystem is the invasion and spread of non-native (exotic) plants. Most exotics in Glacier have a strong association with disturbed areas such as roadides, construction projects, old homesteads, grazed fields, flood plains and utility sites. Removal of topsoil and vegetative cover creates favorable microhabitats for exotic colonization. Spread beyond centers of infestation occur by transport of seeds by visitors, animals, wind and water.

The flora of Glacier includes more than 120 species of exotic plants which have been intentionally or inadvertently introduced by modern man. A number of these species are increasing in quantity, area and density. This presents a problem for the perpetuation of native plant communities and hence the quality of wildlife habitat in the park. It also impacts the quality of recreation and increases the potential for spread to the pristine backcountry and to lands outside the Park.

An Exotic Vegetation Management Plan for Glacier National Park is prepared in response to a growing concern about the spread of non-native (exotic) plants in the Park. A five year course of action is proposed for management of exotic plant species, while keeping the integrity of other Park resources intact. The goal of this plan is to preserve biological diversity of native flora by containing and/or controlling exotic plants.

PLANNING STRATEGY: To make progress in addressing the number of exotic plant species and their dispersal in the park, it is necessary to prioritize work efforts. Considerations that park staff have used in setting priorities for planning strategy and implementation of management actions include:

1. Plant Community: There is evidence to indicate that the structure and site conditions of a plant community have significant influence on the capability of exotics to invade and establish colonies. Factors that are significant include habitat type, aspect, moisture, canopy coverage, soil, geology and competition. Three descriptions used to classify an infested site for management action include vegetation structure, canopy coverage and moisture. Based on investigative studies, the highest priority for control is given to dry fescue grasslands.

2. Categories of Exotic Species: Given the differing characteristics of exotic species in the park, it is helpful to rank species into categories for management action. Individual exotics are not all equal from biological as well as management perspectives. An
Exotic Species Ranking System was used to provide objectivity to the placement of species into categories. Emphasis is on significance of impact and feasibility of control. Each of Glacier’s exotic species has been tentatively classified into one of five categories. Within this scheme, Category 1 species have the highest priority for management actions, while Category 5 species have the lowest priority. Monitoring and other investigations since 1983 have documented the persistent spread of exotic plants in Glacier National Park. Two species, spotted knapweed (Centaurea maculosa) and leafy spurge (Euphorbia esula) have been shown to be aggressive and capable of altering the structure of fescue grasslands. Two other species, St. Johnswort (Hypericum perforatum) and sulphur cinquefoil (Potentilla recta L.) have continued to spread since initial observations. Grassland communities had four times more exotics than conifer forests. The invasive nature of exotic pasture grasses, common timothy (Phleum pretense), and Kentucky bluegrass (Poa pratensis) are also a serious concern.

3. Regional Priorities: Glacier National Park seeks to comply with state and county regulations concerning noxious weeds. Montana has officially designated ten plant species as “Category I Noxious Weeds.” The state defines Category I Noxious Weeds as those requiring management action “to control or suppress existing infestations, or prevent...new infestations” because “these weeds render land unfit or greatly limit beneficial uses.” State, County and private lands are required to carry out these control actions, often at considerable expense. Five of these ten species have been documented in the Park: Canada thistle, field bindweed, leafy spurge, spotted knapweed, St. Johnswort and sulphur cinquefoil.

MANAGEMENT ACTIONS USING INTEGRATED PEST MANAGEMENT Integrated Pest Management (IPM) is the procedure selected to control exotic plants in Glacier. This approach targets an individual plant species, then selects the method or combination of methods that will best achieve the desired management result, as follows: (1) Inventory and Monitoring: Inventory the occurrence of all exotic plant species and monitor the status of their spread, (2) Investigations: Conduct research and experimental investigations in order to determine effects exotics exert on the biological community and the results of management actions, (3) Public Information and Involvement: Educate the public of the exotic plant issue with information and provide opportunities for involvement, (4) Prevention of Dispersal: Prevent the introduction of new exotics and the spread of current species, (5) Control of Established Exotic Species: Reduce the number, density and area of invasive and aggressive exotics.

ALTERNATIVES FOR CONTROL Managing already occurring populations of exotics follows a four phase management model.

Phase 1: Identify areas of infestation. This is a surveying action which consists of identifying areas of infestation by specific exotics in the Park.

Phase 2: Assess potential threat of exotic populations: Monitoring documents change in community structure and composition through time, and determines the threshold and injury levels of the exotic populations.

Phase 3: Consider alternatives for treatment: Before attempts to reduce or contain an exotic population are made, control options are evaluated. This consists of a review of relevant scientific literature, references and field experiences. If an environmental assessment is required it is written based on site specific project plans.

Phase 4: Evaluate treatment effects. The effects of treatments on exotic populations and on associated native species are monitored. Results of evaluation are the basis for continuation, modification or discontinuance of treatments.

Prior to implementation of control actions, site specific IPM Action Plans are completed. Environmental assessments may also be included that evaluate consequences of the proposed actions. Control refers primarily to reducing or containing identified populations of exotics. Treatment refers to the actual method of control. An IPM approach involves a combination of alternative treatments including:

1. Mechanical treatment: The use of tools to remove the exotics by cutting or digging. Hand tools are used to cut or dig out exotics in the backcountry, riparian areas or waterways where machinery or herbicides use is unlikely.

2. Cultural treatment: Provides competition, stress or control by revegetating, pulling or burning exotics. The effectiveness of hand pulling as a weed management tool varies based on the target species, site condition and plant density. It is extremely important that sufficient native species are present to occupy niches exposed by the “pulled” weed. Pulling is an effective control technique when plants occur in small colonies of .5 acre or less. Some disadvantages of pulling is the disturbance to the soil which may increase opportunities of seeds within the soil to germinate. Revegetation operations are closely tied to exotic plant prevention and control projects. Restoration of native vegetation may be necessary at sites where native species have been removed. Site preparation, native plant material and mulches may be used in disturbed sites to reduce susceptibility to invasion by exotics and to prevent erosion.

3. Biological Treatments: Are used to reduce the weed density to tolerable levels. Implementation of biocontrol is best suited to large dense infestations in poorly accessible areas, and is part of the long-term strategy for exotic plant control. Decisions on whether to introduce an exotic species is undertaken only after rigorous review of the proposal and host specificity screening. Non-native plants and animals may be introduced into the backcountry to control exotic plants, however, no releases are planned at this time.

4. Chemical Treatments: Kill the exotic plants by hand spraying directly with herbicides. Control of exotics using herbicides is based on the determination that there is risk from exotics to resources, and that other control methods are unacceptable. Areas within
and adjacent to the developed zone may be considered for herbicide application. However, use of herbicides has not yet been an alternative treatment selected for the backcountry in Glacier National Park.

The backcountry of Glacier is the least affected by human disturbance. The highest priority is given to maintaining the relatively undisturbed ecological features of this area. Elimination of all exotics from the backcountry is not feasible. However, elimination of a high priority exotic population is warranted, especially if its distribution is still limited.

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43
MANAGING NORTH CASCADES NATIONAL PARK'S REVEGETATION PROGRAM. William L. Leaster, NPS, Chief Ranger, Pinnacles National Monument, Paicines, CA 95043 (408)369-4485

By the time North Cascades National Park was established in 1968, like most Northwest wilderness and backcountry areas, the subalpine impacts had been accumulating for more than 25 years. In 1965 the Forest Service began rehabilitation efforts in the Cascade Pass region and implemented camping and fire restrictions. The Cascade Pass region was easily accessible and had been severely impacted. The Park Service adopted the same management techniques as the Forest Service. The parks first superintendent, Roger Contor, contracted the services of Dr. Dale Thornburgh to survey Cascade Pass. Dr. Thornburgh recommended revegetation efforts to repair the more than 45 campsites.

Initial Revegetation Efforts In 1969, Joe and Margaret Miller, who were retired, were asked to implement some of Dr. Thornburgh recommendations. Little did they realize the projects would last more than 20 years. The Millers realized that if they were to reestablish the area, they would need a good plant source while at the same time, protect the genetic integrity of the pass. In 1970, there were a lot of myths regarding subalpine plants: the plants could not be propagated from seed; the plants would not grow at sea level; and if propagated at sea level, would not survive transplanting. Throwing caution to the wind, the Millers carried plants from the pass down to their greenhouse near Seattle and started propagating plants by division. The next fall, they carried the plants back up the 1800 feet to the pass, with the aid of friends.

The Millers were not the first to propagate subalpine species, but they were the first to see the real value and possibilities that could be achieved. Joe and Margaret started what is now the standard method for large scale restoration projects. They knew and made it clear to park management, that revegetation was only one aspect of managing wilderness areas. Without an integrated program of patrols, information and maintenance revegetation was only a very temporary solution. What the Millers really started was a revolution in subalpine restoration and wilderness management; a revolution that changed the way the Park Service looked at its responsibilities in managing wild lands.

Greenhouse Operations By 1976, an "A" frame greenhouse was constructed and in 1978, the best production year, 800 native plants (Luetkea pectinata, Carex nigicens, and C. spectabilis) were grown and transplanted at Cascade Pass. Propagation was still primarily done by division and cuttings. Two years late in 1980, a 20 x 40 foot greenhouse was constructed. This unheated greenhouse was used for about 5 1/2 months, April to Mid-September, when weather and growing conditions were favorable.

Wintering To increase the fall production, a method of wintering "parent" plants was needed. Plant material had to be available in the early spring to have enough time to propagate a plant mature enough to transplant by the middle of September. Several methods of wintering over "parent" plants were tried and it was discovered that burying the plants in 6 to 8 inches of saw dust provided the best survival rate. The wintering process had to be simple and require little maintenance since there was only one person available to put the plants away and bring them out in the spring. The number of "parent" plants wintered over limited the number of plants propagated per season. 2000 plants were the optimum number wintered over and if everything went well, 6000 plants could be propagated for transplant. The ratio of 2000 to 6000 remained static for about 7 years. There was a draw back to this method, we were cloning plants from a relatively small gene pool.

Seed Propagation Experimenting with seed propagation had been on going for several years, but with little success and a lot of frustration. The thinking at the time was that subalpine plants rarely produced fertile seeds, and even with fertile seeds, the germination requirements were thought to be very complicated. During an experiment using a bottom heat test, the thermostat failed and increased the soil temperature to 30 degrees C. Seed germination was achieved within 10 days. Other experiments revealed the most successful germination occurred when the seeds were sowed on top of the soil then stored over the winter in the dark in an unheated storage room. In the spring, the seed trays were covered with a plastic dome, places on propagating mats, and exposed to grow lights 16 hours per day. Finding the combination for successfully propagating subalpine plants from seed was the single most important discovery to date. Greenhouse production in the second year more than doubled and generic diversity was no longer a concern. "Parent" plants were no longer required and this saved time in the fall and spring. After seven seasons of collecting seeds, there was never a bad seed crop if the seeds were properly cared for after collection.

Field Seed Propagation Direct field seed propagation was a natural extension of the techniques learned in the greenhouse. During the summer of 1987, Carex was successfully propagated at two sites near Cascade Pass. Seeds were sown and covered with
plastic sheeting, creating a micro-climate that produced favorable conditions for seed germination. Direct field propagation required personnel to be in the area to monitor the site. The Forest Service has used the technique of direct field seed propagation on more occasions than North Cascades with good success. This type of propagation, and others yet to be developed, hold the greatest hope for large scale rehabilitation projects.

**Funding and Equipment** There has never been a stable funding source for operating the greenhouse or revegetation projects. The most ever funded was $500 annually from base funds. Therefore it was necessary to develop creative funding sources. Our neighboring USFS District received funding for a large project at Heather Meadows near Mount Baker and we propagated 20,000 plants for them at .50 cents per plant. We also received funds to propagate native plants for landscaping around the new Jackson Memorial Visitor Center. A donation box in the visitor center took in about $300 annually which was utilized to fund projects. Grants from Skagit Endowment funds enabled us to fund projects for 3 seasons. In 1991, we received our first NPS support money. Natural Resource Preservation Program provided a total of $157,000. The funds were used to build a new greenhouse and support the revegetation program for 3 years. This was truly a stimulus package. Over a three year period, the Greenwood Nurseries of Seattle, donated more than 10,000 pots and 500 flats. Later we were able to tap into the illegal drug growing operations. Once a case was settled, the sheriffs office would donate confiscated equipment (lights, pumps, pots, flats and full range of propagating equipment). The quality of this equipment was better than anything we could afford.

**Staffing** From 1980 to 1988, a student from the Student Conservation Association helped us with the greenhouse and as many as 4 additional students helped with monitoring and revegetation. Without their support it would have been impossible to achieve what we the accomplished. In the spring the Seattle Mountaineers and Washington Native Plant Society donated time for preparing for the propagating season and in the fall they returned to help transplant. During a couple of particularly bad years, there were no positions funded to work in the greenhouse and it was necessary to operate the greenhouse with the regular staff. The information and wilderness staff were required to work two days during the summer in the greenhouse and on occasion when the YCC needed some extra work, we utilized them as well. Another good source for help was to host a revegetation seminar. We would have the help of more than 30 students during a weekend seminar.

**District Organization** While the greenhouse and revegetation programs were successful for a variety of reasons, one of the primary reasons was the organizational structure of the Wilderness District of North Cascade. The District Ranger, was responsibility for all activities in the district except trail maintenance. This included permits, revegetation, monitoring, patrols and information. Wilderness patrols by rangers were used to provide visibility and resource protection. These rangers were assigned to patrol an area and were given the task of knowing the area better than anyone else. They were to know where the impact sites were, where illegal camping was likely, and what maintenance tasks were needed. They were responsible for the overall management of their area and were held accountable for quality of the wilderness they managed. Since visitor use patterns changed from week to week, and a newspaper article could attract hundreds of visitors to a particular wilderness area, all functions had to work together. The information center would inform visitors of current projects and their responsibilities as visitors using the wilderness.

**Factor of Success** The single most important factor of the success of the revegetation and wilderness programs is the dedication of the staff. The commitment of the staff over the years has been to the ideals of servicing and educating the visitor to leave the wilderness better than they found it and above all else, speaking loud and clear for future generations. They have been and continue to be the voices for wilderness preservation.

REFERENCES


WILDERNESS RESTORATION: WHAT ROLE DOES IT PLAY IN MANAGING RECREATIONAL IMPACTS? Jeffrey L. Marion, NPS, Research Biologist and Unit Leader, NPS-Cooperative Park Studies Unit, Virginia Polytechnic Institute, 304 Cheetah Hall, Blacksburg, VA 24061-0324 (703)231-8603

Introduction. Environmental change is an inevitable consequence of recreational use in wilderness environments. Such changes have the potential to impair the functioning of natural ecosystems and processes and the quality of recreational experiences. Managers therefore consider these changes to be "impacts", which should be prevented where possible, minimized where unavoidable, and eliminated through restoration when unacceptable.

This paper describes the role of campsite and trail restoration in the management of wilderness recreation impacts. A variety of use-related, environmental, and managerial factors are subject to manipulation by managers in their efforts to prevent, minimize and rehabilitate such impacts. The decision process regarding the selection of restoration as a tactic in the management of recreational impacts is reviewed. Restoration practices for addressing campsite impacts are illustrated through brief case studies of two wilderness area restoration programs. Finally, the Minimum Tool Principle is described and its implications for wilderness restoration are discussed.

Recreation Impact Management. Restoration must be considered as one of many options available for managing the environmental changes resulting from recreational use. Its selection from among these options begins with a consideration of the management framework that guides manager's decision making. With increasing frequency, wilderness managers are turning from management frameworks based on carrying capacities, which emphasize the regulation of recreational use, to Limits of Acceptable Change (LAC) frameworks, which emphasize a wider spectrum of solutions to recreation management problems (Stankey et al. 1985, Graefe et al. 1980). LAC frameworks require managers to define desired environmental conditions, select resource indicators and standards that reflect those conditions, and employ monitoring to periodically compare the standards to current conditions. The standards explicitly define the maximum allowable "acceptable" change. When standards are exceeded managers must evaluate the causal factors and select and implement the most appropriate and effective management tactic(s) to remedy the deficient conditions.

An advantage of the LAC approach is that objectives and standards more explicitly define when changes become management problems that require some type of action. Some environmental change is unavoidable if recreational use is to be accommodated. A second advantage of LAC is that it defines a decision process that guides managers in selecting strategies and tactics based on an evaluation of problems and their underlying causes. Such an evaluation considers recreational factors as well as their interrelationships with environmental and managerial factors. This approach recognizes the complexity of problems and their causes and emphasizes the selection of effective and appropriate solutions from a range of potential options.

Cole et al. (1987) offer further guidance regarding the selection of strategies and tactics for dealing with common wilderness recreation problems. They describe eight general strategies, which are defined as broad, conceptual approaches to management, which attack the basic causes of problems (Table 1). Numerous tactics or specific actions are also described for implementing each strategy. The authors caution managers to "Choose strategies that attack the primary causes of the specific problem and tactics that do not conflict with management objectives, that are realistic given the visitor use, environment, and management situation, and that minimize costs to visitors and avoid or reduce unwanted side effects".

A primary goal of wilderness management is the prevention of impacts that are avoidable. This goal might be achieved through strategies which prohibit recreational use in fragile environments or during times when vegetation or wildlife are particularly susceptible to disturbance. Type of use and visitor behavior might also be regulated to prevent particularly damaging practices. Another wilderness management goal is to minimize those impacts which are unavoidable. This goal might be achieved through a strategy of visitor dispersal encouraging off-trail hiking and camping, or visitor concentration emphasizing formal trails and designated campsites. Visitor education through a Leave No Trace educational program represents another strategy for minimizing impacts. A final wilderness management goal is to eliminate unacceptable impacts through restoration. The objective of restoration is to return human-impacted resources to their natural state. It is the primary strategy associated with this goal.

Restoration will do little to permanently resolve recreational impact problems unless the causes are also effectively addressed by management. This is important to note because restoration as a management tactic merely treats symptoms—the impacted areas. Clearly, restoration should not be selected as the only tactic for addressing a wilderness management problem. The cause(s) must also be addressed or the problem will simply reoccur. An exception might be preventive restoration, in which visitors are directed

<table>
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<th>Wilderness Recreation Management Strategies</th>
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<td>1) Reduce use of the entire wilderness</td>
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<td>2) Reduce use of problem areas</td>
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<td>3) Modify the location of use within problem areas</td>
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<td>4) Modify the timing of use</td>
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<td>5) Modify type of use and visitor behavior</td>
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<td>6) Modify visitor expectations</td>
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<td>7) Increase the resistance of the resource</td>
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<td>8) Maintain or rehabilitate the resource</td>
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to travel and camp in impact resistant or resilient areas.

Defining Restoration. In the context of wilderness management, restoration may be defined as the act of restoring natural resources to their former unimpaired condition. The term restoration is typically reserved for active forms of human intervention which enhance the recovery of disturbed resources. However, unassisted recovery may be considered as a special form of "natural" restoration. Finally, restoration is similar but not synonymous with rehabilitation, which seeks to restore the resource to a good or improved condition.

At the ecosystem scale the goal of restoration is to return the ecosystem to pre-Columbian conditions and processes, or, ideally, to the condition it would be in had the Europeans never colonized the continent. Clearly this is difficult to define or achieve. The goal is similar but somewhat more manageable at the scale of a trail or campsite. Here, the goal is to return the area to the natural conditions that would exist had the trail or site never been created. If defined in the broadest sense, restoration can include elements of site selection and maintenance. For example, managers might select or encourage visitors to travel and camp in areas which are resistant to recreational trampling. Alternately, managers might encourage use of the most resilient environments so that impacted areas will more quickly recover from disturbance. These actions might be considered a form of "preventive" restoration. Restoration for established trails and campsites can include elements of rehabilitation, such as adding soil to eroded areas to encourage their use and discourage trail or campsite expansion. And finally, restoration can be applied to closed trails or campsites or unnecessary portions of these features to speed the recovery of natural conditions.

Restoration Literature. Before initiating a restoration program, managers should consult the literature for guidance. Although dated, the best guide to the restoration literature is a report titled "Impacts of backcountry recreation: Site management and rehabilitation; An annotated bibliography" by Cole and Schreiner (1981). A selection of references, including more recent publications, are included at the end of this paper. The most comprehensive managerial guide is titled "Disturbed site restoration: An introduction to principles and techniques", edited by Olds (in press).

Campsite Restoration in the Shenandoah National Park Wilderness. Shenandoah National Park, located in central Virginia, has 110,000 acres of backcountry with 80,000 acres designated as wilderness. Camping is managed under a dispersal strategy which directs visitors to camp out of sight of trails and other groups and to forgo campfires. In response to significant recreation impacts from high visitor use in the 1970's, the park initiated a campsite restoration program in 1981 as part of a campsite inventory and rehabilitation study (Marion and Haskell 1988). A variety of restoration treatments have been employed, including soil loosening and incorporation of organic leaf litter, erection of "No Camping" posts, and placement of large rocks, branches, and small logs within sites and across site access trails. The objectives of the program are to reduce the number and hasten the recovery of illegal campsites, particularly those closest to trails that receive repeated use. In addition to the campsite restoration program, a low-impact brochure is distributed to all backcountry overnight visitors through a permit program.

The dispersal strategy and restoration program has met with mixed success. An inventory and campsite monitoring program initiated in 1992 found 685 campsites, 58 percent of which were within sight of park trails (Marion 1993). However, results from the survey a decade earlier indicated that approximately 80 percent of the campsites were within sight of park trails. Restoration efforts may be partly responsible for the decline in illegal campsites but repeated use of "restored" campsites have prevented a higher level of success. Typically, the most effective approach to preventing further use of sites has been the temporary placement of "No Camping" posts on illegal sites, a practice managers reserve as a last resort. The park is currently revising its Backcountry and Wilderness Management Plan, which calls for the development of designated campsites in popular backcountry areas and a stronger emphasis on low-impact camping on previously unused sites in remote areas. The role of site restoration is more explicitly defined under each form of camping.

Campsite Restoration in the Boundary Waters Canoe Area Wilderness. The BWCAW, located in northeastern Minnesota, includes over 1 million acres. The Forest Service employs a concentration or containment strategy for minimizing campsite impacts. Visitor access to the wilderness is regulated through an entry point quota system but once inside visitors may camp in any of the approximately 2000 designated campsites. The BWCAW has a long tradition of restoration work beginning in the mid-1960's to expedite the recovery of acquired resort and cabin sites, and logging camps. This work was extended to newly closed campsites following implementation of the designated camping policy in 1975. Beginning in 1982 the restoration work was expanded to include rehabilitation and site maintenance work on campsites not closed to use. The objectives of this new program are to keep campsites open and in good condition through by reducing both the area and severity of impact at each site.

Work begins with an evaluation of campsite conditions, site layout, and environmental attributes. Site-specific restoration and maintenance prescriptions are then prepared for each site to direct the field crews who perform the work. The specific restoration practices are highlighted below, a more detailed description can be found in Marion and Sober (1987). Campsite expansion has been addressed by subtly improving tenting locations within core campsite areas and restoring peripheral or satellite use areas. Future use is discouraged in these peripheral areas by embedding large rocks, digging shallow pits and mounding soil, and transplanting locally available small trees and shrubs. Loss of vegetation cover is minimized by enching fire grates to, either bedrock outcrops or the soil to concentrate activity in a single resistant location. Clumps of trampling resistant grasses are often transplanted and occasionally grass seed, obtained from companies specializing in highly pure native seed sources, has been used.
All campsites are water accessed so shoreline boat landings are also evaluated. Landings with bedrock or cobble at the shoreline are favored, unnecessary landing sites and use areas are closed and restored. Soil erosion is addressed through rockwork to harden the site and channel foot traffic.

The Minimum Tool Principle. Both of the restoration programs described above evolved out of the need to provide for wilderness camping opportunities while maintaining impacts within acceptable levels. However, the appropriateness of these efforts and the practices they employ must be judged in light of recognized wilderness management principles. One such principle, the Minimum Tool Principle states that only the minimum regimentation necessary to achieve established wilderness management objectives is justified (Hendee et al. 1990). This and other wilderness management principles imply that restoration work should be ecologically and visually less obtrusive than the human impacted conditions the work seeks to erase. Vegetative stock or seed should be native to the area and propagated from the most local sources. And clearly, managers should use only locally available materials which will easily blend with the natural environment.

Managers must be vigilant in questioning the appropriateness of their restoration work. How much resource manipulation is justified in the restoration of natural conditions? Which techniques are most appropriate? Which materials should be used? Finally, managers must strive to balance preservation objectives with the provision of appropriate wilderness uses. The essential challenge for managers is to prevent avoidable impacts, ensure that unavoidable impacts do not exceed acceptable levels, and, when necessary, restore areas affected by human use to natural conditions.

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THE SIGNIFICANT ROLE OF BACK COUNTRY HORSEMEN IN WILDERNESS RESTORATION PROJECTS. Jim Murphy, President, Washington Chapter, Back Country Horsemens of America, 11839 Glenwood Rd SW, Port Orchard, WA 98366 (206)895-0656

Back Country Horsemens of America (BCHA) is an organization of over 8000 recreational stock users in 72 Chapters in ten Western states. BackCountry Horse men and women are conservationists concerned about care of our wildlands. During 1993 BCHA has documented 30,000 hours of volunteer work plus horses and equipment, for a $500,000 value to public agencies. Because it is

49
difficult to collect accurate volunteer data, we estimate that the real scope may be as large as three-times what is documented.

The purposes of Back Country Horsemen are: (1) To perpetuate the common sense use and enjoyment of horses in America’s back country and Wilderness, (2) To work to insure that public lands remain open to recreational stock use, (3) To assist the agencies responsible for the management of public lands, and (4) To educate, encourage, and solicit active participation in the wise and sustaining use of the back country resource by horsemen and the general public commensurate with our heritage. Volunteer service and user education are primary objectives of our organization.

The obvious advantage of stock use in the back country is the ability to pack heavy loads of material and supplies. However, due to the work involved in raising, handling and caring for stock, and in maintaining the necessary facilities, horse men and women have a wide range of hands-on skills in the type of work required in the back country. Some of these are primitive skills. These skills coupled with their individual profession make a Back Country Horsemen volunteer a valuable resource not common in other user groups.

Back Country Horsemen have participated in a wide variety of volunteer work projects with public agencies. These projects range from assistance in planning a project, to training agency personnel, to actual work in the field. Some examples and illustrative slides are as follows:

- Packing and camping clinics emphasizing “gentle on the land” techniques; distribution of wilderness ethic information
- Clean-up and pack-out of garbage from Wilderness camps
- Wilderness trail clearing and maintenance
- Removal of old puncheons or bridges and construction of new
- Familiarization of agency “summer employees” on proper stock use, handling, and minimum impact camping techniques
- Pack-in of material and equipment for other volunteer organizations
- Construction of facilities for handicapped persons to mount and dismount from a horse

An instructional Guidebook is published by Back Country Horsemen covering horse use in the back country with emphasis on minimum impact horse handling and camping including weed-free feed. These books were originally published in partnership with the U.S. Forest Service. Copies are available by writing to BCHI. BCH of Idaho has produced a 12-minute video presenting “gentle on the land” horse use. A 60-minute video is in the final stage of production and covers complete preparation of a back country pack trip emphasizing minimum impact methods. This video will be available later this summer.

Agency personnel working with volunteers should be aware that there is a limit on the size and duration of projects that volunteers can take on. Most volunteers have a career of their own, so volunteer work is at best part-time. Larger projects would properly belong in the professional Outfitter category. One area which will sometimes discourage volunteers is the cost of travel to and from the work site. If funds are available, paying mileage is a big help.

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ARE REINTRODUCTION GUIDELINES COMPATIBLE WITH "MINIMUM TOOL" REVEGETATION IN WILDERNESS?

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Introduction The issue of reintroduction of threatened and endangered species has generated considerable discussion and debate over the past several decades. Historically, the success rate has been low. For example, Hall (1987) evaluated 15 ces of transplanting as mitigation for environmental impacts in California and found that only 4 (27%) of the 15 cases were 100% successful. Similarly, in the United Kingdom, Birkinshaw (1991) reviewed 144 translocations and found that only 22% were extent after 5 years. For the purposes of this paper, I will use the common North American use of the word "reintroduction" to refer to all types of translocations—introductions, augmentations, reintroductions, or re-establishments.

The controversy over this management option has been overwhelming because of the uncertainties associated with the technique. The uncertainties surrounding reintroduction are immense and include some of the following questions:

- What effect will reintroduction have on the natural population(s)?
- Who should decide if reintroduction is feasible or appropriate?
- Who conducts reintroductions?
- What is a well-designed reintroduction?
- What is the appropriate source of genetic material for a reintroduction?
- Where do we reintroduce a species?
- How do we measure success and how much time should elapse before we declare success?
- How much should be invested in a reintroduction?
- Why conduct reintroductions?

These are just a few of the myriad of questions concerning the use of reintroduction (for a more thorough discussion, see Falk and Olwell, 1992). Yet, despite these and other uncertainties, reintroduction is viewed as a viable conservation tool in the recovery of threatened and endangered species. In fact, almost 25% of the federally listed plants, as of 1990, have reintroduction included as part of the recovery process. And 79% of those recovery plans have reintroduction as a recovery criterion for downlisting or delisting the species under the Endangered Species Act.

The Center for Plant Conservation, as the custodian of the National Collection of Endangered Plants, found itself in the middle of the debate on the use of reintroduction as a conservation technique in the recovery of endangered plants. The National Collection consists of over 430 rare plant taxa and is housed and maintained at the 25 gardens and herbariums that are in the Center's network of Participating institutions. This germplasm collection, whose primary function is as a hedge against extinction, is available for rare plant recovery, research and educational purposes. Frequent requests were made of the Center and its affiliated gardens to participate in reintroductions, either by providing plant material or by conducting the reintroductions.

In determining if reintroduction was an appropriate use of the National Collection of Endangered Plants we quickly realized that there was no clear answer, nor were there any clear guidelines on rare plant reintroductions. Thus began the concept of our 4/20-22/93 conference, "Restoring Biodiversity: Is Reintroduction an Option for Endangered Plants?" (St. Louis, Missouri). It was our intention to bring together the experts and practitioners to discuss the strategic, political, biological, technical, and ethical issues surrounding reintroduction. With this in mind, we set up a steering committee of nationally recognized individuals to assist us in analyzing the existing policies and in developing the agenda for the conference and the outline for the proceedings, which will be published in book format with national guidelines as an Appendix.

Policy Analysis A policy analysis by Dr. Linda McMahan, based on 21 documents written during 1987-92. These documents were from a broad array of institutions: 5 federal agencies, 3 state agencies, 6 non-profit conservation organizations, 2 international organizations, and one professional organization, private business, native plant society, and individual. Most documents were fairly recent; none any older than 1987 and the majority were in draft form. They represent diverse approaches, attitudes, and concerns, and they strongly reflect attitudes and needs of the sponsoring group (McMahan, 1993). Four general themes appearing in the policy documents are: (1) reintroductions should be based in scientific principles; (2) biological and ecological considerations are of utmost importance; (3) careful planning in advance of the project is essential; and (4) careful considerations of political, legal, and social issues is important.

Conference Results Over 200 individuals from universities, federal and state agencies, private industry, botanical gardens, and conservation organizations attended the conference and participated in several workshops with the ultimate goal being the development of national guidelines. The intent of this paper is to present a synopsis of the conference. And I do not mean to insinuate that we found all the answers. In fact, we probably came away from the conference with more questions than we had at the beginning. However, to know what the questions are is a good starting point from which we can begin to develop guidelines. The most universal point to come out of the conference was that reintroductions are not casual and should be conducted as experiments with long-term commitment to the project; this thought pervaded the conference.
With guidelines as the ultimate objective of the conference, three concurrent workshops (Strategic and Political, Biological and Technical, and Mitigation) were held to discuss the issues that should be included in the guidelines. The following is an outline of the main items for consideration from each workshop.

I. Strategic and Political Considerations  (Assumption: Primary concern must be to conserve existing natural populations).
1. Relationship of reintroduction to existing population(s), site(s), and habitat. Will reintroduction be destructive, neutral, or positive to the existing populations? Integrate into bioregional planning.
2. Determine the priorities. What species are appropriate for reintroduction and determine their priority - are the very rare the top priority or do we use triage on them?
3. Control of the process. Should government agencies be in control of reintroductions or should we encourage community involvement, such as high school teachers?
4. Site selection. Is reintroduction appropriate for all suitable habitat (the species’ ecological envelope) or only documented actual range? Climate change strategy - beyond current range.
5. Long term commitment to project must be obtained. Institutional commitment; Financial commitment; Technical commitment; Conceptual commitment

II. Technical and Biological Considerations  (Assumption: During all phases of the project, documentation of the procedures, adaptive management allowing for feedback modification, and involvement of all concerned parties is vitally important to the success and continuation of a reintroduction project).
1. Strategic, political, philosophical. Primary concern must be to conserve the existing population(s) and habitat. Determine when reintroduction is appropriate.
4. Design: Must be in experimental context. Must have an explicit hypothesis. Site selection (keep species within known or presumed range). Must set goals and a well-defined timetable. Consider types of propagules. Accessibility and other logistical considerations.
6. Follow-up: Measure success or failure. Allow for feedback and modification.

III. Reintroduction and Mitigation Considerations  (Assumption: No one is satisfied with current manner in which mitigation is conducted for endangered plants. Need to make mitigation for plants more effective and less reactive. Need more influence, more power in process, and earlier awareness of project for better compensation for endangered plants.
1. All reintroductions should be viewed as experimental. Data available that reintroductions of plants is not successful.
2. Discourage reintroductions in mitigation unless reintroduction is a task in an approved recovery plan.
3. Site to be damaged must be assessed (basion studies).
4. Develop a hierarchy of objectives that can be used in mitigation (regionalized needs and opportunities).
5. Develop pre-listing and post-listing recovery plans on an interagency basis with university and independent researchers.
6. Need a principled standard to measure mitigation by. Define a priori standards for mitigation that are independent of political considerations.
7. Develop creative solutions, such as land trades (Resolution Trust or Debt for Nature) or buy land at non-development zoning rates.

The question remains then, how does this relate to wilderness restoration and the use of minimum tool management in revegetation. I think there are several related areas. Firstly, with the predominant threat to rare plant species being habitat destruction and degradation, Wilderness Areas may be the only laboratory left from which we can learn experimentally about maintaining populations of rare plants. Secondly, if current scenarios for global warming in the 21st century occur, about one in ten plant species in North America may become extinct. Wilderness Areas along with other reserves on public and privately owned land may be critical for migration of species as holdover sites as species need to move further north. And thirdly, on a level of biological organization, reintroduction is to individuals and populations what restoration is to communities and ecosystems. Therefore, the guidelines being developed for endangered plant reintroductions can be directly applied to community or ecosystem restoration. In fact, the issues of concern and the items for consideration are indeed the same.

However, the compatibility of these guidelines to minimum tool management in Wilderness Areas is another question. Reintroduction is a labor intensive methodology, certainly during the initial planting phase and thereafter during the monitoring phase. Does minimum tool management refer simply to the use of non-power machinery or does it also include the presence of as few people as possible in a Wilderness Area? Another reintroduction project may require a closure of an area to the public, and yet necessitate scientific staff access for monitoring. Is this compatible with minimum tool management?
Let me close with a hypothetical situation. The last remaining plants of a particular species, Species X, occur in a Wilderness Area. Species X is declining and there is no recruitment in the population. In fact, there is no seed production. Experts reviewing the options to recover this taxon conclude that they need to augment the population. Yet they have no ex situ collection of seeds from which to propagate material to augment the population. However, tissue culture is an option to produce propagules for eventual reintroduction. Scientists may have to come in via a helicopter to acquire the tissue; a power auger may be necessary for the actual planting; an enclosure may be necessary to keep out the exotic animals which are grazing on the seedlings; and scientists will need to conduct intensive monitoring of Species X for perhaps several decades. Is this impossible to do with traditional minimum tool management?

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56

Introduction. There are proportionately very few wilderness areas on lands managed by the Fish and Wildlife Service as compared to most other federal land management agencies, and this is largely by design. Most refuges are highly manipulated systems where objectives require active management of habitat to achieve rapid results, and this is not normally consistent with wilderness management principles. The classic example of a refuge is an area which manipulates wetland habitat to grow a crop of vegetation to provide food for migratory waterfowl. Although this may be a common perception of refuges, it is actually only one aspect of an amazingly diverse network of refuges which protect and manage an equally diverse network of ecosystems across the country. While there are some highly managed refuges, the opposite is also true.

The 3,254-acre Coachella Valley National Wildlife Refuge is located about ten miles east of Palm Springs in the heart of southern California's rapidly developing Coachella Valley. In passing the Endangered Species Act of 1973, the U.S. Congress recognized that threatened and endangered plants and wildlife have educational, scientific, recreational, historical, and aesthetic values and should be preserved as part of the nation's natural heritage. Established in 1985 as part of the 19,000-acre Coachella Valley Preserve, the refuge protects critical habitat vital to the survival of the Coachella Valley fringe-toed lizard (Uma inornata), an animal threatened with extinction primary because of habitat destruction.

Coachella Valley NWR is an example of a refuge which was established essentially to preserve a single species representing an endangered ecosystem. In that sense, the fringe-toed lizard is much like the northern spotted owl. The fringe-toed lizard is not the only animal suffering from the loss of geographically isolated sand dune habitat, which is extremely dynamic and complex. In protecting the lizard, Congress not only established the refuge, but also identified certain lands as "Critical Habitat" where federal activities cannot occur until a consultation is held to determine any possible short term and cumulative effects to the fringe-toed lizard. A resulting biological opinion may preclude certain activities or establish reasonable and prudent measures which must be taken to prevent harm to protected plants or wildlife. Although much critical habitat lies on private lands outside refuge boundaries, all of the refuge is within critical habitat, and is subject to management activity restrictions. This does not mean that management does not or cannot occur on the refuge, rather, any management action is under strict compliance with the Endangered Species Act, a law considered by many to be more restrictive than the Wilderness Act.

In protecting the refuge, it is extremely important to maintain various habitat components which may otherwise change due to human influences. For example, very few refuges protect entire watersheds, but continually struggle with the goal of managing wetlands which are tremendously influenced by the rest of the watershed. Those who established the Coachella Valley Preserve recognized this concept, and as a result, the refuge protects critical habitat by cooperating with other agencies to preserve portions of an entire ecosystem. This ecosystem provides the many components to create the habitat upon which the fringe-toed lizards depend, and is composed of steep mountainous areas of source rock, desert washes periodically scoured by flash floods, massive alluvial fans where waterborne sediments come to rest, and dunes created by high winds sorting out sand particles. If any part of this sand-conveyance system fails, blowouts cannot be maintained in perpetuity, and the various species which are utterly dependent upon the ecosystem would be lost.

In most instances it is not enough to simply protect native plant and animal species, rather, selected habitat components may need to be actively managed or restored. This is especially true in habitats which are already degraded. Prior to being established as a refuge, portions of the land were altered by establishment of saltcedar windbreaks, cleared of native vegetation, and planted to agricultural products. The Service is currently attempting active management to restore such habitat to conditions which are optimal for native wildlife. This effort includes removal of vineyards and citrus groves, recontouring lands, revegetation with native plants, and restoration of sand movement through removal of wind breaks. Such a program of protecting native plants and animals while removing exotics is usually necessary in the recovery of any threatened and endangered species.

To enable the accurate evaluation of any management action, or even lack of management, a monitoring effort is extremely important. It is often necessary to begin gathering information to provide answers before managers even have the questions they pertain to. Monitoring is probably the key to managing lands for biodiversity. Many wildlife species are excellent indicators of change within an ecosystem, and selected populations should be monitored to document changes and help guide us toward optimal management of a system. An inventory plan, outlining easily duplicated methods for surveying selected plant and animal species is important for the healthy long-term management of some areas. Both the initial collection and analysis of reference data and the subsequent establishment of a continuing monitoring program is important to enable a statistically meaningful analysis of restoration efforts.

Land managers cannot continue to assume that "no management" equates with "no change," when actually the opposite is usually true. Managers need to recognize the possibility that although each area may have specific objectives, that there are interactions among all species. Recognition and appreciation of this integral process should be incorporated into both management planning and day-to-day thinking. Biodiversity management should not be viewed as an innovative approach, but rather as an inherent part of all wise land management decision making.
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DEFINING THE MINIMUM TOOL FOR REMOVING TAMARISK (TAMARIX SPP.) FROM WILDERNESS. Lynn M. Watkins, BLM, Wilderness Coordinator, El Centro Resource Area, California Desert District, 1661 S. 4th St., El Centro, CA 92243-4561 (619) 353-1050

Introduction. "Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area..." These words, laid down by Congress in Section 4. (b) of the 1964 Wilderness Act, express one of the guiding principles of wilderness management. The Wilderness Act further directed that "An area of wilderness is... protected and managed so as to preserve its natural conditions."

Tamarisk, or salt cedar (Tamarix spp.), has been an invasive exotic species to riparian and wetland plant communities throughout the arid and southwest deserts of the United States since the early 19th century. It was first introduced into the United States from Asia as an ornamental, as a windbreak, and for streambank erosion control. Tamarisk does particularly well in and regions within habitats containing moist soils or open surface water. Because tamarisk does not have natural controls in this country, it grows largely unchecked. Prolific production of minute, easily windborne seeds makes it a rapid colonizer. The presence of this nonnative species in wilderness areas is not consistent with preservation of natural conditions.

In the last 50 years, tamarisk has become a particularly intrusive plant that out-competes native plant components in riparian ecosystems. Desert riparian areas may be converted to an impenetrable tamarisk thicket in less than a decade (Hoddenbach, 1987). It is not only detrimental to native plant associations, but can also lower wildlife use of an area, leading to stenosis, monotypic stands containing little animal or vegetative diversity. Endemic ecosystem management, though perpetuation of "naturalness and natural processes," is one of the Bureau of Land Management's (BLM's) wilderness management objectives.

Tamarisk evaporates enormous quantities of water that would otherwise be available for native vegetation or wildlife. It draws moisture from saturated soil in the vicinity of the water table and has been reported to dry-up springs critical for use by wildlife (Hoddenbach, 1987). Few species of wildlife will inhabit the decedent stands that tamarisk forms. Some nesting and use for wildlife escape cover has been noted for the genus, however its seeds have no protein content and the plants create a poor understory condition (Hoddenbach, 1987). More desirable native vegetation is out-competed by tamarisk as a result of crowding/shading, the accumulation of salts deposited in the soil from its deciduous foliage, and by the fact that tamarisk is more resistant to drought than native species. Around desert springs that are never flooded, tamarisk removal must be complete to be effective; but once accomplished, the rehabilitation should be permanent, with only minor surveillance needed to remove seedlings derived from distant seed sources (Naill, 1987).

Carrizo Gorge Wilderness Study Area. Carrizo Gorge Wilderness Study Area (WSA) is located in southeastern San Diego County, California. This 15,408 acre study area consists entirely of public lands administered by the BLM. Elevations range from 1,000 feet in Carrizo Gorge to over 4,600 feet in the In-Ko-Pah Mountains. The southern and eastern portions of the study area are composed of steep canyons and mountainsides which form the side of Carrizo Gorge. The state threatened and federally "proposed" (for listing under the Endangered Species Act) paninsular bighorn sheep (Ovis canadensis cremnobates) inhabits Carrizo Gorge WSA.

Cimarron Spring, located within one of the steep side canyons of Carrizo Gorge, was heavily infested with tamarisk. The dense thicket blocked access to the spring by bighorn sheep and other wildlife. Bighorn sheep were especially impacted because the dense vegetation hindered the sheep's ability to visually detect predators. In addition, tamarisk had almost completely replaced the native willow (Salix spp.), and had caused the spring to go dry most of the year. Removal of tamarisk was identified as necessary not only to aid in returning riparian habitat to its former status (thereby increasing the naturalness, and therefore
wilderness qualities, of the region), but also to allow bighorn sheep to use the spring. A technique that would be compatible with wilderness values was researched.

Tamarisk Control Within Wilderness/Wilderness Study Areas. When considering vegetative manipulation in a wilderness or wilderness study area, the following questions must be considered:

- Are natural ecosystems and ecological processes functioning naturally?
- Have ecological processes been altered by human influences?
- Are threatened or endangered species being negatively affected?
- What is the minimum tool necessary to successfully, safely, and economically accomplish the objective?

Under wilderness management policy (BLM Manual 8560), the BLM is required to foster a natural distribution of native species of wildlife, fish, and plants. Tools and equipment may be used for management when they are the minimum necessary for protection of the wilderness resource. Habitat manipulation by chemical or mechanical means may only be allowed where necessary for threatened or endangered species or to correct unnatural conditions resulting from human influence. Powered handportable tools may be approved when they are the minimum necessary for administrative purposes where work cannot be accomplished with non-powered tools. Motorized equipment should not be used where more primitive equipment can accomplish the wilderness resource objectives for the individual area. The chosen tool should be the one that least degrades wilderness values temporarily or permanently.

The El Centro Resource Area of the BLM evaluated the need to remove/control tamarisk invasion in Carrizo Gorge WSA to correct an unnatural condition and to benefit a state and federally sensitive population of bighorn sheep. A site specific Environmental Assessment was completed to comply with the National Environmental Policy Act (NEPA) and California Environmental Quality Act, and a “conference” was done with the California Department of Fish and Game to satisfy requirements under the California Endangered Species Act (peninsular bighorn sheep were not proposed for federal listing until after the project had been implemented). In addition, an analysis under the “non-impairment standard” as outlined in the BLM’s Interim Management Policy and Guidelines for Lands Under Wilderness Review (IMP) was completed and a Notice of Proposed Action (NOPA) was circulated to the standard El Centro mailing list of parties interested in wilderness actions. In general, activities that protect or enhance the land’s wilderness values are considered “non-impairing.” It was decided that this project would enhance the naturalness of the area by removing an exotic vegetation species, allowing for the gradual recolonization of native riparian vegetation. The project would also benefit peninsular bighorn sheep, a special feature of the WSA. No objections to the proposed action were received during, or following, the NEPA and NOPA review periods.

Several control methods were evaluated based on effectiveness, impacts to resources, and compatibility with wilderness management objectives. Previous BLM experience and literature review indicated that the most effective technique for controlling tamarisk was by cut-stump herbicide treatment. This involves cutting the tamarisk to within two inches of the ground and immediately (within 2 minutes) applying herbicide to the cut stump. Cut-stump application is very controlled, doesn’t effect non-target organisms, and causes the least environmental impact (Hoddenbach, 1987). Foliage sprays may kill the top growth, but tamarisk can readily resprout.

The preferred herbicide for tamarisk control is Garlon 4 or Pathfinder (a ready-to-use mixture containing Garlon 4). The active agent in Garlon, which is produced by Dow Chemical, is triclopyr. Garlon decomposes rapidly after application - in a day or less in sunlit water, and in two weeks to two months in soil. As a non-restricted herbicide it can be used by applicators without state certification and without a permit from the county agricultural agent.

The essential tools for cutting tamarisk are lopping shears, bow saws and hand axes. For larger trees, a chainsaw will be optional or required, depending on the accessibility of the main limbs. Thick, solitary trunks are more easily treated by girdling with a hand ex, rather than by felling the tree and spraying the stump. This alleviates the need to remove the tall, heavy trunk. More commonly, however, tamarisk is multi-trunked, and partial or complete cutting is needed to gain access to the entire bark surface at ground level (Neill 1990). Immediately after cutting, the entire circumference of the cambium layer must be sprayed to insure that the herbicide is transmitted to the roots before the cut surface begins to heal. The cut branches are piled for burning or left to decompose.

Retreatment of resprouted tamarisk should be done several months to a year after the initial treatment. At this time the herbicide can be applied directly to the foliage. Three to four applications may be required to completely control the existing stand, although more treatments in subsequent years may be needed to treat germinated seedlings.

Burning and mechanical removal were discounted in this project for several reasons. The remoteness of the project site, disturbance of soils within a WSA under interim management, impacts to the vegetation during access, and the time at the project site (important to reduce impacts to bighorn sheep) were factors in the decision making process. The use of fire control has been found to be generally ineffective because high water and salt content make tamarisk difficult to burn (Kunzmann, 1987). At one tamarisk burn at Lees Ferry, Arizona, 90 percent of the mature plants survived a hot, canopy fire (Stevens, 1987). In addition,
any high stress (fire, cutting, etc.) greatly increases flowering and seed production. In the early 1980s, tamarisk at Cimarron Spring had been manually removed without the use of herbicides and by 1991 the stand was as dense or denser than before cutting.

Friging (dissicating growth tissue and wilting foliage, without burning) may be a promising technique, but it has not been tried.

Carrizo Gorge Tamarisk Eradication The Cimarron Spring project was a joint effort between BLM, California State Fish & Game, Anza-Borrego Desert State Park, and approximately 50 volunteers, primarily from the Society for the Conservation of Bighorn Sheep. Although a large group could potentially be more disturbing to wildlife than a smaller group (i.e. more noise, etc.), it was felt that the overall disturbance related to the project would be lessened if the initial venture was concentrated and short-term rather than spread out over time. Sheep in particular would be disturbed by the noise and activity associated with the project, and a decision was made to minimize the number of days spent at the site.

The project was conducted in February 1992. Access to the spring was through Anza-Borrego Desert State Park. To facilitate the passage of a large group of people, an access path was cut through tamarisk within the State Park and on BLM lands, while leaving native honey mesquites (Prosopis glandulosa), catclaw acacia (Acacia greggii), and arrowweed (Pruchea sp.) intact. These tamarisk trees were not treated, as the targeted area consisted solely of Cimarron Spring and its immediate vicinity. Approximately 100 meters above and 700 meters below the spring were completely cleared of tamarisk, and herbicide was applied to the cut stumps. Garlon 4 and Pathfinder were both used. Blue RIT dye was added to the clear Garlon 4 to aid in the identification of sprayed and unsprayed stumps; Pathfinder already contains a red dye.

The immediate results were extremely successful. When the site was inspected in July 1992, approximately 100-150 small resprouts were located and treated (less than one percent resprouting). During a visit in February 1993, only twelve resprouts were located and treated.

Recommendations An important factor in managing tamarisk is its nonnative status and agency policy regarding natural functioning ecosystems. It is potentially impossible to kill tamarisk by fire, drought, foliage herbicide treatment, or repeated cutting at ground level. In most situations, the cut-stump herbicide treatment should be considered the minimum tool for eradicating tamarisk from desert springs, even within wilderness areas.

The objectives of the tamarisk eradication program within wilderness are:

• Foster a natural distribution of native species of wildlife and plants.
• Prevent or reverse alteration of succession in riparian ecosystems.
• Allow natural ecosystems and ecological processes to function naturally.
• Retain the primeval character of the environment.
• Correct unnatural conditions resulting from human influence.
• Enhance the wilderness resource.
• Promote the perpetuation of threatened or endangered species dependent on native vegetation.

Things to consider when evaluating tamarisk control projects within wilderness include the following:

• Is the project needed?
• Do benefits outweigh the temporary, long-term, and/or residual impacts?
• What are the impacts to naturalness and wilderness character?
• What are the impacts to other resources?
• Are the end product and methodologies within your agency guidelines and directives?
• How can the public be involved through the review and implementation periods?
• How can the project be evaluated for success and improvement?

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ERADICATING RUSH SKELETON WEED FROM THE JUNIPER DUNES WILDERNESS WITH HERBICIDES. Gary Yaeger, Planning and Environmental Coordinator; Ann Aldrich, Border Resources Area Manager; Richard Hubbard, Range Conservationist; Jim White, Range Technician; and Robert Troiano, Hydrology Technician. BLM, Spokane District, 4217 E. Main Ave., Spokane, WA 99202 (509)353-2570

Rush Skeleton Weed (Chondrilla juncea) has been found growing adjacent to and within the Juniper Dunes Wilderness Area. This species has been classified as a "B Designate" in this area by the Washington State Noxious Weed Control Board (WSNWCB). WSNWCB requires prevention of all seed production for "B Designate" noxious weeds. The Franklin County Noxious Weed Control Board (FCNWB) has requested that the Bureau of Land Management (BLM) prevent all seed production of rush skeletonweed on BLM lands in the area.

Rush Skeleton Weed is well adapted to replace native plants in the sands and sandy soils of the Juniper Dunes Wilderness (JDW). Even without surface disturbance, rush skeletonweed will become a dominant plant species if not controlled. This noxious weed has spread northeasterly with prevailing winds across the wilderness, and scattered plants can now be found in the northeast portion of JDW. Because of the relatively small size of the JDW and the prevailing winds, rush skeletonweed was also a severe threat to the wheat fields lying north and east of the Wilderness. (This weed cannot be cultivated out of crops and currently there are no herbicides available for crop use that provide a high level of control.)

Picloram is the only herbicide known to effectively kill most rush skeletonweed with one application. Biological control agents have been introduced into the area. These agents have proven effective in slowing the growth in size of large populations of rush skeletonweed, but have not stopped population growth or prevented all seed production. The biological agents have proven to be largely ineffective in controlling widely scattered small populations of rush skeletonweed.

Noxious weeds were inventoried in the wilderness during the spring and summer of 1992. All infestations were marked with 3.5 foot survey lath to facilitate locating of plants. The weed locations were also plotted in the field and on a map using a Global Positioning System.

The logistics to effect control involved gaining the support of the local environmental/conservation groups such as the Lower Columbia Audubon Society, the Washington Native Plant Society, and the Wilderness Society to use herbicides in the Wilderness. The herbicide was applied with back pack (portable) sprayer applicators. A plastic dip cloth was stretched out on the ground where formulations were mixed to safe guard against inadvertent spills.

This is an on-going project and will require repetitive inventories and treatments to ensure control of the weed.
Managing Wilderness, Cultural Resources, and Cultural Diversity
WHAT ARE THE PERCEPTIONS AND EXPECTATIONS OF URBAN-PROXIMATE WILDERNESS USERS? Deborah J. Chavez, USFS, Supervisory Social Scientist, PSW Forest & Range Exp. Station, 4955 Canyon Crest Dr., Riverside, CA 92507 (909)276-6285.

Introduction A pilot study of changing wilderness recreation use on the Cleveland National Forest was conducted. The pilot study focused was on the San Mateo Wilderness area. The San Mateo Wilderness area is surrounded by millions of urban residents in Orange, Riverside and San Bernardino Counties in southern California. The pilot study investigated recreation patterns, wilderness knowledge, awareness of Forest Service rules and regulations, trespass, and conflict. The pilot study was comprised of three parts which include these: a mailed survey of all permit holders from the past year; an on-site survey of overnight and day users; and a density count of accessible wilderness entrances. This paper addresses the first part of the pilot study—the mailed survey to all permit holders for a one year period. Issues addressed by the study include these: (1) Who recreates on the San Mateo Wilderness? (2) Why do people recreate on this wilderness area? (3) What are the levels of wilderness knowledge and how information is distributed to respondents? and (4) What other beliefs and preferences do respondents have for a wilderness experience?

Study Implementation The resource managers on the San Mateo provided a list of all permit holders for one year period. The list consisted of names and addresses of 96 permit holders. Of these 90 were usable addresses. Survey questionnaires were mailed to the 90 potential respondents with a postcard reminder the following week. An additional mailing occurred 3 weeks after the initial mailing. Responses were received from 59 permit holders for a 66 percent response rate. Of these, nine were deny users and were dropped from this analysis which examines only overnight (or longer) use of the San Mateo Wilderness. We do not know how non-respondents compare to respondents as no data is available on non-respondents. Another potential problem with this data set, as with any survey requiring recall, is the amount of time elapsed after the event. The survey requested information about their last wilderness trip into the San Mateo and for some respondents that may have occurred one year prior to filling out the survey. We do not know the impact of this.

Who Recreates on the San Mateo Wilderness? The following is a profile of the average San Mateo Wilderness overnight visitor based on responses to the mailed survey: male (90 percent), 37 years of age (range from 16 to 57), 15 years of education (range 10 to 20 years), Anglo (86 percent), English-speaking (68 percent spoke English only, another 26 percent were bilingual), born in the United States (94 percent), married (60 percent married, 28 percent single), with no disabilities (not hearing, visually, mobility, mentally, or learning impaired). On average, respondents spent 1.3 nights on their last wilderness visit, which was most likely to occur on a non-holiday weekend. In general, the respondent engaged in backpacking and wildlife observation, and most (78 percent) had been on six or more previous wilderness trips.

Why do people recreate on the San Mateo Wilderness? To measure this question we told respondents "There are many reasons people enjoy a wilderness experience." And requested that for each item listed they indicate how much value each item had for them. Respondents were provided a set of items with a scale of 1 to 5 where 1 meant "of no value", 3 meant "neutral", and 5 meant "of great value". Items for the San Mateo Wilderness receiving an average score of 4 or more were these: it is a pristine, clean area; it is a place with beautiful scenery; to be close to nature; the absence of man-made objects; for the solitude; tranquility; for the adventure; view the stream/water; to be alone; wildlife watching; escape the routine; and low-cost recreation. Items scoring 3 or less included these: a place easy to get to; spiritual experience; risk and challenge; personal achievement; preparation for future trips; to do something with others; and to slow my mind down.

We also inquired about problems encountered on their trip. We told respondents "Your views about any problem you may have encountered during your most recent visit to the San Mateo Wilderness would be helpful to us. Please indicate how serious a problem you found each item to be." Respondents were provided a scale of 1 to 5 where 1 = not a problem to 5 = very serious problem. No item received a rating of 2 or above indicating the following items where not serious problems on their last visit: too few parking places; litter; graffiti; people shouting and yelling; not enough information about things to see and do; someone in their group being injured; and conflicts between their group and other groups. In their opinion, the area was not crowded (an average score of 1.9 on a scale where 1 = not at all crowded to 5 = extremely crowded).

Another measure we used was "The following statements relate to your general feelings about coming to the San Mateo Wilderness. Please indicate the response that comes closest to your view from each of the statements." Response categories ranged from 1 = very strongly disagree to 6 = very strongly agree. Items averaging 4.0 or above were these: coming here is important to me; this place means a lot to me; coming here offers relaxation; coming here is satisfying; coming here reflects who I am; and I can relate coming here to my life. Items scoring 3 or less included these: I would not substitute any other area for doing the types of things I do here; the time I spend here could have just as easily been spent somewhere else; and I feel no commitment to this place.

Levels of wilderness knowledge and how information is distributed to respondents. To measure wilderness knowledge two questions were asked: (1) "The San Mateo has been designated as a federal wilderness area" and (2) "Motorized use is prohibited in federally designated wilderness". Response options were true, false, and don't know. About 6 in 10 (62 percent) correctly identified the area as a federal wilderness while 7 in 10 (76 percent) knew that motorized use is prohibited in a federally designated
wilderness. Less than 2 in 10 respondents saw motorcycle groups (18 percent) or 3 or 4 wheel all-terrain vehicles (14 percent) during their trip. About 3 in 10 (34 percent) saw mountain bike groups in the wilderness.

About one-third of the respondents received information at the trailhead about what to do there, rules and regulations, safety, or other topics. Information at the trailhead was communicated via signs (30 percent), bulletin boards (26 percent), forest ranger (24 percent) and other forest visitors (4 percent). On average, most respondents felt it would be important (3.8 on a scale of 1 = not very important to 5 = very important) to have an educational program for wilderness travel.

What other beliefs and preferences do respondents have for a wilderness experience? Respondents were shown a series of management options for the San Mateo Wilderness and were asked which they believed would be the most appropriate. Respondents would rather limit hiker use by limiting numbers (62 percent) than by limiting access (28 percent; 10 percent gave no response). They would increase levels of wilderness knowledge through the use of brochures, nature walks, signs, etc. (70 percent) rather than by requiring visitors to have taken a wilderness certification program (20 percent; 10 percent gave no response). Regulations limiting hiker group size were about right (60 percent) though 18 percent felt they could be more stringent, 4 percent thought they could be more relaxed, while 18 percent gave no response. Respondents would rather limit stock group use by limiting numbers (52 percent) than by limiting access (24 percent; another 24 percent gave no response). And group size preference was for being with others (54 percent) (26 percent preferred being alone while 20 percent gave no response).

On average respondents prefer to hike or ride in the San Mateo Wilderness with at least two people, but never more than seven people. And when hiking or riding along the trail in the San Mateo Wilderness, it bothers respondents when they meet parties of greater than 10 people. Respondents think the area is overcrowded if they meet more than 8 parties (groups) in a day’s trip. Most respondents (58 percent) prefer to camp more than 200 feet from the next group. The majority of respondents (80 percent) had no preference about the ethnic composition of visitors to the area where they recreate.

Management Implications. This analysis examined only overnight (or longer) use of the San Mateo Wilderness. We do not know how non-respondents compare to respondents nor do we know the impact that recall has on the results. Based on the results we do have for overnight visitors it appears that few management actions are necessary on the San Mateo Wilderness.

Even though the Wilderness is surrounded by a culturally and racially diverse urban population, there is little racial and cultural diversity among the permit holders sampled. An examination of Wilderness day use (the next phase of the study) will help verify if Wilderness visitation is an Anglo recreational activity, or alternatively, if overnight visitation is an Anglo recreational activity.

The overnight visitors responding to this survey about the San Mateo Wilderness recreate there because it is a clean and beautiful area. The respondents reported few problems on their last visit to the site. More of these visitors knew that motorized use is prohibited in the Wilderness than knew they were in a federally designated wilderness. Educating visitors about the Wilderness designation may alleviate some of the trespass found from motorized vehicles. The next phase of the study will examine motorized trespass as well as mountain bike trespass in more detail.

Finally, respondents to this survey expressed a desire for San Mateo Wilderness managers to manage by limiting numbers rather than limiting access. Respondents also indicated they would be bothered by encountering parties of 10 or more people. These findings show that the managers of the San Mateo can continue managing in their current manner—that is, limiting numbers rather than access and limiting groups to 15 or fewer. While 15 is higher than the group average of 10, the managers of the San Mateo note that group sizes of two are the norm while the bigger groups are rare occurrences.

TRENDS IN THE SOCIO-DEMOGRAPHICS OF WILDERNESS VISITORS. David N. Cole and Alan E. Watson, Project Leader and Research Social Scientist, Wilderness Management Research, Forest Service, Intermountain Research Station, Missoula, MT. (406)721-5694. D.COLE:S22L01A

Introduction. Information about the socio-demographic characteristics of wilderness visitors is of interest for a number of reasons. It provides information to policy makers and managers about who is visiting wilderness, provides insights into why people participate in wilderness recreation, and helps predict future recreation patterns. It can be used to evaluate issues of social equity (Marcin and Lime 1977) and to decide on appropriate education programs and methods of communicating with visitors.

Information about trends in visitor use and users is also of considerable interest. Socio-demographic characteristics of the United States population are changing over time, as is the National Wilderness Preservation System. Managers need to understand these changes and their implications. They must understand changes in wilderness users and their values and be able to respond to changing patterns of use and impact.
This paper describes some socio-demographic characteristics of wilderness visitors, which have been assessed in a wide variety of wildernesses over the past 30 years or more. It describes the results of wilderness visitor trend studies conducted in the Bob Marshall, Desolation, Boundary Waters Canoe Area, and Shining Rock Wildernesses.

Socio-Demographics of Wilderness Visitors A common stereotype of wilderness visitors is that they are young, wealthy, and urban, with substantial leisure time at their disposal (Roggenbuck and Watson 1989). This stereotype has contributed to arguments that wildernesses are only for the elite. However, this stereotype deserves further study.

Age—The median age of wilderness visitors is similar to the median age of the general population. For example, the median age of the U.S. population was 33 years in 1990; the median age of Desolation Wilderness overnight visitors was 32 in 1990, while the median age of Boundary Waters overnight visitors was 34. All age classes are fairly well-represented in wilderness, although the youngest and oldest age classes (people under 16 and people over 55) are under-represented in wilderness.

Income—The annual household income of wilderness visitors is typically higher than that of the general population. For example, the median income of 1990 Desolation overnight visitors was $45,000 compared to a median income for the California population of $35,750. The median income of 1991 Boundary Waters overnight visitors was $43,000 compared to a median Minnesota income of $31,000. However, there are substantial numbers of wilderness visitors with low incomes.

Education—Wilderness visitors have substantially higher levels of educational attainment than the general population. For example, about 50% of 1990 Desolation visitors have undertaken some graduate study, while only 8% of the California population has some graduate study. Only 9% of Desolation visitors, over 15 years old, have not been to college, while 46% of the California population has not been to college.

Occupation—Associated with this higher level of education, wilderness visitors are much more likely than the general population to have professional, technical, or managerial jobs. They are less likely to be craftsmen, laborers, service or clerical workers, or full-time homemakers. Students are also over-represented among the population of wilderness visitors, typically comprising 15% or more of the visitors over the age of 15.

Residence—The proportion of wilderness visitors that come from urban areas—typically 60 to 80%—is comparable to the proportion of the general population that lives in urban areas. However, limited data suggest that a disproportionately large number of wilderness visitors may come from large urban areas. For example, 30% of 1978 visitors to Shining Rock Wilderness were from cities of more than 100,000 people; in contrast, only 15% of North Carolinians were from cities of more than 100,000.

Other Variables—Males are clearly over-represented among wilderness visitors, typically comprising 65-80% of the visitor population. Wilderness visitors are more likely than the general population to belong to conservation organizations, but most wilderness visitors are not members of such organizations. Finally, very limited data on ethnicity documents the fact that the vast majority of wilderness visitors are "white". The proportion of visitors who identify themselves as "white, not of Hispanic origin" was 91% at Desolation in 1990 and 88% at the Boundary Waters in 1991.

Trend Studies in Three Wildernesses To evaluate trends in socio-demographics and other characteristics of wilderness visitors, trend studies were conducted in three wildernesses: the Desolation in California, the Boundary Waters Canoe Area in Minnesota, and Shining Rock in North Carolina. These results can be compared to an earlier trend study conducted in the Bob Marshall, Great Bear, and Scapegoat Wildernesses, Montana (Lucas 1985). These areas were selected because they provide regional representation across the United States and because earlier visitor surveys were conducted (Lucas 1980, Stankey 1973, 1980, Roggenbuck et al 1979). Period of study, sample population, and precise questions varied between areas. Available comparisons are between 1969 and 1991 overnight visitors in the Boundary Waters, 1972 and 1990 day-users and 1972 and 1990 overnight visitors in Desolation, and 1978 and 1990 visitors (both day and overnight) at Shining Rock. The Bob Marshall Complex study compared all 1970 and 1982 visitors.

Age—The typical wilderness visitor of today is substantially older than the typical visitor a decade or two ago. Mean age increased from 30 to 36 years at Desolation, from 25 to 37 years at Boundary Waters, and from 28 to 35 years at Shining Rock. While wilderness visitors 20 years ago were typically younger than the general population, they no longer are. Age had not changed among visitors to the Bob Marshall Complex, between 1970 and 1982.

Income—Median household income did not change significantly among Desolation visitors (in 1990 dollars), despite a significant increase in the income of the general population. Income increased at the Boundary Waters from $31,500 (in 1990 dollars) in 1969 to $43,000 in 1991. Much of this change can be explained by a decline in motorized use over this period from about 38% of the 1969 sample to only 10% of the 1991 sample. Motorized users typically have substantially lower incomes than non-motorized users. At Desolation, then, differences between wilderness visitors and the general population declined over the period, while differences increased at the Boundary Waters.
Education—Education levels increased in all three wildernesses that we studied, as well as in the Bob Marshall Complex. However, only at the Boundary Waters was that increase greater than the increase in educational attainment of the general population. This more pronounced increase at the Boundary Waters can again be traced to the decline in motorized use there. The educational attainment of the motorized users was typically less than that of non-motorized users.

Occupation—In both Shining Rock and the Bob Marshall, occupational trends were not very pronounced. However, there is some evidence that the proportion of visitors in professional and technical occupations increased further over the period. The proportion of students declined dramatically at Desolation (from 44% to 25% of overnight visitors) and the Boundary Waters (from 51% to 18% of overnight visitors). Students declined slightly at the Bob Marshall Complex (from 17% to 11%) and increased slightly at Shining Rock (from 12% to 16%).

Residence—In none of the areas was there a significant shift in the proportion of visitors from urban or rural areas. The proportion of visitors coming from large urban areas increased slightly at Desolation and the Bob Marshall Complex and decreased at Shining Rock.

Other Variables—The proportion of females increased substantially at Desolation, Shining Rock, and the Bob Marshall Complex, but was unchanged at the Boundary Waters, where the proportion of females was already relatively high (29%) in 1969. Membership in conservation organizations declined at Desolation and the Bob Marshall Complex, increased at the Boundary Waters, and was unchanged at Shining Rock.

Conclusions—Clearly, wilderness visitors do not represent a typical sample of the U.S. population. An uncharacteristic proportion of wilderness visitors are white, male, and highly educated, either students or with comfortable incomes and professional or technical jobs. Despite these differences from the general population, there is little to suggest that there are overt barriers to wilderness participation by individuals without these characteristics. Individuals of all ethnic groups, income and education levels, and occupations are visiting wilderness today.

Moreover, some of the trend data suggests that differences between wilderness visitors and the U.S. population are diminishing. There is no longer any difference in median age and the over-representation of males and students, among wilderness visitors, has declined greatly in most places studied.

Interestingly, trends in other visitor parameters (wilderness experience, group type, visit characteristics, visitor attitudes and preferences) were less pronounced than these trends in socio-demographic characteristics. Apparently, the characteristics of the people who visit wilderness can change with very little change in the types of trips these visitors take and their attitudes and preferences about wilderness and its management. This suggests that the implications of shifting demographics in the United States may have fewer effects on wilderness management in the future than previously thought.

Finally, the paucity of clear trends in visitor characteristics and the numerous examples of opposing directions of change in different wildernesses suggests the need to be cautious about broad generalizations. Perhaps a larger number of trend studies would permit the identification of more general trends, but there will always be individual wildernesses where these trends do not apply. Consequently, managers of each wilderness are left with the need to understand the visitors to their specific wilderness.

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RECONCILING ARCHAEOLOGY, PALEONTOLOGY, AND NATIVE AMERICAN VALUES WITH WILDERNESS IN THE LAND MANAGEMENT PLANNING PROCESS. Gary Cummins, NPS, Superintendent, Petrified Forest NP, (602)524-6226 and Larry Norris, NPS, Natural Resource Specialist, Denver Service Center, CO, (303)969-2267.

Introduction A General Management Plan (GMP) has recently been completed for Petrified Forest National Park. This plan recognized five significant resource values within the park: (1) The globally significant scientific value of paleontological resources, (2) The cultural value of an extensive and varied prehistory that reflects a 10,000 year continuum of human occupation, (3) The scientific value of a rare shortgrass prairie ecosystem recovered from grazing, (4) The scenic value of expansive vistas, stark landscapes, and colorful eroding badlands, (5) The recreational and resource "banking" value of 50,260 acres of federally designated wilderness.

These values were also recognized as occurring on lands adjacent the park. When an inventory of the globally significant paleontological and the nationally significant archeological resources was conducted on surrounding lands seven "resource areas" were identified containing 97,800 acres, slightly larger than the existing park (93,533 acres). A number of existing and proposed land uses were identified on these lands during the resource inventory that threatened the continued existence of the globally and nationally significant resources. The GMP was revised to discuss and evaluate potential boundary expansion of the park to include these seven resource areas.

The Quandary When the decision was made to seek boundary expansion based on the occurrence of paleontological and archeological resources, a number of other procedural requirements were set into motion that may eventually come into direct conflict with the original intent of the boundary expansion, which was to ensure protection and preservation of the significant resources.

National Park Service policies and guidelines require that any additions to park lands be studied for wilderness suitability. They also require that a land protection plan be written that determines the priority of acquisition and the dominant management philosophy and land use of the new areas, attempting to link these new areas to the approved management zoning scheme if appropriate.

The GMP directs that separate paleontological and archeological research plans be written for the park, and that these be extended to the resource areas if they are added to the park. Separate paleontological and archeological overviews and assessments would be conducted on the added lands. The GMP proposes to expand the southern wilderness unit in the park. The plan also recognizes the requirement to conduct wilderness suitability studies on each new area, with the purpose of expanding the existing two wilderness units in the park. Some of these potential additions are large enough to contain their own wilderness areas.

It is interesting to note that NPS guidelines do not discuss the preservation of paleontological resources in the context of those resources being within designated wilderness. They do recognize the absolute need to manipulate the resources in order to preserve them. "The natural process of erosion is the key to the discovery of nearly all paleontological specimens. At the same time, it is also the major threat to most fossils, because once exposed at the earth's surface, fossils are rapidly destroyed by erosion. Thus, in many cases significant fossils can be protected only by intensive management, which includes collection, preparation, and placement in a museum collection for preservation and study." (NPS Guideline 77, 1991).

National Park Service program objectives for paleontological resources management in park units are: (1) Identification of paleontological resources within NPS units, (2) Evaluation of the significance of those resources, (3) Adequate protection of significant resources so that their scientific, interpretive, and/or historical value is not degraded, (4) Use of the results of such research to further management objectives.

None of these objectives (especially number 3) recognizes the occasional mechanized requirements for paleontological resource preservation regardless of land designation. Our sister Interior Department Agency, the Bureau of Land Management, has run into strong opposition from the professional paleontological community over the De-Na-Zin Wilderness Area in New Mexico (USDI, BLM, De-Na-Zin Wilderness Management Plan, 1989; Woodburne, 1989).
National Park Service Management Policies and Guidelines make no distinction in the level of protection afforded archeological properties within its wilderness areas and those within its other lands. National Park Service policy requires managers to identify, inventory, and evaluate all cultural resources within their jurisdictions, then to manage them within a conservation framework. While this does not prohibit research-driven archeological it tightly controls it. It recognizes the destructive nature of archeological excavation and establishes an approval process through which researchers must demonstrate that their proposed excavation meets National Park Service needs; that those data they wish to recover are available only at the site they wish to excavate; and that data can be obtained only by excavation. In most cases, such excavations are extremely limited, consisting of shovel tests, core sampling, or test pits to recover data needed for site evaluation. In some instances trenching to expose wall alignments, record stratigraphy, and obtain a sample of artifact material may be carried out. Recent examples are the 1974 work at Chaco Canyon (Ron Iac, Personal Communication, 1993), and at Burnt Mesa at Bandelier National Monument in 1989-1991 (Gary Roybal, Personal Communication, 1993). The authors can recall no instance of a larger-scale excavation of a National Park Service archeological site in recent years for purely research purposes.

The limited type of archeological research most likely to be approved in any National Park Service property, including wilderness areas, lends itself to the "minimum tool" concept. Survey, mapping, surface collecting, shovel testing, core sampling, and test pits require only small crews and few tools. Access to the sites, however, is another matter. When wilderness management policies restrict access to archeological sites to foot or horseback travel, the additional time required reduces the field season and increases costs. Bandelier National Monument, a 37,000-acre National Park Service area in north-central New Mexico was established primarily for its archeological features, but approximately 75 percent of its total acreage is classified as wilderness. Despite language written into the wilderness designation that permitted it, National Park Service archeologists were prohibited from utilizing helicopter transport to access remote areas of the monument during the period 1989-1991. The forced reliance on foot and horseback access greatly reduced the amount of monument land that could be surveyed. This has reduced scientific knowledge of the monument's prehistory, which in turn has hampered the ability of the National Park Service to adequately manage the monument's prehistoric resources.

National Park Service Cultural Resource Management Guidelines call for archeological data recovery when "significant archeological resources must be disturbed by development actions or visitor use activities, are threatened by natural forces, or cannot be maintained in situ" (NPS 28, III, 18-19, 1985). The high cost of archeological salvage results in moving proposed developments and visitor activities away from archeological sites in the vast majority of cases. Archeological salvage or stabilization occurs when natural forces, such as erosion, threatens archeological sites. When such sites are located within wilderness areas, the costs of such work can be prohibitively expensive. Digging trenches and exposing features by hand can take weeks where the same task could be undertaken in days by using the type of mechanical equipment standard in virtually all other archeological excavations. Finally, removal of artifact material by backpack or horseback exposes the material to long periods of severe jostling, thus increasing the risk of breakage and loss.

A preferred alternative to excavation, where practical, is stabilization. This involves filling in aroded areas, buttressing walls, etc. National Park Service Cultural Resource Management Guidelines require that stabilization work requiring ground disturbance must be preceded by archeological clearance and that all actions be thoroughly documented (NPS-28, III, 8, 1985). For the sake of the resource, it is best to utilize soil material, or "borrow" that is similar in appearance and chemistry to that in which the threatened site is located. However, a National Park Service Special Directive now bans the use of borrow obtained within designated or proposed wilderness areas (NPS Special Directive 91-6, 1991). Thus when a cultural resources manager attempts to stabilize an archeological property within a wilderness area, he or she must face the costly prospect of hauling borrow that may not be compatible on horseback. This problem occurred in 1986 at Organ Pipe National Monument in southern Arizona. A stabilization project at the Victoria Mine site, a historic archeological resource within the monument's wilderness area had to rely on the services of a horse pack train to haul borrow material at a cost of $1,250 per day (Rancier, Correspondence, 1993).

We have indicated above that a wilderness designation does not provide any higher level of protection for cultural resources and can actually hinder cultural resources management oriented research and preservation. Is there any benefit to cultural resources accruing from a wilderness designation? The prohibition of mechanized transportation will almost certainly reduce the numbers of visitors at archeological sites and thus reduce the incidence of inadvertent damage to these properties. However, the same prohibitions, combined with tight budgets and staff shortages will reduce the level of site monitoring and protection. Thus erosional impact can go unnoticed for weeks or months at a particular site, with resultant severe damage and permanent loss of scientific data.

Intentional vandalism is a greater problem. Experience in National Park settings does show that archeological properties open to the public are vandalized on occasion. At Petrified Forest National Park, the level of vandalism tends to be relatively minor, consisting mostly of graffiti at certain petroglyph sites. In less accessible places, such as wilderness areas, vandalism also occurs, but is often much more severe, consisting of wholesale excavation and looting by experienced "pot hunters," willing to spend days or even weeks under arduous conditions to extract prehistoric objects worth thousands of dollars in the illicit artifact market. These professional vandals carry out destruction of remote sites secure in the knowledge that they are unlikely to be disturbed by the infrequent patrols by park rangers or resource management staff. Thus while wilderness designation does provide some protection
to cultural properties which may otherwise be over-visited, it is offset by the difficulties it presents cultural resource managers in preserving and protecting them.

Wilderness designations can pose problems for Native Americans as well. The American Indian Religious Freedom Act of 1978 does provide for Native American access to all public lands for religious purposes. In wilderness areas, this has been interpreted as access by non-mechanized means of transport. However, the issue of consumptive use of natural resources for religious purposes on public lands, including wilderness areas, is of great concern to many Native Americans. In a recent case that occurred in Glacier Bay National Park and Preserve in Alaska, a member of the Tlingit tribe was prosecuted for the taking of a seal, despite expert testimony from a government employee that the seal was taken for specific religious, not economic purposes (Cochran, Personal Communication, 1993). Amendments to the Native American Religious Freedom Act that may allow greater latitude in certain specific issues regarding consumptive religious practices (USDI, Executive Summary, AIRFA, 1993).

Thus the quandary at Petrified Forest National Park. Will we use the presence of significant paleontological and archeological resources in lands which may be added to the park as justification for wilderness designation? Will this result in the imposition of barriers to efficient protection and preservation of these same resources?

It is a question of dominant use. How should the planning process address this quandary? Parallel studies will be conducted simultaneously in the park and on the new areas, and their conclusions may be incompatible and mutually exclusive. The long term protection of paleontological and archeological resources may not be in the best interest of wilderness preservation, and vice versa.

What would be best for the resources? What would be best for science? What would be best for management? Is it even possible to reconcile these two? Are there any ways within existing legislation? If this quandary is really an extension of the appropriate minimum tool question, then what is the entrance capability into wilderness for researchers that must extract the resource to preserve it? Does the park superintendent have a prerogative in this?

All of these questions assume the limits of existing entry technology (helicopters, trucks, pack animals, etc.); is there room in the policies and regulations to assume that less resource disturbing technologies might be accepted for entry in the future, as the social concept of wilderness evolves? Possibly, but for those resources exposed by erosion, there is no time to wait.

The planning process at Petrified Forest National Park must answer these questions in the near future. Given these background circumstances, what would you do?

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Most of us take for granted the First Amendment guarantees of religious freedom, "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof...." Although in theory, this principle extends to all citizens, American Indian people have yet to enjoy its full benefit.

From the beginning of native-European contact, Indian religious practices have been seen as inferior to Christian practices by the very people who came to the New World to escape the religious intolerance of the Old. In the Northeast, the British doctrine of discovery gave Europeans "rights" to "heathen and barbarous" lands not inhabited by "Christian People." California tribes were subjected to forced centralization and conversion. In the Southwest, Franciscan priests sought out and publicly burned prayer feathers and kachina masks. In 1655 a delegation from Hopi arrived in Santa Fe to complain about their priest who had beaten a Hopi man caught in acts of idolatry, then doused him with turpentine and set him on fire. The revolt of 1680 in the American Southwest was the Pueblos response to almost a hundred years of religious persecution by the Spanish.

Attempts to stamp out Native American religious practices persisted under policies of the United States government until at least the 1930s. In 1882, Secretary of the Interior Henry Teller ordered an end to all "heathenish dances" due to their "great hindrance of civilization." Indians caught participating in native rituals could be imprisoned for 30 days. Efforts to suppress the Ghost Dance religion led to the 1890 massacre of 390 Minneconjou Lakota men, women, and children at Wounded Knee for which Congress awarded 30 Congressional Medals of Honor to government soldiers. A Jemez Pueblo man once remarked that of the three colonial powers in New Mexico—the Spanish, Mexican, and American—that the Americans were the worst because they took away the land.
In the 1970s the situation ameliorated somewhat with a new era of self-determination for Indian people. To Taos Pueblo was returned Blue Lake, their most important shrine. The 95th Congress passed the American Indian Religious Freedom Act of 1978, known as AIRFA, in an attempt to end the abridgement of religious freedom for traditional Native Americans. In part, AIRFA states that "such religious infringements result from the lack of knowledge or the insensitive and inflexible enforcement of Federal policies and regulations promised on a variety of laws." Laws that have an impact on American Indian religious freedom include the Wilderness Act, National Forest Management Act, Multiple Use and Sustained Yield Act, Federal Land Policy and Management Act, and the Endangered Species Act.

According to AIRFA, "such laws were designed for such worthwhile purposes as conservation and preservation of natural species and resources but were never intended to relate to Indian religious practices and, therefore, were passed without consideration of their effect on traditional American Indian religions....Such laws and policies often deny American Indians access to sacred sites required by their religions."

Unfortunately, AIRFA has not achieved the intended result. The Supreme Court has adopted the most restrictive interpretation in its 1988 Lyng v. Northwest Indian Cemetery Protective Association decision. In overturning two lower court decisions halting construction of the G-O Road through an area in the Six Rivers National Forest sacred to three California tribes, the majority stated that Indians do not have the right to inflict a "religious servitude" on public land thereby affecting the government's "right to use what is, after all, its land." The Court further ruled that AIRFA is merely a policy statement that provides no additional statutory rights beyond the First Amendment. AIRFA simply required that Federal agencies consult with Indian leaders and consider impacts to religious practices before approving projects. Justice Brennan, in his dissenting dissent wrote that Federal bureaucrats have now been given "unilateral authority to resolve all future disputes in [their] favor, subject only to the Court's toothless exhortation to be 'sensitive' to [Indian] religions."

Attempts to use the First Amendment have proved virtually fruitless as well. The courts have applied more stringent standards in Indian cases, ruling that Indians must prove that a belief is central and indispensable to religious practice, not just that it is sincerely held (the standard test). Because courts do not understand the importance of land in Native American religions, they have ruled that impediments to practice are permissible since Indians are only inconvenience, not prohibited from their practice. In several cases, the plaintiffs' lack of title to the land in question precluded their First Amendment claim. Finally, the courts have ruled that state's interests (including tourism, water development, and commercial interests) outweighed plaintiff's rights.

Why does this double standard exist and what can be done about it? The most basic problem is that non-Indians do not understand Native American traditional religions. The wealth of anthropological literature about American Indians is written by and large by outsiders. Native religious practices are encased in literally hundreds of cultural traditions and expressed in hundreds of languages. Indian religions exist for interested non-Indians only in translation. Because secrecy has been a critical component of cultural survival, Indian people are frequently reluctant to discuss such personal matters, especially in the face of a hostile dominant society. Indian people are not out knocking on doors and proselytizing. In fact, several Pueblo people who were informants for anthropologists have been executed.

Another aspect of this basic problem is that Indian and non-Indian views of the natural world are different. Non-Indians view nature as a non-living commodity, formerly as wilderness to be tamed and now to be preserved, and as playground, natural resources, and scenery.

American Indians view a world made up of living beings. Animals, plants, streams, and mountains are treated as persons and are thanked as sources of human life. The sacred is embedded in all phenomena but certain places are especially important as access points or portals to the sacred. According to Deward Walker, Jr., "American Indian religious leaders attest that the geographical location of rituals is vital. Unless rituals are performed at the proper locations, they have little or no efficacy. In a literal sense, the natural environment becomes an alter or church in these religions....it is the rule rather than the exception that American Indian ritual life is inextricably tied to the natural environment" (Walker 1991:110).

Although designation of areas as wilderness may have the beneficial effect of protecting traditional use areas from incompatible development or destruction, the European idea of wilderness is foreign to Native American concepts and can disrupt access. During a series of 10 consultations with tribal representatives summarized in the 1979 AIRFA Report, access to religious sites was the first and foremost issue among many discussed. The Pueblo of Acoma responding to the wilderness issue wrote that "Federal wilderness and conservation laws do not fully respect our traditional rights to the land there and, therefore, we oppose wilderness...for those lands" (Menge 1991:153).

What the Acomas were referring to was a proposal to create a national conservation area including two wilderness units as well as a national monument in the El Malpais region of west-central New Mexico. The area proposed for designation was entirely within Acoma aboriginal lands as determined by the Indian Claims Commission. Acoma hoped to have 13,000 acres of public land in the proposed national conservation area transferred to the pueblo under trust status or at least deleted from the proposed Cabeza Wilderness. The bill passed over Acoma's objections in 1987 although it included assurances of access by Indian people for traditional cultural and religious purposes.
Subsequently, BLM received a request from then Pueblo Governor Ray Hista to allow vehicle access to a religious site in Cabolla Wilderness stating that "Since vehicular access is denied in wilderness areas we have been locked out of an area we once used to reach a fence line in our grazing area. More importantly, this barrier effectively prohibits access for our elders and religious leaders to visit the religious sites located in that area" (June 22, 1990).

The question facing us as land managers was could we meaningfully accommodate Acoma's religious needs and still protect the wilderness? During the General Management Planning process, we took the request into consideration, cognizant of our responsibility to balance the demands of the Wilderness Act with those of AIRFA. In trying to steer a middle course, we arrived at a modest proposal. That is, the BLM Area Manager could permit vehicular access into wilderness to accommodate traditional Native American religious practice if that access is the minimum tool necessary to allow that religious practice and protect Native Americans First Amendment freedoms. For example, some of the traditional leaders that are required to perform these activities are elderly or in poor health. In these situations, we are proposing to allow motor vehicle access when it is the only reasonable alternative that assures getting these practitioners to the necessary place. Wilderness values must not be degraded and, if approved, vehicles must stay on existing ways.

We propose to operationalize this plan by issuing the Acoma Tribal Administration a number of permits with the above stipulations attached. The program would be administered by the Tribal Administration to help ensure the necessary confidentiality. Vehicles found inside the wilderness with these permits on the dashboard would not be bothered by BLM law enforcement rangers. In fact, they would be instructed to leave the vicinity immediately. Vehicles without the necessary permits would be cited. At the end of the year, the Tribal Administration would be required to report on the number of permits issued during the year and what vehicle ways were used.

Although we are aware that this proposal involves a balancing act that may please no one, we feel that it is a baby step, not a giant step in the struggle to insure religious freedom for all Americans.

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PRESERVING THE HERITAGE OF WILDERNESS AREAS. Joseph G. Gallagher, USFS, Assistant Recreation Staff Officer, Boise National Forest, 1750 Front St., Boise, ID 83702 (208)364-4159.

Introduction The signing of the Wilderness Act initiated the preservation of large tracts of unspoiled lands; it was also the green light for the removal of numerous buildings, bridges, cable cars, and other structures in the wilderness. many of these were of no historic interest while probably had considerable. No data exists on the precise numbers of structures removed but anecdotal reports would place the number nationally in the thousands. While this fervor to remove all traces of human occupation succeeded in many places, it in turn enhanced the historic significance of those structures that escaped the torch. The direction to remove these structures was codified in the wilderness section of the Forest Service Manual. Simultaneously, the cultural
resources section of the Manual was written which directed these very same structures be inventoried, preserved, and protected. Not only did this create discontent in the ranks of Forest Service employees, but it continues to be a source of great concern among our publics. At a recent meeting in Boise regarding the Frank Church-River of No Return (FC–RONR), questions were repeatedly asked about what was thought to be the current Forest Service policy of burning structures in the wilderness. Clearly, the management of the wilderness resource may be the most difficult responsibility of Federal agencies today. This difficulty comes, not just from the high standards that we have set for ourselves, but also from the inherent conflicts between societal wants and the preservation of the wilderness resource.

Historic Structure Management in the Frank Church-River of No Return Wilderness. Sixteen years after the Wilderness Act was signed, the FC–RONR Wilderness Act was signed which specifically directed the Forest Service to inventory, evaluate, and make recommendations on the preservation or removal of the ranch, homestead, trapper, and other cabins in the FC–RONR Wilderness. Since the FC–RONR legislation was signed into law, other wilderness acts have incorporated similar wording or sentiments. In reality, the notion of removing all permanent evidence of humans from wilderness would require the removal of every archeological site, as well as every structure. Obviously, an impossible task.

In the Frank, as it has come to be called, the emphasis shifted to carrying out the legislative direction of the Act, while the inventory and evaluation of structures presented no problems for management, the notion of preserving, even restoring structures in the wilderness ran counter to the history of the Forest Service. Indeed, it conflicted with the Forest Service Manual. Through sheer luck, when the selection was made to initiate the restoration work, the archeologists who made the selection chose the Jim Moore Ranch on the Nez Perce Forest, where Tom Kovalkcy was the Forest Supervisor. Through Tom’s support and good offices, plus innumerable volunteers, creative financing, and unlimited energy, several buildings at this National Register property were stabilized and remain today for the Forest visitor to walk through and marvel over. And the word got out. The work at the Ranch was done sensitively, with only hand tools and without any ill effects, to the wilderness resource. Since then, other structures in the Frank have been stabilized or restored at Cabin Creek, Power House and Joe Bump—locations familiar to those frequenting the Frank. This year the lodge owns by A. Anderson, first superintendent of the Yellowstone Forest Reserve, will be restored in the Washakie wilderness in Wyoming.

Forces Driving Structure Restorations. Having had a hand in all of these restorations, as well as those in the BLM managed Malpais Wilderness, it is important to discuss why the preservation of any historic structures might be undertaken. The direction of legislation may be the driving force, but there are reasons: “Complete knowledge of the past Tourism ... monuments to the incapability of humans to persist”.

The first reason is that the preservation of historic structures, especially in their appropriate context, such as mining, ranching, homesteading, provides a complete picture of what the history of an area was. It provides the meat of off site interpretation and an enhancement of visitor experience.

This leads to a second reason to preserve such structures. There are three key principal elements to quality tourism—attractions, attractions, and attractions. While it may make one shudder to think of wilderness in the same breath as tourism, your state’s Departments of Commerce, and Tourism, outfitters and Guide organizations and local Chamber’s of Commerce and all other entities that benefit from visitation to wilderness think along those lines. Ideally, wilderness areas could be left untrammeled with only monitoring efforts to make certain the ecological systems were not being affected by human activity to any significant degree. Instead, they will become linchpin in all sorts of ecotourism programs designed to ease urban tension, reduce the international balance of payments, promote rural development, replace lost jobs in extractive industries, etc. Historic structures, indeed all cultural resources, form a core of key attractions in wilderness areas. Those that would benefit from wilderness visitation will want to preserve those attractions. If historic structures become the attraction that they might, a strong case could not just be made to end restorations, but to eliminate those that have been restored.

Lastly, wilderness is not a place for living history museums. The structures that are preserved must be a clear indication that in some places, the human will to conquer nature was insufficient. That here in wilderness, we are all guests of nature, even when we may be on a first name basis.

These thoughts serve as a preface to a series of short vignettes that describe archeological excavations and historic building restorations in wilderness areas. In each case, steps were taken to preserve the wilderness values within which these heritage values reside.

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MANAGING WILDERNESS, CULTURAL RESOURCES, AND CULTURAL DIVERSITY: WILDERNESS THROUGH THE EYES OF THE BEHOLDER. Andrea Keus, University of California, Institute for Mexico and the United States (UC MEXUS), Riverside, CA 92521 (909)787-3519.

Introduction. In the twentieth century, wilderness stewardship has been developed as a concept separate from land use, as a system of administration, and as a popular social movement. Yet people have many different visions of the places called 'wilderness'. An understanding of the variety of environmental perceptions is of critical importance to wilderness managers in the present controversial political climate for conservation. Hunter-gatherers, farmers, ranchers, park rangers, and politicians all base their views of nature on the values and rules of their societies. Their perceptions result in land use decisions, ranging from resource extraction to environmental protection. In this sense, wilderness stewardship is the result of perceptions about what are appropriate, beneficial, or 'natural' changes for a wilderness environment in the context of human needs and ethics. The future condition of the earth will depend on the ability of this generation of conservationists to recognize and understand the diversity of cultural perceptions which motivate wilderness stewardship.

Western Definitions of Wilderness. In the United States, questions about wilderness are considered in terms of a dichotomy between nature and the urban jungle, because wilderness is perceived as the opposite of civilization. As this nation has developed away from its rural roots, wilderness has become more a remnant of nature than a frontier, and its value to U.S. society has increased with its scarcity (Nash 1990). This value may be seen in terms of beauty, potential products, recreation, scientific research, cultural heritage, education, ecosystem stability, and/or biodiversity (Ehrenfeld 1978; Kellert 1985; Ledec and Goodland 1988; Nash 1988). Ultimately, however, the worth of wilderness is measured by its degree of development (or lack thereof) and its image as an island around which human progress has flowed. Wilderness sites are those areas void of human history and
representative of nature before human contact, "where the earth and its community of life are untrammeled by men, where man himself is a visitor who does not remain" (Wilderness Act of 1964, Section 2(c)). As a result, wilderness is considered pristine because it is untouched by the human struggle to build a civilization; it is primeval because it contains the primal forces of nature from which human civilization arose; and it is primitive because it has not been developed into a functional part of human civilization.

**Alternative Perceptions** Clearly, the above view of wilderness is a version particular to Western civilization, where man in the wilderness is man on the frontier of the unknown, a visitor in a foreign land. However, one person's wilderness may be another's home, and, in fact, wilderness areas are seldom untouched by human history. Every biogeographical province in the world has been inhabited, modified, or managed by human groups in the present or the past (e.g., Anderson and Nabhan 1991; Clarke 1971; Gomez-Pompa and Keus 1982; Hynes and Chase 1982; Klee 1980; Kunstädter 1978; Lundell 1937; Parsons 1975; Sauer 1958). The natural environments now protected in U.S. national parks were once the homelands of past inhabitants who often have been evicted in order to preserve the 'pristine' quality of these areas (Chase 1986; Hecht and Cockburn 1990). Indigenous rights frequently are swept aside under the belief that all human influence is detrimental to the balance of nature and that wilderness preservation, as Western societies define it, is for the common good of humanity and the earth.

Yet, wilderness stewardship is not new or a concept restricted to Western civilization. While words for conservation or wilderness may not be found in other cultures, the principles of environmental protection are embedded in the rituals and myths that govern many different societies' relationship to the land and neighboring groups. In many cases, mythic perceptions and ritual behavior are based on local, long-term experience in a specific environment and may be more pertinent to that region's 'reality' than Western science. In the deserts of North America, for example, Native American folklore about plants and animals, such as stories about Coyote or Raven, often represents the botanical, zoological, even pharmacological features of the local flora and fauna and preserves the knowledge of the environment and its ecological relationships through a powerful and appealing ideology (Nabhan 1982, 1985).

Apart from different cultural perceptions of humans and nature, many of the ecological characteristics which are valued today in wilderness sites are the result of past and present human actions. In the world's tropical forests, for example, botanical and anthropological studies indicate that the composition of mature vegetation in 'virgin forest' reflects local practices of planting or sparing useful trees in cultivated areas and subsequently protecting these species as part of the management of secondary succession in "fallow" sites (Gomez-Pompa and Keus 1990). In the Sierra de Manantlan of Mexico, the recently discovered wild species of perennial maiz (Zea diploperennis), of great potential use to commercial corn production (Litt 1988), has survived along the borders of cultivated fields because the local form of shifting agriculture provides the disturbed habitat in which the species grows. Its in situ protection in a biosphere reserve also implies the continuation of the local land use practices which maintain the species.

**A New Agenda** Not all indigenous people or 'traditional' societies represent folk conservationists who altruistically protect their small parts of the biosphere for the benefit of humanity, and this discussion is not intended as an argument for the rejection of all Western concepts regarding wilderness or wilderness stewardship. Within the Western tradition, beliefs in earth's creation for human dominion are countered by the more benign teachings of St. Francis de Assisi and St. Benedict of Nursia who symbolize an interactive and respectful relationship with Nature (Dubos 1972; White 1967). What is needed is a new agenda for wilderness stewardship which accounts for the social dimensions of wilderness areas and links environmental ethics and scientific research with the realities of local knowledge, concerns, and hopes. Wilderness managers need to recognize the oversimplicity of environmental doctrines which present images of conservationists as wise, scientists as all-knowing, and wilderness "trespassers" as all ignorant, naive, or greedy. Clearly, a wide range of human compassion, intelligence, and wisdom can be found within each of these groups. The key to effective conservation policy will be found in the alliances between those individuals—conservationists, researchers, landholders, or local residents—who share similar visions of land protection, whether for ethical, economic, political, or spiritual reasons.

Many national and international environmental programs, such as the UNESCO Man and the Biosphere Programme, have been initiated over the last two decades with the aim of integrating conservation goals with cultural heritage, indigenous rights, and/or development concerns of local residents and landholders. However, despite the popular concepts of sustainability, multiple use, and local participation, no new culture of wilderness stewardship has arisen. Part of the problem lies in the lack of recognition of the cultural complexity in the human groups that inhabit wilderness areas. The belief that wilderness represents a pristine and primeval environment has been accompanied by the inadvertent perception that its residents are also primitive. Too often, indigenous groups are seen as windows to the past which reflect the roots of human culture and civilization, but they are not considered part of modern society. Descendants of ancient civilizations are considered cultural remnants, just as wilderness is seen as an fragment of nature in its original form. In the same way, indigenous groups are seen as undeveloped cultures whose belief systems represent a primitive understanding of nature. As a result, their perceptions of the human role in the environment may be recognized, even glorified, by researchers and conservationists, but they are ultimately considered quaint, unsophisticated, and inappropriate for the complexity of wilderness stewardship in the modern world. Conservation programs thus remain unrepresentative of the initiatives or viewpoints of local inhabitants in designated wilderness sites, and 'local people' are portrayed as homogenous, self-contained units with a predictably innocent understanding of their place in the environment or the world.
Such representations create unrealistic expectations for local behavior by perpetuating simplistic images of the "ecologically noble savage" or the ecologically ignorant, and therefore destructive, native (Chase 1988, Redford 1990).

Clearly, the diversity of human cultures must be considered a contemporary phenomenon, rather than a gradient of cultural evolution. The failure to attribute to 'local people' the same social and ideological complexity as would be found in any other contemporary human society has left protected area managers unprepared for the intricacies of local land management systems or the range of perceptions regarding a protected area's role, good or bad, within those systems. The social consequences of wilderness preservation have seemed distant to U.S. conservationists, because, historically, policy implementation has affected human groups whose culture and behavior are strikingly different from that of mainstream America. It has not been until conservation issues affected the livelihoods of sectors of U.S. society—the loggers, ranchers, farmers, and fishermen—that the social dimensions of wilderness stewardship have been seriously considered at the policy rather than research level. These groups of resource-users represent the very frontier cultures on which the United States has based its pioneering identity. As U.S. citizens and members of American culture, we cannot dismiss our own society as primitive, quaint, or unsophisticated. In addition, the newest sectors confronted by wilderness advocates are in no way naive in the political arena. Instead these groups have powerful political lobbies, for both their own private interests and those of the big businesses which depend on their products, and they have effectively brought their views into the mainstream of public opinion.

**Conservation Alliances** If we, as the current generation of conservationists, are to design a new agenda for wilderness stewardship that integrates the social and physical dimensions of the environment, we must realize environmental understanding is no more unilinear than social development, and wilderness stewardship is not a simple matter of education. People armed with the same information may reach different conclusions about appropriate land use (including no use) based on their belief systems and worldviews. Conversely, they may arrive at very similar decisions about environmental protection for separate reasons. Conservationists need to look for the intersections of cultural perceptions regarding wilderness and use these perceptual overlaps to motivate allied conservation initiatives in different groups and to build a common culture for wilderness stewardship in the midst of humanity.

A case in point centers around the plight of the Bolson tortoise (Gopherus flavomarginatus), endemic to a small section of the Chihuahuan Desert in northern Mexico, and the symbol of desert protection and local participation in the Mapimi Biosphere Reserve (Durango, Mexico). As a species rather than a symbol, the Bolson tortoise is endangered by human predation and habitat alteration, such as road building or agricultural clearing (Morafka and McCoy 1988). Since the establishment of the Mapimi Reserve in 1977, the local residents, mostly ranchers and their families, have gradually stopped their own consumption of the Bolson tortoise and now protect it from outside poachers, either by informing outsiders of the Reserve's existence or by informing the Reserve management of poaching or hunting activities. As a result, the protection and gradual recovery of the Bolson tortoise population is considered evidence of the Mapimi Biosphere Reserve's success in terms of local participation in conservation. Yet, this perception represents the researchers' and Reserve management's tendencies to value one species as equivalent to any other in terms of its place within a holistic system. The Reserve management has taken it for granted that conservation practices applied to one species will be extended to all other parts of the ecosystem.

The ranchers, however, see the same environment as rangeland, in terms of pasture areas and water sites for their cattle (Kaus n.d.). The key to the ranchers' cooperation is not a shared vision of long-term preservation of the desert and its natural resources, but the security of their usufruct rights and the ability to use the natural resources more productively. The Reserve's presence is less of a perceived threat to the local ranchers than more imminent threats of government expropriation, private land takeovers, squatters, or trespassers. As a group, the ranchers in the area are politically weak, and the Reserve, with the endorsement of state, federal, and international organizations, is seen more as a powerful ally than enemy. As a result, the tortoise is not a symbol of conservation to the ranchers, but a bargaining chip in a social contract to protect their access and rights to rangeland. The maintenance of the Reserve's public relations, and thereby continued protection of the Bolson tortoise, will depend on whether the Reserve management recognizes the differences between its own objectives and those of the ranchers and the role of the tortoise in motivating environmental protection (Kaus 1993).

**Conclusions** Clearly, unprotected land has suffered greatly at the hands of the human species, and stronger measures are needed to prevent the encroachment of destructive land-use practices into undeveloped areas. However, wilderness management is ultimately about people: what they think, what they know, and how they act on that knowledge. A view of wilderness as apart from humans generates policies which isolate conservation practices from the general rules, regulations, and motivations that guide the remainder of land use in a wilderness region. As the needs of our own lifestyles and economies increase, wilderness sites can no longer be protected by virtue of isolation. Instead of focusing on the empty spaces on the map, the wilderness agenda for the twenty-first century needs regional management of a mosaic of land types: from sites which are used intensively to areas which are left alone. Most importantly, conservationists need to recognize that social relationships can be more fragile than those of the ecosystem, and it is the integration, rather than replacement, of alternative understandings of the environment which will protect the biosphere and thus, ultimately, humanity.
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WILDERNESS, CULTURAL RESOURCES, AND THE PUBLIC TRUST: MAKING IT WORK. Ruthann Knudsen, NPS, Supervisory Archeologist, Archeological Assistance Division, Box 37127, Washington DC, 20013-7127 (202) 343-4119.

As a child in the Boundary Waters of Minnesota and Ontario, I knew in my soul what it meant to be listening to a loon across evening waters in a wilderness that didn’t even know national boundaries. In those wild spaces, I stumbled over an old railroad track and a log cabin that was melting back into the meadow, and knew that I was connected to people who had used the timber resources there. Along the Middle Fork Salmon wild river, in the midst of a modern wilderness, I have stood in a two room log cabin that I knew had been home for a couple and their healthy young children while a world-wide Depression swirled the economy outside of their refuge—and have understood their sense of sanctuary. All these things are wilderness in the United States in the 1990s.

There is common ground among the current U.S. definitions of wilderness, cultural resources, and the public trust, just as there is physical commonality. These concepts provide a basis for the conservation and management of human history within lands whose primary use has been designated as non-humanly controlled “nature.” The Public Trust Doctrine is a European concept that states that some things are so important to the health of the human community as a whole, that those things (e.g., water, air) cannot be considered as individually owned property—rather, the community’s government must manage these things as a trust on behalf of the whole community. Both “wild” and cultural resources are subject to public trust management. However, within any community there are differences in opinions, interests, and subcultural values. These subcultures can be identified and their validity accepted, and then the interfaces or common ground between end among them managed for the widest common good.

Wilderness is defined in Euroamerican culture as is listed in the dictionary (Neufeldt and Gurevich 1988:1528) as:

[ME wild place <OE wild animal <wild + deer] (1) uncultivated, uninhabited region; waste; wild. (2) any barren, empty, or open area, as of ocean. (3) a large, confused mass or tangle. (4) [Obs.] a wild condition or quality —SYN. WASTE.

Yet, in truth, archeological evidence indicates that there are few if any areas of the world’s land surfaces that have not been used and/or inhabited by the human community—even Antarctica is today a landscape where human beings have affected the natural community, prehistorically and historically. The Wilderness Act of 1964 (Sec. 2(a)) defines wilderness as “an area where the earth and its community of life are untrammeled by man” but goes on to state that Congressionally designated wildernesses may contain features of “scientific, educational, scenic, or historical value.” The Endangered American Wilderness Act of 1977 reaffirmed these values within wilderness (Sec. 1(b)). Despite the cultural biases of the 1964 Act’s writers, wild lands are cultural as well as natural preserves.

As demonstrated throughout the United States wilderness lands, from the Gates of the Arctic to the Frank Church - River of No Return to the Shenandoah, people have lived and used all the continent’s natural resources for millennia. In 1980 this was explicitly recognized in the Central Idaho Wilderness Act that established the River of No Return Wilderness. Section 8 of that law mandated in the new wilderness a cultural resource management program that included archeological and historic site protection and interpretation, and specified that the program be based on a plan that encouraged scientific research and outlined an anti-vandalism effort as well as provided for public interpretation. The Senate Report (No. 96-414) accompanying S. 2009, the bill marked up as the final legislation, emphasized the need for these cultural resource management activities within a designated wilderness. More recently, the 1987 Senate Report discussion of Section 501(a) of the El Malpais National Conservation Area legislation (P.L. 100-225) noted the presence of significant cultural resources requiring affirmative management within “wilderness” areas.
The term cultural resources is generally one of practice rather than law; its use in the Central Idaho Wilderness Act may be its first Congressional use. The term today encompasses prehistoric and historic (including industrial), terrestrial and submerged archaeological sites and artifacts, historic architecture and engineered structures, cultural landscapes and traditional cultural properties, traditional lifeways, and the documents, oral histories, and other records that relate to those places and collections. The term was first used in a 1972 Tucson meeting sponsored by the Arizona State Museum to discuss responses to the National Environmental Policy Act (NEPA; Lipe and Lindsay 1974). There, anthropologically trained archaeologists in state and federal agencies were trying to grapple with the broad requirements for environmental assessment and impact evaluations, and were looking at the human cultural environment in past, present, and future perspectives.

In the 1970s, the term "cultural resources" was generally applied only to the archaeological and architectural sites subject to National Historic Preservation Act (NHPA) requirements, though the 1978 passage of the American Indian Religious Freedom Act broadened the term to include "sacred sites." The 1980 National Historic Preservation Act Amendments (Title III, Section 502) directed the Secretary of the Interior and the American Folklife Center of the Library of Congress to report on needs for preserving the "intangible elements of our cultural heritage such as arts, skills, folklife, and folklore" (Loonis 1983). This expansion of the referents for the term "cultural resources" tied back to the original NEPA-angered term (Knudson 1986). This broad definition was strengthened by the practical acceptance of a category of traditional cultural properties (Parker and King n.d.) as being eligible for the National Register of Historic Places, and by the Department of Defense's (DOD; 1991) use of a broad definition of cultural resources for whose affirmative stewardship the DOD was responsible under its Legacy Resource Management Program. Cultural resource overviews and management programs in wildernesses (e.g., Knudson et al. 1982, Wildesen 1982) and other wild corridors (e.g., Knudson 1992) thus are directed to the stewardship to a variety of places and objects important to past and present cultural values.

Cultural resources in wild lands embody the human experience of social and cultural marginality, that is, distant from urban communities that rely on large amounts of water for drinking, sewage, transportation, and watering crops and are social, cultural, and political foci. The cultural margins are often coincident with the beginnings of watersheds and require protection to meet downstream human needs, but at the same time they are areas of rich ecological and cultural exchange between watersheds and natural and social ecosystems. They are often at upper elevations and include basic hardrock mineral resources (including strategic minerals) and, because of folding and faulting, may be sources of hydrocarbons. And they are recreational refuges from urban compaction.

Wilderness values are considered to be community values, a broad social interest that should not be damaged by personal interests without consideration of the community. They are thus something to be protected by the government representing those wide citizen interests—they are best managed as a public trust (Knudson 1991, 1993; Sax 1970, 1992). The values being protected in those wild lands are diverse, including humanistic, spiritual, and scientific values in both our natural and cultural heritage. Sax (1992:139) has recently noted that "the owners of patrimonial [e.g., community heritage] properties are...trustees and fiduciaries of things that do not entirely belong to them." In Congressionally designated wild lands, the task is to harmonize the management of the heritage values to be conserved there for present and future generations.

Peter Drucker (1977:25-26) has noted that "Managment is a social function, embedded in a tradition of values, customs, and beliefs and in governmental and political systems. Management is—and should be—culture-conditioned; in turn, management is an organized body of knowledge and as such applicable everywhere, it is also 'culture.' It is not 'value-free' science.... [It] is a practice...and performance...based both on knowledge and responsibility".

Each of us is raised in a specific familial and social culture—set of values—and then trained in an academic disciplinary culture (e.g., animal ecology, civil engineering, anthropology) and an on-the-job corporate culture (e.g., U.S. Forest Service, tribal government, public school administration). Thus, each of us carries these value sets into any discussion that is directed toward management of an acre of land that embodies various values. Each value (e.g., solitude, heritage appreciation, natural ecosystem) may be weighted differently by each discussant; the task is to find the common ground among those values, and the acceptable compromises to maintain as many of the acknowledged values as is feasible.

Such interface management (Knudson 1991) is based on all participants accepting the validity of each other's value sets, then sincerely working to identify the common ground and acceptable compromises with a long-term perspective. Ecologically or commodity-oriented wilderness managers need to recognize that "cleaning up trash" destroys cultural resources that are valued by some people, just as historically oriented researchers and the general public need to recognize that documenting a 1880s homestead and then letting it melt in place naturally may be the more appropriate way to sustain solitude values.

The cry of the loon, the old apple orchard, the centuries-old rock art on the cliff face, and the grizzly bear cubs learning to swipe spawning salmon from a clear swift-running river, are all important wilderness values whose conservation requires wise management. We can be better stewards of designated wildernesses if we use the lessons of the past, exhibited in archeological and architectural sites and landscapes, to point us to the future.
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CONTACTS FOR CULTURAL RESOURCE MANAGEMENT IN WILDERNESS

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A DIFFERENT VIEW OF THE BORDER--THE WHITE MAP SYNDROME. Carlos Nagel, President, Friends of PRONATURA, 240 East Limberlost, Tucson, AZ 85705 (602)887-1188

My professional background is within government service - federal, state and municipal. I understand the concerns of managers within an administrative structure. As well, since 1978, I have lived the life of a small entrepreneur and understand the risks and challenges of earning a living without a fixed income. More and more during the past several years I have tried to share the viewpoints that have evolved from my experiences as a multicultural person - including the public/private experiences - in the form of seminars and workshops presented through the vehicle of civic organizations, the so-called NGOs.
My experiences take place at a practical level and provide insights not usually available to someone that has worked only within an organizational structure. Thus, I have been free to view the events from a different perspective and it is this viewpoint that I wish to share with you in the most concise way possible. My viewpoint is not academic, although I have facts and figures; it is not solely environmental although I draw on environmental viewpoints; it is not only entrepreneurial although economics is an important aspect of the equation as we seek solutions to the economic and environmental pressures on our lives and our planet.

It is essential that we establish a new vision. We must create a balance between economics, ecology and the spiritual/social dimensions of our lives. And, most important we must apply this new vision in a practical way.

In my seminars I use a puzzle with nine dots to demonstrate how we are locked into our frames of reference. We need to step out of our boxes, we need to dare to risk and think in new ways. Today we face a situation akin to the experiment in which a frog is placed in hot water. He or she immediately jumps out. However, if you place a frog in cold water and slowly heat the water the frog will sit and boil to death. We need to recognize the subtle changes and take action before we figuratively "boil" to death.

Yogi Bear said that "Nostalgia is not what it used to be", which is funny, but one of his other quotations: "The future is not what it used to be" could be a metaphor of our times.

Change is occurring at an exponential rate never before witnessed on this plane. For instance, population growth:

<table>
<thead>
<tr>
<th>World Population</th>
<th>CHINA 2,500 increase/hourly</th>
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<tbody>
<tr>
<td>1993</td>
<td>2000</td>
</tr>
<tr>
<td>5.5 billion</td>
<td>6.2 billion</td>
</tr>
<tr>
<td>Net Increase</td>
<td>250,000/day</td>
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</tbody>
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<table>
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<tr>
<th>Mexico (total)</th>
<th>1993</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>89 + (millions)</td>
<td>107-110 (millions)</td>
<td></td>
</tr>
<tr>
<td>Mexico City</td>
<td>22+ (millions) 33 (millions)</td>
<td></td>
</tr>
</tbody>
</table>

What are the implications of this exponential population growth? The first is environmental:
- 70,000 acres of forest per week lost forever - the size of great Britain each year
- The equivalent of a football field disappears every eight seconds in Brazil (slowed from 2 seconds)
- The greatest extinction rate in 65 million years
- 5% world's population using over 40% of energy resources
- 25% of population using 70% of energy, 75% metal, 85% wood. One child in industrial countries uses 125 times the amount of a child in a non-industrialized country.
- Each day deaths from hunger-related causes = 300 jumbo jets with 365 passengers, (110,000) almost 50% children.

How do we develop a new relationship with the environment? Are we a threatened or endangered species?

The second implication arises from the increase in contacts between people. As more and more people come together with others who are different from themselves we need to find ways to relate beyond the differences. Basically there are three options: we can ignore, we can change, or--the only practical approach--we can collaborate/cooperate/coexist. A collaborative approach offers other benefits: it encourages common solutions to the environmental challenges that confront us, not as citizens of this or that culture, but as common inhabitants of this small blue marble—the Planet Earth.

There is a new Paradigm emerging for relations among peoples and it includes an increasing awareness that we are responsible for our destiny. As the conventional structures become less and less able to cope with the complexity of our times, we must assume the responsibility for what happens. This re-values such concepts as Integrity, Trust, Honesty, Good Faith and Love and their real meaning, not as sentimental pleasantries to be considered as religious service, or as ideological blunt instruments but as integral aspects of a survival process. I call it "Honoring the Past as a Window to the Future" or "Going Forward to the Past."

More and more thinkers are seeing this as a new frame of reference— a new paradigm—if you will. Robert Axelrod author of "The Evolution of Cooperation" addresses very practical mechanisms derived from a statistically documented game that emphasizes the "Win-Win" concept. In science, Thomas Kuhn wrote about this new frame of reference in "The Structure of Scientific Revolutions"; the physicist Fritjof Capra wrote "The Tao of Physics" and "Belonging to the Universe"; the evolutionary biologist Rupert Sheldrake wrote about morphic resonance in the "The New Science of Life". Among theologians the concept of a new frame of reference is approached by Matthew Fox in "Original Blessing"; David Steindi-Rast (coauthor with Fritjof Capra) in "Belonging to the Universe"; Hans Kting, and many others. Musicians such as Paul Winter join theology with a "Missa Gaia", a Planetary Mass first performed at St John the Divine Cathedral.
There is also the somewhat controversial but indicative Deep Ecology movement that states that the source of the problems of the environment are within us.

I have reviewed dozens of lists created by many authors that attempt to summarize this new frame of reference or paradigm. The most concise of these is the list in William Irwin Thompson’s “Pacific Shift.” He describes these changes as follows:

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parochial/Local</td>
<td>Bioregional</td>
</tr>
<tr>
<td>National</td>
<td>Planetary</td>
</tr>
<tr>
<td>Religious</td>
<td>Spiritual</td>
</tr>
<tr>
<td>Egocentric</td>
<td>Ecocentric</td>
</tr>
<tr>
<td>Hierarchic</td>
<td>Non-Hierarchic</td>
</tr>
<tr>
<td>Centralized</td>
<td>Participatory</td>
</tr>
<tr>
<td>Homogeneous</td>
<td>Heterogeneous</td>
</tr>
<tr>
<td>Mercantile</td>
<td>Civic</td>
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In order to shift our Paradigm to a more appropriate for survival process in the 21st Century I project slides that offer images of what I call the “White Map Syndrome.”

For instance, when we view a map of the United States in relation to our neighboring countries, our maps almost invariably stop at the borders. The rest is a white map, with nothing of importance, (merely Mexicans or Canadians). The NBC “Today” program weather map is a typical example. However, we are not the only ones who do this. View a map of Mexico and, what happens? Sure enough, even more white map than with US projections. For Mexico it seems as if there is nothing but “ugly gringos” north of the line.

In an era of globalization, the dissolution of the nation states (witness the European Common Market, the NAFFA), this Map Syndrome a very risky world view; it creates the illusion that lines drawn on maps represent the same 16 reality” that they might have in the past. We must view the political geography of our planet with different eyes. The examples I use are: the Western Hemisphere in which the South Pole is at the top; a map showing Australia at the top end center, with the North Pole at the Bottom; a map of Texas seen from a Texan point of view (in this map Texas occupies 7/8 of what we know as the United States); the Sonoran Desert bioregion; and finally, the “third country” view of the US/Mexico border region in which each gradually blends into the other.

My presentation concludes with a symbol: the Chinese compound ideograph for “crisis”, that contains the character for “danger” ... usually associated with “crisis” ... but which also includes the ideograph for “opportunity”.


Over five years ago, in January 1986, Kathleen (Reinburg) Schamel and I presented at a Forest Service colloquium in Tampa, Florida, a paper entitled, “Cultural Resources in Wilderness: The Good Guys vs. the Good Guys.” Ours was one of several presentations on the non-recreational uses of wilderness. Indeed, this part of the colloquium was the first of its kind, focusing on such non-recreational wilderness uses as watershed protection, wildlife, and spiritual values.

In preparing our presentation, we of course did a literature search. We found that virtually nothing had been written on the subject, except for a few unpublished papers (Berger et al. 1987; Cutler, 1980), an article (Wildesen 1985), and some agency publications (DeBlois 1984; Cordell and Green 1984). Indeed, it was in a handbook by The Wilderness Society that we found some of our best ammunition—the stated premise that the Wilderness Act does not eliminate “historical value” as a contributor to wilderness. Rether, §2(c) of the Act defines wilderness as an area that “generally appears to have been effected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable” (emphasis added). Nowhere does the Act state that an area must be pristine with no evidence of human activity. (The Wilderness Society, 1984).

Our presentation was a success, and soon our topic took on a life of its own. We started getting requests for other presentations, including a session sponsored by the Society for Conservation Archaeology in 1988. In 1989, we were asked to submit an article for the Journal of Forestry of the Society of American Foresters. (Neumann and Reinburg 1989). The following year, we were asked to make a presentation at SAF’s annual meeting, in Washington DC. We re-wrote it with Milo McLeod, an archaeologist
with the Lolo-Bitterroot National Forest, accompanied by Milo's slides. (Neumann, Schamel and McLeod 1990). Last year, I presented a new paper on the subject at the wilderness conference in Portland, Oregon; it included references to the National Park Service, Bureau of Land Management and Fish and Wildlife Service as well as the Forest Service. I used McLeod's slides again, along with others loaned by people from the Forest Service. (Neumann and Schamel 1992).

Then and now our essential message has been that cultural resources are an integral part of wilderness. Indeed, they provide wonderful opportunities for enhancing wilderness values and experiences. Management and protection of these resources are not merely matters of law but of common sense. They both offer so much for our knowledge and enjoyment. The old cabins tell us about the rigor and dangers of frontier life. The cave dwellings and other archaeological sites show us what prehistoric humanity endured. And their wilderness settings help to make our understanding of them more vivid and complete.

So here I am again this year, and very pleased to be here. I do believe this conference is the first to make cultural resources in wilderness a major theme, and not just one item among many or a fillar or adjunct to a more dominant theme. I've noticed from other papers and endnotes that knowledgeable people like Ruthann Knudson, William Lipe and Rick Henke have been making presentations and adding to the literature (Knudson and Lipe 1993). The George Wright Society meeting last fall in Jacksonville, Fl. also featured a panel on the subject. What is also apparent, however, is that interest in cultural resources in wilderness, while increasing, has remained the purview of a limited few who know and feel strongly about the subject.

This is not surprising, since the full relationship of cultural and natural resource management still remains diffuse, if not fractured. Although interdisciplinary work has been stressed for decades, sparked by the National Environmental Policy Act and other legislation, natural and cultural resource management is still polarized. The botanists who study plants and foresters who study trees are vastly different from archaeologists who study lithics and historians who study the documentary evidence or our past.

Integrated management is the buzzword these days. Yet among land managers, the differences remain. The park superintendents, refuge managers or forest supervisors who manage vast natural areas are usually quite different in interest and knowledge from the managers of historical structures and archaeological sites. The people with power over these areas are generally from the natural resources side. Where duties overlap, cultural resources usually remain the stepchild. Am I wrong? Some cases in point:

• There were fights a couple years ago over the old dude ranches in the Grand Teton National Park; the natural resources advocates saw them as an intrusion and eyesores which should be removed; the historians saw them as tangible remains of our western history which should be preserved and interpreted.

• As recent as few months ago, a conference was held on the Frank Church - River of No Return Wilderness in Idaho—an area that Congress had recognized in the law as important for both its natural and cultural values. Yet nowhere on the initial agenda was the topic of cultural resources. Fortunately Ruthann Knudson, one of the principal authors of the cultural resources provisions in the Act was able to attend and address these issues, along with another noted archaeologist, William Lipe. (Knudson and Lipe 1993).

• The otherwise excellent February 1993 edition of Journal of Forestry which had many articles under the general heading "Wilderness Around the World," almost totally focused on natural resources management. Only one article mentioned cultural resources, although several pictures of archaeological sites were included and one specifically stated that "One of the purposes of wilderness areas is to preserve sites that have historical and cultural significance." (Hendee and Ewert 1993).

The situation, however, is not all bleak. In preparing for this conference, we sent last year's article around to many of the federal agency professionals and others who could offer suggestions and correct or update any of the material. Most feel that things are improving.

Last year (at the 4th Intergency Conference in Portland, Oregon) I cited BLM as the model in providing guidance through its "Final Policy and Guidelines for Cultural Resource Management in Designated Wilderness Areas." As John Douglas, the senior archaeologist and preservation officer, of BLM has noted, cultural resources are "time resources" and "change resources." He believes this idea is fully pertinent where wilderness is concerned. He notes that there are not many, if any, pristine and totally "natural" parts of the planet. "Understanding how lands were used in the past and how the use changed them is, to me, an essential part of managing the same lands today toward some imagined future." (Douglas, personal comm., March 1993).

Other agencies have responded similarly. The Fish and Wildlife Service, which I felt had the worst compliance record, is now updating its Refuge Manual regarding wilderness management. Kevin Kilcullen, the FWS chief archaeologist, tells me that the new manual provisions will more fully address cultural resources and include language regarding the maintenance of historic structures, and compliance with historic preservation and archaeological laws. (Kilcullen, personal communication, March 1993).

John Twiss, who heads the Forest Service wilderness program has made it clear to us that he believes his agency is changing and that they are selecting line officers with a greater appreciation for all the national forest resources. "Many see the heritage
resources as a treasure to be protected. No question, though, we still have a long way to go with planning and monitoring. (Twiss, personal communication, March 1993).

Forest Service archaeologist Jill Osborn pointed to the new emphasis on ecosystem management. Its focus on resource distribution and density instead of arbitrary project areas "means that they can focus heritage resource surveys on the potential for significant sites, rather than on where the bulldozer is going next." Osborn, who also coordinates the Forest Service Passport in Time (PIT) program, stresses stewardship values. PIT provides opportunities for public participation in archeological work on selected national forests. Over the past two years, PIT has hosted 13 projects in wilderness. These include surveys, monitoring sites for vandalism, recording rock art, and stabilizing adobe cliff dwellings. As she notes, not only does this work help people understand and protect heritage resources in wilderness, it provides another kind of interpretation that is active, rather than through passive signing; it enhances the wilderness experience; it furthers research; it exposes the public to challenges of management in wilderness settings; and it adds the human dimension to wilderness—the struggle for survival through time. (Osborn, personal communication, March 1993).

So where are we headed? In the right direction, I think. Certainly this conference provides an excellent forum for bringing together both natural and cultural resource managers who are involved with and concerned about wilderness and the many resources that wilderness areas contain. We can all share our thoughts and experiences. I do know it matters. Last year, after I gave my presentation, several people came to me and said that it had changed their perspective on the issue. One woman said she had been troubled by the possible loss of a fire tower in a wilderness area; she was going back to her forest and use my arguments to help make her case.

Another bright spot. Congress has increasingly included references, and sometimes specific directions, relating to cultural resources in legislated wilderness areas. This was done, as noted earlier, with the Frank Church - River of No Return Wilderness in Idaho and also in the El Malpais Wilderness in New Mexico. Cultural resources mandates are also in the Californie Desert Protection Act, currently making its way through the Congress.

The issues that now confront us are not just whether cultural resources should be in wilderness but how they should be managed. Research is especially important. Many cultural resources in wilderness are unique due to their presence in rugged and inhospitable terrain. They are often found relatively undisturbed, and offer great potential for different types of study. The Wilderness Act speaks to scientific research, which applies also to cultural resources. We need inventories and evaluations of the cultural resources on all federal lands, including wilderness areas. With this information, informed decisions can be made.

Sometimes research is seen to conflict with the wilderness resource due to the extractive nature of archaeological excavation (Berger, Overbough and Sanky 1987). However, not all cultural resource research in wilderness requires large crews or major archaeological excavations. Much information can be gained with low impact, non-collecting and non-disturbing surveys with field work completed by one or two researchers. Other times major excavations may be warranted. An example is the 1977 Big Creek Lake site excavations conducted in the Selway Bitterroot Wilderness area in Montana. This prehistoric site was excavated to mitigate impacts of reconstruction of a dam. Nevertheless, the project did limit the size of the crew and utilized a minimum tool philosophy to complete the job.

Management of wilderness must also consider the importance these areas hold to Native Americans. They may have used or currently be using some sites within wilderness areas for traditional gathering, hunting or spiritual purposes. Mutual benefits can be gained through cooperation. For example, the Confederated Salish and Kootenai Tribes currently manage the Mission Mountain Wilderness in western Montana. The tribes also manage the South Fork of the Jocko Cultural Area adjoining the Selway-Bitterroot Wilderness and National Recreation area. Tribal members conduct private spiritual quests needed for traditional religious practitioners. Similarly, ethnographic information and discussions with modern Native peoples confirms that portions of the Selway Bitterroot Wilderness area are still used for spiritual purposes.

Lastly, although he cannot be here, I want to share with you some additional slides and thoughts which Milo McLeod has again provided. Last summer, the preservation team in Region One of the Forest Service replaced the wood shingle roof and portions of the log rafters of a 1938 bunkhouse that is part of a log complex located in the Bob Marshall Wilderness area, in the Flathead National Forest, Montana. This project was important for several reasons. The bunkhouse is part of a log complex built by the Forest Service in the early days of the agency and is one of the best intact complexes in the entire region. Restoring the bunkhouse not only helps fulfill the Forest Service's obligations as stewards of important cultural resources, but it also complies with Federal regulations under the National Historic Preservation Act. In practical terms, it also met the ranger district's needs for crew quarters.

The project provided for some new experiences for the workers. Because it was eligible for the National Register, they had to follow certain Federal guidelines, including the Secretary of the Interior's standards. Wilderness designation required that all of the work be done with the "minimum tool," in this case primitive carpenter's hand tools, instead of using a generator and modern power tools. Not only did they do it on time and within budget, they recently received the regional silver axe award for primitive skills. An article on it is expected in the May 1993 National Geographic.
This year, the Region One preservation team will be doing a six-week project in the Washakie Wilderness in the Shoshone National Forest, Wyoming in Region Two. Using Sierra Club volunteers, they will work on the Anderson Ranch, a National Register site and another example of active preservation of historic structures in wilderness.

McLeod also brought to my attention a masters thesis by Ben Munger as an example of limited impact research on prehistoric sites in the proposed Great Burn wilderness area in Idaho and Montana. Basically, Mr. Munger found that Indians were using white bark pine nuts as a significant food source. However, all the white bark pine trees were burned in the 1910 forest fire; this makes "neat stuff in an archaeology survey and environmental reconstruction." (McLeod, personal communication, March 1993). To sum up, I am very encouraged. In just five years, so much has happened and so many more people are now interested in the issue of wilderness and cultural resources. We have a lot to look forward to.

**REFERENCES**


**THE BOUNDARY WATERS CANOE AREA WILDERNESS—THE REALITY OF MANAGING HERITAGE RESOURCES IN A LEGISLATED WILDERNESS.** Gordon R. Peters, Supervisory Archaeologist, Superior National Forest; and Kathleen M. Schamel, Senior Vice President, CEHP Incorporated, 1133-20th St. NW, Washington DC 20036 (202)293-1774

**Introduction.** Everyone seems to agree that heritage resources—archaeological sites, historic structures and artifacts—do exist in designated wilderness areas. Most even agree that these resources deserve protection in wilderness areas. But few managers have taken on the tasks of actually managing such resources in compliance with federal mandates, and agency procedures. The Boundary Waters Canoe Area Wilderness (BWCAW) in Minnesota is an exception. Archaeologists
have developed an active archaeological inventory plan for the area and are attempting to manage these heritage sites. One problem they are encountering is that the archaeological sites are the very areas that contemporary visitors are required to camp and beach canoes. This is creating a professional and management dilemma of how to protect the resources, manage the visitors, preserve the sites, and fulfill the intent of the laws. Opportunities are emerging.

The Intent, the Ideal and the Inference "In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify, all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural conditions, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness."

The intent of the Wilderness Act is to retain the "primeval character and influence without permanent improvements or human habitation" and "to protect and manage wilderness so as to preserve its natural condition." Furthermore, wilderness areas shall be devoted to the public purpose of recreation, scenic, scientific, educational, conservation and historical uses. The Act speaks of wilderness areas as places where human works are "substantially unnoticeable." The Act also states that Wildnesses "may contain...features of...historical value," and requires that such areas be "devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use."

The public generally envisions wilderness to be areas that are better than other lands—more wild, more pristine, more desirable, less people. Those wilderness users in the eastern United States know that this is not the case. Eastern wildernesses are overused. The public cares about protecting and preserving their recreational areas but they are also creating a management problem and a resource predicament. They overuse wilderness areas to the point that the resource is being loved to death.

The attitude "its mine and I can use it" is changing slowly. People are beginning to realize that cultural resources in wilderness do exist, that they are important and that they deserve management and protection, and that actions affect the resources. Yet few have actually begun to address the problem that some heritage resources, by the very nature of being in a wilderness area, are being continually impacted by visitors. In fact, in the case of the BWCAW, the Forest Service requires wilderness visitors to use archaeological sites as canoe landings, camping areas and portages.

Heritage Resources Context To the early European immigrants, the entire nation was wilderness with connotations of "wildness, fear, howling, dismal and terrible". In northern Minnesota, this persisted into the early 20th century, as one only has to peruse the diaries of the General Land Office surveyors to get a feel for the perceived "inhospitable nature" of these "wild lands." But to our Nation's native occupants, it was simply home to them and their ancestors for at least 12,000 years. They were adept to living on and with the land, and were in fact part of what the immigrants defined as "wilderness." The remains of their lifeways continue to be a natural part of our legislatively defined Wilderness today.

Today, wilderness is not a state of mind; it is whatever Congress says it is. Cultural resources exist on the lands included within current and future National Wilderness System, and are part of the land's history. In fact, historic value may be one of the factors for which an area is designated as Wilderness.

Wildernesses contain a wide range of cultural resources including, but not limited to: prehistoric campsites, game drives, rock art sites, quarry sites, ceremonial sites, trails and portages, along with historic mines, cabins, homesteads, administrative structures, logging camps and transportation features. In this context, these historic components are not intrusions or encroachments on the Wilderness. They are part of wilderness as much as the natural resource components of wilderness, such as plants, animals, soil, geology, or water. In fact, they may be as unique as their natural resource component counterparts.

The Forest Service, along with other land managing agencies, are charged with managing the total wilderness, which includes all of its cultural and natural resource components. Because of differing backgrounds and interests, managers must be aware of our tendencies to manage one component at the expense of another. We therefore have to make an overt effort to understand the significance of all of the components in order to make wise management decisions.

The Reality - BWCAW example The BWCAW has numerous cultural resource sites dating from as far back as 8000 B.C. when the Paleo Indians exploited the resources. Subsequent cultures also used the area including the Archaic people whose sites are rare in northern Minnesota due to environmental changes. Woodland and historic Native American settlement and other activities are more common. These include camping sites, villages, nicing sites, cemetery areas, and sites of spiritual and traditional importance. Generally, these kinds of cultural resources are distributed more heavily along major travel routes, such as the lakes along the U.S.-Canada border, and lakes and rivers with access to this route. Conversely, sites are less common on smaller lakes which are isolated from major travel routes.

The BWCAW contains evidence of a number of historic European activities ranging from the fur trade up to including Forest Service administrative sites still in use. Common historic sites include those associated with mineral exploration and mining, settlement (homesteads), logging (including railroad and water-driven logging systems), commercial fishing, fur trapping, resorts, and recreational year-round dwellings such as cabins.
The first reality faced by wilderness and heritage resource managers is that archaeological resources inside wilderness are still subject to other federal laws such as the National Historic Preservation Act, the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, and the National Environmental Policy Act. Management decisions must be made in accordance with the provisions of the applicable law. Management decisions for cultural resources within wilderness areas involve the same considerations as those located outside designated wilderness—they must be inventoried, evaluated, and managed for their cultural and scientific importance.

Research into the location, nature, and physical condition of cultural resource sites in the BWCAW has been ongoing since 1981. Each current campsite and portage is individually examined for the presence of cultural resources, and a decision made whether the resource merits further protection due to its potential eligibility for the National Register of Historic Places (NRHP). Eligibility usually is determined by the significance of the site and its ability to provide information about how ancient people lived. If the site is badly disturbed or destroyed, it will be ineligible for the NRHP, and no further protective measures will be taken.

Wilderness designation does affect how cultural resource management activities are conducted, both in terms of time and cost. Unlike conducting cultural resource inventory in non-wilderness areas to which access is relatively easy, access to wilderness is more restrictive and time consuming, hence costly. To put this into perspective, the Superior National Forest completes approximately 100,000 acres of non-wilderness cultural resource inventory annually. By contrast, in 1982, we began an inventory of the 2,200 half-acre designated campsites within the BWCA Wilderness. We will complete the inventory in 1992.

About 90% of BWCAW campsites and portages have been inventoried as of 1992. Of these, 39% contain cultural resources. This means that almost half of the campsites have been used for that purpose for hundreds or thousands of years. Unfortunately, damage has taken its toll on these finite, nonrenewable resources; at least 41% of known cultural resource sites are still badly deteriorated to merit further protection. The bulk (63%) of the known sites may still be undisturbed enough to qualify them for NRHP protection. These sites, which require further formal evaluation, have been prioritized on the basis of their physical condition and the urgency required to avoid further damage or loss of the resource. The reason for this high level of site damage is due to the fact that contemporary BWCAW visitors are limited in where canoes can be beached and where campsites can be located. These happen to be the same areas as were used since prehistoric times. Today's wilderness campers are sharing their camping sites with the spirits of the past.

In addition to doing inventory for sites, the archaeologists on the Superior National Forest are developing opportunities for both on-site and off-site interpretation of cultural resources to improve public understanding of our heritage, to raise awareness of the fragile and irreplaceable nature of cultural resources, and to provide enhanced public recreation opportunities. Off-site interpretation will be preferred for BWCAW cultural resources.

Many visitors believe that cultural resources are protected in wilderness because there are no ground-disturbing projects and therefore, no project-related impacts. The truth is that projects do occur in wilderness and cultural resources are subjected direct and indirect impacts. While timber sales, mineral exploration, and generally excluded from wilderness, projects such as trail, portage and campsite construction or rehabilitation do occur in wilderness. These have the potential for causing direct impacts to archaeological sites. Further, the use of these features by wilderness visitors can have major indirect effects through soil compaction, defoliation and erosion. In addition, certain types of cultural resources, e.g., historic buildings have been purposefully singled out and burnt down because they were viewed as "incompatible" with wilderness; or at best, left to deteriorate naturally.

Cultural resources are not protected because a line is drawn on a map. Protection requires identifying and evaluating the resources, assessing means of protecting important ones from natural or human-caused impacts (including vandalism), deciding on a protection plan and implementing it.

Cultural Resources research and other research is expressly mandated in the 1964 Wilderness Act. In terms of Forest Service Policy, Chapter 80 of the Wilderness Management Handbook directs the agency to conduct a Cultural Resource Management Program in Wilderness Areas. While providing for scientific investigations, the Handbook requires the research to be carried-out in an "unobtrusive manner and must employ the minimum tools needed for accomplishing the objective".

While interpretive signing is not appropriate in Wilderness, many interpretive methods including brochures, books, videos, guided verbal on-site interpretation and trailhead signing might be considered. In fact, not only will cultural resource interpretation enhance the enjoyment of wilderness visitors, but has the potential to educate the public toward an appreciation for the wilderness resource and an over-all conservation ethic.

New Management Plan The Superior National Forest is trying to improve overall management of the Boundary Waters Canoe Area Wilderness including protection of the heritage resources. The Forest has developed a draft Management Plan which includes six different management alternatives related to archaeological and historical sites. These range from no change, to limiting party size, to reducing the number of parties allowed to enter, to redistributing visitors to other areas, to allowing unrestricted camping in primitive conditions. The plan is being evaluated but the hope is that these alternatives will help preserve the sites in the designated wilderness.
Opportunities Emerging  The future of heritage resources in wilderness in general need not be as bleak as the past. Wilderness managers are becoming aware of their responsibilities for the identification and protection of cultural resources. The Wilderness Handbook provides strong direction for complying with the above noted statues within wilderness. It states in part, "Wilderness designation, in and of itself, does not affect Forest Service cultural resource management responsibilities."

Congressional appropriations for cultural resource management and wilderness management are increasing. Since funding is tied to the Forest Plan and the Wilderness Handbook directs us to address the management of cultural resources in wilderness in the Forest Plan, the agency has an opportunity to amend the Plan with more emphasis on wilderness.

Tied to this first opportunity, is the 1988 Amendment to the Archaeological Resources Protection Act which requires us to schedule cultural resources inventory of non-project areas. Some of the increases in cultural resource appropriations are due to the amendment. As congress becomes more concerned with how appropriations are being spent, we have an opportunity to demonstrate compliance with their intent.

Through interpretation of the historic uses of the wilderness areas, there is an opportunity to increase stewardship values for wilderness users and local communities. In addition, this may be an opportunity to start building bridges with local and national environmental groups who are concerned with commodity issues. There is a real opportunity to demonstrate "New Perspectives" and balanced resource management.

Finally, by identifying cultural resources in wilderness, there is the opportunity to "stock-pile" these non-renewable resources for future research. While many cultural resources located in non-wilderness areas will continually be evaluated against other resources and priorities, most of those located in wilderness will be allocated to "quiet protection". Many will survive for future generations to contemplate if we initiate proactive inventory and protective measures in the near future.

Why should we be concerned with "stock-piling" cultural resources and establishing protective measures to ensure their survival? Like threatened and endangered species, once they are gone, they are gone forever. Unlike threatened and endangered species, which reflect current resource management practices and use for a particular area, cultural resources provide us with information on the adaptive successes and failures of human populations from their first occupation of the area. Consequently, they reflect adaptations to changing climates, vegetation, animal populations, etc. In the fast-paced changing world that we live in, this information may be critical to our survival and that of future generations. With the increase in urban and recreational development we have witnessed over the past 20 years and is presently occurring at an ever increasing rate, public lands, especially wilderness, may be the last "preserve" for cultural resources.

REFERENCE
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MANAGING WILDERNESS, CULTURAL RESOURCES, AND CULTURAL DIVERSITY. Farrell Secakuku, Second Mesa, Arizona

THE HOPI WORLD VIEW AS RELATED TO THE EARTH  The Hopi religion is very simple yet it is based on the complicated rituals of four basic religious societies. There are also additional rituals specifically designated for Hopi women. These rituals are performed as meditative prayers, songs expressing predestined life, stories of the past, and the gathering of plants, soil, bird feathers, and animal articles from the four earthly directions, the sky, and the bottom of the earth. These objects are treated carefully and add to the extension of life, the protection and survival of the environmental, enhancement of prosperity, progress, and continued connection with our ancestors.

The Hopi religion teaches the three fundamentals of life: 1) spiritual, 2) life is based on spiritual value, and 3) greed condones evil. Each of the four religious societies has its own given instructions deriving from the spiritual power which you may refer to and understand as God. It is from respect of life and to carry this mortal life to the next world that these societies became sacred and are secretly maintained by their priests. The societies are supported by strenuous initiations and self-sacrificial religious practices while conducting prayers and rituals. We literally bake our mouths and avoid several nights of sleep in order to stay alert. This results in a weakening of the body. This self-sacrifice promotes the true Hopi living culture and perpetuates humbleness.
Hopi religion does not describe creation in the way the Christian Bible describes creation. For many reasons, that portion of our religion is hidden in the sacred philosophies and prophecies of the four religious societies. Hopi religion accounts for the past, the present, and the future. Little is known about the third world. It is the basis for the story of the beginning of life and the religion of the fourth world, which is the present world. In the Hopi view, the creation is contained in the three previous worlds. Creation evolved through time and each religious society exhibits its own part of that evolution. Present day Hopi religion is complicated because intertwined in it are the many religious cults and teachings of the many clans who came and became part of the present-day Hopi land. This was compounded by the religious instructions issued by the spiritual authority, Masawu.

The emergence contains many folds which pattern religious life. One of them leads directly to our stewardship of the earth. The supreme power gave each race the choice of an ear of corn. The type of corn selected predicted the life pattern of the race. There were pretty ears, large kernels, long ears, spotted ears, short ears, and all sorts of ears of corn. After many races chose their ears, the Hopi chose the short, stout ears of corn. The Hopi believe this wise choice of corn would embrace a long, rugged life.

This choice also promotes wisdom, humbleness, spiritual and physical strength, and the stamina to be patient. The choice was a sign for Masawu to direct the Hopi to make four directional journeys through the world. The journeys were to earn Masawu’s respect while living here with him. After following the wishes of Masawu, the Hopi became the stewards of the land and, thus, of the world. Upon their return from these journeys, more detailed religious directions were issued. It is this religion of stewardship that the Hopi practice today.

Our stewardship is based on religion rather than on making laws and ordinances. Our relationship to the earth is like a connection to a mother. We drink milk from our mother to grow and be secure. This is represented by our gathering food, products, and all that we need to be secure. We were born from our real mothers the same way we emerged from the underworld. We maintain our mother’s health by making sure she has proper warmth, nutrition, ample stored food, rest and lots of fresh water.

The earth is taken care of in the same way and our religious practices produced the same effects. We honor and make prayers to the sun for its warmth. Our prayers and meditations are nutrients for the earth. Natural habitats provide storage. Liquids form the rain, proper air circulation, and balance the ocean, the bottom of the earth, the bodies of the heavens.

THE HOPI VIEW OF WILDERNESS AND CULTURAL RESOURCES Hopis do not have a word for wilderness and setting aside land as wilderness is not practiced. All land should be respected and all land is used only for survival, whether it be physical, spiritual, or mental. When the need arises, Hopis will designate an area for providing certain resources; meat from certain areas, medicines from certain areas, colors from certain areas, plantations or farms in certain areas. The areas are maintained through clan holdings and their religious obligations. Our religion does not teach us to subdue the earth. Our religion teaches us to take care of the earth in a spiritual way as stewards of the land.

Hopi do not view cultural resources, such as ruins, as abandoned or as artifacts of the past. To a Hopi, these villages were left as is when the people were given a sign to move on. These homes, kivas, store houses, and everything else that makes a community, were left exactly as they were because it is our belief the Hopi will someday return. Our people are still there. Today the Hopi designate these ruins as a symbol of their sovereign flag. Potsherds are left in abundance, usually broken into small pieces with the trademarks showing. These are the footprints of the occupants as designated by Masawu. They testify to the fact that a certain clan or clans (family) of Hopi were looking for the center of the universe and actually had a living culture.

All of this is bound together by the people who were left thara to hold it in place -- People of the Daad -- until the living return once more. (This is re-integrated or renewed during Wwuchim.) Hopis believe that ruins should remain untouched because when anything is taken it breaks down the value of holding the village in place. It doesn’t lose its identity and it still holds the strength to magnify its people back. Pilgrimages to the ruins and prayers are done annually, to some twice a year. The winter and summer solstices are designated times for this keeping in touch.

All of Hopi prophecy recognizes these cultural resources as part of today’s living culture. They indeed should be protected for the future of our people. Most of the time, the way white men view protection, interpretation, and education seems not to be the Hopi way. For Hopis, protection is based purely upon the honor system, upon respect and trust. Sometimes Hopis feel that the things they believe -- honor, respect, and trust -- is not compatible with other societies but we continue to think it should be the Hopi way.

The Hopi way of measuring the value of cultural resources and other so-called artifacts is not in terms of money. Rather it is their importance for life today and their future destiny. The future of the Hopi is a great burden to them because we believe we must live a life of spiritual meditation and humbleness in order to take this corrupt world, which will get worse, into the better world. Yes, we believe in the fifth world and our spiritual integrity must be strong to keep our ruined villages alive. Our houses, kivas, and our shrines at the ruined village perimeters must be kept warm and active. We rely on our spiritual ancestors who passed away and are still there to receive the messages.
CULTURAL DIVERSITY  "Dewe Kachi" refers to the land from ocean to ocean before the arrival of the white man and other groups, the land which was designated as the place for all. It was a place of Masawu where our people were given responsibility as stewards. For this, a sustainable life was put in place. Wherever one goes, whichever direction one looks including the bottom and skies, there is provision for the continuance of life. However, there was already the expectation, an even a prayer of expressed awareness, that soon there would be an abundance of people. Hopis' true and humble ways will erode, their lands will be squatted, their spiritual resources will be taken. For protection we say, "You must not go to sleep, you must always have a partner, you must have a way in prayer to control your birth, to continue your survival and your prayer teachings. And you must learn the white man's ways." This is still part of our religious obligation today.

In prayer the chief would say, "Today...early this morning at the presentation of our father the sun a better road of pollen has been drawn and laid down for everyone, for everything, for the whole world (Dewa-kalmukah). Through this road of pollen you will walk to accomplish all the things you wish for your life, whether it be a long and good life, security and abundance for your wealth, protection of life, places, and the world (Tutsque). Also through all this life will come new life, that this life will use all that land can and will offer, meat and foods to add flavor to our mouth and cherish our bodies, corn for the survival and to supplement life, eagles will replenish to enhance our prayers to life beyond and of the past. Let the people reach the peaceful end through happiness and pleasure of an elder and wisdom of the honor to sleep into the spiritual world. The people of the above will come eagerly to give us a drink of water that will dispel evil and sickness, also to sustain our food plants and all plants of the world that it will provide a way to the future. It is with these prayers that we ask that the people will expand (ladders be extended and more put up) at the will of the natural and spiritual forces."

The teaching and prayer is cited to bring into this conference the question of where cultural diversity is in your management. Unfortunately, many people today are selling artifacts on the black market for large amounts of money. When old villages or rock writing (petroglyph) are defaced it demonstrates a lack of family upbringing based on respect and pride.

Keeping cultural resources the way they are would be the best form of management. A law must be enacted and enforced to stop the defacing of rock writing and digging in burial places. Certain Hopi individuals and groups have the ability and responsibility to survey areas where cultural resources are present. They have very sound advice on how those resources should be managed. However, they should never be asked to disclose sensitive or inappropriate information which Hopi religion requires them to keep secret.

Many times religious objects are left in the open to be taken by spiritual beings from other places, not by human beings. It should be respected that the axis of the earth is kept balanced by spiritual forces on the outer perimeters of space. We have spiritual gods who are the keepers of that responsibility.

My recommendation is that Hopis be consulted as knowledgeable individuals and groups in interpreting and managing cultural resource. That is important when development will destroy certain lands. Our religion allows ventures which sacrifice our lands but they must be initiated in a very delicate manner. Any venture that will destroy a religiously significant place, whether it is a mountain, a small shrine, a burial area, or other cultural resources, should be halted. During development, when a burial site or religious object is encountered, it should be reported to the tribe's preservation office for a decision on what to do. We support the U.S. Antiquities Act and state burial legislation and any tribal ordinances which protects any tribe's cultural heritage.

I am not objecting to anything the agencies are doing now to protect and preserve these important treasures of the past and future. I am saying these things to bring more light into the management of these resources. I also ask that our views be respected.

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Wilderness is outwardly defined by the natural environment. However, there is a cultural environment to consider as well. The traditional and religious values of Native American people, extending well beyond the present-day boundaries of tribal communities and reservations, are by far the oldest and most widespread component of that environment. Wilderness Areas embrace places and objects of cultural significance to many Native Americans, in all sectors of the country. The gathering of medicinal plants, the resurrection of traditional subsistence activities, the maintenance of religious shrines and landmarks, the harvesting of materials
used in traditional crafts, all are on-going expressions of the cultural roots that run very deep through the lands agencies administer. Moreover, archeological sites bear mute testimony to the antiquity and extent of these traditions. From the standpoint of many Native Americans, cultural memory is not perceived as simply having ceased at the end of prehistory, end neither should it be permanently displaced by the posted boundary of federal property. Thus, there exists a cultural continuum from the past to the present, on which modern jurisdictions have been overlaid. Wilderness represents but one of many such jurisdictions.

Particularly in the western United States, where so much more of Indian culture has remained intact, agencies and tribal communities recognize a shared responsibility toward the identification and protection of traditional sites, while guaranteeing access to cultural practices and beliefs. Federal land managing agencies have been entrusted with nothing less than helping to maintain the cultural patrimony of Native American people. As friends and neighbors, this is first and foremost a moral obligation. But it is also a legal one.

Historically, the management of cultural resources on federal lands has been limited to the "past" component of the cultural environment: archeological sites. More recently, there has been a proliferation of renewal and interest in contemporary Native American practices, which has prompted agencies to respond in a cooperative spirit to assist tribes. This has also led to legislation and promulgation of agency regulations and guidelines which specifically address Indian interests in cultural preservation.

How does one agency react to these emerging roles and responsibilities, including the management of Wilderness areas under it jurisdiction? I'll attempt to offer one example from the U.S. Fish and Wildlife Service, a multi-faceted organization which is best known for its administration of the system of 485 National Wildlife Refuges on 90 million acres of federal land across the country. Because Refuge lands have been selected for their primary habitat qualities, and they are predominantly riverine and coastal, it should come as no surprise that the ancient Native American economies of hunting, fishing, and agriculture have established a major association with this land for millennia.

Like the other land managing agencies of the federal government, the Fish and Wildlife Service has had a long history of interaction with Indian tribes. By far, most of this has been the day-to-day variety interaction on routine matters of law enforcement, grazing, water rights, agricultural pesticides, rights-of-way etc. The Service stocks tribal fishing waters from its nationwide system of Fish Hatcheries, and cooperatively operates hatcheries on several reservations. The Service also offers tribal governments a great deal of technical assistance and grants on a wide range of biological topics, and annually represents tribal interests during the regulations setting process of the Migratory Bird Treaty Act.

The Fish and Wildlife Service has also had considerable experience working with tribes toward the identification and preservation of traditional, historic, religious, and contemporary practices and uses. It is something of a proud tradition around the agency that for over 50 years, the Fish and Wildlife Service has served as the federal agency designated by law to help tribes legally obtain Bald and Golden Eagles and their parts for religious purposes. (Of course someone could legitimately argue that there was a time when there was no need to have a government agency regulating the supply of eagles or the use of their feathers and talons. Those days, along with the numbers of birds, are gone, yet the millennia-old traditions of many Native American groups live on, and so the Fish and Wildlife Service has in effect become a supply agent to Indian religious practice).

Let me focus on the range of issues that uniquely relate to the preservation of traditional values and practices with respect to the lands and programs administered by the Fish and Wildlife Service. To do this, I will draw upon a proposed "Native American Policy" which is pending final issuance by the agency. This Policy Statement was developed in recognition of the unique status and importance of tribal governments with respect to fish and wildlife resources, as well as the significant land bases of neighboring reservations. The Policy Statement covers a wide range of issues from law enforcement and technical assistance to federal grants. There is also a special heading on "Culture and Religion", which contains three topical subheadings. My paraphrasing of the three subheadings follow, end I have annotated each with specific examples and a statement on the effects of our policies in Wilderness Area management. Note that nothing in the Service "Native American Policy" supplants the separate provisions of the Alaska Native Claims Settlement Act and the Alaska National Interest Lands Conservation Act.

CONSULTATION: The Service will consult with Native American governments and/or Tribal Historic Preservation Officers in all Service actions that may affect their cultural or religious assets, including archeological sites, on Fish and Wildlife Service lands, on other lands that will be effected by Service actions, or in regard to burials and funerary items which originated on Service lands. The Service is guided in this respect by the National Historic Preservation Act [36 CFR 800.1(c)(iii)], the Native American Graves Protection and Repatriation Act (regulations pending), the Archeological Resources Protection Act [43 CFR 7.7], and guidelines of the Advisory Council on Historic Preservation and the National Park Service/National Register of Historic Places.

Wilderness: The designation of a Wilderness Study Area, or the formulation of a Wilderness Management Plan, would require the Service to consult with tribes. Issuance of an Archeological Resources Protection Act permit in a Wilderness Area would require tribal consultation. Discovery of an exposed human burial would require consultation under the Native American Graves Protection and Repatriation Act.
ACCESS: Native Americans will be provided access to Service lands and waters for exercising ceremonial, medicinal, and traditional activities. A key element here is that the agency will only permit such activities if they are compatible with the purposes for which the National Wildlife Refuge was established. Access is guaranteed either by prior treaties or judicial mandates, or by the provisions of the American Indian Religious Freedom Act. However, not all access or activities are so guaranteed legally, and thus some activities are simply permitted annually in response to long established practices, or where there are other compelling reasons to do so. Refuge managers exercise considerable discretion in this regard. Then too, there are other activities which continue more or less in secret, without the prior knowledge of the agency. Though rare, the latter example is known to occur and so far appears to have posed no real problem to agency managers.

At the National Bison Range in Montana, Kootenai-Salish have conducted traditional religious practice under a Special Use Permit. At Tamarac National Wildlife Refuge in Minnesota, the Chippewa maintain ancestral burial customs by informal agreement. In other parts of the country, it is not too uncommon to find recent examples of small shrines still in use, with such things as small offerings, prayer feathers, rock cairns, or rock alignments set in place.

Wilderness: Presently, proposed Wilderness Management Guidelines of the Service allow for non-motorized access into Wilderness areas for Indian religious purposes. Agencies do not appear to be entirely consistent in this. National Park Service guidelines prohibit motorized access into Wilderness, while Bureau of Land Management guidelines can allow motor vehicles for this purpose.

PLANTS AND ANIMALS AND ANIMAL PARTS: The Fish and Wildlife Service will continue to expedite the distribution of animals parts, such as eagle feathers, for religious, ceremonial, and cultural purposes. Eagle permits are available to tribal members who obtain them from one of the seven Regional Offices of the Service. Eagle parts are shipped from a central repository (The National Forensics Laboratory in Ashland, Oregon). The taking of excess Buffalo, whole animal and/or parts, has been designated for religious ceremonial purposes at such places as the Wichita Mountains Refuge in Oklahoma and the National Bison Range in Montana. Procedures for Buffalo are set forth under the Fish and Wildlife Service Refuge Manual (7 RM 5.12b). The Wichita Mountains Refuge maintains a unique arrangement whereby its extremely limited number of Bison skulls are donated to the Department of Anthropology of the University of Oklahoma, which then makes them available to tribes for religious purposes.

The Fish and Wildlife Service can authorize the taking of certain other wild animals which are protected by law. Annually, the agency's Law Enforcement Division permits the taking of live eagles and red-tailed hawks by the Hopis for ceremonial purposes. These are juvenile, pre-flight birds which are raised in captivity.

The Service can authorize by Special Use Permit or by informal agreement the harvesting of plants and natural materials used in traditional crafts. For example, the Mojave and Chemehuevi harvest willow for basket making on the Bill Williams National Wildlife Refuge in Arizona under an annual Special Use Permit. The Chippewa of Minnesota can obtain birch bark for traditional crafts at the Tamarac National Wildlife Refuge.

Some taking of animals or harvesting of plants are protected by existing treaty. At the Rice Lake and Tamarac National Wildlife Refuges in Minnesota, Chippewa Indians employ traditional methods to harvest wild rice in continuation of a practice dating to prehistoric times. The Rice Lake harvest is conducted under a Special Use Permit, but is also guaranteed by an 1832 treaty between the U.S. Government and the Chippewa. Those consumptive uses not covered by treaty or other prior right may still come under the provisions of the American Indian Religious Freedom Act, since there is often at least an indirect religious significance connected with traditional plant or animal harvests. Examples might include the Saguro harvest of the Tohono O'odham, the Klamath salmon harvest and marsh lily harvest, the Yakima Camus harvest at Conboy Lake National Wildlife Refuge in Washington, and Makah ocean fishing and whaling off nesting islands of the Flattery Rocks National Wildlife Refuge. Lastly, some consumptive uses could also be considered basically a subsistence activity, such as the harvesting of Taro, a cash crop, by Native Hawaiians in the Hawaiian Islands National Wildlife Refuge.

Wilderness: Current USFWS guidelines do not allow for motorized access for any of these activities in Wilderness areas under its jurisdiction.

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MANAGING HISTORIC STRUCTURES IN PACIFIC NORTHWEST WILDERNESS AREAS. E. Gail Throop, USFS, Regional Historian, Pacific Northwest Region, (503)326-3644, G.Throop:RO6C.

Introduction Forest Service policy does not preclude retention of National Register eligible sites, buildings, and structures in wilderness, but in practice management direction encourages abandonment. The Forest Service Manual states that Regional Foresters may approve stabilization or restoration and subsequent maintenance of such structures if their continued existence is essential to cultural resource management. The qualities required to make a property essential to cultural resource management are undefined as is the requisite analysis process, but the inference is exceptional significance to merit retention.

This paper describes a process for determining which standing historic buildings in wilderness are "essential for cultural resource management." In its simplest form, this "Essential Process" answers the questions of which, why, where, when, and how. The process was developed in response to the needs of managers to resolve the questions in a manner that meets both wilderness and cultural resource management objectives. The intent was to devise an objective classification system that had regionwide utility and servicewide applicability. The process is used in the Pacific Northwest Region, and is presented here as a management tool in that frame of reference.

The issue is one of dominant and subordinate values. It is neither appropriate nor desirable to retain and preserve all historic buildings in wilderness. The crux is selection. The problem is to define the conditions under which it would be appropriate to retain (and maintain) a historic property and what values or level of significance that property needs to equal or exceed the dominant value of wilderness. All that possesses age is not necessarily significant, and what is significant can only be determined in relationship to the historic development from which it emerged and in relationship to a group of similarly associated properties. The thematic approach to evaluation of historic buildings is basic to the Essential Process. To evaluate in isolation is to risk undervaluing or overvaluing a property.

Inventory of Base Data A comprehensive "thematic" inventory is necessary to obtain base data on selected property types. The minimum "field of search" must be sufficient to identify all similar properties within and outside of wilderness. This equates to one National Forest. Identification of an extant resource population within a geographic area defined by 3-4 National Forests having common environmental characteristics, or within a region produces a more workable resource base for management of a property type.

The development of base data begins with the identification of relevant historic themes. Historic contexts are developed from these themes. Context identifies the effect of broad patterns (themes) of history over a particular area or locality. Historic context also identifies the contributions of a locality to the history of larger units. Contexts provide the framework for evaluation — for estimating the relative importance of themes and associated events and the level of significance of historic resources. They form the structure for analysis of the vernacular resources ("folk" architecture or carpenter-built structures using the most common or typical forms and materials of a period), isolated local events or persons, properties of recent age, commonplace and ubiquitous resources, and resources of questionable integrity that are so often found in wilderness in the Pacific Northwest. Thematic groups, or property types, derive from these contextual frameworks. Property types may include a variety of buildings and structures with diverse physical characteristics or may be based on distinguishable structural types or functions. Physical and associative characteristics for each property type are identified.

The Essential Process The "Essential Process" is not an entirely new methodology, but a synthesis of current methods. It consists of a series of interrelated steps drawn from existing procedures and systems. Six steps are involved in the overall process, once base inventory data are available.

Step 1 recognizes the absolute values of historic buildings through evaluation against the National Register criteria. The results of this first level evaluation are binary: eligible or not eligible. This step establishes the legal significance. Those properties found to be ineligible are given no further consideration in this process.

Step 2 is a further evaluation against detailed thematic criteria to establish the relative importance of the eligible buildings in a theme group for management. In this second level evaluation, theme-specific criteria are developed to assess how effectively the buildings and structures illustrate the cultural, social, political, economic, or industrial history delineated by the context they represent, and the quantity and quality of information contained [changes in technology, cycles of occupancy and abandonment, design concepts, resource development] that cannot be obtained from any other source - or fully understood or appreciated without the physical evidence. These criteria are based on the physical and associative characteristics identified for the property type. For example, building integrity is related to form and function, and not limited to structure and materials; architecture is examined in terms of design, construction, execution, and chronology; and history is reflected in affiliation, pattern, and rarity. Mechanically, a series of verbal grades are assigned to the several criteria, with numerical values assigned to the various verbal grades. The final evaluation is derived from the sum of the scores for each criterion.

Step 3 entails rank-ordering the raw scores derived from the evaluative procedure and locating them on a curve to assign classification (primary, secondary, tertiary).
In Step 4, Wilderness Resource Spectrum (WRS) class standards are applied to determine whether the retention of a historic building of primary, secondary, or tertiary rank is compatible, inconsistent, or incompatible on a class by class basis. The WRS is associated with the Recreation Opportunity Spectrum (ROS) as subclasses within the Primitive and Semi-Primitive Non-Motorized classes. The WRS describes conditions within wilderness. The social, physical, and biological factors that compose the values of wilderness are all aspects of condition. Selected standards have direct relevance for determining the suitability of retaining a historic building in individual WRS classes. For example, Pristine: essentially no facilities are required to protect the wilderness resource ... free from evidence of past human activities ... ; Primitive: only essential facilities for resource protection and safety ... no facilities for comfort and convenience of user.

Integrating historic ranking with WRS class is a search for compatibilities, where compatible is defined as capable of existing together in harmony. The values of wilderness and of human history are in equilibrium when the evidence of past human activity is not intrusive. Properties found compatible are suitable for retention, and are essential for cultural resource management. This infers a very high historic value because the wilderness resource has value dominance for management. A property that is inconsistent does not meet the WRS class objectives but its superlative level of historic significance affords it special dispensation. Properties that are inconsistent may be retained in interim status for further planning consideration. An incompatible property is by definition intrusive and incongruous with WRS objectives, and may be abandoned to deteriorate through natural processes following consultation and suitable mitigation.

Step 5 is a further refinement of the management analysis. The historic ranking is coordinated with Recreation Opportunity Spectrum (ROS) class to discover what management treatment(s) are appropriate to the setting. Management treatments, including Stabilization, Preservation, and Restoration, are defined in the Secretory of the Interior’s Standards for Historic Preservation Projects. The systematic application of the tenets of ROS, including the setting criteria, results in a diversity of management treatments that help to realize the desired experience accorded each class.

Management treatments are consistent with the site development level normal to the class. These scales are defined in the Forest Service Manual (2330.3). For example, Primitive – Level 1. Minimum site modification. Rustic or rudimentary improvements designed for protection of the site rather than comfort of the user. Use of synthetic materials excluded. Minimum controls are subtle. No obvious regimentation, spacing informal and extended to minimize contacts between users. The comparable treatment for primary buildings in the primitive ROS class is Preservation. Preservation is also the norm for primary buildings in the SPNM class, with restoration found to be fully compatible. Stabilization is the prescribed treatment for primary buildings in the Pristine subclass. These buildings are of exceptional value, essentially "exceptions to the rule".

Rehabilitation, returning a property to a state of utility through repair or alteration, making possible a contemporary use while retaining significant portions or features, is not identified as a norm or fully compatible in any ROS class in wilderness. This is because the treatment presupposes the reuse or a new use of a building that is either inadequate or in disuse, which may be incompatible or inconsistent with wilderness management objectives. Such proposals must be evaluated on a case by case basis. Those buildings that are found incompatible should be abandoned and allowed to deteriorate through natural processes after appropriate mitigation. Where impacts from a building’s presence are severe or temptation to maintain it is great, whether by Forest Service or "Friends of", consideration may be given to disestablishing a weathertight enclosure to accelerate the process of deterioration, or to removal.

Finally, in Step 6, it is necessary to identify and assess the impacts, if any, associated with the building site, and to set a Limit of Acceptable Change for the site through the LAC planning process.

These procedures are consistent with the non-degradation principle of wilderness management. The LAC process consists of four major components: (1) the specification of acceptable and achievable resource and social conditions, defined by a series of measurable parameters; (2) an analysis of the relationship between existing conditions and those judged acceptable; (3) identification of management actions necessary to achieve these conditions; and (4) a program of monitoring and evaluating management effectiveness.

Within this general planning framework, there are three relevant factors for areas containing historic buildings. These reference the physical attraction or destination location of many historic sites. In selecting indicators, property condition is specific to the historic resource. Campsite condition is analogous as an indicator for [wilderness] resource condition while campsite solitude may serve as an indicator for social condition. In addition, depending on access and remoteness, a building site could be the destination for a day hike as well as for overnight stay. Indicators of property condition may include the percent of historic material disturbed, damaged, or lost through human predation within a six-month period, on a scale based on severity of impacts ascending from 1 to 5. Effects of "natural" deterioration, including snow-loading, freeze-thaw, dry rot, and/or insects must be considered in management of the historic resource, but should not be used as an indicator for LAC planning.
Summary When the limit of acceptable change has been established for an area containing a historic building, the Essential Process is complete. The questions of which, why, where, when, and how have been answered. In summary, the process composes evaluation of legal and management significance, and analysis of management issues through application of the WRS and ROS systems and the LAC planning process. There are no new procedures introduced in the Essential Process. It is instead a formulation of selected elements of existing systems applied to resolve the question, "What is essential to cultural resource management in wilderness?"

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MANAGING WILDERNESS RELATIVE TO AMERICAN INDIAN PERSPECTIVES AND CULTURAL VALUES. Bob Tippeconnic, USFS, Native American Coordinator, Office of Deputy Chief for State and Private Forestry, Box 96090, Washington DC, 20090-6090 (202)205-0892

There are numerous American Indian tribes and varied tribal members living all over the United States. Many have aboriginal and contemporary ties to designated wilderness areas on federal and public lands. These ties provide an ongoing manner of relationship that these tribes or Indian people have with wilderness areas.

Because contemporary ties exist and because there is a cultural, traditional relationship to place (a wilderness area), Indian people have a unique way of enjoying, visiting, or conducting activities in these areas. Indian people have a respect for land and place and a reverence that has been one of son or daughter to mother, hence the term "Mother Earth". Mother Earth provides life and to her we will return. Thus, as we treat a biological mother, we likewise respect, care, and protect "Mother Earth", or a wilderness area.

Wilderness areas can be no different to some Indian people that areas that are non-wilderness. The wilderness area or place within the wilderness may mean something or be of importance because of activities that have occurred over time. Some places have been visited for the gathering of materials or plants for medicinal or ceremonial reasons. Some visits have been because of cultural, sacred, or spiritual reasons. These activities can constitute doing certain things, that can be sacred, and not exposed or explained to others. In these cases Indian people do not advertise them, but go about doing them. This activity is done in reverence of the place and surroundings but it can be something that is of thanks to the Great Spirit or the place where special understandings or knowledge is sought.

In the management of wilderness areas Indian people would not want to impair the use and visit by elders or those who would have need but difficulty in getting to certain places. The use of places and the gathering of materials or plants is conducted to sustain these matters and not to "wipe out" or eliminate them. They have learned over centuries that wise use protects and sustains plants, animals, and all life within a present day wilderness area. Management considerations need to acknowledge these traditional activities. In some cases, activity is individual, and in others it is small group or groups. Indian people do not see this as a problem to sustain the special attributes or uniqueness of an area or wilderness. Management of activity of other people within a wilderness area can be of concern to Indian people if they visit or go to places that are special, sacred, or camp or have a fire or something of that nature upon an area.

Management of special places such as wilderness means giving special attention to the protection and preservation of all that is found in these places. It does not mean that you and/or people cannot have a time to visit and use the place. It is how you visit and use the place that is important. Visiting and having special times in a wilderness area can provide the subsistence that sustains the culture and ways of a people. It allows the people to live forever.

Management must then be one of allowing Indian people to access special places and to conduct special ceremonies, events, or the gathering of special items from the place. In some minds this can be a contradiction to wilderness. To Indian people all is linked and everything is connected and vital to one another.

SUBSISTENCE USES AND NATIVE ALASKAN PERCEPTIONS OF WILDERNESS. Steve Uli, NPS, Subsistence Manager, Gates of the Arctic National Park and Preserve, Box 74680, Fairbanks, AK 99707 (907) 456-0281, e-mail GAAR Subsistence

Introduction Native Americans have used and occupied the diverse landscape of the subcontinent of Alaska for the last 10,000 to 20,000 years and possibly even longer. At contact perhaps as many as 71,000 Native Americans inhabited these northern ecosystems; some nomadic but many settled in fairly large villages on the relatively rich rivers and coastal margins. Over hundreds of generations these earliest Alaskans hunted and developed unique adaptations for exploitation of their demanding subarctic and arctic homelands. Today many people continue to depend upon these vast natural landscapes for spiritual and nutritional sustenance.

In sharp contrast to the lower 48 states the forceful displacement of indigenous people never really occurred in most of Alaska primarily because of its immensity and that those who came to the north to exploit its mythic wealth seldom wanted to stay long and, until recently, had little use for the land itself. By the 1970s the idea of protecting large natural areas from development as "wilderness" was an agreeable notion to cultures dependent on the land and seeking some certainty for the future.

Federal and State powers and subsistence management in Alaska A model constitution and Alaska statehood in 1959 along with a rapidly increasing urban population set the stage for classic political polarization between the dominant urban majority and a rural indigenous minority. The need to clarify land ownership in order to establish a pipeline corridor to the huge oil discovery near
Prudhoe Bay precipitated two monumental linked pieces of national legislation: the Alaska Native Claims Settlement Act of 1971 (ANCSA) and the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). This grand partitioning of the "national interest lands" has brought into question the survival of traditional ways of life, especially in the interior arctic regions where subsistence requires extensive land areas.

A tenuous "subsistence priority" arose in state law in the 1970s which was also strongly, though ambiguously, expressed in ANILCA Title VIII for federal public lands. The social values and "world views" of the dominant majority and indigenous minority are nowhere more sharply contrast then on the pivotal subsistence issue. The intense objections of urban sport hunters to any rural subsistence priority culminated in the 1989 ruling by the Alaska Supreme Court in McDowell v. Alaska that such a priority violates "equal access" and other provisions of the Alaska constitution. This landmark case precipitated the federal assumption of subsistence management on federal public lands (60% of the state). The resultant dual management regime and the complex ramifications of the national statutes are both a threat and promise to these nearly uninterrupted and timelessness uses of the land.

"Subsistence", as Richard Nelson says, is "the procurement of food, clothing, heat, or shelter from natural resources for purposes of self-support [and] was always available to those with the knowledge and ambition to pursue it". The straight forward innocence of that long and direct relationship is gone and replaced by the dualities of dealing with corporate structures, complex land status, the influence of special interest groups, and the politics of federal-state relationships. Lines of concern, confusion, and anger are permanent features on many weathered facets.

Nowhere is the subsistence management debate more contentious than in designated wilderness, particularly in National Park system units, and expressed specifically with regard to ATV use around Anaktuvuk Pass in Gates of the Arctic. The promises of continued subsistence opportunities on parklands were key in the "unholy alliance" formed between the environmental coalition and native people that was necessary to pass ANILCA. The tacit support of native people made possible the establishment of parks, wilderness areas, and wild rivers of unprecedented proportions. The good faith of wilderness proponents and the government are being called into question as wilderness management decisions multiply and impact people's lives.

Further, the numerous compromises to wilderness protection forced into ANILCA for access, inholdings, easements, mines, commercial development, and corridors for access to mineral resources seriously threaten the common values of wilderness and subsistence.

Native Alaskan perceptions of wilderness The central Brooks Range is the historic homeland of at least three separate cultural groups: the Koyukon Athabaskans on the Koyukuk River, the Kuuvamiit Eskimos of the upper Kobuk River area, and the Nunamiut people or Inland Eskimos of Anaktuvuk Pass. The movements and territorial shifts of these Native Alaskans prior to contact is not clearly understood. The people of the Kobuk and Koyukuk Rivers probably first settled into permanent riverbank villages by the late 1800s while the Nunamiut did not settle in Anaktuvuk Pass until after World War II. Three separate bands of this unique Eskimo group inhabited the mountains to ensure interception of the caribou herds they depend on and were considered the last truly nomadic natives in North America.

It should not be surprising that these first Americans view the landscape and all that inhabits it in a fundamentally different way then most park managers. There are no words in their languages that directly translate "wilderness" as a concept despite the fact that these same languages incorporate countless word variations to describe the most subtle details of the natural world. The Euroamerican wilderness idea is an impractical concept; an attempt to define the undefinable, a concept born of modern people's separation from the natural world.

The deep appreciation of their natural surroundings was repeatedly and patiently explained to anthropologists by these people in studies leading up to establishment of these parks:

A Kobuk River valley resident observed that outsiders consider this region a wilderness. In fact it is not a wilderness and has not been for millennia. It is an occupied land, supportive of a people and a culture that have grown out of it. To the Eskimos the Kobuk River valley is a thoroughly known, elaborately named mosaic of recognized places and features, each with a long history of human occupancy, utilization, and personal associations (Anderson 1977).

Further, the practical and spiritual views of these cultures are very different with regard to beauty - an intangible concept seemingly inseparable from that of wilderness in the Euroamerican mind:

Beauty is perhaps a universal human concept, but its sources vary from culture to culture. Thus, an empty landscape can be full of beauty for one who comes from an urbanized agricultural society; it holds no immediate spectre of starvation. But for the Eskimo, beauty comes not from the artistry of the landscape, but from its promise of richness and activity, its ability to reward the quest for food. Land is not just something to be viewed in the abstract, it is a place to pursue the activities that people love (Anderson 1977).
To the Koyukon the landscape and the animals moving through it, even the weather are imbued with spirits. For the "traditional Koyukon people the environment is both a natural and supernatural realm" (Nelson 1983), as familiar as the back forty is to a farmer, but infinitely richer because of oral traditions portraying intimate associations of generations of ancestors.

The proposals for new park areas and associated wilderness designations were understood within these practical terms and generally accepted - even supported - because the people believed that the landscape would be protected from development and intrusion by outsiders. And that their use of the land could continue to be as it had been since the beginning in the "distant time".

Gates of the Arctic National Park Wilderness. In the summer of 1929 Robert Marshall stepped off an airplane in Wiseman, Alaska on "the fringe of civilization" to explore and climb in the unmapped Koyukuk River headwaters. Marshall's visions of setting aside "untammeled" landscapes would become the foundation for The Wilderness Society, the Wilderness act of 1964, and a place at the northern limit of the continent-wide sweep of the boreal forest that he called "Gates of the Arctic".

Gates of the Arctic National Park encompasses 7,262,800 acres of designated wilderness within the 8.2 million acre park and preserve units as well as six wild and scenic rivers. This single unit embraces approximately 20% of the wilderness acreage in the entire national park system. Within the broad spectrum of superlative natural, historical, and recreational areas within the National Park System this unit is further distinguished by an especially strong emphasis on wilderness purposes.

The park's enabling legislation reiterates the wilderness values so eloquently described in the legislative history (Senate Report 96-413)and goes on to say that "subsistence uses by local residents shall be permitted in the park, where such uses are traditional, in accordance with the provisions of title VIII" (ANILCA, sec. 201 (4)(a)).

Even more unclear is the intent of Congress as expressed in the extensive legislative history and statutory language of ANILCA Title VIII. Entitled Subsistence Management and Use this title has proven to be especially ambiguous and is subject to wide interpretation depending on perspective and agenda. Some experts feel that the intent of this title goes far beyond remedying the unresolved subsistence use issues of ANCSA, but that it is in fact "Indian Law".

The Future. "If the only tool you have is a hammer then all problems begin to look like nails" (Mark Twain).

The complicated mandates of ANILCA require cooperative development of a longterm, flexible management strategy that ensures the protection of natural values of designated wilderness and continued traditional subsistence opportunity. Does the highly "tradition and image" conscious NPS, the keeper of "vignettes of primitive America" and many nationally significant cultural sites, have the institutional flexibility necessary to find a dynamic balance point? Can those of us inculcated with a reverence for wild places and the abstract idea of wilderness, which is often unrealistic and static, "monotheistic and always seek[ing] uniformity" (Snyder 1990), incorporate humans as a functional component in ecosystem processes? Is protection of cultural diversity of lesser importance to that of biological diversity to our national heritage? Are we really only protecting "illusions of wilderness" (Roger Siglin, personal communication, 1992)?

As Gary Snyder explains "the sum of the natural forces is the spirit of the place". This natural spirit of place was central to Muir, Thoreau, and Marshall. True understanding of wildlands and the human condition are nowhere more tangible than in cultural traditions spawned of it. Perhaps allowing for the continuation of the rarest of natural relationships, the living expression of 3 million years of hunter-gatherer adaptation in relatively unaltered landscapes, is the most precious purpose of all, and perhaps a saving grace, for these wilderness units in Alaska.

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Emerging Challenges--Adjacent Land Uses.

Day Use, Outfitters, and Access for the Disabled Wilderness Visitor
The ADA and wilderness: managers options for recognizing myths and acting on truths. Phyllis Cangemi, Executive Director, Whole Access, 517 Lincoln Ave., Redwood City, CA 94061 (415)363-2647

This paper presents strategies that park managers can use to make wilderness areas more accessible, while meeting the dual legal mandates for protecting wilderness areas, and providing access to all people. The paper briefly reviews the history of laws requiring access for persons with disabilities to public accommodations and programs, and provides an introduction to access standards; the standard-setting agencies, and; developments currently underway at the federal level which will result in additions to existing accessibility standards that will more specifically address natural environments. The paper will also present managers with strategies for planning and designing for accessibility.

Strategies in planning for accessibility include: using a comprehensive, systems approach in planning for accessibility; building intra-agency "access literacy"; acquiring a knowledge of the of the laws and accessibility standards; including persons with disabilities on the planning team; having an access specialist on the planning team; exceeding standards whenever possible, and; extending accessibility beyond the immediate vicinity of core facilities.

Design strategies include: incorporating accessibility into areas that provide for a variety of outdoor experiences and differing levels of difficulty; planning for a continuous path of travel; retaining environmental and aesthetic values while incorporating access; learning first-hand if building materials and supplies perform as claimed; and, considering access to persons with (for example) visual and hearing impairments, not just those with mobility disabilities, in order to make wilderness areas accessible to all.

A discussion of the Wilderness Act of 1964 will address the Act's prohibition of "mechanized transport" in wilderness areas, and policies adopted by federal agencies to exempt disabled pedestrians using manual and motorized wheelchairs from this ban. A 1990 report from the Wilderness Society, entitled, "Federal Agency Policy on Wheelchair Access in the Wilderness," cites the policies adopted by: USDI National Park Service; USDA Forest Service. The 1990 Wilderness Society paper also reported the USDI Fish and Wildlife's intention to adopt a policy on wheelchair access in the wilderness similar to that of other land managing agencies within the Department of the Interior.

Some key issues for managers to consider concerning wilderness protection and disability access:

- Unequivocal confirmation, via uniform land agency policies, a single multi-agency policy, or, by Congress' passage of a (single) amendment to the Wilderness Act--of the right of access to wilderness areas for all pedestrians, including persons with mobility disabilities who use wheelchairs.
- Improving constructed trails/service roads to increase access to persons with disabilities; Improving access/removing barriers at existing facilities to bring parking lots, rest rooms, ranger stations and established trails into compliance with the Americans With Disabilities Act Accessibility Guidelines (ADAAG), and/or the Uniform Federal Accessibility Standards (UFAS).

It is inevitable that we will all see more restrictions with respect to public access to certain natural areas. These restrictions must not, however discriminate against any "class" of people--in this case, people with disabilities. Approaches need to be carefully worked out to insure that equality of opportunity is not compromised--approaches that ensure the protection of wilderness areas and the rights of all human beings.

On an international level, park and open space officials from other countries are beginning to confront the issue of access to nature for all people. It is inevitable--human rights struggles are taking place all the world.

At the same time, all of us will have to confront the grave environmental issues facing our planet. The reconciliation of our society's needs with the needs of the environment is our greatest challenge.

We need to address both of these important issues--human rights and environmental protection--simultaneously as we seek ways to incorporate accessibility in our wilderness areas.

Notes:

1. The USFS has developed a set of criteria around this concept which it calls The Recreation Opportunity Spectrum or ROS.

2. Wheelchair access is addressed in Section 6.8 of Management Policies: U.S. Department of the Interior, National Park Service, 1988, as follows: "Mobility impaired persons may use wheelchairs (as defined in CFR 1.4) in wilderness" (Emphasis added). 36 CFR 1.4 (a) defines a manual wheelchair as "...a device that is propelled by human power,
designed for and used by a mobility impaired person for locomotion, that is both capable of and suitable for use in indoor pedestrian areas." In addition, 36 CFR 1.2 (3) (e) states: "The regulations in this chapter are intended to treat a mobility impaired person using a manual or motorized wheelchair as a pedestrian, and are not intended to restrict the activities of such a person beyond the degree that the activities of a pedestrian are restricted by the same regulations (Emphasis added).

From an ADA Compliance Guide January, 1993 article "NCOD Reports on Wilderness Accessibility For People With Disabilities." The National Council on Disability (NCOD), under direction given that agency under Section 507 (e) of the Americans With Disabilities Act (ADA), conducted a study to determine "how and if people with disabilities use the National Wilderness Protection System (NWPS),"...and that they use it for the same reasons and in the same ways that people without disabilities do."

MANAGEMENT OF OUTFITTERS ON THE ARCTIC NATIONAL WILDLIFE REFUGE. Glenn W. Elson, USFWS, Refuge Manager, Arctic NWR, 101 12th Ave., Box 20, Fairbanks, AK 99701 (907)456-0250.

Introduction  The Arctic National Wildlife Refuge (Refuge) has experienced rapid growth in wilderness visitation, since passage of the Alaska National Interest Lands Conservation Act in 1980, partially as a result of promotion by outfitters. River rafting and backpacking are the most popular activities. A few outfitters offer base camp experiences, generally focused on intercepting the annual migration of the 165,000 member Porcupine caribou herd. Guided hunting, primarily for Dall sheep, caribou, brown bears, and moose, is a long standing use of the Refuge. Management of hunting guides and outfitters is an issue unto itself. This discussion will focus on river outfitters and visitors, the sector of greatest public interest at this time.

Arctic National Wildlife Refuge  Arctic is the largest and most northerly refuge in the 485 unit National Wildlife Refuge System; it contains 8 million acres of wilderness; one of the nations largest areas and almost 40% of all wilderness acreage in the Refuge System. The entire refuge, 19.3 million acres, an area approximately the size of New England, is all de facto wilderness. The Refuge's scenic qualities are superb, its environmental integrity exceptional, and its fish and wildlife resources abundant. The Refuge is bisected by the Brooks Range with peaks rising 9,000 feet above the Arctic Coast only fifty miles distant. Nine major rivers, including three designated wild rivers, flow from the mountains. The Refuge is the only area where people can practically traverse on foot or by boat a full range of boreal forest, mountain, and Arctic landscapes because of the close proximity of the coast and the Brooks Range. As a practical matter, there is little difference in management or activity between the wilderness and non-wilderness portions of the Refuge. Consequently, this discussion will refer to the Refuge at large.

The Refuge includes fish and wildlife common to the Arctic. The majority of the Porcupine caribou herd's calving grounds is on the Refuge coastal plain. Dall sheep are abundant, and brown, black and polar bears are found throughout the refuge. Moose, wolves, wolverines, and muskox are widely distributed. Tundra swans, snow geese, other waterfowl and a host of migratory shore and water birds and passerines are seasonally abundant.

Visitor Use  Indigenous people have inhabited and traversed the area that is now the Arctic Refuge for thousands of years. The area was largely unexplored by non-indigenous people and unmapped or only crudely mapped until well into the twentieth century. Until the mid-1970's, recreational use of the Refuge was very sparse. Annually, a handful of adventurers would backpack or float rivers. The national debate over establishment or expansion of National Wildlife Refuges and National Parks in Alaska raged throughout the 1970's. Publicity about the Arctic Refuge in particular and Alaska lands in general exploded as organizations argued for or against the establishment of Conservation System Units. The attendant publicity sparked great public interest and visitor use increased rapidly.

Visitor data are sparse and not particularly accurate since Refuge access is open with no check in required and no central access point to monitor. Ritchie and Childers (1976) estimated in 1975, 281 people; half of them hunters, visited the Arctic Refuge. Warren (1980) estimated 248 sport hunters and 186 other recreationists visited the refuge in 1977. Use peaked in 1989 at approximately 700 hikers and floaters and total visitation of approximately 1,300. Outfitting visitor use grew rapidly. In 1975, only one non-hunting guide operated on the Refuge. Seven commercial permits for outfitting were issued in 1980. By 1989, the number had increased to 21. Group sizes tended to be small, generally less than ten, though as high as 28.

Arctic Refuge visitors are a unique group; far from the average cross section of the American public. Visitors are among the wilderness cognoscente. While the majority of visitors are from the United States, a significant minority are from Europe, Japan, Australia, and elsewhere. Because travel to the Arctic Refuge is very expensive, not surprisingly Refuge visitors are generally well heeled or so motivated to see the Arctic Refuge they are willing to commit a significant part of their spendable incomes. Visitors tend to be well educated and politically activist. A visit to the Arctic Refuge requires significant planning and allotment of time.
The Refuge is not on the way to anywhere. The rapid increase in visitor use was caused, in large measure, by the highly controversial debate over whether Congress should authorize oil and gas leasing on the 1.5 million acre Arctic Refuge coastal plain. This issue existed for years but reached fever pitch from 1986-1991. Preservation of the coastal plain became an environmental cause celebre. Every major environmental entity opposed leasing and actively promoted its position; including major pictorials in its organization's magazine. Several organizations sponsored trips. The Sierra Club for example, in 1993 listed six Refuge trips in its outings catalog.

Outfitting and visitor issues. With less than 1000 hikers and floaters in an area the size of New England, crowding is ironically one of the primary visitor issues, followed by localized impacts to habitat, displacement of wildlife and allocation of commercial opportunity. There are several reasons; foremost is the short recreational season. The reliable snow free period is from about June 10-August 15. Prime summer weather is generally from June 20-July 31. While rivers are generally ice free from about June 1 to September 20, the peculiarity of Arctic hydrology limit favorable water conditions for rafting to approximately June 15 to late July or early August depending upon the river. Typically Arctic rivers are high and turbid at break-up and they fall and clear rapidly starting in late June, and by early August they can be so low that floating, even with rubber rafts, is difficult.

Outfitters have created some problems through promotion of a relatively small segment of the recreational opportunity. For business reasons and partially from habit outfitters focus on a few premier rivers to the exclusion of other outstanding opportunities. They promote trips which have appeared repeatedly in the popular media. They use the same camp sites and try to hit the very best weather and wildlife viewing opportunities. Visitor expectations are a significant factor in their reaction to their actual experience. Because of the billing from outfitters, what visitors may have read or seen in the popular media, and the immensity of the Refuge, visitors expect little or no contact with people. The reality maybe significantly different. Access is almost exclusively by small aircraft landing on gravel bars. These access points are externally limited so most trips, by necessity, must start and stop at the same points. Arctic rivers are generally straight and very open with few trees. Consequently, other groups can regularly be seen up or down river, though they may be camped miles away. Though essentially all visitors access the area by aircraft, overflights are a common complaint.

Outfitter management. The Arctic Refuge, as a matter of law, is managed to fulfill its Congressionally designated purposes which generally are: to protect fish, wildlife and habitat; to fulfill treaty obligations; to provide for subsistence uses of fish and wildlife; and to provide water to achieve these purposes. Other uses may occur if they are compatible with these designated purposes. Therefore, visitor and commercial uses are secondary uses and subservient to Refuge purposes. This legal framework significantly influences how the Fish and Wildlife Service manages visitor use on the Arctic or any refuge.

Outfitters are required to annually apply for a Refuge Special Use Permit (SUP). These permits contain stipulations that result in the outfitters operating in a manner compatible with Refuge purposes. Each outfitter must carry a minimum of $300,000 liability insurance. There are no limits on numbers of outfitters that may operate on the Refuge at this time. Outfitters are charged a $100.00 administrative permit fee, plus $2.00 per day per client for river floating, backpacking or sport fishing.

The Service recognized by the mid-1980's that the largely laissez-faire management of outfitters and general visitor use could not last indefinitely. The history of outfitter and general user conflicts on the Colorado, Salmon, and other rivers provided a vivid precedent. However, no action was taken because the regulatory climate was unfavorable and cenddly the real conflict was still in the future. By 1989, complaints from visitors about crowding and other problems were increasing. Several of the outfitters, including some intimately familiar with user conflicts on the Colorado River and elsewhere, suggested that something needed to be done to protect the wilderness experience they were marketing. The Service felt that public recognition of visitor use problems had reached critical mass; support for a river planning effort appeared present.

The Service initiated a river management plan in late 1989. The plan included extensive public involvement. Because river outfitters were both asking for the plan and would be most affected by it, the Service hoped the outfitters would be leaders in suggesting workable solutions. The draft plan was released recently. The plan recognizes that problems are largely ones of timing and spacing rather than total visitor numbers. The Service is in the enviable position of dealing with user conflicts in the early stages of a problem when there is significant opportunity to maneuver. The plan focuses on public education and outfitter regulation because these things can be done administratively. Philosophically and practically this is the minimum action necessary to address the existing and reasonably anticipated problems.

The draft plan recognizes that only the Kongakut and Hulahule rivers, have real crowding issues at this time. Restrictions on outfitter opportunity are limited to these two rivers. However, the plan also anticipates, based on historical precedent, that user conflicts will occur on other Refuge rivers over time. The plan provides for the expansion of these restrictions to other rivers when the number of launches is ten or more for two consecutive years.

The draft plan's preferred alternative establishes an objective of not more than five encounters of other groups per week. If opportunity must be allocated, 60% will go to private users and 40% to commercial users. Commercial launches will be limited to one every three days during the peak use period; June 12-August 10. The allocation system, for rivers where opportunity must
be restricted, is through a competitive prospectus evaluation. Group size is limited to twelve. Camping is limited to three nights per site in an effort to reduce encounters between groups. Campfires are prohibited north of the treeline for commercial groups. Human waste would be buried and toilet paper safely burned or buried. The general public is encouraged to comply with the requirements placed on the outfitters. Information and education are key components in obtaining compliance.

The Service believes it is inevitable that additional regulations will be required in the future. Historical precedent is too strong to think otherwise. We believe use restrictions placed on outfitters and public information and education about low impact camping and land use provide the correct balance between protecting the Refuge and personal freedoms to enjoy the wilderness.

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WILDERNESS AND ACCESSIBILITY: A VISITOR'S PERSPECTIVE. John Galland, c/o Barry Corbett, Editor, Spinal Network/New Mobility, 1111-11th St., Suite 301, Boulder, CO 80302 (303)449-5412

This presentation will attempt to look at how the passage of the Wilderness Act and the boom in the public interest in getting "back in there" have combined with the recently passed Americans With Disabilities Act, to create confusion and dissonance within the disabled community, as well as anxiety among service providers. A brief examination of the issues, attitudes, and expectations surrounding these areas will be presented, including the ideas of wilderness access vs. Wilderness access and the R.O.S. (recreation opportunity spectrum).

I draw upon my twenty-five years in leading adventure based, Wilderness-sited trips for both able-bodied and disabled persons, as well as a lifetime of Wilderness travel adventures. Included is a discussion of literature on these issues and a recent survey on the attitudes towards Wilderness access for persons with disabilities.

A brief slide presentation highlights many of the wilderness activities available to persons with disabilities. Examples of adaptive equipment and modifications of existing equipment is shown. An attempt to de-mythify issues surrounding persons with disabilities will be offered, and an examination of how "equal rights, not special rights" applies to access and the wilderness (this is also discussed in the attached essay).

REFERENCES


ACCESS TO WILDERNESS: 
MYTHS AND MISPERCEPTIONS

BY JOHN GALLAND

Wilderness access for persons with disabilities has been befuddled by myth and misperception. To cut through the confusion, it is helpful to distinguish between federal Wilderness (big W) which is protected by the Wilderness Act of 1964 and wilderness (small w) which is administered by a variety of state and federal agencies.

Wilderness with a small w:
The vast majority of federally managed wilderness lands in the lower 48 states are not designated Wilderness. These lands, most administered by the National Park Service, the Forest Service or the Bureau of Land Management, already have road encroachments and constructed facilities. Every effort should be made to make these accessible to persons with disabilities, and little time should be wasted on debate.

These small-w areas receive the brunt of the public’s recreational use—over 90 percent of the total—and we should expect access. But while some state and federal agencies have done a good job of making their facilities accessible, others are less praiseworthy.

The biggest problem is lack of information, both in the disabled community and in the federal agencies. The agencies involved need to conduct surveys to determine what lands and facilities need modification and to what degree. A region-by-region identification of these accessible areas by both the federal government and the disabled community could then yield a national directory and resource guide. The directory should include a listing of those outfitters and guides who will accommodate folks with disabilities and itemize adaptive equipment and techniques allowing the disabled traveler to use existing means of transportation. Both motorized and nonmotorized. Improvements to the existing facilities should be according to “the greatest good for the greatest number.”

Wilderness with a big W:

But the question of access to designated Wilderness areas is another matter entirely. The designated Wilderness/Primitive areas in this country are selected because of their relatively untouched natural qualities and character. Only a small fraction of the public gains access to these Wilderness lands.

That is because getting to most designated Wilderness requires time, energy and preparation—it’s not the instant gratification that we expect. To the extent that we have become lazy in our pursuit of Wilderness, it would seem that accessibility is an attitude as well.

But Wilderness is not out-of-bounds for the disabled, for there are many non-mechanized ways to approach it. In my experience water affords the best alternatives. Whether that water be frozen or fluid, flat water or swift water, it offers the best access for the energy expended. I have been able to get “back in” most successfully in boats, in such places as the Grand Canyon, the Everglades, the Middle Fork of the Salmon River and the Boundary Waters Canoe Area in Minnesota. I do occasionally have fantasies of having a well-trained horse in the Rocky Mountains.

A look at our many options might dispel some of the myths about how hard it is for people with disabilities to get into the woods. There are now dozens of outfitters catering to our needs. “Integrated” wilderness adventure trips offer equal value, at an equal price, to disabled and nondisabled co-participants.

We live in the late 20th century, enjoy the luxuries of solar-heated hot water showers and portable wilderness privies. We can’t complain too loudly about “roughing it.”

But our luxury is our undoing. We send the message that we are “special” and that we deserve every convenience we can get. As Americans, even with our various disabilities, we have access to a wealth of opportunities that is the envy of the world. If you want a reality check, try traveling to a developing nation and taking a look around.

We as members of the disabled community must not promote an extralegal quality in our debate. We can’t say, “Treat me the same, but treat me different.” The Holy Grail of fairness in access must not usurp the standards of that access. Our community has stated clearly that we don’t want special rights, just basic rights. So why should access to the wilderness be different? Let’s hold to the intent of the Wilderness Act, which is protection from all special interests.

John Galland is a severely able-bodied T10 paraplegic living in Minneapolis, Minn.

PERSPECTIVES

“I believe that one of the most heroic things we ever do as a species is to set aside a piece of land that we are not going to try to control—any piece of land. We will let it be itself to the largest extent possible and let the creatures who want to live there live there, and when we go there, make as little impact on it as we can. I am glad enough when we do this that it doesn’t bother me in the least that this may be a place that I may never be able to go.”

—Lyn Dickey, Sheridan, Wyo.

“I’ve seen the center of Florida change in 25 years from a tropical paradise to a suburban sinkhole. Coon, deer and even bear can be seen on the concrete tourist transit, but they don’t have much appeal unless you’re into road-kill chili.

“Tm fact, the only animal that’s safe is one sorry California mouse, and I can’t believe how much damage he and his late Uncle Walt have done to some of the best hunting and fishing country in Central Florida.”

—Lee Slater, Brandon, Fla.
OUTFITTER-GUIDE PARTNERSHIPS AND TRAINING. Gregory F. Hansen, Wilderness Staff, Tonto National Forest, Mesa RD, Mesa, AZ 85211-5800 (602)379-6446, DG Address G.Hansen:RO3FR2DO3A.

Introduction. Outfitter-guide operations and services are a direct reflection of the wilderness managing agency that they coordinate with. It is our job as wilderness managers to establish and maintain quality outfitter guide partnerships that benefit the operator, the public, and the wilderness resource. Positive working relationships that foster understanding, communication, coordination, and training, must be established and maintained if we can expect to move ahead in effectively managing the National Wilderness Preservation System.

Outfitters working across the country are in the business of helping the American public enjoy the unique resource of wilderness. Our partners have chosen this line of work for many of the same reasons we have chosen to become land stewards. Outfitters have a strong connection to the land, they enjoy working with people, and in many cases their families have been running outfitter operations for generations. If we as managers and prospective partners can keep these common ties in mind, then understanding and working towards common goals related to wilderness management can be achieved more efficiently.

Although productive partnerships can be useful in accomplishing wilderness management objectives, it is vital for managers to understand that the benefits derived from coordinated efforts must support the outfitter as well. This paper will attempt to present a variety of field tested techniques and that have been useful in building a successful outfitter guide partnership program in the Superstition Wilderness. This eight year partnership has been successful in improving working relationships between the managing agency and the outfitters and has been instrumental in serving the public and protecting the naturalness of this heavily visited interface wilderness.

Developing an Effective Partnership. Developing and maintaining a successful partnership program takes time and effort. The following topics are key in developing a productive partnership, that will benefit all involved and as well as the wilderness resource.

Effective communication is undoubtedly the single most important aspect in building a productive partnership program. Both partners must feel they have the structure and the confidence to communicate freely with each other if the partnership is expected to work. Good communication must be accomplished throughout the entire operating season, not just at evaluation time. Coordination meetings can be set up prior, during, and following normal working seasons. These meetings can be informal or formal in design, depending upon the relationship that exists between you and your partner(s).

Informal, unscheduled field visits can be useful in evaluating your partners but avoid making the operator feel he/she has to always be looking over their shoulder. Formal meetings should be pre-scheduled and handled like any other type of important function, with an agenda that is co-developed and agreed upon prior to the meeting.

Utilize the transitional period to your advantage by identifying the positive and negative aspects of the existing partnership. Then, work towards weaving your philosophies and management objectives in with your outfitter's needs and perceptions and this will assist you in moving ahead with your program. Take the time to get to know each of your partners before establishing your program objectives. If possible, communicate with your predecessor to ensure a smooth transition. This communication could be instrumental in identifying priority projects that are unfinished and that need to be followed through on and completed.

Transitions can be trying for both the new manager and the outfitter. Utilize this time to your advantage by getting to know your partner's philosophies and understanding of wilderness management. Work towards meshing your management objectives with your partners needs and philosophies and develop a program that best suites you, your outfitter(s) and the wilderness resource.

Developing An Annual Workplan will enable you and your partner(s) to agree on short and long term management goals and objectives and will help to document your success in accomplishing them. As we know, an operating plan is required for each outfitter operation. Many areas also create a separate document during their preseason coordination meeting or training that identifies in detail, both short and long term wilderness management goals and objectives. Developing a workplan or action plan that is agreed on by both partners, before or at the beginning of each season, will help to monitor your overall progress. A workplan can also assist in identifying needs and problems early in the season, instead of waiting until the end of the year when it is to late to do anything but point fingers.

An action plan can be simple as writing a few tasks or projects down, that you and your partners will work on throughout the season. A simple plan can be helpful if you are starting a new program. Be sure to take the plan seriously, no matter how simple and follow through with it if you wish to begin your partnership on a positive note. Annual work plans that are more structured list actions, time frames for completing the actions, and information on coordinated projects. Obviously this type of a plan will take more time to develop, but in the long run will enable you to better meet management challenges and document your successes. Action plans should be updated as tasks are completed or when priorities change.

Developing a plan that is created by both you the manager and partner, will give the outfitter a sense of ownership in the working relationship. A plan of work will help to facilitate a more productive partnership, in turn improving your overall wilderness

107
management program. Many areas have Outfitter-Guide Associations that meet regularly. Try to plan your coordination meetings so that conflicting schedules do not exist and so that traveling time and distances can be minimized. All operation owners and guides; priority or non-priority, can be present at coordination meetings. Some managers choose to meet individually with each outfit depending on the number of people involved, meeting objectives, and how well your partners get along with one another. Meeting together with all of your partners at once can bring consistency to your wilderness program but coordination and communication is needed with individual outfits as well.

If you are new to an area, ask someone who knows or has worked with the outfitter(s) to go with you to the operators place of business and introduce you. Going to meet with someone in their surroundings can help them to feel more at ease and can make them feel more comfortable in conversing freely with you. If you are a new manager, initiating the first few contacts can show your partners that you are willing to work with them to construct a positive working relationship.

More traditional ways of communicating with your partners are talking over the phone and having an open door policy that invites them to visit you at your office. A balance of outreach coordination meetings, field visits, coupled with information sharing over the phone and the open door policy, can ensure open communications between you and your partner(s). Understanding Your Partner(s) is crucial when trying to establish or support any type of outfitter-guide program. Outfitters are people and must be treated fairly and with respect if they in turn are expected to treat you with the same courtesy.

Realizing the fact that our partners are trying to run a business in today’s unstable economy, with a great deal of competition should tell us that this road is not an easily traveled one. Excessively high insurance costs make it very difficult and costly to run an outfitter service. Many operations travel south in the winter and north in the summer and this also can be time consuming and costly. It is our job as wilderness managers and advocates to identify the ultimate potential of each of our partners or prospective partners. It is also our job to foster that potential, so long as operations do not endanger the natural integrity and value of the wilderness resource.

When struggling with difficult decisions concerning your outfitters remember that the resource must win, but that your partner must win as well. Be compassionate and fair in your decisions concerning outfitters. Try and seize every opportunity to improve your partnership, by understanding their point of view and their perspective, relative to the situation in which you are dealing with. Understanding all sides of an issue make for better educated decisions, that benefit the land and all parties involved.

Transitional leadership is one of the most difficult aspects of maintaining a quality outfitter partnership. It can be very frustrating for an outfitter to work with a number of agency people over a short period of time, as each have their own style and ways of doing things. There is nothing wrong with doing things differently, as long as you extend the courtesy and take the time to involve your partner along the way.

Training and Shared Leadership. Training and shared-leadership is yet another important aspect to consider when attempting to build a quality outfitter partnership, our partners have a great deal of experience and knowledge to share in a variety of areas such as stock care and maintenance and traditional packing techniques. People really begin to wonder if they are an important part of the team when the agency is doing all of the teaching and training. Include sessions in your training that are taught by your outfitters, as they are a wealth of knowledge in many cases and will feel good about sharing their skills.

There are a number of training techniques that work well in sharing pertinent information between partners. Many areas utilize their pre or post season coordination meetings to present a new theme or topic that relates to all parties involved, such as water purification methods and equipment, minimum impact camping techniques and equipment, or how to use trail condition and maintenance inventory forms. Try and make each topic exciting and meaningful and avoid preaching to your partners.

Formal training can also be co-developed such as the Partners Associated in Recreation Services (PARS) Conference, sponsored and presented by the Southwest Region, Forest Service and outfitter-guides from around Region 3. Areas of emphasis this successful session were; developing successful partnerships, shared leadership, liability and insurance, understanding agency policies and conflict resolution. Formal training such as the PARS Conference are useful in bringing agencies and their partners together to share common goals and objectives that relate to the future of outfitter program management and development.

Formal or informal training sessions can vary from one day to one week and will be successful or will fail, depending upon the time and sincerity that you and your partners are willing to commit to them. Training and shared leadership is the only way that we can do our jobs effectively in managing the American legacy of wilderness. If you and your partners are willing to sit down and discuss conflicts, management challenges, and common management objectives, then you are ready to enter into an exciting and productive partnership that could serve all involved for years to come.

Summary. Developing and maintaining a positive and productive partnership with our outfitters and guides is a crucial part of managing wilderness. Through effective communication, understanding, planning, coordination, and training, a quality working relationship can be built and supported. Your program’s success relies heavily on the time, effort, and commitment that you and your partners are willing to devote to it. Seize the opportunity to get to know and work with your outfitters, as the benefits that
can be accomplished will continually serve all involved, as well as help to better protect and preserve the enduring resource of wilderness.

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UNDERSTANDING AND RESPONDING TO DAY USE IN WILDERNESS. William L. Lester, NPS, Chief Ranger, Pinnacles National Monument, Paicines, CA 95043 (408)389-4485

Day use in the wilderness is probably the least understood activity Wilderness Managers deal with. Almost without exception day use is not controlled or regulated and is generally not considered as an impact on wilderness. For example, only five of California’s 58 wilderness areas required day use permits and have quotas for day use. All five of these areas are administered by the Forest Service.

Unique Challenges. Day users present a different challenge to managers than overnight users. In some wilderness areas, day use makes up 100% of the use while in other areas there is almost no day use activities. Day users are usually not required to contact agency personnel. They have less ownership or feeling of responsibility in the wilderness than users who plan for an overnight stay and tend to invest little to no time planning for their trip. In most cases, are not aware they are in wilderness or understand its significance. Wilderness permits provide the agency they opportunity to convey information concerning resource issues, minimum impact techniques, wilderness ethics, and the significance of wilderness. Reaching these users and getting the message without changing the system or the requirements will present a real challenge.

Attempts at Management. The wilderness day user is the true invisible force in wilderness management. Managing day use is very complicated and extremely difficult. How much and to what extent day use is impacting wilderness is not very well understood. Most agencies do not even attempt to manage it. And when an attempt is made, it appears the techniques used are for the appearance of managing and less for the protection of the wilderness resource and its values.
When there is a true attempt to manage day use, as in the Wilderness Plan, it is often given its own use zone or is zoned out of wilderness. There four major ways of "managing" day use in wilderness. (1) Ignore it. It doesn’t exist as a management concern or if a concern, not a high priority. (2) Zoning day use out of wilderness. This may be unique to the Park Service where wilderness designation is a secondary layer. Wilderness boundaries are occasionally drawn to exclude heavy day use areas that would be difficult to manage if it had previous wilderness designation. (3) Involve day use in the planning process. When addressed in a wilderness plan, it generally is zoned using the lowest accepted standards (higher social contacts, higher trail standards, more development, and more relaxed minimum tools standards). (4) Require permits and a quota system. This enables the wilderness managers to control and regulate the type of activities and to inform the day user of their responsibilities.

North Cascades, Mount Rainier and Olympic National Parks use Day Use Zones in their Wilderness Plans. Overnight camping and visits in the day use zones are prohibited and enforced. Unfortunately, the total numbers of visitors using the areas are not regulated and group sizes are not enforced. Olympic NP is beginning to try to determine the effect day use is having on a couple of easily accessible overnight areas. They may consider setting limits using a ratio of day and overnight users.

Accessibility Wilderness areas are becoming more and more accessible. Development in the form of logging roads and urban expansion, are shrinking the wilderness and enabling visitor to get into areas not possible just a few years earlier. North Cascades northern boundary borders the Canadian Province of British Columbia where logging activities have created roads to the park boundaries. These areas that were once considered the most remote in the park, are now becoming day use areas. Mount Rainier has similar problems with private timber companies that border the park. Olympic National Park’s coastal strip is 50 miles in length, is 3 miles wide at the widest point, and the majority is about 1/2 mile wide. It is bound by private or state timber lands. Nearly a hundred logging roads end at the park’s boundary making accessibility to the "Wilderness" extremely easy.

The park has made intense efforts to work with the logging companies to close roads. There has been some success but the companies are closing roads to protect themselves from liability and not to protect the wilderness.

Incompatible uses As wilderness becomes more accessible, illegal activities increase. Wilderness products are becoming commercially valuable. Mushrooms, ginseng, yew bark, shell fish, wildlife and wildlife products are but a few commodities of value found and collected in wilderness. Accessibility is also increasing the cultivation of marijuana and manufacturing of illicit drugs in wilderness areas.

A different twist to wilderness management is gang activity. Gangs have started using Pinnacles National Monument as a place to sharpen their fighting techniques. Managers are spending thousands of dollars each year to remove graffiti and repair vandalism left by gangs. Another incompatibility is the agency itself. In an effort to protect as much land as possible from future development, zones are often drawn very narrow. In some cases there is less than 100 feet between development and wilderness zones. The intentions are noble, but the problem becomes the ease of access and the inability or reluctance of the agency to manage use within the frame work of the Wilderness Act and agency policy. Some wilderness areas receive thousands of day users per day and to protect the resource, management finds it necessary to provide facilities for the ever increasing numbers. Wilderness in these cases does not exist in the letter or intent of the law. In these situations, it may be necessary to reevaluate wilderness boundaries or management of the area.

Obligations and Responsibilities Day use must be part of the wilderness planning process and managed if we are to fulfill our obligations to future generations. This begins with knowing what the condition of the resource. This can be done by simply asking if the wilderness is less impacted today than when it was established. In most cases this is obvious, but if you are unable to ascertain this through memory or good monitoring records, then consider if its less impacted than last year. Also, is the management program preventing additional impacts to the resource? If the answer is no, end most will answer no, then our obligation is to find out why, come up with a solution, and implement it.

There are two types of wilderness impacts; those that will happen today and tomorrow, and those that have accumulated over time. We have control over both but must deal with today and tomorrow first. We will always be dealing with the accumulative impacts, they are the gauge of our ability to manage or failure to manage. Without a wilderness program that deals with impacts then the wilderness will continue to degrade and the cost of eventual repair will be enormous. The problems of the past impacts are overwhelming; but if we are not willing or able to deal with day use equally with other uses, we will pass the problems on to the next generation of wilderness managers.

There are hard management decision to be made. We know that to reduce impacts, we must reduce the total number of visitors, control where and what activities occur, and to educate the visitor. Education has always been the tool we have hoped would be our salvation for wilderness management. Education over regulation...it sounds good and has a nice ring, but the problem with education is it does not repair the accumulative impacts. At best education might reduce some impacts from occurring. We have no real idea of how effective education will be in managing wilderness, there has never been an all out effort to educate the users.

In 1983 a Wilderness Conference was held in Moscow, Idaho. Four Wilderness managing agencies and five private citizen groups developed and published Wilderness Management, A FIVE YEAR ACTION PLAN. Education was the primary recommendation, for visitors and managers. In addition, the plan recommended: (1) Managing wilderness by objective, use a management system like LAC; (2) Interagency coordination and consistency; (3) Wilderness practices, use of minimum tool and traditional skills. Its been more then ten years and while some of the recommendations have been implemented at local levels, little has been accomplished.
at the national levels. There is little evidence that shows improvement of the wilderness resource over these last ten years.

**Conclusion.** Day use in wilderness needs to be managed on the same level as all other uses. Wilderness management needs to find a new track, a new sense of direction, a direction that in the next ten years will show results. Results that reveal less impacts and an overall increase in the wilderness values. The talent and ability to manage the wilderness is there and so are the tools and wisdom. What is needed is support, dedication and commitment. It’s not that difficult to do what is right. Day use is the indicator of how well we manage, and future generations will judge our success (and condemn our failures).

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**Introduction.** Joshua Tree National Monument was established in 1936 as a reserve of over one-half million acres for protection of natural and cultural resources. Located in California’s Mojave Desert, this area protects diverse desert natural systems as well as a rich cultural history. On October 20, 1975, Public Law 94-567 designated 429,690 acres as wilderness and 37,550 acres as potential wilderness within the monument. With greater than eighty percent of its area designated as wilderness, the concepts of wilderness play a significant role in the management objectives of this unit.

The Pinto Basin wilderness unit is one of the largest, more than 100,000 acres, and the most pristine. Located in the monument's eastern half, this unit protects a unique portion of Colorado Desert. This area's large expanse, moderate winter temperatures, and diverse topography make it one of the most popular wilderness use areas during Joshua Tree's extended fall to spring visitation period. Significant wilderness values include spectacular geology, solitude, vistas without signs of human development, and night skies free of artificial light.

The Pinto Basin lies north of the Eagle Mountains that were once a part of the monument. In 1951, more than 200,000 acres were removed from the monument for the purpose of mining gold and iron ore. For more than thirty years Kaiser Steel operated a large open-pit mine in the Eagle mountains. Low grade ore, higher costs for extraction, and competitive prices in the world's steel market brought operations to an end in 1984. Today, many square miles of mined lands include three large open pits. Each pit averages two miles in length, one half mile wide and one thousand feet in depth. The western-most pit is less than one quarter of a mile from the monument and wilderness boundary.

Several years ago, private industry announced plans to lease the old pits and use rail lines to haul 20,000 tons of household trash per day, for more than one hundred years, from the urban centers of Southern California. Solid waste would be used to fill the pits and old tailings used to cover the refuse. Since then, the National Park Service has been involved in the environmental compliance process that has turned out to be one the most controversial land use proposals in Southern California.

It is not the intent of this presentation to summarize all of the events associated with this proposal. In fact, the project is still short
of approval and embroiled in legal and ethical controversy. However, what may be of benefit is discussing some of the proposed mitigations and how they evolved through and outside the normal National Environmental Policy Act (NEPA) process.

One of the most significant problems that National Park units and wilderness units face in the compliance process for new adjacent developments is the lack of protection from long-term cumulative impacts to natural systems. In contrast to endangered species, few laws can be used directly to protect non-listed species, especially when dealing with long-term cumulative impacts and developments such as landfills where few studies exist that examine these issues. Mitigation and monitoring are straightforward when suspected impacts are anticipated to have even potential impacts on species of concern. However, if adjacent species are not known to be threatened, and even more complex, if there is no documentation that suspected impacts will even have any effects on the natural system, then requests for mitigation are often ignored.

This is the situation that faces Joshua Tree National Monument. Many known threats such as air quality, water quality, blowing trash, impacts to desert tortoise and other listed species, are being dealt with directly. However, nagging concerns over alteration of behavior by carnivores such as coyote and kit fox, that will be lured out of adjacent natural systems, and the subsequent alteration to natural food webs failed to receive attention for direct assistance from existing laws. Similar questions relating to dozens of subtle but potentially disastrous situations, especially when examined over more than a century, were raised in the early stages of review but failed to receive serious attention.

In the Park Service's comments to the Final Environmental Impact Statement (EIS) we proposed a solution to address these concerns: creation of an inter-agency, multi-disciplinary monitoring team that would conduct monitoring and research specifically to examine long-term effects. The team is proposed to be funded by the landfill operation, work throughout the life of the project, receive monitoring and research direction from an expert oversight committee of academicians, and have direct input for recommending changes in operation as well as shutting down operations if no apparent solution to direct conflicts exists.

As currently proposed, the team would consist of three field specialists, one from the National Park Service, U.S. Fish and Wildlife Service, and Bureau of Land Management. Each field specialist would have a different specialization such as botany, zoology, etc. The team would be devoted to full-time landfill monitoring, with facilities provided by the operators of the solid waste project. Each agency would provide support from their respective science branches such NPS Cooperative Studies Units and USFWS Research Stations. Through these research centers, academicians and scientists, with interests in this type of research, would be solicited for participation in the technical oversight committee. This committee would agree on experimental design for field surveys and monitoring as well as recommend contracts for techniques such as remote sensing efforts and development of surveys to monitor perception of wilderness degradation by park visitors. The committee would review data and recommend methods for analysis and interpretation. This research would be conducted on monument as well as Bureau lands adjacent to the landfill.

An obvious question is how this monitoring will be funded. In the early stages of review, the proponents for the landfill established a proposed "tipage fee" of one dollar per ton for the express purpose of ecological compensation. This money would be used for conservation related activities in the desert region of Riverside County. Expressly, land acquisition for open space and critical wildlife habitat were the original targets for this revenue. At an estimated 20,000 tons per day, this represents a sizable amount of funding. When the concept of the monitoring team developed, all parties agreed to allow fifteen percent of the one dollar to be specifically earmarked for monitoring. This represents approximately $1,095,000 annually from the proposed project. These funds would pay salaries of the three field specialists, support contracts for additional techniques such as remote sensing and Geographic Information Systems, and provide compensation for expenses incurred by oversight committee members to attend committee functions.

While the idea of this proposal appears in the Final EIS, it was through a series of meetings with county officials that this proposal was adopted as a condition of operation at the county level. What this means, is that regardless of what happens through the remainder of a long process for acquiring necessary permits, if this project is eventually approved the monitoring proposal must be implemented or the county will refuse to issue the necessary business licenses.

The landfill is still a long way from final approval. The National Park Service is officially opposed to this project, as proposed, on grounds of significant air quality issues. Lawsuits have been filed by organizations such as the National Parks and Conservation Association over the adequacy of the EIS. Questions over indexing fees for inflation, pose real concerns for monitoring over the actual life of the project. Conservation organizations are petitioning the state to provide better planning to encourage more recycling and eventually abandon landfills as cheap solutions to solid waste issues.

The safest solution is to have no landfill adjacent to Joshua Tree's wilderness. However, if the existing environmental review process and county officials allow this development to proceed, it will be due in part to the lack of existing information on long-term impacts from landfills in arid systems. It seems fitting therefore that revenue from this project fund an unprecedented effort to develop monitoring and research that can eventually provide answers.

An important lesson we have learned is to not overlook local government in searching for opportunities to protect critical resources that may fall through the cracks of federal laws.
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A RENAISSANCE IN WILDERNESS STEWARDSHIP: FOUR EMERGING CHALLENGES. Steve Morten, USFS, Northern Region Wilderness and Outfitter Specialist, P.O. Box 7669, Missoula, MT 59807 (406)329-3522.

The conference organizers have chosen the theme "A Renaissance in wilderness Stewardship" for this gathering. Being from Montana I had to look up the definition of some of those words in order to understand what to say here today. "Renaissance" had several meanings, such as the classical period of art and literature, which wasn't too illuminating; the 14th to 17th centuries in parts of Europe, which wasn't much help; but reading on I came to "rebirth" which I understood, and finally "a return of youthful vigor, freshness, zest, and productivity," with which I immediately identified. Under "stewardship" I found the role of a steward to be "exercise responsible care over possessions entrusted to one's care, requiring one's time, talent, and treasure."

So, this conference boils down to simply doing our job - with vitality and skill; but getting on with it - moving out - being in front taking action. We have had almost 30 years to learn what to do, and we are still learning, but Wilderness stewardship requires that we do something.

I understand the four emerging challenges selected by the steering group were based on recurring issues pulled from their peers and common to all agencies. You will be hearing from a number of distinguished presenters who will share their expertise on several sides of each of these concerns. My purpose this morning is to present a bit of what I have learned about each of them in a brief overview. I would also like to give you my "renaissance vision" of each of these challenges, which is based on where we might go as we seek to make each of them non-issues, thus enabling us to move on to identify and solve others.

Before I focus on these four issues, let me say that as I was thinking about the talk I jotted down a list of my own which contained all the issues I could think of. Let me flash them up so you can see some of the work we have yet to do. You can cell these issues, challenges, opportunities, threats, or "potential agents of change," depending on your viewpoint. Not in priority order: Suppression of Natural Fires, Failure to return fire to ecosystems, Human induced air pollution, Human induced climatic change, Abuse by domestic livestock, Abuse by recreationists (crowding, trampling, dogs, etc.), Water pollution, Adjoint and Intermingled land uses (public and private), Mining abuses, Exotic species invasion and control, Other laws and policies (T&E, HPA, Clean Air Act, Clean Water Act, ANILCA, ADA, etc.), Exhaustive hunting and trapping, Fish stocking, Overflights, Noise, Pack and saddle stock abuse, Trail mgmnt., Loss of challenge, Predator control, Failure to capture the American imagination, Lack of agency will and foresight, Research, Failure to recognize Wilderness role in ecosystem management, Failure to foster wilderness champions in Congress, the administration, and the courts.

My list of issues contains the four we're highlighting this week. Two of them, outfitting and day use, fall under the recreation umbrella. So does access for the disabled, but it also falls into the challenge of coordinating the other laws and policies which create opportunities for dialogue with an ever-widening constituency. This ever-increasing array of players in Wilderness is to be expected as the NWPS grows and the allocation concerns are replaced with management concerns. Wilderness specialists must welcome the opportunity and not close their tents to it. Intermingled and adjacent land uses can be related to recreation, but usually stand on their own as an issue. Let me address each briefly.
Outfitters: In the Northern Region of Montana and North Idaho, outfitting is big business. There are about 1000 licensed outfitters and 3300 licensed guides. Of these 1000, about 800 are National Forest permittees who return about $700,000 to the govt. in fees, which is between four and ten times what any other Region collects in outfitter fees. They have direct payoffs of about 30 million dollars and generate about 200 million dollars for the two states, with over 80K residing in communities less than 500 people. They are important rural area development partners in tourism. Anyone who has been involved with outfitters can recite stories to you of the challenges they present, but probably not much different than those who work with loggers, miners, or ranchers. Dealing with a hall jam packed with black cowboy hats or riding into a tent city in the wilderness can give most administrators pause. Historical abuses of the Wilderness...yes, I could show you slides that would turn your stomachs, but I don't show them much anymore. It's counterproductive to dwell on the postwar outfitting boom and bygone era. Incidentally, there is equal documentation of non-outfitted abuses, and I dare say of past agency scarifying of the resource. But we have turned the corner on that and many of the outfitters are leading the way. Outfitters today are a principal recreation service provider in the Wildernesses of this country, and an important principle to remember is that an outfitter camp is not a camp full of outfitters. It is a camp full of wide-eyed dreamers from not only this country but around the world, most of whom have saved their money for five years or a once in a lifetime trip. (Refer to handouts.) My vision of the outfitter of the future is that of a highly professional partner with the agencies. Professionals who know and respect the land, understand and teach Wilderness history and philosophy, are skilled in natural and cultural history of the area - with guides who are admired and emulated and who cause their clients to leave the Wilderness with a sense of awe, revelation, inspiration, and protection. In other words, a profession who helps visitors realize the range of benefits Wilderness can provide all who enter it.

It is our job to help produce the outfitter of the future and I have found the majority of them to be increasingly receptive. Throughout the Northern Region most Forests hold annual split and whistle sessions between District Rangers and local outfitters. The FS participates in the outfitter association meetings. Things are on the move. The Professional Guide Institute at Rick's Collage in Rexburg, Idaho, has learning objectives with which most Wilderness Rangers would struggle. The Chief of the FS is committed to this partnership and has stated "If some outfitters and some FS administrators find they Can't make this partnership work, perhaps they should consider a different line of work." Folks, in some cases, we have been the problem in this arrangement. And while looking toward the outfitter for compliance, we must always look inward and examine our own attitudes and behaviors. There is no longer any reason why one shouldn't be an advocate for both Wilderness and outfitters. Teach them, and learn from them...and help them help the public both of us serve.

Day Use: Now let's talk about day use of the Wilderness. I have assumed in listing this as a challenge, the steering committee is concerned about those portions of Wilderness which are easily accessible to large numbers of people, frequently on an urban interface. Actually, there can be day use throngs even in the rural interface as well, depending on the boundary location and the attributes of the area. As you know, the common impacts associated with day use which exceeds the threshold limits can include parking, road congestion, crowding, dogs, resource damage, litter, water pollution, sanitation, loss of solitude, effects on wildlife, visitor conflicts, effects on local landowners, and so on.

One of the important factors to remember is that the people come to these hot spots (and keep coming back) for a reason. It is that wildlands are important to them, physically, emotionally, spiritually, and socially. So when Congress granted the benefits of an enduring resource of Wilderness, it was also for these people. But of course, and you know, that at some level of use and impact, we have dropped below the threshold of Wilderness. There's the rub. And there's the classic rationale for determining the LAC standards for such areas. These transition areas from the trailhead into some point are going to have a higher tolerance for use than the more primitive portions. In my view, one of the principal values of establishing Forest Plan mgmt. areas (the old term was opportunity classes) within Wilderness is not to enhance the transition zones, it is to protect the primitive and pristine areas. The standards for those mgmt. areas must provide outstanding opportunities for solitude, primitive and unconfined recreation, retention of primeval character, and unnoticeable imprint of man's work.

Those of you who have these day use pressures don't need me to tell you your alternatives. The management options are well documented. The methodologies are not secret. It's what you get paid to do. You don't need much more data than you've already collected, nor in many cases, much more funds than are allotted to you. There are success stories out there. Remember, these areas are not city, county, or State parks: they are part of Wilderness, and when the visitor passes through the portal, something should begin to happen "in contrast" to other areas, and should deepen as the experience unfolds. So, my vision of day use mgmt. is that through LAC or other analysis processes you would prepare standards and a desired future condition of the mgmt. areas within your wilderness. Then by managing access, matching visitors with non-wilderness dependent locations where possible, strengthening education programs, selecting necessary restrictions, instituting a reservation system when necessary, your wilderness will be on an upward trend.

Adjacent and Intermingled Lands: This is a challenge for every Wilderness manager to a greater or lesser degree. Every Wilderness has a boundary line, sometimes one which makes good sense, and frequently one that creates immense headaches. It is general agency policy and sometimes stated Congressional policy that there is not to be a buffer zone around Wilderness, but it is customary for the public to challenge that thinking, in appeals and lawsuits. My experience has shown that adjacent and intermingled lands issues can be divided into two categories: 1) those that are related to agency activities, and 2) those conceived and conducted by the private sector.
From the agency perspective we see development proposals involving access which brings people closer to the boundary, without consideration of wilderness values or road standards and mgmt. options, invariably use of the wilderness increases, sometimes dramatically, putting us way behind the power curve in corrective action. Another consideration is trail standards leading to wilderness, or various other resource treatments, however beneficial they may be to the target multiple use. Wilderness specialists simply must be represented on the teams assessing those projects. It has happened that wilderness boundaries have been breached by timber sales, commercial thinnings, and road construction. Hopefully, those days have ended.

From the public perspective, we still experience issues of incursions into wilderness by motorized equipment, snowmobiles, ATV'S, M/C, motorboats, bicycles, and unauthorized aircraft. Commonly, these occur for periods following designation and gradually are eliminated. We still have hard core snowmobilers in the Absaroka-Beartooth Wilderness ten years after designation, but all-out efforts are now paying off.

The intermingled lands present a great challenge in some Wildernesses. These patented parcels and mining claims tend to lie dormant for years and all of a sudden flare into inferno's of controversy. You've read in High Country News of the proposed subdivision in a Colorado wilderness. Requests for access of various types, roads proposed to remote settings, structures being built, properties offered for sale, planned retreats catering to big spenders, and so on. These all threaten the integrity of wilderness and incur the wrath of conservation groups who seek a non-development solution.

As a general rule, the highest priority for land acquisition are the intermingled lands within wilderness. If and when they become available, we need to act quickly and sometimes with a third party purchasing an option and buying time for the agencies to adjust priorities. If the parcels are sold to a private party, we've lost the opportunity and will incur costly, time-consuming, lose-lose struggles as the purchaser seeks to do something with the property. There are no easy answers when an owner seeks access or development. The ANILCA provisions for access must be considered which clearly grant reasonable and appropriate access; but it must be access commonly enjoyed by owners of similarly situated tracts and appropriate to the intended purpose. My vision is that wilderness specialists and landownership staffs are proactive in preparing acquisition plans which prioritize acquiring the remaining intermingled tracts.

**Access to Wilderness for people with disabilities** When I consider this challenge, what comes to me is that there is probably much for me to learn about it, it is an emerging issue, that's why it's on this agenda. We believe we should all listen to those who are most affected by the decisions which have been made and are yet to be made, and I suspect it is the disabled themselves who will speak most personally and eloquently about what they want from wilderness. Not what they want from Parks, Forests, Refuge, or from the BLM wildlands - but what they need and want from Wilderness. Wilderness for the disabled, in my view, offers the opportunity not only to become close to the land, but uniquely close to themselves and other people. This human closeness occurs through the helping relationship of an outfitter-guide or a friend sharing the physical and emotional challenges. It is a time of extraordinary courage for the disabled, with powerful memories of inspiration for the helper and the lifetime knowledge of a conquest for the disabled. When they have met the wilderness with its trials and its beauty, they are not the same again.

So, my vision is that we will listen to those of the disabled community who have a love for Wilderness and who have shared a campfire or two and have thought about what it is they want from these lands which represent the last 2 percent of native America. And we must not forget the work we have yet to do on the remaining 98 percent.

I remember the words of past FS Chief Max Peterson who said "Never allow your Wilderness stewardship to be understood as anti-people. That will be the quickest way to lose the system." I would add that we must enlarge the Wilderness tent, while still preserving the Wilderness character.

In closing, let me recount a brief story. One day while at a conference in Portland, I took a mid-day stroll into one of the city parks. In the distance I saw a man and woman leading what appeared to be a cougar. As they approached I saw they were leading it by a heavy chain wrapped around it's neck. When they reached me I engaged them in conversation about the animal's demeanor and if they were concerned about potential liability to stroll such a magnificent wild animal through a city park. They said - "Oh we've had him deranged and declawed.11 Whereby they opened his mouth and showed me the 4 holes where his canines once were. Folks... that we must never do to the wilderness. To look like Wilderness from afar but stripped of its wilderness up close is not the stewardship our descendants deserve.

115
DAY USE PATTERNS, IMPACTS, AND WILDERNESS MANAGEMENT STRATEGIES ON THE APPALACHIAN TRAIL.

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Introduction: The Appalachian National Scenic Trail is not a wilderness. It is not a single resource, nor was it conceived or is it managed as such. Rather, it is the sum of many resources associated with a 2,147-mile traverse of the Appalachian Mountain chain between Georgia and Maine. The Appalachian Trail Comprehensive Plan describes the Appalachian Trail as "...a way, continuous from Katahdin in Maine to Springer Mountain in Georgia, for travel through the wild, scenic, wooded, pastorial, and culturally significant lands of the Appalachian Mountains. It is a means of sojourning among these lands, such that visitors may experience them by their own unaided efforts. In practice, the Trail is usually a simple footpath, purposeful in direction and concept, favoring the heights of land, and located for minimum reliance on construction for protecting the resource. The body of the Trail is provided by the lands it traverses, and its soul is in the living stewardship of the volunteers and workers of the Appalachian Trail community."

A long-distance hiker travelling end to end on the Appalachian Trail will pass through or within a footprint of 23 designated wildernesses and many other areas that are managed as such. But that hiker will also pass through towns, cross interstate highways, walk along backcountry roads, and encounter agricultural practices, utility lines, residential development, present and past forest management, and a myriad of other land uses. However, as a result of the vision of Benton MacKaye, his colleagues, and his successors, these experiences remain infrequent. The long-distance hiker on the Appalachian Trail will also find solitude, remoteness, and all of the trappings of a true wilderness experience. More than 1,500 miles of the Trail provide the user with a primitive or semi-primitive recreational opportunity.

The Trail is now protected by a land base of more than 250,000 acres (101,250 ha) that is managed and maintained by the volunteers of the Appalachian Trail Conference and its 32 member Trail-maintaining clubs in concert with six National Parks, eight National Forests, and 67 state and municipal land-management agencies. In the parlance of the Trail project, these organizations and agencies are referred to as the "cooperative management partners," and the Trail is managed under a system referred to as the "cooperative management system." The cooperative management system works because it encourages decision-making at the field level, with only the broadest of central policy guidelines. Most decisions are arrived at by consensus among the line officer of the land-managing agency, a representative from the Appalachian Trail Conference, and a volunteer from the Trail-maintaining club with assigned responsibility for that section of the Appalachian Trail.

Wilderness Along The Appalachian Trail: To date, Congress has designated 23 wildernesses that are either bisected or bordered by the Appalachian Trail. Perhaps the most well-known are the Great Gulf Wilderness and Presidential Range - Dry River Wilderness in New Hampshire, Lye Brook Wilderness in Vermont, the Shenandoah National Park Wilderness and James River Face Wilderness in Virginia, and the Southern Nantahala Wilderness in North Carolina and Georgia. Eastern wilderness is typically not wilderness in its purest sense; many of the lands are second or third generation growth, and many bear the scars of present and past use. Eastern wilderness should more appropriately be viewed as "wilderness under rehabilitation."

The Appalachian Trail is prominently featured in the legislative history of many of the committee reports as both a key factor in wilderness designation and as a compatible use. The Appalachian Trail Conference has supported wilderness designation as a means of ensuring long-range protection for portions of the Trail, and has been instrumental in designation of wilderness along more than 100 miles of the Trail in the last 25 years. Through language in Congressional committee reports, the Trail has been provided with special recognition as a resource both independent of and compatible with wilderness.

Day Use on the Appalachian Trail: There have been no reliable estimates of total Trail use in recent years. This may be due in part to the difficulty of distinguishing between actual Trail users and other visitor use within the park, forest, state and municipal units, and in part due to the sheer magnitude of the task. With more than 300 Trailheads and at least as many undesignated side trails and spur trails intersecting the Trail, such a study would take a tremendous investment of personnel and resources. In the 1970s, extrapolations were made from localized studies that estimated total Trail use at three to four million users annually (Appalachian Trail Comprehensive Plan 1981). Though there has been no attempt to aggregate use levels since that time, more recent localized studies indicate somewhat lower use levels.

Not surprisingly, many of the designated wildernesses intersected by the Trail appear to be some of the most popular areas. In the White Mountains of New Hampshire, backcountry visitation along the Appalachian Trail exceeded 168,000 user-days in the 1987 (Gehhardt, USDA RIM data). In a more comprehensive study using electronic-eye counters, met counters, and other methods, researchers in Great Smoky Mountain National Park conducted an extensive study from 1988 to 1990 indicating daily average traffic counts as high as 576 users per day during a 74-day study period (Van Cleave, Beard, Shunamon, and Peine).

By contrast, low levels of use are particularly evident in less accessible and less well-known sections of the Trail. Sections such as the rugged Mahoosuc in New Hampshire and western Maine and the more remote areas of southwestern Virginia are visited by as few as two to three hundred users per year. Even in the Smokies, some sections of the Trail receive as little use as an average of five users per day (Van Cleave, Beard, Shunamon, and Peine). The extreme fluctuations in use levels indicate that very
little of the current use of the Trail is overnight use. Recent studies conducted on the Trail and in other backcountry areas and wildernesses in the east lend support to a perception that many backcountry recreation managers have held for some time: much of this use is day use. This conclusion should not be surprising—after all, the Trail is located within 4 hours' drive of most of the major metropolitan areas on the East Coast and is within a day's drive for more than two-thirds of the nation's population.

A recently completed survey of national park units with backcountry use areas by Marion, Roggenbuck, and Manning indicates that high levels of day use are not unique to the Appalachian Trail or the East. This study, titled "Problems and Practices in Backcountry Recreation Management," found that "by far the greatest number of backcountry users in National Park areas are day users. The average percentage of day use across all areas in the study was 64%; the median day use was 70%. These figures suggest that NPS backcountry users are even more likely to be day users than are Forest Service wilderness visitors, where estimates of about 50% day use are common. Average percentages of day use exceeded 50% for all NPS regions except Alaska. Estimates of day use exceeded 90% in the National Capital Region and the North Atlantic Region; such use exceeded 80% in the Rocky Mountain Region and the Mid-Atlantic Region. Even in Alaska, National Park Service personnel estimated day use to average 25% per park." (Marion, Roggenbuck, and Manning, in press.)

We also believe that in addition to having a high percentage of day users the Appalachian Trail has a high percentage of first-time or novice backcountry users. No contemporary research currently exists to support this contention. However, a study done in 1974 indicated that more than a third of the users of the Appalachian Trail in the southern National Forests were novice hikers, and 78% of those users were day-hikers (Murray 1974). Volunteer trail-maintainers and ridgerunners regularly report frequent contacts with organized groups from Boy or Girl Scouts troops, local wilderness camps, and college outing clubs, as well as individuals or unaffiliated small groups that are experiencing the great outdoors for the first or second time.

**Impacts Associated with Day Use on the Appalachian Trail:** Impacts associated with day use can be divided into two categories: physical impacts to the resource and perceptual or experiential impacts to the user. In the 1970s, the impacts of day-use on the Appalachian Trail were evident to even the most casual observer. As a result of a number of management practices implemented since that time, and as a result of a decline in use, these impacts have been reduced significantly. They are, however, still readily apparent in some areas. Physical impacts of day-use include:

- soil erosion at Trailheads and popular destination sites;
- treadway damage, such as destabilization of drainage structures, cutting of switchbacks, and dual or meandering sets of pathways;
- vandalism to physical improvements such as bridges, signs, puncheons, and shelters;
- trampling of vegetation, particularly at overlooks, mountain peaks, and other destination sites;
- trash, graffiti, and litter;
- contamination of water sources; and,
- illegal collection of plants, animals, and geologic specimens.

Twenty years ago, the experiential impacts of day-use on the Appalachian Trail were perhaps even more significant than the impacts to the physical resource. In 1973, it was not uncommon to encounter more than 1,000 users on a weekend hike in the summer through the Presidential Range in the White Mountains. During the summer and fall seasons, Great Smoky Mountain National Park and Shenandoah National Park faced similar pressures.

These high levels of use generate a number of perceptual impacts to both the long-distance hiker and the day-user. The long-distance hiker is typically pursuing a personal challenge, one that requires stamina, strength, and endurance. The long-distance hiker also is seeking a solitary or small-group experience, one that provides the maximum degree of separation from large groups of other users. Many sections of the Trail do provide the opportunity to achieve both objectives, but in the White Mountains, the Smokies, and other popular locations, attainment of these objectives may be compromised in easily accessible areas by large numbers of day users.

The most significant experiential impact is the disparity between the Trail user's desired experience and actual experience. This disparity is perhaps greatest among experienced users, who understand and practice minimum-impact and leave-no-trace backcountry techniques but who confront the evidence of others who do not. Though statistical data does not exist, most long-distance hikers will cite occasional unpleasant experiences with crowding, conflict with other users, noise, harassment of wildlife, feeding wildlife, pets running loose, litter, and large groups. Complaints about illegal uses, including mountain bikes, horses, and occasional ORVs, are also infrequently registered.

The level of impacts and the concerns registered by some visitors should be kept in perspective. Since the 1970s, the impacts to the physical resources of the Trail have decreased dramatically. Many areas that were heavily impacted in 1973 have recovered from years of overuse and abuse, due at least in part to management actions (which I will review later in this presentation) implemented by the Appalachian Trail Conference, the Trail-maintaining clubs, and our agency partners.
Additionally, the complaints that are received are usually few and far between. The testimony of the 100 to 150 individuals who thru-hike the entire Appalachian Trail annually provides at least anecdotal evidence that the over-all experience of hiking the Trail is very much what people expect: a singularly remote sojourn through the Appalachian Mountains. Thru-hikers on the Appalachian Trail are typically experienced backcountry users seeking a preeminent backcountry experience. Virtually without exception, they request a 2,000-miler patch from the Conference and report, often in excruciating detail, the positive and negative aspects of their hike. Their reports are overwhelmingly positive—even those that offer suggestions for improvement.

**Wilderness Management Strategies:** The matrix of management techniques available to the Appalachian Trail manager is no different than the matrix of techniques that many backcountry and wilderness managers work with on a daily basis. There are a few that you may not have considered, and a few that we have evaluated but not implemented. With regard to the latter, we have avoided techniques that require direct intervention because of one of the prevailing management philosophies for Trail management, namely, that “managers will foster an unregimented atmosphere and otherwise encourage self-reliance and respect for Trail values by users. Hiker regulations will be kept as unrestrictive as possible, and should be developed only to the extent that they are proven necessary to protect the physical Trail, its environment, and the interests of adjacent landowners.” *(Appalachian Trail Comprehensive Plan 1981.)*

Management actions can be roughly broken down into three categories: trail design and construction techniques and educational techniques that require little or no user contact; educational methods that require informal interaction with the user; and last-resort techniques that require direct, official or quasi-official contact with the user. Increasingly, we are gearng our options in all three categories towards the day-user.

First and foremost, we rely on education of the user. The Appalachian Trail Conference and its member clubs produce the most comprehensive set of guidelines and maps available for any backcountry area in the nation. A total of eleven guides, each several hundred pages in length and accompanied by a detailed set of topographic maps, provide a step-by-step guide to the Trail, as well as information on low-impact use, safety precautions, first aid, emergency actions, Trail ethics, geology, plants, animals, and the environment. The guidebooks also include information on both general and site-specific policies and regulations for use of the Trail.

We are realizing, however, that as few as 20 percent of the day-users on the Trail actually purchase a guidebook or map. As a result, we are encouraging greater reliance on Trailhead signing in many areas. We are also supporting the efforts of several Trail clubs that are producing brochures and small pamphlets, which are made available to users through register boxes. In addition, the Conference is initiating an outreach program directed at educating the user before he or she arrives at the Trailhead. We are also diverting use away from high-use areas through educational efforts. The name of the Appalachian Trail is often a drawing card, but by promoting opportunities in areas of the Trail that receive low levels of use or by offering alternatives to the Trail, we are dispersing use along the Trail.

The Conference and its management partners are also building trail differently than ever before: we are building trail to last forever. The Conference’s Trail-crew program, which was begun in 1983, now consists of four crews and provides support for three others. The crews support the work of the Trail clubs on difficult design problems, and in the process, train Trail-club volunteers in proper trail design and construction. In relocations and reconstruction projects, the treadway and tread structures are designed and built to withstand high-use levels while still maintaining a rustic appearance. In 1991 the Conference was awarded the National Primitive Skills Award for the Laurel Fork Bridge in the Pond Mountain Wilderness in Tennessee. Moderate-level techniques include lists of policies and guidelines for appropriate hiker etiquette, which are promoted through guidebooks, Trailhead signs, brochures, and ridgerunners, and implementation of various actions to minimize localized impacts in sensitive areas. The Conference has developed a set of policies to promote limits on group size, discourage litter and other forms of inappropriate behavior, and protect sensitive resource values. We have found that the most effective means of contact with the day user is face-to-face contact, and in response, have implemented or supplemented ridgerunner and caretaker programs in more than 20 locations along the Trail. The ridgerunners are deliberately low-profile: they are outfitted in uniforms that are clearly not official; they greet but do not interfere or interact with hikers whose equipment and behavior indicate that they are experienced hikers; and they use educational rather than confrontational modes of communication. We are also conducting a comprehensive survey of sensitive plant and animal resources along the Trail, with somewhat startling results. To date, we have surveyed more than two-thirds of the Trail corridor, and found more than 530 discreet populations of sensitive, threatened, or endangered plant or animal species. We have implemented a volunteer-based monitoring program for these sensitive areas in four states. And, where appropriate, we have diverted users away from sensitive sites through seasonal closures or relocations of the Trail tread.

As a last resort, we turn to our agency partners for enforcement of local codes and regulations. Voluntary registration has been implemented at several of the areas that receive particularly high levels of use. And in a few cases, permits and fees are required for overnight use (though not for day use). We have also constructed more than two miles of snow walls to define the Trail pathway and constrain visitor use in sensitive alpine areas in the White Mountains in New Hampshire.
Management options under consideration: What next? The Appalachian Trail Conference and its member clubs are active participants in a number of ongoing wilderness implementation schedules with the national forests. We are comfortable with the "Limits of Acceptable Change" planning process as a tool for defining and monitoring changes in wilderness, and hope to address the challenge of day use through that process.

Yes, a true wilderness experience can be found on the Appalachian Trail by the overnight visitor. But the day user, constrained by time and proximity to the trailhead, will have a more difficult time finding a wilderness experience along the Trail, even within the boundaries of a designated wilderness. The challenges for us as managers are to recognize that those day users may have different needs than long-distance hikers and to educate them so that they and others on the Trail find the experience they seek.

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CONTACTS ABOUT DAY USE IMPACTS AND WILDERNESS MANAGEMENT STRATEGIES

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Carl Gebhart, Recreation Program Leader, White Mountain National Forest (603) 528-8721 (Laconia, New Hampshire)
Wesley Henry, National Wilderness Coordinator, National Park Service (202) 208-5211 (Washington, D.C.)
Jeffrey Marion, Regional Scientist and Unit Leader, NPS-CPSU, Virginia Tech Dept. of Forestry, (703) 231-6603 (Blacksburg)
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Prioritizing Acquisition of Nonfederal Inholdings in Designated Wilderness Areas. Mark Pearson and Dr. George Wallace, Dept. of Recreation Resources, Colorado State University, RM 238, Ft. Collins, CO 80523 (303) 491-5165

Wilderness managers call the presence of wilderness inholdings a substantial impediment to long-term preservation of wilderness character. At the end of 1990, 454,000 acres of non-federal lands existed with the Forest Service's 33.6 million acres of designated wilderness. Similarly, the Bureau of Land Management's 1.6 million acres of wilderness contained at least 17,000 acres of non-federal inholdings. These non-federal lands consist primarily of patented mining claims, homesteaded lands, and state lands. Though Congress frequently attempts to excise non-federal lands from wilderness areas when drawing the boundaries, it is often impossible to secure lasting protection for threatened ecosystems and landforms without creating some wilderness inholdings.

Various types of development incompatible with preservation of wilderness values have been proposed or implemented on wilderness inholdings. Developments have included construction of residential structures such as cabins and lodges, extraction of mineral resources ranging from marble to gypsum, and construction and repair of water diversion and storage structures. While some of these non-conforming uses are protected by legislation, others can be reduced or eliminated by selective acquisition of inholdings. Impacts to wilderness include fragmentation of heretofore pristine ecosystems and environmental degradation such as air and water pollution, soil erosion, loss of solitude, and disruption of wildlife. Proliferation of non-conforming uses such as airport landings and motor vehicle intrusions associated with inholdings heighten the probability of visitor conflicts.

Most agency land use plans accord highest priority to acquisition of wilderness inholdings. Unfortunately, the only available prioritization method for obtaining federal Land and Water Conservation funds emphasizes attributes that are not necessarily important to wilderness, such as providing multiple recreation opportunities and existing infrastructure for public access. Given the multitude of wilderness inholdings nationwide, agency managers need a method for prioritizing acquisition to secure the greatest and most prompt protection for wilderness resources.

A model for prioritizing non-federal inholdings in designated wilderness areas was created to assist federal land managers and others in pursuing acquisition of those inholdings. The priority model consists of three major components: (i) assessing the parcel's development potential; (ii) evaluating its ecological importance; and (iii) its effect on visitors, managers, or other social impacts. Development potential is assessed using the parcel's physical characteristics such as access, slope, and improvements in addition to the owner's development interest. The contribution to an area's ecological integrity is measured by factors including level of human developments, density and spatial arrangement of inholding parcels, distance from the wilderness boundary, and its relationship to ecological nodes of diversity. Social impact potential is evaluated for each parcel using factors such as naturalness and visual impacts, conflicts with recreation, wilderness manageability, and ability to mitigate impacts.

The inholding prioritization model was applied to two wilderness areas with distinct characteristics, the Forest Service's Holy Cross Wilderness in Colorado and the BLM's Cebolla Wilderness in New Mexico, each containing more than 1,000 acres of inholdings. Holy Cross is an alpine wilderness whose inholdings consist primarily of patented 10-acre mining claims. Cebolla is a desert wilderness with inholdings ranging in size from 40 to 640 acres. In the two test cases, the prioritization model favored acquisition of parcels deep in the wilderness interior, parcels that offered attractive development sites for recreational uses, and parcels situated near popular recreation areas such as lakes or along heavily used trails.

As validation of the model, Forest Service wilderness managers were asked to apply it in a test case. These managers found the model quick and easy to apply. The model utilizes information that is readily available and familiar to wilderness managers such as topographic data, wilderness recreation opportunity settings, and general knowledge of wilderness resources.
PROTECTING SAGUARO NATIONAL MONUMENT WILDERNESS RESOURCES IN THE FACE OF URBAN EXPANSION.

Luther Probst, Executive Director, Rincon Institute and Sonoran Institute, 6842 Taque Verde Rd., Suite D, Tucson, AZ, 85715 (602) 290-0828.

Americans in increasing numbers are choosing to live on the perimeter of wildlands and wilderness areas. Many protected areas throughout the country have become magnets for private development. For example, the 1990 census shows that the 20 counties in three states surrounding Yellowstone National Park, Grand Teton National Park, and the seven adjoining national forests would have been the fastest growing state in the Union if they were a separate state. Unplanned and unmanaged development can do great harm to protected areas by reducing and fragmenting wildlife habitat, introducing exotic plants and animals, polluting streams, degrading air quality, and degrading scenic views. In addition, unplanned development threatens the very quality of life that attracts people and investment to many communities adjacent to wilderness areas.

Most protected area managers and adjacent communities have not been eager to address the conflicts that may arise when resource managers perceive adjacent development as incompatible, or when local officials perceive protected lands as detrimental to the fiscal or social well-being of the community. My remarks this afternoon outline an alternative to polarization and conflict between protected area managers and local officials and other residents of adjacent communities. My hope is to leave you a little more optimistic and informed about the potential advantages of mutually-beneficial partnerships between these diverse interests.

First, let me give you a little background. The Sonoran Institute was created in October of 1990, with assistance and funding from World Wildlife Fund and The Conservation Foundation (WWF), to create innovative mechanisms for reconciling potential conflicts between protected natural areas and adjacent communities throughout the country. Underlying the Sonoran Institute’s mission and activities is the conviction that natural areas can be more effectively protected when tailor-made, cooperative approaches to resolving adjacent land use issues are used. Such approaches involve resource managers, local governments, landowners, and other community interests, and recognize both the needs and aspirations of adjacent communities as well as the contribution that natural areas make to the local quality of life.

One of the Sonoran Institute’s first projects was to enter into an innovative partnership to create and fund the Rincon Institute, an affiliated organization whose mission is to protect the ecological integrity of Saguaro National Monument as urban growth occurs around its boundaries. Allow me to explain.

Saguaro National Monument protects 87,114 acres of Sonoran Desert and mountainous “sky island” habitat adjacent to the city of Tucson, Arizona. The Monument consists of two units; the Rincon Mountain Unit includes 59,930 acres of wilderness. Both units were some 20 miles from Tucson when they were created. However, over the years, the city has grown to the very boundaries of the Monument, making Saguaro a suburban wilderness area. By the mid-1980’s, continued piecemeal subdivision and unplanned development of land adjacent to the Monument raised concerns about the area’s ecological and scenic integrity.

A proposed mixed-use community on the 6,000-acre Rocking K Ranch, which shares a five-mile boundary with the Rincon Mountain Unit of Saguaro National Monument, embodied the diverse land use challenges facing the Monument. The Rocking K was one in a long series of issues arising from development of adjacent private lands that collectively will determine the future ecological integrity of the Monument and the quality of the visitor’s experience.

Rocking K Development Company proposed to convert the ranch into a mixed-use resort and residential community. Realizing that some form of urban growth would almost certainly transform the Rocking K Ranch and the surrounding Rincon Valley over the next 20 years, the park service concluded that planned development with significant environmental protection measures would be preferable to incremental piece-meal development, even if the planned development might have a higher overall residential density. The scale of the proposed Rocking K development offered the opportunity to protect integrated corridors for undisturbed wildlife movement. Saguaro National Monument, county officials, WWF, and local environmentalists worked with the developers to produce a site plan that protects critical wildlife habitat. The development plan sets aside over one-half of the total area as protected open space in a system of integrated wildlife corridors, which are keyed to riparian habitat. The landowner also joined national and local environmental organizations in supporting legislation which in June of 1991 added 3,540 acres to the Monument. This land includes the most ecologically significant portion of the Rocking K Ranch and another 1,800 acres of neighboring ranch lands.

The development plan also includes provisions for restoring critical riparian habitat along Rincon Creek, a principal drainage which issues from the Monument and has been degraded by decades of farming and cattle grazing. This restoration -- which may cost six to eight million dollars -- is particularly important for the area’s wildlife, since it is estimated that 80 percent of all vertebrates in Arizona are dependent on riparian environments for at least a portion of their life cycles. The plan also provides new public access into the Monument and 15 miles of public hiking and equestrian trails, contributing substantially to the county’s aggressive trails program.

While these measures were desirable, alone they were insufficient to adequately protect the Monument from regional growth pressures over time. The challenge was how to ensure stewardship of environmental values not just in the short-term, but through
conservation to Reconciling Development activities. A new kind of mechanism was needed to secure long-term stewardship of the Monument’s resources. The Rincon Institute was created to meet this need. An independent, nonprofit organization, the Rincon Institute provides independent professional guidance to ensure that development occurring around the Monument incorporates the highest level of environmental sensitivity. The Institute has four principal functions: (1) performing scientific research and monitoring activities to provide information necessary for the ecological restoration of Rincon Creek and for wildlife conservation initiatives; (2) providing environmental education programs designed to instill a conservation ethic among builders, homeowners, school children, commercial tenants, employees, and guests in the Rincon Valley; (3) managing natural open space within the Rocking K Ranch for wildlife, science, education, and outdoor recreation; and (4) providing professional guidance and oversight ensuring the environmentally sensitive development and management of the Rincon Valley.

The Rincon Institute’s board of directors includes resource management experts as well as business leaders and a representative of the Rocking K Development Company. Members include chairman Frank Gregg, former director of the U.S. Bureau of Land Management and former chair of the School of Renewable Natural Resources at the University of Arizona; Fred Bosselman, a prominent land use and conservation lawyer from Chicago; and Ervin Zube, a professor of landscape architecture at the University of Arizona and a leading authority on real and lands management and national park protection. In addition, the Director of the Pima County Parks and Recreation Department and the Superintendent of Saguaro National Monument serve as board members in a nonvoting and ex officio capacity.

The Rincon Institute and Rocking K Development Company have entered into a long-term agreement to fund the Institute’s activities. Long-term funding is assured through innovative deed restrictions that bind future builders and landowners within the ranch. These deed restrictions require that various fees paid to the Institute for its conservation activities. In addition to startup funding of $240,000 over five years, these deed restrictions will derive funds for the Institute through nightly hotel room fees, residential and commercial occupancy fees, real estate transfer fees, and monthly homeowner fees. For example, room fees from the first proposed resort hotel could generate approximately $50,000 per year for the Institute.

All over the country, people who care for wilderness and other protected areas are coming to realize that they cannot rely upon isolation and federal spending to protect the integrity of these areas. At the same time, many local leaders realize that the old formulas for economic development no longer work. The challenge facing both wilderness resource managers and residents of nearby communities is to mobilize cooperative action that both protects natural values and capitalizes upon them to meet community objectives. The Rincon Institute provides a promising model of this approach.

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EMERGING CHALLENGES IN WILDERNESS MANAGEMENT. J. Thomas Ritter, NPS, Superintendent, Sequoia and Kings Canyon National Parks, Three Rivers, CA 93271 (209)565-3101

Introduction Challenges that wilderness managers will face during the next decade that will demand significant attention include: (1) Better understanding of changing demographics of users, (2) Improved coordination of resource managers for land use, (3) Preparation for extensive increase in day use, (4) Expanded management of commercial activities, (5) Greater response to provide access of disabled people, (7) Understanding of changes in cultural diversity, and (8) Major improvement in wilderness education programs.

One of the most important trends in wilderness management that we must be prepared to respond to is the ability to predict the future with reasonable accuracy. Decisions on future policies and management of wilderness will require much greater investment in research, analysis of data, and monitoring of all wilderness resources. This high demand for knowledge and facts includes information on wilderness visitors and natural resources. Failure to design and conduct the studies and monitoring to provide this information will result in decisions that have high potential to be faulty and are destructive to wilderness values.

Demographics of Users Wilderness use has either stabilized or is declining at a low rate. The reasons for this trend involves several conditions that include the following factors: The population is aging and there has been a significant change in interests that results in less wilderness use and this is expected to continue for at least another decade. There are many more constraints on leisure time. During the past 20 years, leisure time has shrunk by a large degree when we consider that many more spouses are working and more people are working longer hours. This results in complications in coordinating vacations and requires trips with limited time thereby wilderness travel is often not considered. Dual income families and single parent homes have a difficult time scheduling a five day wilderness trip. In addition there is more competition for free time because of the options that air travel has provided along with the convenience provided by mechanized types of travel.

Generally the average user is 30 to 50 years old, has decreased fitness, involves more family groups, has average income, 75% are males, is a white-collar worker and from the state where the wilderness is located. The average user is better educated than most other recreation groups and has previous experience in wilderness. These people are coming for multiple activities such as fishing, wildlife viewing, and nature photography.

There has been a decrease in novice users, with urban populations concerned that it is "safer" to go some other place with more people and controls. These inexperienced people lack most basic skills resulting in poor understanding of fundamental resource values.

Changes in the characteristics of users requires that wilderness rangers must be fully conversant and have knowledge about limits of acceptable change, threatened and endangered species, general principles of resource management, have good knowledge of the trails, be highly proficient in search and rescue, law enforcement, and emergency medical skills. The requirement that rangers have must diverse skills and higher competence levels is a trend that can be expected to continue.

Use of wilderness located near major population centers has increased at a very dramatic rate with significant increase in day use. This type of use demands easy access by people who want a high quality experience with a small investment in their time. The
conflict between easy access, limited time, and a quality experience will require major attention by wilderness managers.

In the Sierra Nevada, international visitation has increased significantly and is expected to continue at a greater rate. Countries with the greatest use are Germany, France, England, and Holland. We must be prepared in the future for discovery of wilderness by Japanese and Hispanic visitors. We must give more attention to these visitors through development of foreign language brochures and better understanding of their cultural values.

Adjacent Land Uses. When evaluating trends related to adjacent land use we must consider effects in three categories: These are effects of wilderness on other lands, effects that occur with the wilderness areas, and those effects common to all lands. Wilderness is not isolated from the eco-system and we must recognize that wilderness is an integral component of bio-social systems that have little relationship to boundaries.

Among the major threats to wilderness are these problems that must have more and more attention:

- Fragile ecosystems are fragmented by established boundaries.
- Major development is increasing up to the wilderness boundary.
- Recreation pressure is increasing because opportunities do not exist in other areas.
- Air and water quality are affected by external factors.
- Government agencies are not coordinated when making decisions about resource use.
- Interest groups do not represent all resource use factors which results in poor balance and polarization.
- Conformation rather than cooperation is common between resource management agencies and interest groups.

General problems related to adjacent land use have developed and are almost always based upon different resource and cultural values. Communications between the various user groups at any level is burdened by strong opinions. The boundary mentality by government agencies is a major concern and we must mentally eliminate boundaries within agencies and between agencies. Cooperation and collaboration must become the normal management objective. We must consider the complete system of all affected lands including wilderness and non-wilderness if we are to protect the integrity of the resources that our society values.

When agencies have different policies related to wilderness use the result is general confusion by the public and irritation towards the agencies. Examples of activities that are causing these problems include dogs on trails, hunting, use of campfires, and inconsistent party size.

A significant conflict of land use is over emphasis on recreational use of wilderness. Although recreation is important, wilderness must be considered along with other uses for which the land was designated, including research and monitoring. Resource management and scientific programs are fragmented and do not relate to emerging issues. Interdisciplinary studies need to be designed and conducted through interagency programs based upon bio-regions. Our decisions must be based upon comprehensive studies and information and we must carefully evaluate the cumulative effects of our actions on all lands and resources.

Day Use of Wilderness. Hiking into wilderness and leaving in one day is the most common use of wilderness lands. This is true in several large wilderness areas and is the dominant trend related to wilderness that must have much more attention by wilderness managers.

There have been few systematic studies and inventories conducted about day use and the result is limited information and data. There are some isolated cases of excellent day use monitoring but this work must expand. Consequently, managers are unable to assess user characteristics, use patterns, site preference, visitor expectations, and their effect on resources. Good baseline data is clearly needed about this user group in most wilderness areas. Knowledge about distribution, visitor characteristics, and use patterns will be necessary to identify management problems related to day use. It appears that day hikers have similar demographics to the typical front country visitor, but differ substantially from backpackers.

With few exceptions day users are not required to check-in or obtain a permit before using wilderness, consequently they do not receive adequate information about minimum impact, behavior near wildlife such as bear and mountain lions, river crossings, lightning warnings and many other hazards. This results in more visitor injuries and a much greater impact on resources. Day use of wilderness has and will continue to rise in proportion to front country use which is increasing at dramatic levels. As leisure time decreases, day use of wilderness will increase. Systems to monitor, control and enforce day use must be developed.

Outfitter Policies. With aging of the population and decrease in leisure time there are strong indicators that commercial stock use of wilderness will increase. Visitors will turn to outfitters to meet their needs for easier access. Many land managers have concerns that this increase in stock use will result in resource damage. Conflicts between backpackers and stock users have been increasing and can be expected to be one of the major issues of the future related to various interest groups. To reduce this conflict there are several potential solutions. Outfitters could be encouraged to provide similar recreation experiences outside wilderness resulting in reduced impact on these resources. Outfitters and stock users could increase activities and practices that reduce direct effects through minimum impact programs. Increased education of backpackers, stock users and wilderness
managers is necessary. Many wilderness users are concerned about commercial use of wilderness regardless of the specific type of activity. This is viewed by many people as one of the greatest inconsistencies of wilderness use.

To promote resource protection and assist with advance planning of trips by commercial pack stations, Sequoia and Kings Canyon National Parks have developed a granting quote system. Operators are allocated a share of available annual forage to use as they deem necessary for their pack trips. The normal destination for many stock trips requires a location with good forage and good fishing. This has resulted in some campsites that have been impacted and resources damaged. Outfitters use must be dispersed to reduce prolonged effects on popular sites. Development of alternative activities such as photography and wildlife viewing would help alleviate some resource damage by dispersing stock use.

There is a significant increase in the use of pack stock for spot trips which provides transportation for people and their packs over difficult terrain. The stock returns back to the pack station and the backpackers establish a base camp or continue hiking to their destination. This type of use will continue because many former backpackers do not have the energy or time to hike the entire route.

Access for Disabled People Access to wilderness for disabled visitors has received more interest in the past several years because expectations and awareness have been strengthened through several Federal laws. The Architectural Barriers Act of 1968, Rehabilitation Act of 1973 which was amended in 1978, and the Americans with Disabilities Act of 1990, have resulted in much greater requirements when wilderness managers make decisions regarding accessibility. This has created improved access and greater confidence for visitors. Therapeutic benefits of wilderness have been recognized for many years and will receive greater emphasis. Some of the benefits sought and realized by all wilderness users include greater self esteem, improved confidence, independence, increased physical skills and better survival skills.

Methods and techniques on how access is provided has been a point of extensive discussion. The policy of the National Park Service is to provide access to the widest spectrum of park visitors as is possible in accordance with the existing laws. Undeveloped areas, such as those areas beyond the influence of structures and roads, will not normally be modified nor will special facilities be provided for the sole purpose of providing access to disabled visitors.

The Americans with Disabilities Act may result in changes in the regulations related to wilderness access. The Administratve Board related to this legislation will soon issue design standards for many recreational structures and facilities. This includes trails, toilets, bridges and many other facilities. Access for the disabled to remote locations in wilderness is greatly enhanced through use of horses, boats, canoes and dog-sleds.

The increased use of wilderness by disabled people may also be linked to a surge in the number of private, non-profit programs that have provided access for many people. These include Environmental Traveling Companions, Wilderness Inquiry, S'PLORE, Outward Bound and Challenge Alaska.

Food Storage Facilities To protect food from bears metal food storage boxes have generally become preferable to hanging food from cables or the use of bear poles. The public has strongly accepted the presence of these boxes in the wilderness and enjoys the convenience of their use. The most important benefit has been a major decrease in the incidents of problem bears and incidents of human-bear conflict. An additional trend in wilderness food storage is the use of portable canisters. These canisters are viewed as an option and not the ultimate answer.

Cultural Diversity and Wilderness Perceptions The population of the United States is growing rapidly and becoming more culturally diverse at an even greater rate. This changing public combined with much greater international visitation has a variety of views, preferences and behaviors about leisure, recreation and the environment. This is the public that will determine the future of wilderness. These cultures have many different definitions and expectations of wilderness. We must have more sensitivity and understanding of other ethnic and cultural values when making decisions. These effects will become evident in the future as day use increases and visitor characteristics change. We must expand the diversity of wilderness managers who make decisions and establish policy for the future. We must improve our education and outreach programs to inform the public of the economic and social values of wilderness. We can not ignore these significant changes in our society.

Wilderness Education The public is anxious to obtain reliable information that will assist them with planning their wilderness experience and help them have a positive experience. More information is needed on how visitor actions affect resources and what they should do to decrease impacts. Sequoia and Kings Canyon National Parks have developed a publication, Backcountry Basics, that is designed to provide potential visitors with a wilderness education before they leave their home. Each person that inquires about using the wilderness of the Parks is sent a copy. Managers need to understand their clientele and their expectations. Consequently, education of agency managers must be improved.

Summary Most of these emerging challenges of the future are long term conditions that have been partially understood for several years or even decades. We need to validate each potential change that we anticipate and in some cases establish better understanding through research and monitoring. With this knowledge we can develop a solution for a potential problem and
prepare an action plan to mitigate and resolve most of these issues. The question remains will we invest the time, the energy and the courage to take this bold action? The future of wilderness depends upon your unified support.

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BLURRING BOUNDARIES: TWELVE YEARS REFLECTION ON LIMITING ADJACENT LAND USE IMPACTS ON HAWAIIAN WILDERNESS.

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Introduction Hawaii Volcanoes National Park is a medium-sized Park (90,000 ha) located on the island of Hawaii in the Hawaiian Archipelago. The island of Hawaii is the largest in the archipelago, which consists of 8 inhabited islands and hundreds of atolls and other island remnants. The Park occupies 8.5% of the island territory. 54% of the Park is designated as Wilderness under the 1964 Act. Fully 90% of the Park is wild. Certain areas are excluded from designation because of the potential for native homestead claims and geologic research which involves unencumbered instrumentation and access to monitoring sites in backcountry areas. The Park is both a World Heritage Site and an International Biosphere Reserve.

There are other public land management agencies in the State, including the US Fish and Wildlife Service, some Department of Defense agencies, and the State Department of Land and Natural Resources. There is a US Forest Service presence, but USFS has no lands to manage. The Park is the only sea-to-summit land unit in the State of Hawaii which is administered by a single agency. The sea coast is about 56 km long, consisting mostly of steep cliffs and with few beaches or inlets. The coastal areas of the Park are mostly dry, hot, and hostile, except where there are sandy beaches. These are popular destinations for wilderness travelers. The summit is the famous Mauna Loa volcano, 4,164 m elevation. Mauna Loa is an active volcano, whose most recent eruption was in 1984. Another eruption of this volcano is anticipated within the next 5 years. Kilauea Volcano, also in the Park, is the country's most active volcano. Its East Rift is erupting as we meet. Mauna Loa is within a designated Wilderness Area; Kilauea is not.

Threats to the Park. Hawaii Volcanoes is one of the most threatened Parks in the National Park system. These consist of both external and internal threats. External threats include loss and fragmentation of native forests near boundaries, proposals for geothermal electricity and rocket launch industries near boundaries, proposals for massive resorts in the region, helicopter sightseeing tours, and rapid urbanization of threshold settlements. These are in addition to the universal threats posed global atmospheric changes and other intractable deterioration of the habitable portion of our planet. Internal threats include massive introduction of alien plant and animal species and diseases, changes in the fire regime caused by conversion of native forests and shrublands to alien grasslands, and loss of native species.

Minimizing threats. Threats to wilderness resources don't need to cause despair. They can be viewed by creative managers as challenges. They can (and should) stimulate innovation. Some of the thought processes Hawaii Park managers have developed in the process of trying to buffer the Park from threats include:

- Walk in our neighbor's sandals. Understand that land uses that Park managers perceive as threats might be thought of as good land stewardship by our neighbors.
- Talk over the fence. Develop a personal network among colleagues in the public and private sector.
- Find common ground. Realize that we and our neighbors have a good deal more in common than not.
- Share dreams. Exchange management plans with our neighbors and ask them to help in the preparation and execution of our plans.
- Emphasize solutions. It's OK to disagree. Disagreement can usually lead to resolution if we are willing to compromise.

Some examples of resolutions Hawaii National Park managers have enjoyed include:

- Developing a regional forest management group among State, private, and Federal land managers, including commercial forest harvest and industrial developers.
- Removing the threat of a geothermal electricity industry immediately adjacent to a designated wilderness through a land exchange.
• Redesigning a proposed resort hotel complex to avoid an incompatible vista. Included in the package is agreement to properly manage turtle nesting sites on a shore line and to develop a trail system linking the Park with the hotel property.

• Gaining support from county and neighborhood organizations to put pressure on a helicopter tour industry to avoid flying over the Park’s designated and de facto wilderness areas.

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THE EFFECTS OF ALIEN FAUNA SPECIES ENCCROACHMENTS ON WILDERNESS RESOURCES IN HAWAI'I. Dr. Charles P. Stone, NPS, Research Biologist, Hawaii Volcanoes National Park, HI 96718 (808)967-8211 [presented May 6, 1992 @ 4th Interagency Wilderness Conference, Portland, OR]

Introduction: Forests were once the primary natural vegetation on six of the eight "main" Hawaiian islands (Kaua‘i, O‘ahu, Lana‘i, Molokai, Maui, and Hawai‘i). By the time of Captain James Cook’s arrival in 1778, much of the lowland vegetation had been altered by over a thousand years of occupation by Polynesian settlers. Subsequent to 1778, land clearing associated with ranching, agriculture, and timber harvest encouraged further forest loss and fragmentation, especially at higher elevations. Development for residential, visitor, and modern commercial use has accelerated loss of natural landscapes. Nearly two-thirds of Hawai'i's forest cover, an estimated 90% of dry forests, 61% of moist forests, and 42% of wet forests, has been removed.

Because the Hawaiian biota evolved in relative isolation, it is extremely vulnerable to invasions of continental organisms. Alien species (those brought by humans accidentally or deliberately) are especially prevalent in areas already disturbed, but numerous examples also exist of serious disruptions in relatively pristine areas. High percentages of endemism (species found only in Hawai‘i; often only on one island), localized and small populations, and reduced geographic scale increase probabilities of serious impacts on native species, including endangerment or extinction.

Although Hawai‘i encompasses only 0.2% of the land area of the U.S., 75% of historically documented plant and bird extinctions have occurred in the islands. Over 20% of the native Hawaiian flora is threaten with extinction, and for nearly half of these species, no more than 100 individual plants remain. Some 43% of the 70 extant species of native birds are federally endangered. Of 150 identified natural community types, less than five examples exist for 85 (57%).
Although Polynesians brought 32 species of plants and several species of vertebrates and invertebrates from their homelands to Hawai‘i beginning in 400 A.D., most (with the exception of the Polynesian rat, *Rattus*), are not considered disruptive in natural areas today. Introductions subsequent to 1778 are a different matter and are of serious concern to managers and researchers. Approximately 860 species of vascular plants, 17 mammals, 37 birds, 10 reptiles and amphibians, 19 fishes, 2,900 arthropods, and 50 molluscs have become established. During FY-90, federal, state, and private forest managers spent over 75% of resource management budgets to reduce alien species damage.

National Park Service Wilderness Hawaii Volcanoes NP (93,000 ha) on Hawai‘i island and Haleakala NP (11,400 ha) on Maui are two of six areas over 10,000 ha in size managed primarily for natural values in Hawai‘i. Other NPS areas in Hawai‘i are smaller and primarily cultural or historical in purpose. Both Hawaii Volcanoes and Haleakala include diverse biological communities in several ecological zones ranging from sea level to 3,000 m (Haleakala) or 4,270 m (Hawaii Volcanoes). Designated wilderness in Hawaii Volcanoes includes four areas totaling 49,838 ha (123,100 a), 53.6% of the Park area. In Haleakala, one area of designated wilderness encompasses 7,802 ha (19,270 a), 70.6% of the Park.

Activities currently occurring in wilderness areas in one or both parks include feral ungulate, small mammal, and invertebrate control; alien plant control; volcanic and biological research; and public hunting of ungulates. Approaches to animal control include the use of fencing, snaring, trapping, staff hunting, and helicopters. Alien plant control techniques include use of herbicides, biological control, and manual and ecological strategies. The USGS has used jeep roads and seismograph cable and other equipment over much of Hawaii Volcanoes in the past, but is now implementing less obtrusive date-collecting procedures. Existing roads, shelters, or cabins (except in Haleakala Crater) and management and research activities were deemed necessary special provisions at the time wilderness was designated for these parks in the early 1970s.

General Approaches to Alien Species Management Because not enough human resources (including knowledge) are available to manage all disruptive alien species in the parks simultaneously, ecologically valuable target areas have been chosen for emphasis. These areas are as yet largely uninhabited by, or have been cleared of, disruptive alien animals or plants; are diverse in species or contain a number of rare forms; are representative of type; or are readily manageable. In Hawaii Volcanoes, the Special Ecological Areas (SEAs) approach emphasizes 23 such areas, ranging in size from 25 to 4,950 ha (62-12,225 a). As invasive aliens in SEAs are eliminated or markedly reduced, managed areas are enlarged or efforts begun in new SEAs. The first step in managing an area is to clear it of ungulates and prevent other disturbances likely to modify community structure and function. Preventing all fire (for which most Hawaiian plants are not adapted) and curtailing establishment of alien plants that modify ecosystems are also early management priorities. Some SEAs have also been managed to reduce established small mammal and invertebrate pests and are the focus of major research and monitoring projects.

Species managed on parkwide, regional, or islandwide bases (or even over the entire State) include those that invade smaller management areas too rapidly for managers to succeed in controlling them. Included are extremely aggressive species that have not yet invaded a particular management area, as well as those that are so prevalent that they can no longer be controlled. Prevention of establishment requires necessary expertise to identify the problem, an active detection program, the ability to deal with the species once found, and the will to act quickly and effectively. Management of species that are not currently amenable to conventional control because of abundance and widespread distribution requires long-term support of biological control or other research to find a solution. In the meantime, labor-intensive management in ecologically valuable areas (often with herbicides), and tolerance of the species in most areas, is necessary. Cooperative approaches among agencies, organizations, and individuals beyond administrative boundaries are especially important in research and management programs for widespread and newly invading species.

Major Alien Species Problems

Feral Ungulates. Introduced pigs (*Sus scrofa*), goats (*Capre hircus*), sheep (*Ovis aries*), mouflon (*O. mouflon*), and deer (*Axis* and *Odocoileus hemionus*) degrade Hawaiian wilderness by foraging, trampling, digging, and spreading alien plants. Effects on fresh water quality and ocean life have been noted. Feral goat eradication has been successful in both parks through exclusionary and/or barrier fencing, systematic staff hunting, and use of telemetered "Judas" goats, which find the last few animals and help managers detect ingress from adjacent private ranches. Helicopter and ground shooting are both useful. Judas goats are left indefinitely in cleared areas. Feral pigs have been eliminated in nine management areas totalling about 78 km² (30 mi²) in Hawaii Volcanoes and in 5 km² (2 mi²) of Haleakala rain forest. Pigs are removed by staff hunting and snaring within areas enclosed by fencing or topographic barriers. Managed areas have ranged from 1.4 to 22.6 km² (0.5-9 mi²) in size. Monitoring for pig activity along systematically placed transects throughout each management area, scouting, and monitoring of fencing continues indefinitely to detect ingress of animals from adjacent areas. Feral sheep have been reduced to low levels on Mauna Kea through systematic hunting coordinated by the State (after 1979 and 1981 court orders) to protect habitat of the endangered palila (*Loxoioides bailleui*). The State was ordered to remove mouflon in 1986 and 1988. Systematic hunting is also used to control this species. Axis and mule deer are managed through public hunting administered by the State, but removal of axis deer from native forest on Lana‘i by hunting is being coordinated by Nature Conservancy of Hawaii. Deer, sheep, and mouflon are not yet established in the parks, but axis deer threaten Haleakala and mouflon threaten Hawaii Volcanoes.
Rodents. Four species of introduced rats and the house mouse (Mus domesticus) are established in park wilderness areas, and most species are found over a wide ecological range in high numbers. Of primary concern is the arboreal black rat (Rattus), which preys on tree-nesting birds opportunistically and consumes rare plant fruit, flowers, and bark, apparently to the extent of limiting successful recruitment in some cases. Rats have been successfully controlled (populations drastically reduced for several months) with anticoagulant toxicants in palletized or cake baits in areas as large as 4 ha (10 a). Bait stations were established at 25-m intervals in “grids of grief” for 15-18 days during the research phase. Eventually, toxicant baiting for short periods annually may afford some protection for vulnerable rare birds and plants over small areas.

Mongoose. The small Indian mongoose (Herpestes auropunctatus) is found over a wide geographic and ecological area in park wilderness, with high populations generally at low elevations. This omnivorous predator takes eight species of endangered ground-nesting birds in Hawaii, two of which, the Hawaiian goose or nene (Nesochen sandvicensis) and the dark-rumped petrel (Pterodroma phaeopygia) nest in wilderness areas at both parks. Year-round live trapping is currently used at Haleakalā to protect both species of birds at elevations that are marginal mongoose habitat. At Hawaii Volcanoes, a few petrels apparently attempt to nest high on Mauna Loa (above 2,400 m elevation), also beyond the altitudinal range of most mongooses, but unfortunately within foraging range of feral cats (Felis catus); cats are not successfully controlled at Hawaii Volcanoes. An anticoagulant has been registered for mongoose control in Hawaii and is being tested as a management tool to protect nene egges and young in a wilderness area of Hawaii Volcanoes. Toxicant bait stations located 100 to 250 m apart in grids as large as 100 ha (250 a) are baited each week for a 3-week period (each station must be well anchored and marked by two large warning signs). Egges and young of the endangered hawksbill turtles (Eretmochelys imbricata) are prey for mongooses and cats in Hawaii Volcanoes; control to date has been by live trapping during nest season.

Introduced Birds. Alien birds are reservoirs for avian malaria and pox, known to drastically affect native forest birds. Alien species also compete directly with native birds for food and other requirements and spread seeds and fruits of introduced plants that degrade native forests.

Introduced Reptiles and Amphibians. The primary threat to wilderness species in this group is the arboreal brown tree snake (Boiga irregularis), already responsible for the extinction of eleven species of birds in Guam. Native to the Solomon Islands, coastal Australia, and New Guinea and brought to Guam on military transport, the species has arrived in Hawaii on commercial transport on six occasions. A Brown Tree Snake Control Group has now been formed in Hawaii, and increased awareness (including House and Senate resolutions) has resulted. Training in snake detection and control and tightened inspection at possible entry sites have occurred. Since the snake frequently causes power outages and considerable expense to utility companies, the Hawaii Electric Company has provided a research grant to help with prevention programs.

Introduced Invertebrates. The identification of many invertebrate species, as well as the specific problems they cause, await further research effort in Hawaii. An estimated 20 new alien insect species now arrive each year. Alien arthropods have had devastating effects on the native biota in Hawaiian wilderness areas, especially at lower elevations. In all areas, predation on and parasitism of native insects, with consequences to pollination of native plants and interruption of food webs, are probably among the worst effects. Social insects such as western yellowjackets (Vaspula pensylvanica) and Argentine ants (Iridomyrmex humilis) are of considerable concern to managers of wilderness areas because of their tolerance of higher elevations, where the most intact ecosystems remain. General management measures for invertebrates have included some attempts at improvement of quarantine inspection procedures, use of biological control, and increased public education. Slow-acting chemicals that can be carried back to colonies by ant or yellowjacket workers have been used in the parks with some success. Yallowjacket populations are monitored year-round with pheromone traps in key areas of each park, and underground yellowjacket nests are mechanically destroyed.

Solutions/Actions/Recommendations. Protection, management, and restoration of Hawaii’s wilderness areas is proceeding slowly and incrementally, but progress is being made. Recovery from centuries of “biological pollution” will never be complete for the following reasons: many native species have been lost; an enduring alien species component will remain; management of many alien species is intractable now and for the foreseeable future; costs of restoring some areas are too great. Nevertheless, with adequate support, systematic approaches, and continued emphasis, a considerable portion of Hawaii’s remaining wilderness resources can be protected and enjoyed by future generations.

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INTRODUCTION The National Wildlife Refuge System is the only system of lands owned by the federal government which are managed primarily for the conservation of wildlife. Cabeza Prieta National Wildlife Refuge is the largest wilderness area in the National Wildlife Refuge System in the lower 48 states. Located in the lower Sonoran Desert, it has 93% of its land or 325,270 ha (803,416 ac) designated as Wilderness. Designated as wilderness in November 1990, Cabeza commenced its Wilderness Management Planning process in 1992. Most of the refuge lies under the airspace of the Barry M. Goldwater Air Force Range which conducts live air-to-air gunnery exercises over the refuge throughout the year.

ITEMS OF INTEREST 1. Inventory and monitoring the natural ecosystem of the refuge.
2. Alien species inventory and management.
3. Limits of Acceptable Change (LAC), public use and other issues impacting the ecological conditions of the refuge.
4. Determining ecological indicators and establishing useful standards.
5. Military uses, recovery of military debris, contaminant cleanup and cooperation with military officials and other permitted.
6. Determination of minimum tool use for refuge management.
7. Native American and cultural resources.

NEIGHBORS The refuge shares 90.1 km of its southern border with the State of Sonora, Mexico. In 1991 Cabeza initiated contacts with Mexico through Centro Ecologico de Sonora in Hermosillo and is working with them on recovery efforts for the endangered Sonoran pronghorn (Antilocapra americana sonontensis) which inhabits both areas.

The entire southern boundary of the refuge is fenced except for about 6.21 km in the southwest corner. Within this past year, refuge staff and the State of Sonora local cattle inspectors and cattle owners have established a positive working relationship and are working towards solutions of the trespass cattle issue. Local cattle owners have recently offered to build a fence on the Mexico side to keep their cattle restrained. Other issues are the continued invasion of alien species of plants on sensitive habitats like the Pinta Sands on the southern boundary of the refuge next to Mexico. The Pinta Sands is a crucial foraging area for the Sonoran pronghorn.

Organ Pipe Cactus National Monument occupies the southeast corner of Cabeza. These two agencies work visitors and wilderness hand in hand. As four-wheel drive vehicles are needed to access the refuge, visitors have the option of going to Organ Pipe on their two-wheel drive scenic loops. Cabeza and Organ Pipe are working jointly on Geographic Information System regarding their respective land areas, sharing information and building databases together. The productive results which have come about from this positive and growing agency relationship are multiplying as managers think less about fences and boundaries and more about biodiversity and ecosystems. The large size of the refuge provides a rugged wilderness area for wildlife populations in the Sonoran desert such as Sonoran pronghorn.

To the east of Cabeza lies the Bureau of Land Management (BLM) which includes cattle allotments. Cattle had been removed in the mid 1980’s from Cabeza but the boundary fence separating these two agency lands is still maintained as cattle fence. This area once held more pronghorn than is present today. The refuge is evaluating the idea of modifying the fencing on the south and east sides of the refuge for pronghorn passage to eliminate one of the potential barriers to genetic diversity. The BLM has also been assisting the refuge in the removal of trespass cattle from Mexico from Cabeza.

The entire refuge lies within the Barry M. Goldwater Air Force Range (BMGAFR) which conducts live air-to-air gunnery exercises over the refuge. At these times the refuge closes 30% of its road to visitors. The Memorandum of Understanding between BMGAFR and Cabeza restrict flights below 1500 feet. The Air Force controls the airspace from the ground up over the refuge. The military is working on a new EIS to address the impacts of military operations over the refuge and other areas. The refuge is pursuing funding for baseline wildlife data in order to assist with evaluating at the effects of military noise and low level flights on wildlife and reproduction rates. The refuge and military are working together on proposals for wildlife research to be funded by military Legacy funding.

Cabeza works with Arizona Game & Fish Department (AGFD) on Sonoran pronghorn and bighorn sheep surveying and GIS data exchange. Recently Heritage Funds have provided new funding sources for projects which will aid the refuge in wildlife monitoring. The Refuge and AGFD along with Organ Pipe Cactus National Monument, Bureau of Land Management, Tohono O’odham Nation and El Centro Ecologico de Sonora (Hermosillo, Mexico) comprise a Core Working Group planning recovery activities for the Sonoran pronghorn; the group is working to incorporate the minimum tool philosophy into the recovery efforts.

DIRECTIONS FOR THE FUTURE Wilderness public hearings for Cabeza began in 1971 and the refuge was managed as “de facto” wilderness until its present legal status was attained. Since the cattle had previously been removed from the refuge and the park,
Cabeza began removing the boundary fence between its neighbor Organ Pipe Cactus National Monument and the refuge in 1988. The southeast section of Cabeza and the northwest section of Organ Pipe along with northern Sonora, Mexico have long been recognized as essential habitat for the endangered Sonoran pronghorn. The Service is evaluating the opportunity to create a Biosphere Reserve in the habitat of Sonoran pronghorn. This Reserve could eventually include lands managed by multiple agencies in two countries and provide international protection and conservation efforts.

Cabeza is evaluating their water management relative to wildlife management to ascertain if there is evidence of negative or positive affects regarding native and alien wildlife on the refuge. From dated field diaries from past refuge managers, there is information about population levels from before the installation of man-made sheep tanks on the refuge. While the United States has been involved in a massive water development program for the past 30 years, Mexico’s sheep population seems to be doing exceedingly well without such a program (Lee 1993).

The effects of military activities over the refuge is not known for the refuge’s 21 listed species. Low-level flights occur over two endangered mammal species, the Sonoran pronghorn and the lesser long-nosed bat (Leptonystis curasaoe verhabuenae). The refuge is working towards obtaining a noise profile map of the entire refuge utilizing GIS and sound spectrum analysis from military overflights. This data would give refuge managers information which is which to make management decisions regarding routes for military exercises relative to habitats of sensitive species.

Less than 400 permits are issued per year for entrance on the refuge due to the rugged terrain, extreme summer temperatures and road closures due to weather and military exercises. These factors aid in protecting one of the largest segments of the sensitive Sonoran ecosystem. Recent evidence has indicated that marks on desert pavement made from early wagons healing through Cabeza nearly a century ago are still present where low level impact has since occurred (J. Hayden pers. comm.) The refuge is working towards interpretation for visitors to educate them before they come to the refuge. This education is geared towards the unrealistic expectations of what wildlife will be seen in the Sonoran desert compared with other places where they are used to seeing large numbers of wildlife end at close range. Improvement of wildlife viewing experiences will perhaps give visitors greater understanding and appreciation for the many roles of wildlife managers (Hammit 1993).

Another aspect of border management which Cabeza is working with is the Operation Alliance/Joint Task Force 6 (JTF6) proposed road along the entire Arizona-Mexican border to monitor drug traffic. At this point in time, there is not a usable road and there are no plans by the refuge to have the road built. Such a road would most likely degrade wilderness valueds and could potentially inhibit pronghorn travel between the United States and Mexico.

The Comité Consenso Internacional, directed by the Sonoren Institute from Tucson, is a newly formed tri-cultural effort applying a regional and ecosystem management approach to our border area. Management in the entire system of protected areas helps to ensure viability of species populations and ecological communities (Reid and Miller 1989). Since Cabeza encompasses almost a million acres, the refuge provides a crucial link as the core wilderness area in the chain of ecosystems in this border area.

Whether working on a small scale such as cattle fencing or a grand scale such as regional planning, Cabeza Prieta is pursuing working with its neighbors to integrate its wilderness philosophy. The challenge is becoming more exciting every day. As Secretary of Interior Babbitt mentioned in a recent interview in Audubon magazine, we need to plan towards "gateway communities" concepts. "We can encourage gateway communities outside the parks (or refuges in this case) where people can do their thing as Americans (Cohn, Williams 1993). We will try to use the refuge plan to say that the refuge experience should be a different experience.

"All native animals and plants should benefit by the presence of a refuge unit...Naturalism in management is to be considered a virtue" (Leopold et al. 1968).

REFERENCES


WILDERNESS FIRST! ACCESS, OUTFITTERS, AND GUIDES SOMEWHERE DOWN THE LIST, DEPENDING (AND IF YOU’VE GOT TWO GOOD FEET, DOGGONE IT, USE ‘EM. Dave Willie, Coordinator, Wild Hope, Inc.:Sierra Treks/Littlefoot Expeditions, 15187 Greensprings Hwy., Ashland, OR 97520 (503)482-0526

I am somewhat familiar with the issue of “wilderness and the handicapped”… In 1976 I was frostbitten on Denali such that I lost half of each of my hands and feet. The flesh on the bottom of the half-feet I have left was frozen to literal death and replaced with flesh from my thighs. Flesh from one’s thighs is not as evolved for walking as original-equipment-sole-of-your-foot flesh. So I can’t be on my feet too long or walk too far without pain and eventual abscess and infection and fever and breakdown. I depend on custom-made, expensive “choparts” foot prostheses to walk at all — and always carry antibiotics, just in case. My backpacking days ended when I climbed into a rescue helicopter (another issue) seventeen years ago.

I began backpacking in the Sierra at age 11. At 19 I was given charge of a small backpack program for a large camp and conference center. At age 23 I was frostbitten. Two years later I had my own horse. I have coordinated and guided (for various types of groups from churches to politicians) backpacking/mountaineering and horse/llama trips on the west coast from Joshua Tree to the Glacier Wilderness and still do. When not working on my outfitting business I focus my efforts toward protecting what precious little de-facto-but-not-designated wilderness left.

In these wilderness advocacy efforts I have often encountered the tired and disingenuous argument that “wilderness discriminates against the handicapped.” The argument goes that — since many handicapped people feel they can’t experience a piece of land without a motor vehicle, there should be either no wilderness at all or no more additionally designated. That is, if a tax-paying, god-fearing American can’t ride on and/or over every square inch of public land in the U.S. of A. in a motor vehicle, then a land allocation which prohibits such motoring is cruel elitism, if not a down-right breach of the Bill of Rights.

As you know, such an argument is only slightly less voiced after a piece of land is designated wilderness. The issue is not handicapped access. The issue is the value of wilderness and a wilderness experience that does not handicap the wilderness itself as it is experienced. The handicapped are a convenient violin/red-herring for those who want to prevent or diminish wilderness designation or perpetuation — or for those who are apathetic and/or ignorant about the value of wilderness and the proverbial (but very real) non-motorized, non-developed wilderness experience.

The issue is not the fact or severity of one’s physical malady — the issue is the value of wilderness. Both people in and out of wheelchairs and people with and without prostheses and limbs will continue to differ on the value of wilderness. Those who value it less will continue to aid and abet in its degradation so that they may have a “motorized or developed access wilderness experience.” Those who value it more will die first.

My mother and I work very hard at not getting into discussions like these. She caught the polio virus when I was two. She was paralyzed from the waist down and eventually recovered use of her right side, but not her left. Braces, crutches, and wheelchairs were part of the furniture in our house. And my father—sacrificially—he has to this day fulfilled his vow not to (essentially) do anything she couldn’t do. Nice for Mom. Not too sweet a deal for my two brothers and I. I grew up in a family where the wilderness experience was excluded or minimized because of the handicapped. (You can’t have everything.) When Oregon State grad students adopted me as mascot and took me backpacking and fishing in the Cascades I felt free indeed.

When I lit out on my own with peers to start climbing I felt even freer.

Now that I am handicapped myself and now there is far less de facto wilderness left then in my childhood, I resent more strongly than words can express any statement that bleeding-heartedly (if not wolf-in-sheep’s-clothingly) suggest that yet more wilderness should become less wilderness so the handicapped can ride a jet-boat, 4x4, or helicopter or have an overweighted, handrail bed wheelchair path for a “genuine wilderness experience.”
This country is loaded with motor vehicle routes and paved paths. Leave what precious little wilderness (de facto or designated) remains well enough alone. There's plenty of "pretty country" to see without degrading designated wilderness, preventing wilderness designation of de facto or wilderness recovery areas, or motoring/paving/overgrading your way through somebody else's non-motorized, semi-primitive, wilderness experience.

Mom recently took a Hell's Canyon jet-boat trip in her wheelchair. She said the company employees were real nice to her. She said the company PR cameras clicked like playing cards on bike spokes when they helped her on and off the boat in her chair. Whether and where jet-boats should be allowed in Hell's Canyon is a source of current debate -- as is who should manage it and how it should be managed. Click, click, click went those cameras. If anyone ever tries to use me as a pawn for wilderness degradation or prevention, what I will feel like shooting back at them will not be a camera.

In our shared cultural confusion of ends and perfection of means we have dominated virtually the entire landscape with flying, floating, creeping, and crawling motor vehicles and their effects. The earth is becoming a series of fast-food roadside attractions seen through a windshield in this Grade-B multiple-wise-use (sic) movie we seem to be trapped in too much of the time. In our concern to maximize our own experience we have overrun the land we wish to experience.

You know the state. 59% of designated wilderness areas are smaller than Disney World. Only 3% or less of the lower 48 is designated wilderness at all. With a potential of what-- 5% total? This country needs more wilderness, not less. (And, as Ed Abbey said, "Wilderness needs no defense, only sore defenders!). It's time for wholesale wilderness recovery, not more nickel-and-dime, kinder-and-gentler wilderness prevention and degradation.

Men aren't "discriminated against" when prohibited from walking into women's restrooms. You don't ride a motorcycle in an art gallery. You don't scream while the pastor's preaching in church (in most denominations). You can't find darkness with a flashlight. And you don't create a wilderness experience for the handicapped with jet-boats, helicopters, 4x4s, snowmobiles, paved trails, over-graded trails, or handrails. The wilderness and/or the elusive wilderness experience simply disappears in the process--for the handicapped and able-bodied alike. Period.

Don't get me wrong. I'm all for the handicapped experiencing wilderness. I've helped them. I've helped myself. I could (and may) tell you stories. The handicapped can get into the wilderness without degrading it or the experience of others. But it requires--as wilderness quite properly requires for everyone--more forethought, skill, ingenuity, and discomfort than driving to Disneyland, "E" ticket rides, and staying at the Holiday Inn.

Finally. This is not to say that the handicapped are not discriminated against with regard to wilderness access and management in some cases. One case I'm familiar with is my own ... I was at a packer's clinic in Klamath Falls a few years ago. A member of the Backcountry Horseperson's Association was giving a good pitch to get folks to wise-up to minimum-impact horse-camping methods. "Otherwise," he said, "the Forest Service won't let us go into the backcountry."

I couldn't believe it. "What you mean us, white-man?" I thought. "You've got two good feet and legs. They're carryin' a little too much cargo, but all you gotta do is run a few pre-trip laps and you can go as far into any backcountry as you like. I'm the one who'll have real trouble getting into the backcountry if horse-people continue to trash it and stock are closed out. I'd give my right arm--what's left of it--just to be in the situation, you're trying to avoid."

In fact, because so many people who can or could walk distances just fine choose to ride horses in hordes, there are areas of backcountry from which I--as a person who cannot walk distances without injury and who does need a horse more than most--am prohibited from riding. That's discrimination, by the can-walk-just-fine horse-users and by the wilderness-managing agencies, against me.

Certain trails and off-trail areas are off limits to me traveling by legitimate traditional wilderness travel method because use or feared overuse of stock by people who don't need stock does and would damage or diminish those areas or others' experience of them. I don't think those restrictions would be in effect if only folks who really needed horses rode horses into the wilderness. Walking is far more historic and traditional wilderness travel method than riding.

If wilderness managers are really concerned for both the wilderness and the handicapped, some sort of "most historic/traditional wilderness travel method physically possible" policy should be adopted. Motorized travel would certainly continue to be prohibited. But folks who need a horse the most could have some sort of backcountry equivalent of a disabled license plate -- and priority, if not sole, use of stock. Then wilderness opportunity would be more equal for all legitimate methods of wilderness travel--for each according to his/her need.

And if many who can walk just fine are no longer permitted to join a "legal" cavalry of 25 trail-ripping, meadow-stomping, manure-pumping equines--if fewer of these wilderness stampedes even existed--would that be the worst thing in the world? If those who could walk in the wilderness did walk, think how much healthier and fit they'd all be. There'd be less heart disease. The backcountry would be far less trashed. People like me wouldn't be discriminated against by stock-off-limits regulations driven by
THE PROPER ROLE FOR OUTFITTERS AND GUIDES IN WILDERNESS.  William A. Worf, President, Wilderness Watch, Box 9175, Missoula, MT 59807  (406)542-2048

Commercial enterprise, in general, is inconsistent with the legal definition of Wilderness and, with some specific exceptions, is prohibited along with structures, installations, motorized equipment and mechanical transport. However, Congress recognized that commercial enterprise to provide outfitter and guide services could fill a special role in meeting wilderness objectives. Accordingly, §4.1(d)(6) of the 1964 Act provides that if outfitter and/or guide services are necessary to meet some wilderness purpose the managing Agencies may permit them. Specifically the Act says, "Commercial services by be performed to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas."

Outfitters and guides have an important role in making it possible for people who do not have the equipment, skill, or physical ability to enjoy the benefits of wilderness. They also have an important role in setting the example for other visitors. Most outfitters are experts in outdoor living skills and some have aggressive programs teaching "no trace" wilderness use techniques. The only difference between the commercially outfitted public and the non-outfitted visitors should be that the former have engaged services to tote their gear, cook meals, pack game, etc. Administering agencies should insure the mountain resorts (Aldo Leopold's summer hotels) are available outside of wildernesses where people who wish that kind of experience can enjoy the outdoors from a snug cabin. However, inside Wildernesses all visitors must abide by the same rules.

Aldo Leopold said in the Sand County Almanac: "European hunting and fishing are largely devoid of the thing that wilderness areas might be the means of preserving in this country. Europeans do not camp or cook or do their own work in the woods if they can avoid doing so. Work chores are delegated to beaters and servants, and a hunt carries the atmosphere of a picnic, rather than of pioneering. The test of skill is confined largely to the actual taking of game or fish." A few outfitters in the US today are promoting this "picnic" atmosphere in our Wildernesses.

The wilderness outfitter/guide relationship with the client should be as a teacher and guide rather than as a "beater, servant or inn keeper." The client should be involved in the adventure to the fullest extent possible. This would include learning about stock use and care, packing, setting up and striking camp, camp cooking, carrying water, wood gathering, etc. In other words, the trip should belong to the client and they should share responsibility for its success or failure. By offering a positive learning experience, the outfitter/guide plays a tremendous role in promoting understanding of and proper behavior within this irreplaceable resource.

It is important for outfitters and guides to give their clients advance information about what to expect when they visit a Wilderness. They must point out that all visitors are expected to pack in what they need and pack out what they leave. They must also say that all visitors are expected to practice "no trace camping" in which the objective is to leave a campsite in such a condition that after the winter snow has come and gone there will be no trace that modern man had been there. They should tell their clients that this presents a real challenge, and many visitors have a long ways to go to achieve it. They must enlist the clients commitment in working toward that goal.

Most professional guides and outfitters are committed to the wilderness concept and will be setting the example for others to follow. The public should see a marked difference between the services (the kind not the quality) provided in Wilderness as compared to those available in non-Wilderness back-country. In Wilderness, firewood will be cut with a hand saw, water will be carried in a bucket, and the guest may have to balance the dinner plate on a knee rather than sitting at a table. The client can expect plenty of good wholesome, well prepared food but there will be no "Waldorf" frills. He/she can also expect the outfitter to show how to live and travel without structures, installations or motorized equipment much as American pioneers did.

Administrators are continually faced with requests from entrepreneurs wishing to establish some new outfitter service in wildernesses. Wilderness Watch urges the managing agencies to establish clear criteria to guide field personnel in determining when such services are "necessary". The fact that a commercial service can be successfully marketed does not mean that it is necessary. For example, a hunting camp near the road end or airfield could be readily filled with clients. However, no outfitter base camp is necessary (and none should be permitted) within a half day hike from any portal.
When it becomes necessary to limit use, the allocation between commercially outfitted and non-fitted users must be based on freedom of choice. In other words, all prospective visitors must compete on an equal basis for a chance to visit the Wilderness. After they get a permit they can choose whether they wish to go in on their own or hire an outfitter.

Expansion into areas that have previously not had commercial activity must be carefully weighed. It is important to maintain some parts of every Wilderness where the "do-it-yourself" visitor can enjoy the wilderness without competing with visitors employing outfitters.

In summary, there is no question that outfitter and guide services are necessary for achieving the public purposes of the Wilderness System. The only questions are: what kind, how much and where?
Memorandum

To: All Bureau Wilderness Managers

From: Jeff Jarvis (AZ-931)

Subject: Interagency Wilderness Conference Proceedings

The Bureau of Land Management along with the National Park Service, Fish and Wildlife Service, Forest Service, and the Society of American Foresters sponsored a National Interagency Wilderness Conference in Tucson, Arizona on May 17-21, 1993. The conference was designed to emphasize successes in wilderness management and focused on three themes:

- Wilderness Restoration - Use of Minimum Tool in Revegetation and Alien Plant Control;
- Managing Wilderness, Cultural Resources, and Cultural Diversity; and
- Emerging Challenges - Adjacent Land Uses, Day Use, Outfitters, and Access for the Disabled Wilderness Visitor.

The following information on the conference is enclosed:

- Conference Handbook. The Handbook contains a complete synopsis of the conference presentations and posters, references and contacts for more information. In addition to wilderness specialists, the Handbook should be of particular interest to Archaeologists, Biologists, and Range Conservationists.

- "We are not Alone Anymore"; a paper presented by Denise Meridith, State Director, Eastern States.

- Handbill announcing the 1994 Interagency Wilderness Conference. The location has been tentatively set for Albuquerque, New Mexico. Celebrating the 30th Anniversary of the Wilderness Act, this conference is shaping up as another excellent opportunity to learn the latest techniques in wilderness management and continue to develop partnerships between the wilderness managing agencies.
Why We Are Not Alone Anymore?

There is a growing need to develop partnerships to continue the renaissance in wilderness stewardship we are discussing this week in Tucson. There are several reasons for this.

First of all, we are confronting shrinking resources. Lands meeting criteria for wilderness designation are disappearing. Money to acquire and manage these lands will be harder to obtain, as issues such as health care compete for Congress' attention.

There is an increasing need for information about wilderness area resources, threats and workable alternatives; the needs are for social, as well as natural resource, research and technology transfer.

Also, there are major changes occurring in the US lifestyles which impact wilderness. There are technological changes which can hinder and help stewardship efforts. New "toys," such as the growing array of recreational vehicles, can provide new challenges to attempts to maintain the roadless character of wilderness. Other innovations, such as the Global Positioning System, will increase our capabilities to identify and map wilderness areas and resources. Still other technological advances have positive and negative effects. The Wall Street Journal had an article last week about the impacts of cellular phones. How do you weigh the sound of ringing phones on the "feeling of isolation" character of an area with the practical needs to locate and rescue people lost in these areas? Time will tell. People will decide.

The changes in lifestyle in the US are having major impacts on visitation. Studies have shown that people have less, not more leisure time, in contrast to the predictions made when I was studying recreation in college twenty years ago. At the same time, there is a growing desire to "get back to nature" and "get away from the rat race," even if it is just for a day. This has resulted in long-term recreation sites go unused as day-use-only sites become overcrowded. Demographic changes have resulted in changes in the types of escape people desire and how they engage in those activities. Wilderness areas near urban areas will face different challenges than those which are hours away.

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The knowledge and interest of the public in environmental issues is increasing. This interest has been reflected in activism of all sorts—from "ecoterrorism" to reactions to "environmental racism" to "wise use" activities. Views are becoming increasingly polarized and it is becoming harder to formulate "win/win" solutions to environmental conflicts.

No, we are not alone anymore, if we ever were. There are no simple or obvious answers. Stewards of wilderness must continue to forge new and varying partnerships if they hope to maintain the momentum of the renaissance.

Where It's Working Now

There are many wonderful examples of working partnerships in the wilderness arena. This conference, itself is a collaboration of Federal agencies, professional societies and others to share successes and improve the quality of and enthusiasm in our wilderness stewardship responsibilities.

Without partnerships, my agency—the Bureau of Land Management (BLM)—would not have wilderness to manage. BLM currently manages 66 designated wilderness areas involving 1.6 million acres. Designation required the advocacy and cooperation of various interest groups (e.g. The Wilderness Society and the Cattleman's Association) working with BLM and Congress to delineate suitable areas, assess wilderness characteristics, and resolve land use conflicts. In the past 15 years, BLM has completed more than 90 studies and environmental impact statements to determine wilderness potential on 25 million acres of public lands and these could have not been completed without the help of other Federal, state and local agencies, private industry and non-profit groups.

With the help of partners, BLM has been able to use the Land and Water Conservation Fund and donations acquire sensitive areas needing protection. Non-profit organizations, such as the Nature Conservancy and the Trust for Public Lands, assist BLM and private land owners in identifying and acquiring suitable lands.

Planning for and management of the areas is as important as their initial acquisition and designation. BLM uses techniques which foster partnerships in planning efforts. In California, BLM has been successful in developing Coordinated Resource Management Plans (CRMPs) which solicit and involve the input of local constituents in building consensus regarding future use of natural areas. In New Mexico, BLM has worked with local ranchers to develop management plans in wilderness areas and wilderness study areas, which encourage stewardship of sensitive areas while allowing ranchers to effectively maintain grandfathered livestock operations. These techniques, along with the growing use of forums such as the Forest Summit and PacFish efforts to establish
ecosystem approaches to management in the Northwest or the agreements with Georgia Pacific in red-cockaded woodpecker areas in the Southeast, provide valuable lessons in how to bring diverse potential partners to the table and enlist their support to achieve environmentally sound gains. It is these types of approaches to planning and management which will ensure long-term sustainability of wilderness.

Where We Need More Work

The most important partner is not an agency or an industry or a non-profit entity, but the public, the people. People, who do or may not ever go to wilderness areas. People, who live in a farmhouse in Bangor, Maine or Duluth, Minnesota, a trailer park in Homestead, Florida or El Paso, Texas, a subsidized housing unit in Philadelphia, Pennsylvania or Knoxville, Tennessee. They are important, invaluable to the survival of wilderness. Wilderness areas cost money. Wilderness areas on Federal lands are subsidies. In the long-term, the money spent on them will have to be weighed against competing and compelling uses of Federal funds, like health care, crime prevention and basic deficit reduction.

Therefore, the value of the Beaver Dam Mountains wilderness in Arizona must be clearly articulated and communicated to people in Modesto and Newark, as well as Tucson, if Congress is to maintain or increase the $11 million allocated to BLM for the wilderness program in the future.

How do we do this? How to we engage the person from Anacostia in Washington, DC?

The Anacostia River in DC was recently identified as one of the country's top five most endangered rivers. We must make the mental link between environmental problems in the cities and in isolated areas. While discussing the Anacostia River with local community people in the East, we may learn about similarities and differences in threats and proposed solutions which will help the Rio Grande. While teaching neighborhood children about the values of cleaning up the Anacostia, we can at the same time be showing them the value of keeping the Colorado River clean.

We need to approach people we may not have thought of approaching before, in ways in which have not used before. There can be no "us vs them", there is only "we." The thousands of people who do or must use vehicles can become partners if persuaded that areas with no roads are valuable, that there will places on Federal lands where they can use their vehicles, and educated about where vehicles can and should not be used. For
example, the New Mexico 4 Wheelers helped BLM monitor a wilderness study for illegal vehicle use and wood cutting area for illegal vehicle use. We must work with off-highway clubs and horseback riding associations as well as hikers.

In addition to western universities, such as Colorado State University and University of Northern Colorado, which helped BLM monitor a wilderness study area last year, we could approach major Eastern and Midwestern land grant colleges or Historically Black Colleges and Universities in the South with ideas for projects which involve public education or use of GIS for mapping needed for the wilderness program. Secretary Babbitt has proposed the National Biological Survey, which would include research units on college campuses throughout the US. We must be sure to take full advantage of this new opportunity to propose and conduct research on biological issues which affect wilderness management.

In addition to non-for-profit groups, such as the Montana Wilderness Society, which helped construct trails in the Centennial Mountains WSA, we could more aggressively approach for-profit groups for participation in challenge cost-share programs. In the East, my office has been very successful in working with such diverse companies such as Waste Management Inc, RJR Nabisco, Coca Cola and Pepsi Cola and groups like the American Recreation Coalition (which includes Disney, Kampgrounds of American, REI and other companies) in contributing to environmentally related activities.

The biggest challenge and best opportunity we have to secure the future well-being of wilderness areas is to enlist children from all economic strata and parts of the country as our partners. Madison Avenue-type techniques were used to successfully advocate the use of seat belts and prevention of littering. Whether you agree with the message or not, there is no more well-known environmental icon than Smokey Bear; the majority of kids from within the 90210 zip code to the ghettos of Atlanta recognize this image and his message.

We should get together with our industry and non-profit entity partners to use innovative and exciting techniques aimed at children. The methods which can be used are only limited by the imagination. People currently involved in wilderness activities should continue to develop videos, games and other educational materials which are aimed at children throughout the country (this means multilingual and closed captioned materials as well). We cannot be satisfied with reaching only a few thousand people who live next door to wilderness areas.

There are many existing examples of environmental education activities which should be supported, expanded and emulated elsewhere. Partners Outdoors, a coalition of recreation industry
and government agency members, is working on constructing an
Urban Treehouse in Washington, DC. This will be a site, similar
to one already in operation in Atlanta, which is used to deliver
environmental education to urban children.

My office just conducted the third annual Kids Fishing Day
in northern Virginia, during which we gave 75 inner-city children
under 14 years of age education about stream and fish ecology and
gave them the opportunity to fish on the Occoquan River. We had
15 private, non-profit and government sponsors for the event.
Usually government looks to the Sierra or Audubon Society for
volunteers for such activities. We get our volunteers from local
African-American churches and people within our own staff—staff
assistants, adjudicators, cadastral surveyors, geologists and
others who are often left out of our environmental planning
activities. In conjunction with other sponsors, we put on a
similar event every fall aimed at children with disabilities.

To build effective partnerships, we cannot practice one-way
communication; "we" teaching "them" about the values of
wilderness. Wilderness advocates must make a special effort to
learn about non-advocates' desires, needs, values and attitudes.
Only then can we develop consensus about which areas should and
should not be wilderness areas, how we are going to pay for them,
and how we can provide long-term support and protection of these
areas. We need to assess threats to the Anacostia River and
develop local community-based solutions, as well as the people in
Anacostia have to learn about the value of the De-Na-Zin
wilderness area in New Mexico.

The "P" in "partners" stands for people. We, as wilderness
advocates or managers, are not alone anymore and we cannot
accomplish our tasks by ourselves. Let us involve all the people
in our quest to identify, protect and restore wilderness in the
United States.
6th Annual Interagency Wilderness Conference

and the

30th Anniversary of the Wilderness Act

August 28 through September 3, 1994

The purposes of this conference will be to examine the original intent of the Wilderness Act, critique and celebrate what has been accomplished, and to strategize and plan for actions necessary for the wilderness managing agencies to carry the vision forward into the 21st century. Participants will have opportunities to hear prominent managers, concerned cooperators, and proficient technicians and to engage in open-forum discussions, organized workgroups, and individual discussions. Research and operational issues will both be emphasized. Potentials for partnerships and interagency consistency in management and research will be thoroughly explored.

Program will include plenary and concurrent sessions, workgroups, poster sessions and trade exhibits, and field workshops after the main conference adjourns. A proceedings will be compiled and distributed to all registrants at the time of the conference. An ongoing series of celebratory events and activities will also be offered throughout the week.

The conference general agenda will be organized around four symposia topics:

| RESEARCH AND RESOURCES MANAGEMENT IN WILDERNESS ECOSYSTEMS | INTERNATIONAL WILDERNESS ISSUES |
| RECREATIONAL, SPIRITUAL, HERITAGE, AND OTHER SPECIAL VALUES OF WILDERNESS | HOW TO MANAGE FOR SPECIAL PROVISIONS ALLOWED IN WILDERNESS, YET ACHIEVE NON-DEGRADATION TARGETS |

Venue: A conference facility (tba) in or near the Rocky Mountains will be selected that is in keeping with the importance of this 30th anniversary observance.


Any person or organization wishing details on co-sponsorship, desiring details on presenting a poster, video, or exhibit, or wanting to suggest a speaker or activity is encouraged to send comments at any time via FAX to:

USFS—Steve Morton, Missoula, MT (406) 329-3132;
BLM—Jeff Jarvis, Phoenix, AZ (602) 650-0452;
NPS—Alan Schmierer, San Francisco, CA (415) 744-3932;
FWS—Dick Steinbach, Albuquerque, NM (505) 766-1904;
SAF—Dick Reid, Bethesda, MD (301) 897-3690
Announcing the 6th Annual Interagency Wilderness Conference

August 28 -- September 3, 1994