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| C:\Users\don_faber-langendoen\Pictures\Utah\2008_0908SwellSept0110.JPG  A BLM VEGETATION GUIDEBOOK FOR THE U.S. National Vegetation Classification  Draft Outline | A supplement to the Integrated Vegetation Management Handbook, including guidance on plot data inventory, vegetation mapping, and assessment and monitoring of rangeland condition.  NatureServe    cid:image017.png@01D0BE12.512F0870  2016 |

A BLM VEGETATION GUIDEBOOK FOR THE

U.S. NATIONAL VEGETATION CLASSIFICATION

**Draft Outline**

Bureau of Land Management

Photo: Marion Reid, September 2008. San Rafael Swell, UTAH

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* 1. INTRODUCTION

This will become a description of why and how the guidebook was developed. (need statement that, based on memo, “as of 2012, BLM will be using the NVC as the FGDC vegetation standard” needs for retroactive vs. moving forward….etc. further statements about how useful it would be to the various agency needs…)

* + 1. Why the guidebook is needed.

With development of U.S. National Vegetation Classification (NVC) products suitable for standardized vegetation description and classification, technical guidance is needed to facilitate adoption and utilization of the products by federal agencies. Agency personnel need to be sufficiently oriented to the technical basis of the USNVC and related ecological classifications, along with the descriptive, field sampling, and mapped products available for use in vegetation-related ecological inventory and condition assessment.

* + 1. Objectives.

To gather a joint NatureServe, BLM, and ESA Panel team to scope, outline, and build initial content of a guidebook on vegetation inventory for BLM and other federal agency personnel.

* + 1. Techniques, Procedures, and Methodologies

We will gather input from BLM staff on how they currently conduct vegetation field sampling and develop or use vegetation maps. From this basis, we will develop and outlines and begin compiling materials to explain vegetation, land, and ecological systems classifications. We will use workshop or webinar opportunities to identify and engage agency staff to discover review, and evaluate potential guidebook materials. We anticipate that the guidebook may take several forms (e.g., hard copy, website, interactive web tool) and will include the following topics:

* + 1. Topics

The topics will include: [these topics should be revisited in light of the Integrated Vegetation and Management (IVM) Handbook, which addresses management and planning.]

a) Explanation (with examples common to BLM lands) of inter-related classifications (NVC, ecological systems, ecological sites)

b) Sources of information on both classifications and maps; how to access it, how best to exchange it

c) Vegetation plot data protocols, with recommendations to ensure that they support ongoing NVC development, and for use in vegetation type-based inventory and monitoring

d) How to apply the classification to any given area, identifying where you might have a new vegetation type, and who to work with to resolve classification questions

e) Appropriate uses (and limitations) of classifications and maps at different spatial and thematic resolutions for BLM’s primary decision making needs for assessment, planning, management, and monitoring (e.g., regional assessment vs. RMP updates vs. site restoration, etc.).

* 1. INTRODUCING THE USNVC
     1. A Federal Standard

Classifying vegetation is critical to sound ecological science and efficient land assessment, management and planning. The National Vegetation Classification (NVC) is a central organizing framework for how all vegetation in the United States is inventoried and studied, from broad scale formations (biomes) to fine-scale plant communities. The purpose of the NVC is to produce uniform statistics about vegetation resources across the nation, based on vegetation data gathered at local, regional, or national levels.  The latest classification standard was published in 2008 by the Federal Geographic Data Committee and provides the basis for ongoing refinement of the NVC

CAPTURE MORE NEEDS FOR understanding and valuing native plant communities and composition (relative to discussion of “integrated vegetation management” defined as collaborative establishment of vegetation objectives vs. “integrated weed management”

The National Vegetation Classification is supported by a standard that provides the basis for a process for considering, evaluating and acting on proposals. Yet, at all times, a definitive, current list of types will be available.  As revisions to hierarchy are made and new descriptions are drafted, the new information will be posted on usnvc.org. The ESA Vegetation Classification Panel will be managing a formal review at each level of the classification.  In the future, this web site will feature a system for interactively displaying details of proposed changes. At present, the following information will provide a general guide to the revision process.

(from usnvc.org).

* + 1. Partnerships – Inter-agency and Organizational Support.

History of development of the NVC and all the partners over the years and currently.

* + 1. The Hierarchy

Reference four examples for introduction; to be built upon later; intro to natural-to-cultural continuum…

* + 1. Classification Development

Plot data, sampling design, analysis, databases, reference sites, peer-review, etc.

* + 1. Current Content

What is the current status of NVC- numbers of units, where it is served on-line.

* + 1. Publications and Products

Multiple products, websites, access to descriptions, relevant reports and papers.

* 1. INTRODUCING THE USNVC FOR BLM USE
     1. An Introduction to the Benefits of the USNVC for BLM needs

Basic orientation for field offices to know what their vegetation types are and its conditions, and to approach it so that it is complementary to what staff are already doing. i.e., this won’t be starting from scratch but instead will augment and build upon what they are already doing. E.g., already using landfire, as well as e.g., what State of CA is doing, but we are trying to improve on this with AIM.

Also baseline information to help us with change over time, current CC hook.

Often staff struggle with taking data to the next step; after collecting (field sample) data, often difficult to summarize it and apply it to baseline condition or application to planning decision. (Bridging AIM quantitative data to current qualitative assessments)

So how can the USNVC help? In three ways:

1. **Ecological Classification and Description**: include material on value for managing Wildlife habitat, a 4th way valuable to BLM?

Just as ecological sites benefit from the body of information provided by soil taxonomic units of the National Cooperative Soil Survey (NCSS) (Duniway et al. 2010), including texture, slope, moisture) so ecological sites can benefit from the body of information now available for plant communities of the USNVC. Specifically, the USNVC provides a systematic compilation of the characteristic species combinations of all known plant communities across the U.S., their climatic and site factors, and their key ecological processes and disturbance factors. As with soils, a key step is to sort through the information provided by the classification to determine which properties are most helpful in distinguishing sites. In addition, as the USNVC becomes increasingly built on quantitative vegetation and ecological information, it will provide better guidance on whether ecological sites should be lumped or split based on whether the same reference plant community types occur on multiple sites (suggesting sites are too fine) or whether multiple plant community types occur on the same site (suggesting sites are too lumpy). We suggest that the macrogroup (regional scale), group and alliance (local/site scale) levels of the USNVC will be of most use for these purposes.

1. **Vegetation Inventory and Mapping.** By linking USNVC plant community types to ecological sites, it becomes possible to systematically inventory and map the range of vegetation types found in and across ecological sites.
   1. **Inventory.** The plot data collected for the AIM program provide sufficient composition data for the plots to be readily keyed out to USNVC types, at least to the group level (alliance and association keys are not widely available). By also determining which ecological sites these plots occur on, users can provide an inventory and description of the range in variation of types found on ecological sites. And, in so far as plot data are part of a monitoring program, they document the changes in vegetation types occurring on ecological sites.
   2. **Vegetation Mapping**. There are several benefits to BLM from using the USNVC (integrated with ecological systems). Comprehensive maps of all rangeland and non-rangeland types have been completed through the Landfire project at the Group/Ecological System and Macrogroup levels. [A spatial scale that is broader than ecological sites] By overlaying these maps on MRLAs and on ecological sites, it is possible to obtain a general overview of the types and conditions of those MRLAs (including through the mapping of the invasive / ruderal types) and ecological sites. In turn, the plot data collected by AIM, if classified to the USNVC and to Systems, can be used to either help train future mapping of rangeland types or to provide accuracy assessment data for those maps.
2. **Condition Assessment and Monitoring.**  A major purpose for ecological sites, along with other tools that BLM uses, is to assess and monitor rangeland condition, in order to ensure that rangelands remain healthy and can sustainably provide the desired ecosystem services. Currently, indicators are available to assess rangeland health (Pellant et al. 2005) and a subset of those have been refined to monitor rangeland health (Herrick et al. 2005, 2009). But these are available only for rangelands, and they are largely focused on ground-based, relatively intensive and expensive, but accurate protocols. By integrating the USNVC (and its linkage with the ecological systems classification) with these rangeland tools, a wider set of assessment and monitoring protocols tracked by and developed for the USNVC are also available. Remote sensing based indicators of rangelands have been developed for BLMs REAs (Comer et al. 2013, Crist et al. 2014), specific to broadly distinct types of vegetation. Ground-based, rapid and intensive forest and wetland indicators of ecological integrity have been developed for many non-rangeland types, following very similar models to the rangeland indicators used by BLM (e.g. these models include indicators for Vegetation, Soils, and Hydrology). Nation-wide protocols are available for wetland assessments (Faber-Langendoen et al. 2012, Comer and Faber-Langendoen 2013) and a regional model is available for forest monitoring (Tierney et al. 2009).
   * 1. The USNVC and BLM’s Integrated Vegetation Management Handbook.

The use of the USNVC relates to a number of key vegetation management goals of BLM.

* 1. A common approach to managing vegetation is greatly facilitated by a common approach to classifying vegetation and the ecological sites they occur on.
  2. To “promote healthy, sustainable rangelands” requires identifying the diverse set of rangeland types and the distinctive reference conditions of those types.
  3. The USNVC can assist the BLM towards achieving its goals – “protecting, maintaining, and restoring ecologically diverse and properly functioning native plant communities on public lands.”

The topics we present in this report relate to a number of topics presented in the IVM Handbook (See Table xx)

Table XX. The relation of the topics presented in this report to that of the IVC Handbook. [this is a demo, not all topics have been finalized yet]

|  |  |  |  |
| --- | --- | --- | --- |
| **TABLE OF CONTENTS FOR THIS REPORT** | **SECTION IN THIS REPORT** | **CHAPTER IN IVM HANDBOOK** | **COMMENTS** |
| Common Terminology | Section D | Chapter 3 – Common Terminology |  |
| Ecological Sites and Vegetation | Section E | Chapter 4- Assessing Vegetation Condition |  |
| Inventory | Section F | Chapter 4 – Assessing Vegetation Condition |  |
| Mapping | Section G | ? | FRCC mapping is discussed in Chapter 4. |
| Rangeland Condition – Assessment and Monitoring | Section H | Chapter 4 – Assessing Vegetation Condition,  Chapter 5 -Addressing Vegetation in Planning Documents, Plan Implementation, Monitoring and Adaptive Management,  Chapter 6 - Treatment Selection and Effectiveness Monitoring |  |
| Best Management Practices | Not included | Chapter 7 – Best Management Practices |  |
| Using Native Plant Materials | Not included | Chapter 8 – Using Native Plant Materials |  |
| Funding and Budgets | Not included | Chapter 9 - Funding, Budget Development and Accomplishment Reporting |  |

* 1. COMMON TERMINOLOGY

This section defines some key terms in the USNVC and relates those to key terms defined in the IVM Handbook.

USNVC and BLM Terminology

This section follows the IVM Handbook, in order to identify the key features of the USNVC relevant to that Handbook.

* + 1. Defining Native Plant Communities
    2. Native Plant Communities are: “Plant Communities having the proper mix of native species, structures, and landscape mosaic consistent with the natural disturbance regime.”
    3. Native Plant Communities and a) desired plant community b) diverse plant community c) potential natural community d) resilient natural community and e) historic climax plant community
    4. Defining ruderals…
    5. Ecological Sites, BpS, Ecological Systems and USNVC Groups.
    6. Ecological Sites
    7. BpS
    8. Ecological System and USNVC Groups
    9. Clarifying PNV/BpS/HCPC/Systems

Insert and clarify issues identified in Yanoff et al. (2007) report comparing BpS to Ecological Sites.

* 1. VEGETATION TYPE INVENTORY
     1. Introduction

Why do you need to inventory vegetation? Broader applications to environmental assessment and planning.

* + 1. Case Studies to Introduce the NVC
       1. Big Sage Shrubland [under development] (just use two of these)
       2. Pinyon-Juniper Woodland [under development]
       3. Northwest Great Plains Mixedgrass Prairie
       4. Wetland type?
       5. Sherm Karl’s Ruderal example
       6. Jornada type (desert scrub or desert grassland)
    2. Mapping Vegetation

Intro to common map sources for inventory, etc. crosswalking standard for map integration

Ecological systems, landfire, maps

Validation of vegetation inventory products (e.g., maps)

* + - 1. Inventory of rare community types.
    1. Applications
       1. Wildlife Habitat Characterization

GSG habitat assessment (look at newly released WAFWA habitat assessment framework). May have alluded to veg units that should be gleaned as example material. Sage grouse forbs!

* + - 1. Special status species associated with vegetation
      2. Other environmental assessments and plans using vegetation

##### (e.g., gap analysis of ecological representation in ACECs); GPRA goals, etc.

* + - 1. Applications to Cultural Resource Inventory

Examples of species collections or other resources strongly tied to veg types; the link to subsequent assessment of changing conditions, etc.

* + 1. Ecological Sites and the USNVC
       1. Introduction

The USNVC can contribute to the needs of BLM to develop and refine ecological site descriptions and state and transition models, conduct inventory and mapping, and improve rangeland condition assessment and monitoring. To understand these contributions, we first provide a brief background on the key analytical tools in use by BLM.

* Scaling of Ecological Sites currently uneven across country, and only in preliminary stages of development in much of the east.
* Closely related ecological Sites can be grouped, and this may facilitate identifying common ecological and vegetation responses at broader scales (Table XX)

Table XX. Comparison of various scales of ecological land units to USNVC units.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Hierarchy** | **Ecological Land Units** | **Forest Service ECOMAP** | **USNVC** | **Example** |
| Regional | MRLA | Province | Division scale? Several broadly related dominant formations in a region? | Warm Semi-Desert in “Southeast Arizona Basin and Range MRLA 041  = N.A. Warm Desert Scrub & Grassland (D039) |
| Broad | Broadly related ecological sites | Land Type Association | Macrogroup | All grassland/semi-desert scrub ecological sites in Southeast Arizona  = Chihuahuan Semi-Desert Grassland (M087) |
| Medium | Cluster of closely related ecological sites | Land Type | Group (and Ecological System | Foothills ecosites  = Chihuahuan Desert Foothill-Piedmont & Lower Montane Grassland (G490) |
| Fine | Ecological Sites | Land Type Phase | Association, Alliance? | Loamy Slopes 16-20" p.z. / *Agave palmeri* - *Nolina microcarpa* / *Bouteloua curtipendula* - *Eragrostis intermedia* ( / Palmer's century plant - sacahuista / sideoats grama - plains lovegrass)  = USNVC association (TBD) |

* + - 1. Case Studies to introduce the NVC/ESD concept relationships
         1. Big Sage Shrubland [under development]
         2. Pinyon-Juniper Woodland [under development]
         3. Southeast Arizona Grasslands
         4. Northwest Great Plains Mixedgrass Prairie
         5. Jornada type (desert scrub or desert grassland)
    1. Detail of classification and State-and-Transition Models (all concepts)

Use of classification in STMs.

* + 1. Vegetation / Ecological Site Mapping and the USNVC

33 System Types for BLM climate change maps (cover 90% of the land). Cross section of types that help illustrate what the USNVC is about. Systems, BpS, Groups. ESDs mapped with soil polygon.

Current requirement for macrogroup, moving towards Groups

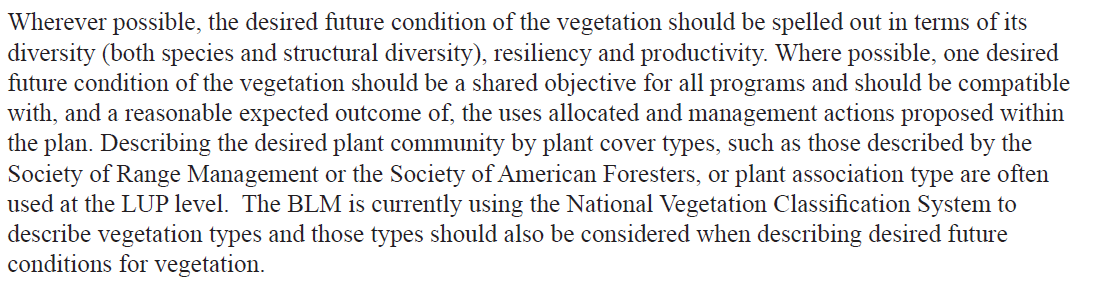
Illustrate crosswalk of: systems to Groups, (ask Jason Karl about Craters or other Idaho “cream of the crop”) Jason is at ARS in Las Cruces.

* Cool Semi-Desert
  + Big Sage
* Warm Desert
  + Chihuahuan Grasslands
* Great Plains
  + Northwest Mixedgrass Prairie
* Great Basin Woodlands
  1. ASSESSMENT OF VEGETATION TYPE CONDITION

The USNVC provides a multi-level hierarchy that allows users to scale up or down, depending on the application. Ecological Sites are a fine-scale land unit, which can be linked to fine-scale USNVC types. But for broad-scale assessments, such as BLMs Rapid Ecological Assessments (REAs), USNVC types can be scaled up, and help guide or link to broad-scale assessments.

What is a practical scale for stating desired conditions?

* + 1. Assessing Vegetation Condition
  1. Why assess Condition?
  2. Temporal Issues.
  3. Intro to Level 1-3 measures
  4. Techniques BLM uses to measure Condition.
     1. Condition and HCPC
     2. Condition and FRCC
     3. Condition and Rangeland Health Indicators / ESD
     4. Condition and Habitat Types
     5. Condition and Riparian Area Proper Functioning Condition
     6. Condition and Wildlife Habitat
  5. Condition and EIA / ESD / Systems / NVC Groups
     1. Designing a Framework for Integrated Vegetation Assessment.
        1. Multiple scales

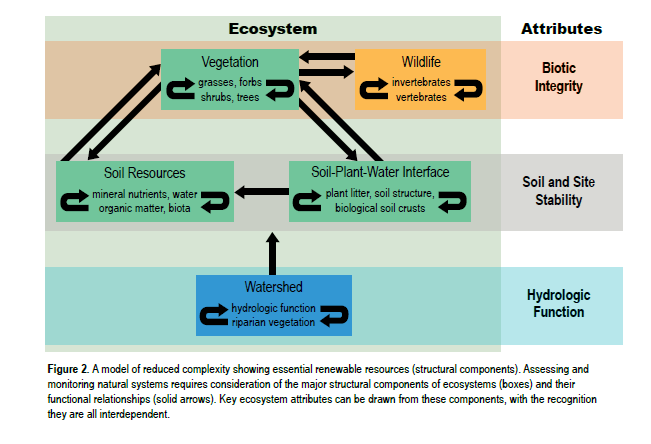
1. Regional
2. Specific Types
3. 
   * + 1. Landscape Ecoregion / Watershed (Regional Planning).

Watershed recommendation = 5th Unit (10 digit?) HUC. Preferably not allotments or pastures.

1. Proportion of desired plant community types
2. Proportion of overall seral status (or FRCC, or rangeland health) across plant community types.
3. Proportion of region covered in invasives
4. Wildlife habitat quality
5. Wildfire risk
6. Number and Size of Vegetation patches (fragmentation, hazardous fuel continuity)
7. Species Habitats that need regional perspective.
   * 1. Additional Considerations on Assessing Condition: USNVC and indicators

BLM has advanced the monitoring of the condition of a wider range of upland range types (grassland, savanna, steppe) through a careful selection of indicators (Herrick et al. 2005, 2009). Partners to the USNVC have been developing indicators for many other ecosystem types, including wetlands (Faber-Langendoen et al. 2012). By linking both rangeland and non range-land types to the USNVC, BLM will be able to readily access information on a variety of indicators for all ecosystem types found on BLM lands.

* + - 1. Ground-based Indicators

* + - 1. Remote-sensing Indicators
      2. Level 1 rangeland indicators developed by NatureServe for REAs.
    1. Case Studies of Assessing Vegetation Condition
       1. Broad Scale Rangeland Condition Assessment of Southeast Arizona Grasslands

In conclusion, this case study shows a variety of ways in which use of the USNVC can enhance current rangeland assessment methods at multiple scales.

* + - 1. Case Study – Fine Scale Rangeland Condition Assessment [under development]

Ecological site inventory is a condition assessment for a project or a local scale.

* 1. PLANNING VEGETATION TYPE MANAGEMENT
     1. Stating desired conditions –
        1. E.g. extent of types, condition of types, attributes of condition such as Fire regime departure
  2. MONITORING OF VEGETATION TYPE CONDITION

Focusing this section on change detection. Implementation of restoring desired conditions identified in a Condition Assessment framework.

* + 1. Addressing Vegetation in Planning, Monitoring and Adaptive Management
  1. AIM grid is documenting trends broadly vs.
  2. Effectiveness Monitoring (relates back to planning section)

AIM Assessment, Inventory and Monitoring (AIM) and plots.

\*\*\*\*

* 1. REPORTING
     1. Inventory of resource in public lands
     2. Effects of management across BLM lands; e.g, reporting progress of condition of GSG habitat
  2. SUMMARY OF ADVANTAGES AND LIMITATIONS OF THE USNVC FOR BLM

[To be developed in consultation with BLM].

* 1. REFERENCES
  2. APPENDICES