



EBIPM

Assessment Guidelines

Putting Assessment to Work for More-Informed Land Management Decisions:
A How-To Guide





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A How-To Guide

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(Cover photo courtesy of Jaepil Cho)



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Getting Off to a Good Start Managing Invasive Species

As invasive annual grasses continue to spread it is clear that “business as usual” on rangelands does not solve the weed problem. In fact, this is precisely one of the issues: weeds are not the problem; they are the symptom of an ecosystem not functioning properly. One of the challenges involved in invasive species management is the fact that ecosystems are complex systems and there is no simple fix to invasive species infestations.

This guideline has been developed as part of the ecologically-based invasive plant management (EBIPM) program to assist land managers in pinpointing ecological processes not functioning in these complex systems. In recent years many rangeland professionals have adopted a protocol for rangeland health assessment and it is used to provide early warnings of resource problems on rangelands. We have formulated a method where the detailed information gathered for a rangeland health assessment can also be used to identify

actual ecological processes in need of repair. When we better understand what is driving these invasive annual grass infestation we can determine the best management methods to a succeeding in achieving more desired species.

There is significant value when managing invasive species in first being able to determine which ecological processes are in disrepair. With this information land managers understand the true cause of the invasive weed infestations. Understanding ecological processes increases our ability to develop integrated treatment plans for returning the land back to health and productivity. If you implement a strategic, ecologically-based management system, not only will you be successful against these tough, competitive invasive species but you will see a difference in the bottom line with more cost-effective treatments. It all starts with assessment and this booklet will guide you through Step 1 of the EBIPM program.



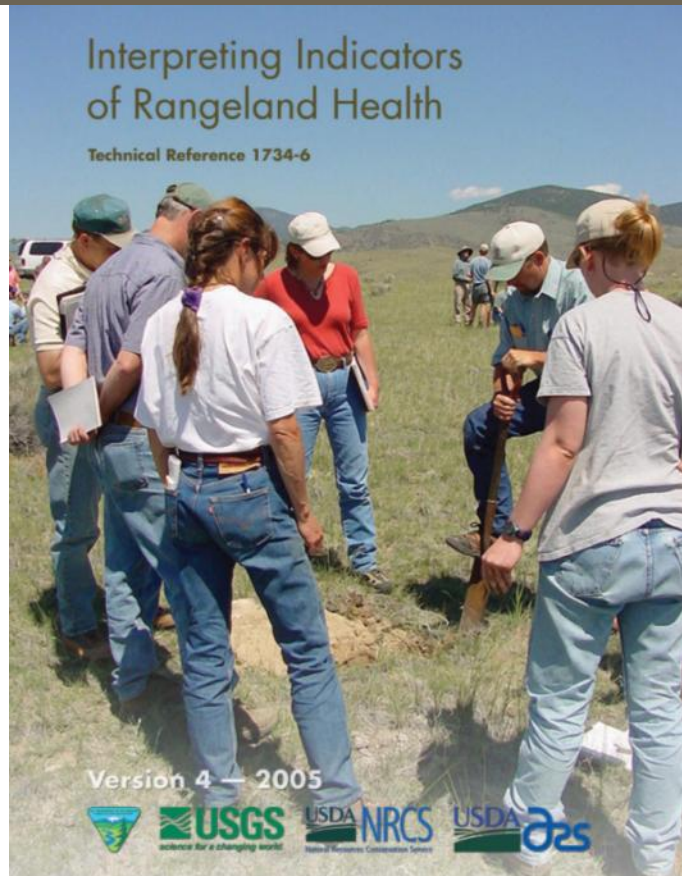
The complex nature of ecosystems amplifies the difficulty of managing, and particularly restoring, these systems, especially when invasive species further complicate the situation.

Some Background Information: What is Rangeland Health Assessment?

The ability to gather information on the condition of rangeland has been recognized as an important component of effective management of these lands. How rangelands are assessed has changed over the years as concepts and protocols evolve (Interpreting Indicators of Rangeland Health, Version 4 2005).

In 1994, the National Research Council (NRC) advanced the concept of “rangeland health” as an alternative to “range conditioning”. A NRC panel advocated the use of multiple indicators to assess soil stability and watershed function, integrity of nutrient cycling and energy, and the resilience and resistance of a community to change that would provide an assessment of ecosystem health (NRC 1994). The resulting protocol developed from this initial concept is a rangeland health

assessment technique that is currently being used by most range professionals. The goal is aimed at providing a rapid qualitative assessment of rangeland health at the management unit level as well as to provide a communication tool with stakeholders regarding the status of ecosystem properties and processes (Pyke et al 2002).



The Rangeland Health Assessment provides a thorough, qualitative evaluation of a given landscape that can give managers and stakeholders a clear picture of the status of ecosystem properties and processes.



Completing the Rangeland Health Assessment call tell you the current status of the rangeland - it tells you where you are now and as the proverb says, “you can't know where you're going until you know where you've been.”

The rangeland health assessment is a five-step process involving:

1. identifying the evaluation area and confirming the ecological site,
2. identifying an Ecological Reference Area used to develop expected indicator ranges,
3. reviewing and modifying descriptors of indicators,
4. rating the indicators, and
5. using the information to determine the functional status of the three rangeland health attributes (Rangeland Health Attributes and Indicators for Qualitative Assessment, 2002, Pyke et al, Jour of Range Mgmt).

The protocol, described in detail in the technical reference “Interpreting Indicators of Rangeland Health” (Tech Reference 1734-6), is designed to provide a preliminary evaluation of a site and early warnings of potential problems or where current problems exist (Interpreting Indicators of Rangeland Health). **This guideline is designed to be used *after* you complete a rangeland health assessment.**

What is Ecologically-based Invasive Plant Management?

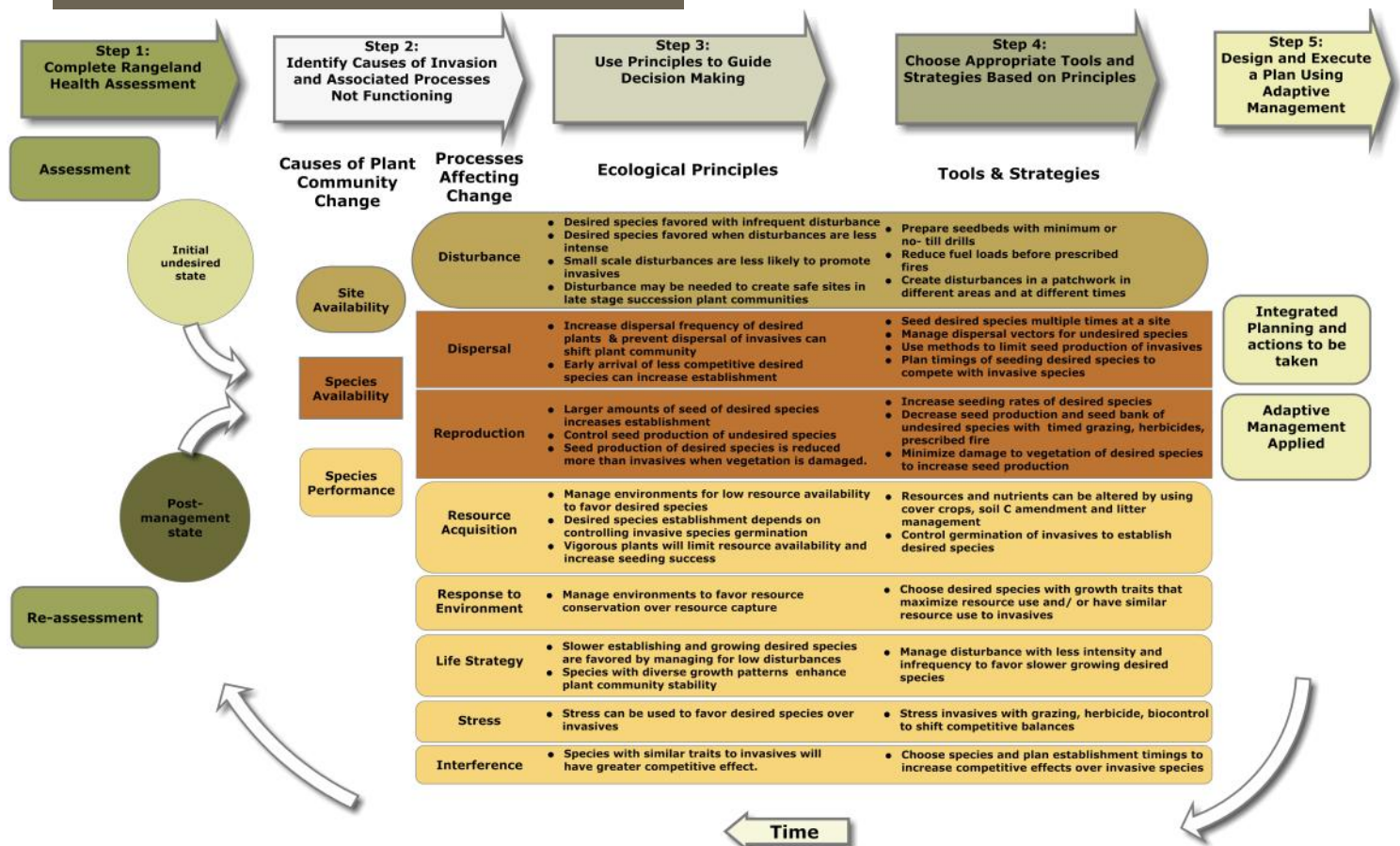
Historically, the tools used for invasive plant management have focused on treating symptoms while the ecological processes those tools affect are usually unknown. EBIPM is a systematic thinking and planning process, set up in a stepwise framework. Most importantly, this model provides a way for managers to understand how to apply the appropriate combination of tools and strategies to address the underlying cause of invasion rather than simply controlling invasive annual grass abundance.

The model includes three primary causes of plant community change (site availability, species availability, and species performance), ecological processes that drive these causes, and factors that modify these processes. In this

model, management tools and strategies are designed to target specific ecological processes that influence one or more of the three causes of succession. This links treatments manager may impose to ecological processes driving plant community dynamics.

The first step of EBIPM is to complete a rangeland health assessment. After you have an assessment on the area that is being considered for managing for invasive species, we have developed a simple worksheet that completes step 1 in the model below and provides the information for getting to step 2. You will be well on your way to developing a successful management program.

The EBIPM Model



Why Integrate Rangeland Health Assessment and EBIPM?

The value in completing this first step in EBIPM is the information collected now gives some solid information from which to develop integrated management plans. The utility of the EBIPM framework ultimately depends on how it helps managers select appropriate tools and strategies to successfully manage invasive species in any number of different environments. When a land manager completes a Rangeland Health Assessment and then uses this guideline, they will have a better understanding of the ecological conditions that are occurring on the land before implementing invasive plant control treatments.

Once an assessment has been conducted, the EBIPM model offers a practical and effective framework for restoration strategies to be designed and applied, especially where invasive annual grasses are decimating

productive rangeland. The Rangeland Health Assessment as a stand alone is not designed to identify the cause of resource problems (Interpreting Indicators of Rangeland Health). In this guide we show how to categorize the assessment information based on how it is related to the three important causes of succession and the ecological processes in disrepair. With the EBIPM worksheet, managers can then begin to identify those ecological processes in need of repair.

Our EBIPM assessment worksheet bridges the gap between evaluating range health to being able to understand ecological processes that are in need of repair. The resulting information is the basis for creating a holistic plan using ecologically-based invasive plant management (EBIPM).



The Rangeland Health Assessment can help land and resource managers to obtain a comprehensive assessment of their land and integrating that with EBIPM, they can then use that assessment to determine the underlying problems and guide them in their decision-making process and management efforts.

Everything You Will Need to Complete Step 1 of the EBIPM Model

Technical Reference:
"Interpreting
Indicators of
Rangeland Health"

Ecological Site Description - ESD

Evaluation Sheet
Once you have completed a
RHA you will need to have
this evaluation sheet

Site Type: Rangeland
MLRA: B11X R011XY014ID

United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland
Site Name: SANDY LOAM 8-12' ARTRVB/ACHY
Site ID: R011XY014ID
Major Land Resource Area: B11X

Physiographic Features

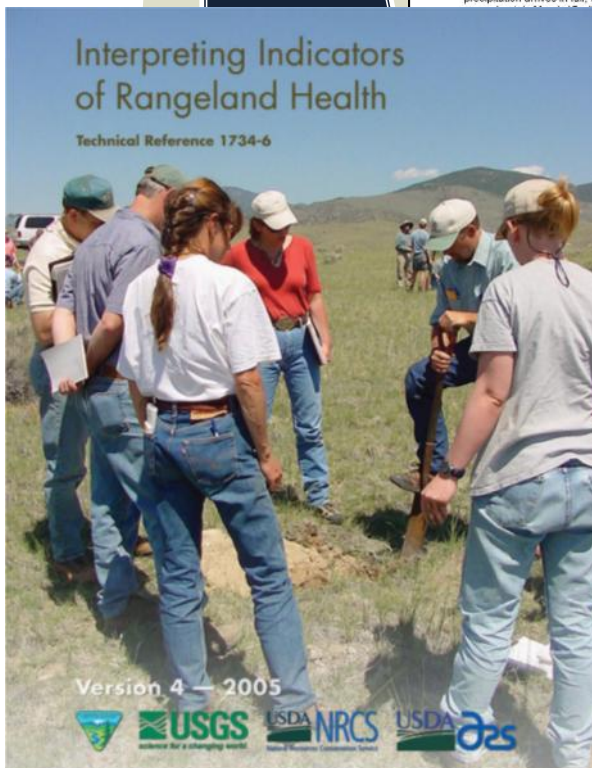
This site occurs on nearly level to steep slopes that range from 0 to 25 percent on all aspects. Elevations extend from 2500 to 4800 feet (750-1500 meters). This site is associated primarily with the Snake River lacustrine deposits but extends up into the adjacent rolling rhyolite hills.

Landform: Terraces, Alluvial plains, Foothills, Alluvial fans, Basalt plains, Benches

	Minimum	Maximum
Elevation (feet):	2500	4800
Slope (percent):	0	25
Water Table Depth (inches):	>60	
Flooding:	None	None
Frequency:		
Duration:		
Ponding:	None	None
Depth (inches):		
Frequency:		
Duration:		
Runoff Class:	Very Low	Very High
Aspect:	All	

Climatic Features

Average annual precipitation ranges from 8 to 12 inches (20-30 cm). About 60 percent of the precipitation arrives in fall, winter, and early spring. Summers are hot and dry. Plant growth begins in late spring and continues through fall. Grasses and forbs maturing by June.



6-4 Evaluation Sheet (Print)

Aerial Photo: _____

Management Unit: _____ State: _____ Office: _____ Range/Ecol. Site Code: _____

Ecological Site Name: _____ Soil Map Unit/Component Name: _____

Observer: _____ Date: _____

Location (descriptor): _____

T _____ E _____ or _____ N lat _____ W long _____ Position by GPS Y / N
UTM Zone _____ Datum _____

Size of evaluation area: _____

Composition (Indicators 10 and 12) based on _____ Annual Production _____ Cover Produced During Current Year or _____ Biomass _____

Soil/site verification:
Range/Soil Site Desc., Soil Surv., and/or Ecol. Ref. Area:
Surface texture: _____
Depth: very shallow _____ shallow _____ moderate _____ deep _____
Type and depth of diagnostic horizons:
1. _____ 2. _____ 3. _____ 4. _____
Soil Effect: none _____ v. slight _____ slight _____ strong _____ violent _____
Parent material: _____ Slope: _____ % Elevation: _____ ft.
Average annual precipitation: _____ inches

Evolution Area:
Surface texture: _____
Depth: very shallow _____ shallow _____ moderate _____ deep _____
Type and depth of diagnostic horizons:
1. _____ 2. _____ 3. _____ 4. _____
Soil Effect: none _____ v. slight _____ slight _____ strong _____ violent _____
Topographic position: _____ Aspect: _____
Seasonal distribution: _____

Recent weather (last 2 years) (1) drought _____ (2) normal _____ or (3) wet _____

Wildlife use, livestock use (intensity and season of utilized use), and recent disturbances:

Off-site influences on evaluation area:

Criteria used to select this particular evaluation area as REPRESENTATIVE (specific info. and factors considered; degree of "representativeness")

Other remarks (continue on back if necessary)

Reference: (1) Reference Sheet _____; Author: _____; Creation Date: _____
or (2) Other (e.g., name and date of ecological site description, location of ecological reference area(s))

Evaluation Matrix
And also have on hand this
evaluation sheet

**EBIPM Assessment
Worksheet**
(Appendix of this guide)

Evaluation Matrix

State _____ Office _____ Ecological Site _____ Site ID _____

Authors _____ Revision Date _____

Indicator*	Extreme to Total	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills					Reference Sheet
Generic Descriptor	Rill formation is common and well defined throughout most of the site.	Rill formation is moderately active and well defined throughout most of the site.	Active rill formation is slight or infrequent intervals, mostly in exposed areas.	No recent formation of rills; old rills have blanketed or muted features.	Current or past formation of rills as expected for the site.
2. Water Flow Patterns					Reference Sheet
Generic Descriptor	Water flow patterns extensive and numerous, unstable with active erosion, usually connected.	Water flow patterns more numerous and extensive than expected; degradation and cut areas common; occasionally connected.	Number and length of water flow patterns nearly match what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Number and length of water flow patterns nearly match what is expected for the site; some evidence of minor erosion. Flow patterns are stable and short.	Matches what is expected for the site; minimal evidence of past or current soil deposition or erosion.
3. Pedestals and/or Terracettes					Reference Sheet
Generic Descriptor	Abundant active pedestalling and terracettes. Many rocks and plants are pedestalled; exposed plant roots are common.	Moderate active pedestalling; terracettes common. Some rocks and plants are pedestalled with occasional exposed roots.	Slight active pedestalling; most pedestals are in flow paths and interspaces and/or on exposed slopes. Occasional terracettes present.	Active pedestalling or terracette formation is rare; some evidence of past pedestalled formation, especially in water flow patterns on exposed slopes.	Current or past evidence of pedestalled plants or rocks as expected for the site. Terracettes absent or uncommon.

* Descriptors for each indicator should be more specific than those listed in the Generic Descriptors, if possible. The None to Slight descriptor, which is based on the Reference Sheet (Appendix 1).

	Causes of Succession															
Rangeland Health Indicators	Site Availability					Species Availability					Species Performance					
Rills, water flow patterns, pedestals, and/or terracettes, wind scoured, blowout depositions, litter movement	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight											
Bareground, soil surface loss or degradation	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Plant Community Composition						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Compaction Layer	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Functional/Structural Groups						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight						
Plant mortality/ decadence	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Litter Amount												Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Annual production												Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Invasive plants						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight						
Reproductive Capacity of Perennial Plants						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight

Everything you will need to complete Step 1 - 7

How to Complete a Rangeland Health Assessment

At this point you will want to complete a rangeland health assessment to provide information on the functioning of ecological processes as they are related to a reference state for that land area (IIRH). To be able to complete the assessment, you will want to obtain the technical reference shown to the right “Interpreting Indicators of Rangeland Health, Version 4 – 2005” and it can be downloaded at <http://www.blm.gov/nstc/library/pdf/1734-6rev05.pdf>.

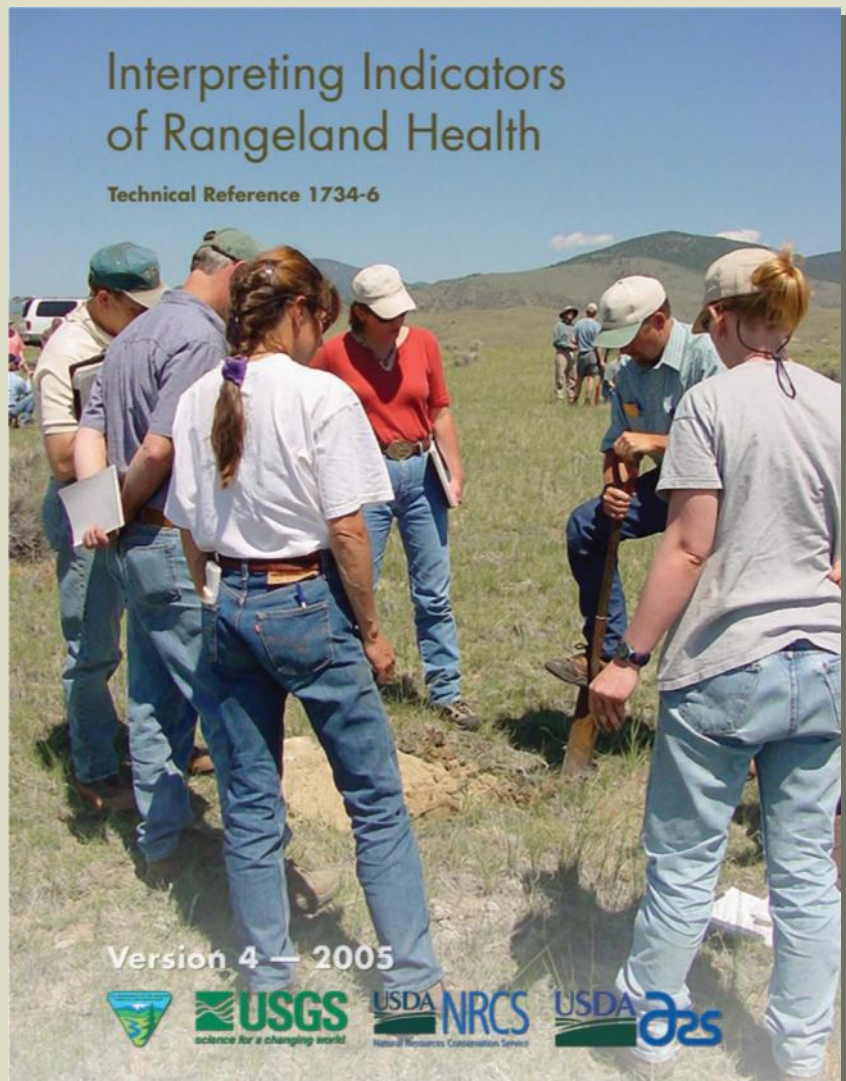
If you would like to order a printed copy contact:

Mike Pellant
BLM
(208) 373-3823
mike_pellant@blm.gov

or

Dick Mayberry
Rangeland Resources Group, (WO 220)
(202) 452-7750

Workshops for completing rangeland health assessments are usually held several times each year in different parts of the country. For more information on workshop schedules, contact Mike Pellant.



The technical reference “Interpreting Indicators of Rangeland Health, Version 4 - 2005” (pictured above) provides the entire process of obtaining an assessment of rangeland health. The reference contains a thorough explanation and pictures of each of the 17 indicators and more detail on each of the steps mentioned on page 2 of this guide. The reference also contains a glossary of terms that may be helpful in understanding terminology as well as blank and filled-in example sheets of the “Evaluation Matrix”, “Evaluation Sheet”, and others that are necessary to complete a Rangeland Health Assessment.

How to Find the Online Course for Rangeland Health Assessment

The BLM National Training Center website offers a series of training videos for “Interpreting Indicators of Rangeland Health” at the following web address:

<http://www.ntc.blm.gov/krc/uploads/415/IndicatorsOfRangelandHealth.html>



The series includes video modules for the Introduction and Overview, Indicators and Attributes, Reference Sheet, and Application

Simply enter the URL listed above into your internet address bar. A Google™ search for “ntc blm rangeland health” will also bring up the site listed above as one of it’s top results. Once the page has loaded, click on the picture of the “Interpreting Indicators of Rangeland Health” manual cover under the “CLICK TO PLAY THE VIDEOS” text in the bottom left corner.

The page will reload and begin to play the “Course Introduction”.

Any of the other modules can be viewed by clicking through the menu and sub-menus on the top left.





Disturbance in the form of a fire created site availability, one of the three causes of succession, which yielded an opportunity for cheatgrass to establish heavily on this hillside in eastern Oregon.

After You Complete the Rangeland Health Assessment—What's Next?

At this point, it is time to take the information collected in the Rangeland Health Assessment to complete Step 1 of the EBIPM model. To summarize this information we have developed a worksheet (Fig. ?)

For the EBIPM worksheet we categorized the 17 rangeland health indicators into three general causes of succession. Among the 17 indicators, rills, waterflow patterns, pedestals and/or terracettes, gullies, wind scoured blowouts, depositions, and litter movement were combined into a single category indicating that site availability is likely to be high so the relative comparisons would not be heavily

weighted by these indicators. Similarly, we combined bare-ground, soil surface loss or degradation and soil surface resistance into a single category. Once the rangeland health indicators have been ranked, that information, combined with knowledge of whether the indicator is associated with a cause primarily or secondarily, can be used to provide an indication of the relative importance of each cause in directing succession. This information is central to using the EBIPM model because it provides the initial link to identifying the ecological processes in need of repair for successful restoration. This evaluation is mainly qualitative. In most cases, the indicators can be

measured, but the magnitude and degree to which they indicate that a particular cause is driving successional dynamics is highly variable.

It may be most useful to consider this assessment as a relative indication of the primary causes of succession. As the number of indicators in the extreme and moderate to extreme rating increases, it is reasonable to suspect that those causes are in need of attention since they deviate far from the conditions of the Reference Area. Additionally, this evaluation should be used with other

information, such as site history, observations, and land managers' experience working on the management unit. This information should be used to focus on a starting point in the identification of ecological processes that appear in need of repair. By using the EBIPM framework, managers can strategically work their way through a thought process that can lead to the development and implementation of a truly ecologically-based management system.

In the next section, we offer 2 different examples will be detailed for filling out the EBIPM worksheet.

Example: Integrating Rangeland Health Assessment with Successional Management

In the first example we are using data collected in 2002 of a highly degraded site described in a test of augmentative restoration (Sheley et al. 2009).

From the Rangeland Health Assessment (step 1), we used the evaluation sheet and evaluation matrix to fill out the worksheet below (step 2). The rangeland health assessment suggested that site availability was moderate to extreme, mainly because of the high degree of bare ground. We checked the

“extreme” box for bare ground because it was extremely deviated from the reference site. The availability of desired native species (plant community composition) also deviated extremely from the reference areas. Species availability was very low and the functional groups were largely changed from grasses to perennial invasive broadleaved plants. The three indicators of species performance suggested that species performance also was extremely altered. Desired plant mortality was

	Causes of Succession																
Rangeland Health Indicators	Site Availability					←	Species Availability					←	Species Performance				
Rills, water flow patterns, pedestals, and/or terracettes, gullies, wind scoured, blowout depositions, litter movement	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight												
			✓														
Bareground, soil surface loss or degradation	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight								Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
	✓												✓				
Plant Community Composition							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
							✓							✓			
Compaction Layer	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight								Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
			✓												✓		
Functional/Structural Groups							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight						
							✓										
Plant mortality/ decadence	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight								Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
													✓				
Litter Amount													Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
															✓		
Annual production													Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
													✓				
Invasive plants							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight						
							✓										
Reproductive Capacity of Perennial Plants							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
								✓						✓			

high and annual production by those species was very low. Additionally, desired species' reproductive capacity appeared somewhat limited.

In this case, many ecological processes appeared in disrepair. As we predicted based on the assessment, modifying species availability by seeding desired species and species performance by adding water produced the highest desired species establishment. The assessment indicated a high amount of bare ground; thus, we anticipated that safe sites were likely already available for desired seedling establishment and growth on this site. Amending site availability did not improve establishment on this site.

In this study, using the variables collected in the rangeland health assessment, along with the successional management framework to identify ecological processes in need of repair, improved the management outcome by 66% over traditionally-used techniques (Sheley et al. 2009)



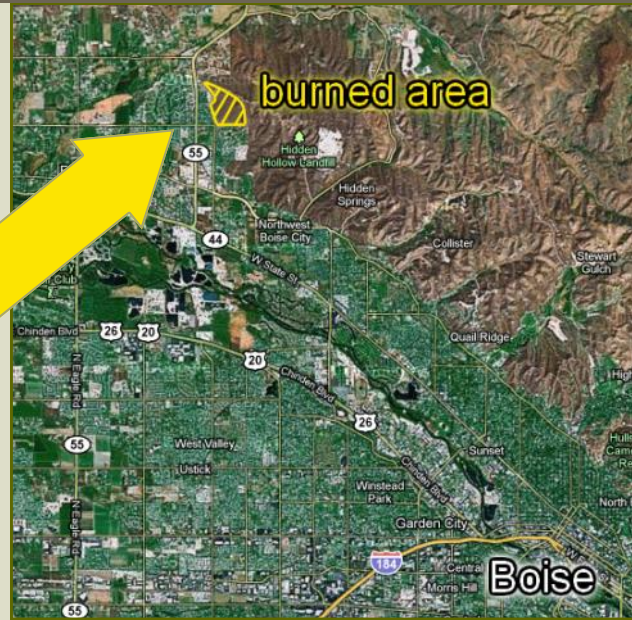
In an area dominated by invasive annual grasses and annual broadleaf plants, the weeds are merely a symptom of what likely are underlying ecological processes in need of repair.
(photo courtesy of Alex Boehm)

Case Study: Working Through the Assessment Process

In another example, we used the following case study to complete an assessment of a site near Boise, Idaho.

Setting the Stage:

An area of more than 200 acres on the urban-wildland boundary northeast of Boise, Idaho, known as the “Skate Park”, burned in the fall of 2009, threatening nearby homes, a recreation area and wildlife habitat. The area sits in the lower foothills and there are neighborhoods to the west and south as well as scattered homes to the north and east and a landfill



Despite the charred landscape, mountain bikers (above) ride one of the many trails in the area of the 2009 Skate Park fire (above left), which tore through the foothills, leaving behind sagebrush skeletons (at left), charred bunchgrasses (below), and an opportunity for cheatgrass to take over (next page).



to the east. Recreationalists, including mountain bikers, hikers with and without pets, and others, have created a number of trails on the hillsides and it's rare to visit the site and not see others walking, hiking or biking there.

Before we began our Rangeland Assessment for this site, we first obtained an ecological site description (ESD). A Rangeland Health Assessment requires that you have a reference area in order to compare current conditions to "reference" conditions.

At the Boise site, the ESD for this area indicated the primary vegetation at the site should be Indian ricegrass, Thurber's needlegrass, and Wyoming big sagebrush. However, historical land uses including agriculture and grazing, as well as the more recent recreational uses, have caused the area to be heavily invaded with three-awn grass, cheatgrass, several different species of annual forbs (hoary cress, mustards, Russian thistle, etc), and some medusahead. The fire in 2009 further allowed the annual plants to dominate the area. Some sagebrush either was passed by unburned or survived the fire but as the two pictures to the right illustrate, invasive annual grasses and forbs are now the dominant vegetation of the area. The information collected from the Rangeland Health Assessment is summarized on the EBIPM Assessment worksheet on the following page.

A volunteer effort (urban-wildland boundary) is underway to restore the burned area and educate the public and recreationalists about the need for management and prevention. In addition, a 20-acre EBIPM site was set up with four high-density seeding studies that were initiated in winter 2010.



	Causes of Succession									
Rangeland Health Indicators	Site Availability					Species Availability				
Rills, water flow patterns, pedestals, and/or terracettes, gullies, wind scoured, blowout depositions, litter movement	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight					
Bareground, soil surface loss or degradation	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight					
Plant Community Composition						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Compaction Layer	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight					
Functional/Structural Groups						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Plant mortality/ decadence	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight					
Litter Amount										
Annual production										
Invasive plants						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Reproductive Capacity of Perennial Plants						Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight

The EBIPM worksheet for the Boise Skate Park site was filled in based on the information gathered from completing a Rangeland Health Assessment approximately one year after the fire that had burned on the site. Even though the site was primarily bare ground throughout the winter precipitation season, we found little evidence of soil movement from water, so these indicators for site availability only slightly deviated from expected.

There was minimal deviation from expected conditions, as there was minimal bare ground due to the extensive biomass from annual plant production in the spring season. When we compared the plant community composition currently in the field to the ecological site description, the plant composition deviated

moderate to extreme from what was expected since nearly all the plants identified were annual grasses and forbs. This also lead to an extreme departure from expected for functional groups, as the shrub component had been lost in the fire. It was difficult to evaluate the plant mortality and decadence with a recent fire in the picture, so for this indicator, none to slight departure from expected was checked. For the annual production indicator, even though the species that were expected from the site description were not at the site, the species that were present were robust in growth, so we found there was only slight to moderate departure for species performance under this indicator. Invasive species were rampant at this site and for this indicator, there was extreme

departure from the expected, dramatically effecting species availability. Finally, because there were only a few remaining desired perennial species and they were competing for resources from high populations of invasive species the reproductive capacity was extreme from expected.

Where do we go from here?

In reviewing the EBIPM assessment worksheet, it was determined that efforts should be directed at improving ecological processes affecting species availability primarily, and species performance secondarily. With this information, we are able to transition into step 3 of the EBIPM model and begin using ecological principles to develop a strategy and treatments to return more desirable species back to the site.

Initially, treatments that reduce the seed production of the invasive species will be crucial. Any treatments that would augment our reduced seed bank of desirable species

should be considered at this site. Treatments that could increase the dispersal of desirable seeds without creating any additional severe disturbances would be ideal.

A number of plans are underway at this site to begin to return the site to plant species that would keep fire danger low, keeping in consideration that the site is in a place where the public recreates. Among the treatments being looked at are an herbicide treatment to reduce the seed production of invasive species to try and create a window where a number of desired species could be seeded to fill available sites vacated by the invasives as a result of the herbicide treatment.

By using adaptive management, the land managers at this site will be able to determine if the plan and treatments chosen are reducing the invasive species and helping to create a safer natural environment near the urban boundary.



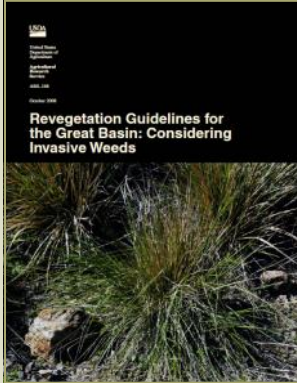
The Skate Park area in the foothills northeast of Boise, Idaho just a few months after a fire burned through the area. Most of the green grasses visible in the above picture are cheatgrass plants.

Appendix

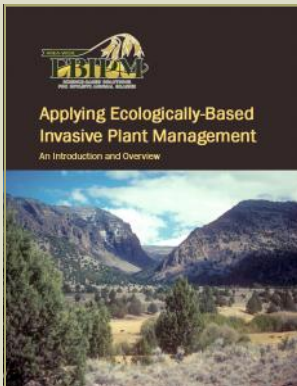
EBIPM Assessment Worksheet

	Causes of Succession																
Rangeland Health Indicators	Site Availability						Species Availability						Species Performance				
Rills, water flow patterns, pedestals, and/or terracettes, gullies, wind scoured, blowout depositions, litter movement	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight												
Bareground, soil surface loss or degradation	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight	
Plant Community Composition							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Compaction Layer	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight								Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Functional/Structural Groups							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight						
Plant mortality/ decadence	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight								Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Litter Amount													Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Annual production													Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
Invasive plants							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight						
Reproductive Capacity of Perennial Plants							Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight		Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight

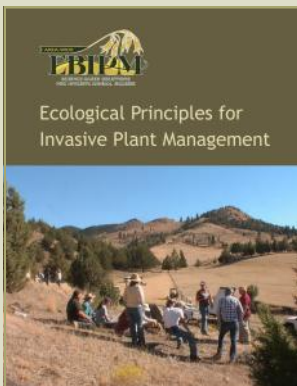
Additional Resources in our EBIPM Series:



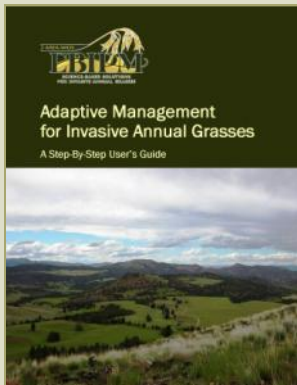
[Revegetation Guidelines for the Great Basin: Considering Invasive Weeds](#)



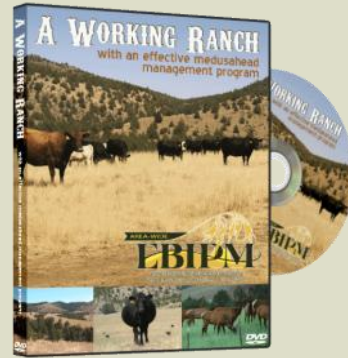
[Applying Ecologically-based Invasive Plant Management: An Introduction and Overview](#)



[Ecological Principles for Invasive Plant Management](#)



[Adaptive Management for Invasive Annual Grasses: A Step-by-Step User's Guide](#)



DVD Video:
[A Working Ranch with an Effective Medusahead Management Program](#)



DVD Video:
[Implementing EBIPM In the Field](#)
tackling invasive plants with science-based solutions

[Establishing a Weed Prevention Area](#)
[A step-by-step User's Guide](#)



All of the above products are available to request or download at www.ebipm.org. Also, more resources are in development; www.ebipm.org offers the most up-to-date listings.

