Rangeland Pre-Assessment Workflow

Working draft developed by the Institute for Natural Resources and The Nature Conservancy in Oregon
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Purpose of pre-assessment

This working document presents a pre-assessment workflow to consider for a rangeland health assessment, such as the Bureau of Land Management (BLM) Land Health Assessment. The objectives are:

- Compile information in one place for planning field work. Much of this information will also be useful for interpretation and reporting later in the process.
- Set a preliminary expectation of the conditions that are likely to be encountered in the field and prioritize data collection locations based on this information.
- Facilitate conversation among assessment team members about data needs, areas of interest, potential challenges, and the most efficient approach to conducting field work.

The following list contains recommended data sources and questions to consider at multiple scales, with embedded hyperlinks to selected resources. A brief example is provided on the last page.

Step 1. Landscape pre-assessment (e.g., allotment or watershed)

When planning field work, start by considering the broader landscape if applicable (allotment or allotment group, watershed, or other larger landscape boundary). This will provide landscape-scale context for the assessment and may help identify efficiencies in approaching field work. Using the data layers outlined below, briefly consider the following questions:

- ❖ *How much variability in biophysical conditions exists across the landscape? Are there large elevational gradients, distinct landforms or widely varying soil types?*
- ❖ *Is there a dominant vegetation condition? Vegetation condition can be described in many ways, including simple threat-based model ecostates. Which major threats are present and how extensive are problem areas (e.g., ecostates C and D or mapped extent of annual grass or juniper cover)? How variable is ecological condition across the area?*
- ❖ *Can similar pastures be grouped together for simplicity and efficiency? Consider adjacency as well as similarity in underlying physical conditions, current vegetation, grazing management, etc.*
- ❖ *To what degree have fires or historical treatments affected the landscape?*

The answers to these questions may be used in multiple ways, such as setting or altering the boundaries of the assessment area, filtering what data sets might be needed, creating a mental picture of the landscape, and identifying areas that warrant a closer look in the field.

Step 2. Pre-assessment by assessment unit (e.g., pasture or smaller allotment)

Once you have considered the broader landscape context, take a closer look at each individual unit (e.g., pasture) using the list of data sets and questions below. Compile the data layers below into a single map project, if possible, and use this information to start forming a mental picture and thinking about potential ways to stratify the landscape for conducting field work. Organizing this information within the assessment reporting structure that will be completed after collecting field data may streamline later reporting.

Administrative and Background Information

- Administrative boundaries such as allotments, pastures, management designations, etc.
- Ownership map
- Road map and other access information

Site Potential or Biophysical Setting

Data Layers

- Imagery: High resolution imagery can reveal variability in substrate, tree/shrub cover, and other patterns (e.g., fenceline contrasts, rock outcrops, etc). Different imagery sources—such as Google Earth, Bing and ArcGIS image services—may vary in the timing and image quality.
- Ecological Site Potential: Review available soil data and/or ecological site descriptions to identify major components and patterns. Consider simplifying ecological sites into groupings such as disturbance response groups to identify major differences in site potential.
- Landforms: Assess the complexity of the physical landscape using elevation, slope and aspect to identify major landforms.

Questions

- ❖ *How variable and complex are the underlying physical conditions? Are there large areas with relatively consistent site potential, patterns such as distinct drainages, or gradients (e.g., increasing elevation in one direction)? Are there outliers that are different from the rest of the pasture?*
- ❖ *Can site potential, landforms, or other features provide context for interpreting current condition?*

Disturbances and Treatments

Data Layers

- Wildfire Perimeters: Compare burn perimeters (and burn severity, if available) to patterns in the vegetation maps and plots. Look at the date of each fire to see how recently the area was burned.
- Vegetation Treatments: View recent and historical treatments (mechanical, chemical, seeding). Compare treatment perimeters to vegetation maps and plot data to better understand the potential relationship between past treatments and current condition.

Questions

- ❖ *Are there places where historic management appears to affect current condition? Have recent treatments occurred in the area, and have those occurred within or outside of burned areas?*
- ❖ *Can other documents (e.g., post-fire Emergency Stabilization and Rehabilitation reports) provide more information about recent fires, post-fire treatments, and post-fire monitoring, if applicable?*

Current Vegetation Composition

Data Layers

- Vegetation Map(s): Remotely sensed maps can efficiently represent current vegetation condition across large, continuous areas, including locations that are difficult to access. There are many map products; see the list of rangeland vegetation maps to determine what is available in your area. Choose one or two map sources that you think best represent the area. When using vegetation maps for pre-assessment consider the following steps:
    - Evaluate vegetation patterns across the area and whether they follow known disturbances, landform features, elevational gradients, etc. Focus on broad spatial patterns and functional groups such as sagebrush cover, perennial grass cover, and annual grass cover. As one example, threat-based model ecostates simplify complex conditions to identify primary threats and potential management actions.
    - Spatial patterns in the map may seem overwhelming. For a simple snapshot of landscape condition, summarize cover classes of the most important functional groups (e.g., 0%, 0-5%, 5-10%, 10-25% and >25% sagebrush cover). A simple table or pie chart (see example on last page) can highlight the most common conditions and the extent of problem areas.
    - If using multiple map products, compare broad patterns and identify areas where using multiple maps leads to the same conclusions or areas where maps differ widely.

- Plot Data: Evaluate plot distribution and view photos and quantitative data where available.
    - Determine the locations of plot data such as BLM Assessment Inventory and Monitoring (AIM) and Landscape Monitoring Framework (LMF) plots. Gather any trend plots and determine if any other plot data or photos are available.
    - For each AIM or LMF plot, view the photos and primary indicators of interest. Consider each plot in the context of biophysical setting, wildfire perimeters, and previous treatments to determine how representative a plot may be of the broader area.
    - Calculate the trend from any available trend plots; compare to other plot data and maps.

Questions

- *What is the most common condition class (e.g., ecostate)? What is the prevalence of problem areas, and are those due to lack of sagebrush, presence of invasive annual grasses, low site potential, etc?*
- *Are there homogenous areas of current vegetation condition? Are there discrete patterns?*
- *Is existing plot data available in most or all pastures? Are plots concentrated in certain areas?*
- *Will any plots be visited for another reason this year (e.g., AIM resample)? Does a trend plot need to be read? Do the existing plots provide some recent on-the-ground information?*
- *Do the available vegetation maps and plot data generally support the same conclusions? If not, can data collection be prioritized in areas where these information sources differ significantly?*

Other Data Layers and Sources of Information

The list of layers above focuses primarily on upland rangeland condition. Other data and information will often be needed, such as relevant land use management plans, wildlife habitat layers, information about livestock infrastructure and grazing -management systems, riparian resources, etc. Use this workflow as a starting point and add layers and information as applicable to your assessment process.

Step 3. Synthesis and developing assessment approach

After reviewing the available pre-assessment information for each assessment unit as described above, develop a map to direct in the field data collection and verification. Compiling this information should help create confidence in on-the-ground condition for some areas while identifying other areas that warrant a closer look. Come up with a preliminary placement of where data collection could occur based on data layers outlined above (e.g., groupings of ecological sites). The goal is to spend less time in areas where multiple lines of evidence in the office are all pointing towards the same conclusion and more time in those areas where condition is complex or there are conflicting results. Documenting this synthesis in writing can help jump start the reporting process later on.

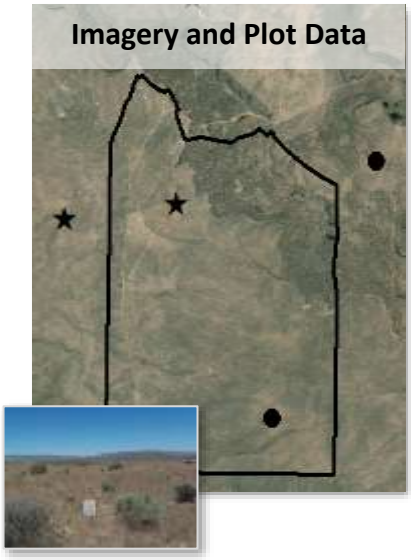
Synthesis questions

- *How does each pasture contribute to the overall allotment condition? Are pastures across the allotment highly variable or similar in their condition?*
- *Can maps be used to break large and complex areas into manageable units for assessment? Consider using broad areas with similar site potential or areas of relatively homogeneous current condition to divide the landscape into assessment units, where needed.*
- *Are there pastures with enough information based on maps or previously collected plot data to justify minimizing field time and data collection in these areas?*
- *Are there pastures that can be grouped with adjacent pastures based on similar conditions?*
- *Are there places with conflicting information or complex patterns? If so, can additional field time and resources be directed to these areas?*

See the next page for brief example of how different information sources can contribute to a preliminary understanding of landscape condition and context prior to conducting an assessment.

Example pre-assessment

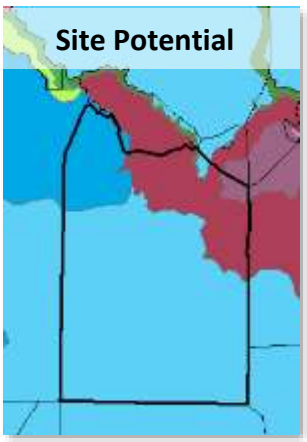
Imagery and Plot Data



Satellite imagery shows a historic lava flow in the northeast corner of the pasture. The pasture contains only one AIM plot (circle) and one trend plot (star), limiting the ability to summarize plot information. Consider focusing on photos and key indicators (e.g., deep-rooted perennial grass cover) for each plot in the context of map products, below.

Site Potential

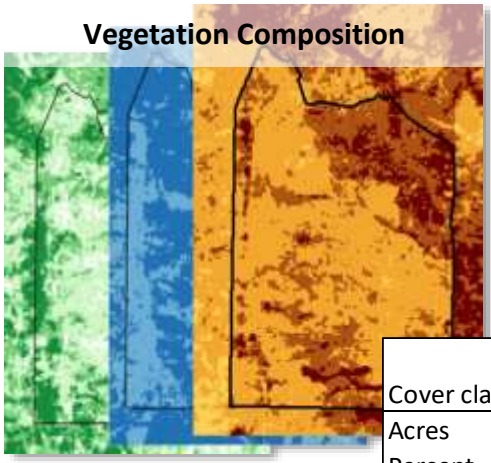
This pasture contains a few different ecological sites, with similar site types shown in shades of blue. Ecological sites are often used to stratify the landscape into assessment units; however, similar ecological sites can be grouped to simplify the landscape. Grouping ecological sites allows field staff to focus on differences in current condition (below) when site potential is relatively homogeneous.



Disturbances & Treatments

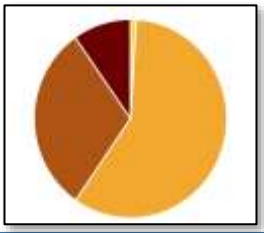
Disturbances have played a major role in this pasture, with multiple historic treatments -- both chemical (yellow) and revegetation (green) -- and a 2001 wildfire (red hatching). These disturbances are key to understanding current vegetation patterns such as lack of sagebrush cover and prevalence of invasive and seeded non-native grasses.

Vegetation Composition



Remotely sensed maps depict vegetation functional groups across the entire pasture. Summarizing conditions as shown in the table and pie chart below can help simplify the detailed patterns in the map into more interpretable information. In this case, maps indicate that most of the pasture contains moderate (10-25%) annual grass cover, with pockets of higher invasion, primarily in the northeast and southern parts of the pasture. Other maps indicate a widespread lack of sagebrush cover and moderate perennial grass cover.

	Annual grass & forb cover classes				
Cover class	0-5%	5-10%	10-25%	25-40%	>40%
Acres	0	84	4936	2576	821
Percent	0%	1%	59%	31%	10%



Synthesis: These multiple data sources can inform a preliminary assessment of current landscape condition. In this instance, this pasture likely exhibits a moderate to significant departure from reference conditions due to wildfire and historic vegetation treatments. If on-the-ground conditions are consistent with this evidence, less time intensive, photo-based and/or qualitative methods could be used to confirm. Alternatively, if on-the-ground conditions conflict with this information, consider more time-intensive and quantitative methods.