The United States National Vegetation Classification and International Collaborations

Scott B. Franklin
University of Northern Colorado, Greeley CO

http://esa.org/vegweb2/

www.usnvc.org
Outline of Talk

I. Introducing the USNVC
   i. Why a National Classification for US?
   ii. Partnership & Standard
   iii. EcoVeg Approach
   iv. Building the USNVC
   v. Infrastructure

II. Maintaining Dynamic Content
   i. The Peer Review Board
   ii. The Review Process

III. USNVC collaborations

IV. International Collaboration
   i. Development
   ii. VCWG of IAVS
Why a National Classification?

Disparate classification systems in the US existed for many natural resources and thus the United States created the Federal Geographic Data Committee (FGDC) with various subcommittees to formulate national standards. The charges to the FGDC Vegetation Subcommittee were to:

1. define and adopt standards for vegetation data collection and analysis,
2. facilitate inter-agency collaboration and inter-agency product consistency,
3. foster accuracy, consistency, and clarity in the structure, labeling, definition and application of a systematic vegetation classification for the U.S.,
4. establish a national set of standards for classifying existing vegetation,
5. develop minimum metadata requirements, and
6. collaborate between state, federal and international efforts (FGDC 2008).
FGDC Organized all Classifications

NGDA Themes

- Federal Geospatial Data Portfolio (NGDA Portfolio)
  - NGDA Theme
    - NGDA Dataset
    - NGDA Dataset
    - NGDA Dataset
  - NGDA Theme
    - NGDA Dataset
    - NGDA Dataset
    - NGDA Dataset
  - NGDA Theme
    - NGDA Dataset
    - NGDA Dataset
    - NGDA Dataset

- Biota
- Cadastre
- Climate and Weather
- Cultural Resources
- Elevation
- Geodetic Control
- Geology
- Governmental Units
- Imagery
- Land Use-Land Cover
- Real Property
- Soils
- Transportation
- Utilities
- Water – Inland
- Water – Oceans and Coasts
The Mission/Purpose of the Vegetation Subcommittee is: the coordination of terrestrial vegetative data-related activities among Federal agencies and the establishment of a mechanism for the coordinated development, use, sharing, and dissemination of terrestrial vegetation data.

Members include:

- Marianne Burke, USFS
- Mike Mulligan, USGS
- Gene Fults, NRCS
- Don Faber-Langendoen, NatureServe
- Scott Franklin, ESA
- Alexa McKerrow, USGS
- Kristin Snow, NatureServe

- Cliff Duke, ESA
- Jill Parsons, ESA
- Harbin Li, USFS
- Robert Peet, UNC/ESA
- Dave Tart, USFS
- John Dennis, NPS
- Michelle Cox, US Navy

- Carol Spurrier, BLM
- Nate Herold, NOAA
- Karl Brown, NPS
- Kathy Goodin, NatureServe
- Laurel Gorman, USACE
- Elizabeth Middleton, NASA
- Patrick Donnelly, FWS
NVC Partners
FGDC Vegetation Subcommittee

[Logos of various organizations, including USGS, Forest Service, National Park Service, NRCS, Department of Defense, Environmental Protection Agency, NASA, ESA Panel on Vegetation Classification, and NatureServe]
Goals of National Vegetation Classification (NVC) Standard

- Define and adopt standards for vegetation data collection and analysis
- Facilitate inter-agency collaboration and inter-agency product consistency
- Foster accuracy, consistency, and clarity in the structure, labeling, definition and application of a systematic vegetation classification for the U.S.
- Establish a national set of standards for classifying existing vegetation
- Develop minimum metadata requirements
- Collaborate between state, federal and international efforts
How does the NVC Classify Vegetation?

• The classification is **hierarchical** and incorporates the physiognomic (top 3 levels), general floristic-biogeographic (mid 3 levels), and detailed floristic (lowest 2 levels) criteria, guiding all criteria by ecological considerations.

• **Type Concept:** Extensive concepts describe the full membership or range of variation of a type in relation to other types.

• Like all biological systems, plant communities are temporally and spatially **dynamic**; they change at all possible scales.
USNVC: an EcoVeg Approach to Classification

- **Partners**: federal agencies, Ecological Society of America, NatureServe, Canadian agencies, Network.

- **Objectives**: provide a dynamic, multi-scaled ecosystem classification, applicable from international ecosystem red lists to sub-national EOs.

- **Major Deliverables**: comprehensive descriptions for all levels, posted on usnvc.org and NS Explorer, integrated with ongoing I&M and assessment programs (EPA wetlands, FIA forest inventory, ecoregional assessments, national mapping, etc).

- **Timeframe**: ongoing, with JAN 2016 deadline for first iteration of all levels.

- **Benefits**: Dynamic standard of ecosystem units shared by agency, academic and network partners, with practical links to mapping and assessments in concert with Ecological Systems.
Growth forms and floristic characteristics reflect ecological and biogeographic variables.

Vegetation with no apparent recent historical natural analogs...often composed of invasive species that have expanded with human influence.

Distinctive structure and composition that is determined by the response to human intervention.
Photo 1. Asian elephant passing through a tea plantation (cultural vegetation) in the Valparai plateau in Anamalai Hills of the western Ghats, India, on its way from one natural forest patch to another. Classifying the type of cultural vegetation is important.
All-Lands Approach

Proposed Planning Directives

• Ecological Integrity
  – Sustainability
  – Diversity

• Listed Species
  – Threatened & Endangered
  – Proposed, Candidate

• Social and Economic Sustainability
  – Cultural
  – Economy of communities
Two Main Explanatory Monographs

Standards for associations and alliances of the U.S. National Vegetation Classification

Michael D. Jennings, Don Faber-Langendoen, Orie L. Loucks, Robert K. Peet, and David Roberts

EcoVeg: a new approach to vegetation description and classification

Don Faber-Langendoen, Todd Keeler-Wolf, Del Meidinger, Dave Tart, Bruce Hoagland, Carmen Josse, Gonzalo Navarro, Serguei Ponomarenko, Jean-Pierre Saucier, Alan Weakley, and Patrick Comer
EcoVeg Approach*

Classify existing vegetation in context of ecological factors.

- **physiognomic characteristics** – strongest role in describing broad-scale vegetation patterns (e.g., UNESCO 1973), but relevant at all scales.
- **floristic characteristics** – strongest role for fine-scale vegetation patterns. (e.g., Braun-Blanquet approach).
  - Full floristics (overall composition)
  - Dominants
  - Diagnostic species
- **Ecological characteristics** plant communities respond to cumulative effects of climate, soil, geochemistry, topography, and disturbances. The vegetation is viewed as an integrated result of these ecological factors.
<table>
<thead>
<tr>
<th>Hierarchy Levels</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper</strong></td>
<td></td>
</tr>
<tr>
<td>Level 1 – Formation Class</td>
<td>Shrubland &amp; Grassland</td>
</tr>
<tr>
<td>Level 2 – Formation Subclass</td>
<td>Temperate &amp; Boreal Shrubland &amp; Grassland</td>
</tr>
<tr>
<td>Level 3 – Formation</td>
<td>Temperate Grassland &amp; Shrubland</td>
</tr>
<tr>
<td><strong>Mid</strong></td>
<td></td>
</tr>
<tr>
<td>Level 4 – Division</td>
<td>Great Plains Grassland &amp; Shrubland</td>
</tr>
<tr>
<td>Level 5 – Macrogroup</td>
<td>Great Plains Tallgrass Prairie</td>
</tr>
<tr>
<td>Level 6 – Group</td>
<td>Central Great Plains Tallgrass Prairie</td>
</tr>
<tr>
<td><strong>Lower</strong></td>
<td></td>
</tr>
<tr>
<td>Level 7 – Alliance</td>
<td>Big Bluestem – Indian grass Mesic Prairie</td>
</tr>
<tr>
<td>Level 8 – Association</td>
<td>Big Bluestem – Indian grass / Gayfeather Prairie</td>
</tr>
</tbody>
</table>
Shifting significance of traits through the hierarchy:

From FGDC 2008
Level 1 – Formation Class

- Forest Woodland (Mesomorphic)
- Shrubland & Grassland
- Desert & Semi-Desert Vegetation (Xeromorphic Vegetation)
- Aquatic Wetland Vegetation (Hydromorphic Vegetation)
- High Mountain Scrub and Grassland Vegetation (Cryomorphic Vegetation)
- Rock Vegetation (Lithomorphic Vegetation)

Agricultural Vegetation; Developed Vegetation
<table>
<thead>
<tr>
<th>Guideline</th>
<th>Division</th>
<th>Macrogroup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition (FGDC 2008)</td>
<td>A vegetation unit with broadly uniform growth forms and a broad set of diagnostic plant species at large biogeographic scales that reflect continental distinctions in climate, geology, substrates, hydrology, and disturbance regimes.</td>
<td>A vegetation unit that contains moderate sets of diagnostic plant species and diagnostic growth forms that reflect subcontinental to regional biogeographic composition and subcontinental to regional mesoclimate, geology, substrates, hydrology, and disturbance regimes.</td>
</tr>
<tr>
<td>Biogeography/floristics</td>
<td>Large scale, continental, biogeography with largely nonoverlapping floristics (i.e., most species ranges fully contained), species heterogeneity high. Global formations separated by continental-intercontinental patterns of species into divisions.</td>
<td>Subcontinental to regional ecological gradient segment (often mesoclimatic), reflected by sets of strongly diagnostic species (many species ranges fully contained); overall composition very distinct from other units.</td>
</tr>
<tr>
<td>Diagnostic species</td>
<td>A large suite of strongly diagnostic species (large number of character species among the diagnostic species; species have high fidelity but variable constancy).</td>
<td>Multiple sets of strong diagnostic species, including many strong differential and character species. Constant species become more important; at least 25% constancy expected.</td>
</tr>
<tr>
<td>Growth forms</td>
<td>Broadly uniform sets of growth forms and canopy closure (same as formation level, but variant expressions; e.g., conifer-dominated Rocky Mountain forest division vs. broad-leaf deciduous hardwood forests of Eastern North American forest division).</td>
<td>Broadly uniform sets of growth forms and canopy closure. May be specific growth form variants that support floristic patterns, e.g., herb vs. shrub, coastal soft-leaved chaparral vs. inland sclerophyll chaparral.</td>
</tr>
<tr>
<td>Climate</td>
<td>Continental macroclimate. Separates formations by continental or major intercontinental climatic patterns.</td>
<td>Subcontinental mesoclimate. Indicative of primary regional gradients in vegetation, e.g., latitudinal, altitudinal, continentality (major zonal or strong azonal gradients).</td>
</tr>
<tr>
<td>Disturbance regime/succession</td>
<td>Variable range of disturbance regimes consistent with continental expression of formation.</td>
<td>Broadly consistent, but variable disturbance regimes indicative of subcontinental climate (e.g., floods, large-scale fires).</td>
</tr>
<tr>
<td>Edaphic/hydrology</td>
<td>Broad range of conditions consistent with continental expression of formation (e.g., the divisions span floodplain and swamp conditions).</td>
<td>Broad range of conditions, sometimes reflective of broad topo-edaphic interactions with climate (e.g., large-scale drouth soils with or without fires) or broad-scale specialized geological substrates.</td>
</tr>
</tbody>
</table>
## EcoVeg Hierarchy: Cultural Vegetation

<table>
<thead>
<tr>
<th>Hierarchy Levels</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper</strong></td>
<td></td>
</tr>
<tr>
<td>Level 1 – Class</td>
<td>Anthromorphic Vegetation</td>
</tr>
<tr>
<td>Level 2 – Subclass</td>
<td>Herbaceous Agricultural Vegetation</td>
</tr>
<tr>
<td>Level 3 - Formation</td>
<td>Row and Close Grain Crop</td>
</tr>
<tr>
<td>Level 4 - Subformation</td>
<td>Graminoid Row Crop</td>
</tr>
<tr>
<td><strong>Mid</strong></td>
<td></td>
</tr>
<tr>
<td>Level 5 – Group</td>
<td>Tropical and Temperate Corn Crop</td>
</tr>
<tr>
<td>Level 6 – Subgroup</td>
<td>Temperate Corn Crop</td>
</tr>
<tr>
<td><strong>Lower</strong></td>
<td></td>
</tr>
<tr>
<td>Level 7 – Type</td>
<td>Zea mays Crop</td>
</tr>
<tr>
<td>Level 8 – Subtype</td>
<td>Zea mays var. saccharata–Zea mays var. rugosa Crop</td>
</tr>
</tbody>
</table>
Peer Review Board - ESA Panel

Building the USNVC & Maintaining the USNVC

Editor-in-Chief: Don Faber-Langendoen
20+ Associate editors

<table>
<thead>
<tr>
<th>Region</th>
<th>Regional Editor</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEST</td>
<td></td>
</tr>
<tr>
<td>Warm Desert</td>
<td>Este Muldavin</td>
</tr>
<tr>
<td>Californian</td>
<td>Todd Keeler-Wolf</td>
</tr>
<tr>
<td>Cool Semi-Desert</td>
<td>Marion Reid</td>
</tr>
<tr>
<td>Vancouverian</td>
<td>Del Meidinger</td>
</tr>
<tr>
<td>Rocky Mountain</td>
<td>Jack Triepke</td>
</tr>
<tr>
<td>GREAT PLAINS</td>
<td></td>
</tr>
<tr>
<td>Great Plains</td>
<td>Bruce Hoagland</td>
</tr>
<tr>
<td>EAST</td>
<td></td>
</tr>
<tr>
<td>Laurentian-Acadian</td>
<td>Don Faber-Langendoen</td>
</tr>
<tr>
<td>Central Interior-Midwest</td>
<td>Shannon Menard</td>
</tr>
<tr>
<td>Appalachian- Northeast</td>
<td>TBD</td>
</tr>
<tr>
<td>Southeast Coastal Plain</td>
<td>Alan Weakley</td>
</tr>
<tr>
<td>CARIBBEAN</td>
<td></td>
</tr>
<tr>
<td>Caribbean</td>
<td>TBD</td>
</tr>
<tr>
<td>BOREAL</td>
<td></td>
</tr>
<tr>
<td>Boreal-Subarctic</td>
<td>TBD (US)/Ken Baldwin (CA)</td>
</tr>
<tr>
<td>ARCTIC</td>
<td></td>
</tr>
<tr>
<td>Arctic / Alpine</td>
<td>TBD (US) / TBD (CA)</td>
</tr>
<tr>
<td>POLYNESIA</td>
<td></td>
</tr>
<tr>
<td>Hawaii</td>
<td>TBD</td>
</tr>
</tbody>
</table>
UPPER LEVELS
Formations

MID LEVELS
Div, MG, Group

LOWER LEVELS

Provisional Types
HRWG (FGDC 2008)

Provisional Types
(incomplete)
HRWG

Provisional Types & Descriptions
NatureServe, Biotics Database

Provisional Types
& Descriptions
HRWG

Provisional Types
(incomplete) &
Descriptions
NatureServe & partners

Alliance | Association
NatureServe

Peer Review

Screening Tool

Initial NVC Content
(Database Management)

Beta Release MAY 2015
Official Release JAN 2016

Peer Review - Lite

Formal Peer Review / Maintenance Review

2008

2009-2015

2016ff
Three Main Forms of Review:

• “General Review”
  – Completed by the “Associate Editor,” in charge of a number of groups within related macrogroups

• “Concept Review.”
  – Completed by Regional Peer Reviewers, who review one to several related groups usually within one or a few macrogroups, depending on their expertise

• Narrative Evaluation
  – Reviewer’s summary of questions:
    • Is the type definition valid?
    • What is needed or desired to improve description?
    • Is it well written and does it follow format?
    • Is plot data summarized or used in specific analysis?
<table>
<thead>
<tr>
<th>Criteria specific to Group:</th>
<th>Criteria Guidance</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does the group contain</td>
<td>For the group it is appropriate for diagnostics to be from the dominant stratum or growth form. The diagnostics should be moderate in number (at least 5), share a broadly similar structure and ecology, and occur across a relatively wide geographic range. The group usually contains many moderate differential species or two or more strong differential (character) species. The above rules of dominance may not apply in sparse vegetation (e.g., deserts, coasts, cliff and talus or aquatic vegetation)</td>
<td>y/n/u</td>
</tr>
<tr>
<td>appropriate number of</td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>diagnostic and dominant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>species from the dominant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>strata or growth form?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td>&lt;5 diagnostics listed However, other diagnostics not mentioned are Ephedra nevadensis, Salazaria mexicana, Menodora spinosa, and Thamnosma montana. Yucca schidigera and Coleogyne are not entirely characteristic since in other groups (but not as a diagnostic)</td>
<td></td>
</tr>
<tr>
<td>2. Are there diagnostic</td>
<td>For the group there should be several strong differential or characteristic species in other strata or growth forms in addition to those from the dominant stratum or growth form.</td>
<td>y/n/u</td>
</tr>
<tr>
<td>species from other than the</td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>dominant strata?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comment</td>
<td>Yes Yucca brevifolia in tree layer (since a scrub), many of the additional species mentioned in detailed comments are good differentials and characteristics, mostly in shrub stratum</td>
<td></td>
</tr>
</tbody>
</table>
Narrative Evaluation via SharePoint Example
Deliverables of Initial Review

1. Consistent description materials within levels for all known ‘concepts’ across US (a completed USNVC)
2. A level of quality associated with each description: Confidence level
   1. Provisional - insufficiently described; a guess
   2. Low – insufficient plot data, unpublished
   3. Medium – plot data and publications, but of varying quality
   4. High – high quality plot data, diagnostic species, specific environment, several publications
3. Basis for future efforts
Infrastructure

Searchable Classification

Explore The Classification

The USNVC Hierarchy Explorer provides detailed descriptions of vegetation types in the U.S. with ecological context and geographic ranges.

Searchable Classification

Concept Descriptions

USNVC Proceedings

Plot Data

VegBank

Explore plots

Find plots

Searchable Classification

The USNVC Hierarchy Explorer provides detailed descriptions of vegetation types in the U.S. with ecological context and geographic ranges.

Some levels of the USNVC are under development and review. For details see Status of the USNVC Natural Vegetation Hierarchy April 2015.

Beta Release of the USNVC for the Conterminous U.S. – May 5, 2015

Explore plots

Find plots

Download the NVCS database

(A Method Defined Text Format)
Searched Colorado for Class-Division; Only showing one Class
Clicked on one Division

Example Type Concept for one Association

### Association Detail Report: CEGL000387

**Picea pungens / Carex siccat Forest**

<table>
<thead>
<tr>
<th>Collapse All</th>
<th>Expand All</th>
</tr>
</thead>
</table>
| **Trans Name**: Blue Spruce / Dry-spike Sedge Forest
| **Colloquial Name**: |

#### Typo Concept

This blue spruce forest association occurs from Arizona and New Mexico north to Wyoming. This description is based on information from Grand Canyon National Park in Arizona, and additional global information will be added as it becomes available. This high-elevation association occurs on the North Rim from 2347 to 2683 m (7700-8802 feet) elevation in mesic environments. It occurs in canyons, cold-air drainage channels, and on adjacent skidpiles. Slopes are low to moderate (up to 30°) and are usually west- or south-facing. Soils are primarily silt loams. Stands have a high cover of litter, some bare soil, and occasionally significant moss cover. There is minor evidence of fire in several stands; however, the mesic nature of this association and its typical positioning along cold-air drainages have precluded any significant influence from fire. *Picea pungens*, *Pinus ponderosa*, and occasionally low cover of *Populus tremuloides* dominate the canopy of this mesic, mixed-conifer community. *Picea pungens*, *Populus tremuloides*, and *Abies concolor* are common components of the subcanopy. Shrub layers are typically sparse. *Juniperus communis* is the most frequent and abundant short shrub, while *Rosa woodsii* occurs occasionally as a dwarf shrub with extremely low cover. *Carex siccat* clearly dominates the herbaceous layer. *Poa fendleriana* and *Bromus balsamoides* are also common graminoids, typically at low cover. Forb cover is very sparse in this vegetation type. *Antennaria parviflora*, *Achillea millefolium*, and *Fragaria virginiana* are common components of the understory. Seedlings of *Populus tremuloides* are ubiquitous and seedlings of *Abies concolor* and *Picea pungens* are also very common. This association essentially hosts the highest species richness of all high-elevation, forested community types in Grand Canyon National Park, with 32 species per 400-square-meter plot. This may be a result of the vicinity of this vegetation type, which occurs in cold-air drainages, to the adjacent meadow communities (which are often particularly species-rich).

#### Classification

<table>
<thead>
<tr>
<th>Vegetation Hierarchy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class</strong>: Meromorph Tree Vegetation Class</td>
</tr>
<tr>
<td><strong>Subclass</strong>: 1.8 Temperate &amp; Boreal Forest &amp; Woodland Subclass</td>
</tr>
<tr>
<td><strong>Formation</strong>: 1.8.2 Cool Temperate Forest &amp; Woodland Formation</td>
</tr>
<tr>
<td><strong>Division</strong>: 1.8.2.1 Abies concolor - Pseudotsuga menziesii - Picea pungens Forest Macrogroup</td>
</tr>
<tr>
<td><strong>MacrogROUP</strong>: 1.8.2.1.1 Abies concolor - Pseudotsuga menziesii - Picea pungens Forest Macrogroup</td>
</tr>
<tr>
<td><strong>Group</strong>: 1.8.2.1.1.1 Abies concolor - Pseudotsuga menziesii - Picea pungens Forest Alliance</td>
</tr>
<tr>
<td><strong>Alliance</strong>: 1.8.2.1.1.1.1 Abies concolor - Pseudotsuga menziesii - Picea pungens Forest Alliance</td>
</tr>
</tbody>
</table>
FDGC 2008 Standard calls for:

1. Newly defined types to be supported by field data.

2. A permanent archive of plot data to support vegetation classification.

Also indexed in GIVD: Global Index of Vegetation Databases
Proposed data flow for dynamic classification

Researchers will submit proposals for changes

Legend
- External Action
- Internal Action
- Software Entity

USNVC Database
Classification Mgt.
US-NVC Panel
Proposal submission
Analysis & Synthesis

VegBank & other plot archives

NVC Web Viewer
Extraction
NVC Database
Classification Mgt.
US-NVC Panel
Peer Review
NVC Proceedings

Legend
- External Action
- Internal Action
- Software Entity

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Legend
- External Action
- Internal Action
- Software Entity
Maintaining Dynamic Content

Peer Review Board
Editor-in-Chief
Regional Associate Editors
Associate Editors

Determine type of review and coordinate

<table>
<thead>
<tr>
<th>Minor Edits</th>
<th>Full Peer Review</th>
<th>Expedited Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE only</td>
<td>• AE only</td>
<td>• Data variable</td>
</tr>
<tr>
<td></td>
<td>• Quantitative, good quality data</td>
<td>• Local study / range-wide persp.</td>
</tr>
<tr>
<td></td>
<td>• Range wide study</td>
<td>• Brief proposal</td>
</tr>
<tr>
<td></td>
<td>• Full proposal</td>
<td>• AE, 1 other (internal) review</td>
</tr>
<tr>
<td></td>
<td>• AE, 2 external reviewers, NVC team</td>
<td></td>
</tr>
</tbody>
</table>

Authors / Investigators can submit several types of changes to NVC

<table>
<thead>
<tr>
<th>Minor, non-Sig. edits</th>
<th>Mod/Maj Sig. edits Full data</th>
<th>Mod/Maj Sig. edits Min. data</th>
</tr>
</thead>
</table>

Significant Edits: Moderate = Type Revision; Major = New Type Concept
Data = vegetation plot, new literature publications, etc.

STANDARD

Investigators
Initial NVC types

The National Vegetation Classification
1. High confidence types (Level 1)
   A. Quantitative analysis
   B. High quality classification plots
   C. Sufficient geographic and habitat coverage
   D. Full peer review
2. Moderate confidence types (Level 2)
   A. Not sufficiently quantitative or
   B. Not sufficiently broad geographically
   C. High quality classification plots
   D. Full peer review
3. Low confidence types (Level 3)
   A. Mostly qualitative
   B. Local studies
   C. Expedited peer review

Proposals
1. New types
2. Revisions of types
3. Promotion of a type’s confidence level

Expedited Peer Review

Region

<table>
<thead>
<tr>
<th>Region</th>
<th>WEST</th>
<th>GREAT PLAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm Desert</td>
<td>Californian</td>
<td>Great Plains</td>
</tr>
<tr>
<td>Cool Semi-Desert</td>
<td>Vancouverian (North Pacific)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rocky Mountain</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>EAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laurentian-Acadian</td>
<td>Central Interior-Midwest</td>
</tr>
<tr>
<td>Appalachian- Northeast</td>
<td>Southeast Coastal Plain</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>CARIBBEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caribbean</td>
<td>BOREAL</td>
</tr>
<tr>
<td></td>
<td>Boreal-Subarctic</td>
</tr>
<tr>
<td>ARCTIC</td>
<td>Arctic / Alpine</td>
</tr>
<tr>
<td>POLYNESIA</td>
<td>Hawaii</td>
</tr>
</tbody>
</table>
Peer Review Process

Essentially similar to journal submission, but with more interaction among reviewers/authors: proposal of change is submitted

Goal is to **improve** NVC

### 5-Year Timeframe

1. **Concept Change**
2. **Non-Concept Change**
3. **One L1-L5 Peer Review Board Member**
4. **L1-L5 Peer Review Board**
5. **Editor-in-Chief**
6. **Database Manager updates USNVC content**

### Continuous Review: Annual Update

1. **Proposer**
2. **Concept Change**
3. **Regional Editor(s)**
4. **Specialist Reviewers**
5. **USNVC Input**
6. **Associate Editor(s)**
7. **Conference Call**
8. **Editor-in-Chief**
9. **Database Manager updates USNVC content**
10. **Author publishes new/ altered concept in Proceedings**

**Note:** Database manager maintains ability to fix typographic errors
USNVC: Applications

• LANDFIRE sequence tables
  – has relied on sequence table process to support labeling of plot data for mapping Ecological Systems, this year they are expanding that effort to include NVC macrogroups and groups.

• FIA AutoKey
  – NatureServe is working with FIA to develop auto-keys for labeling FIA plots to macrogroups and groups for eastern forests.

• BLM Instruction Memorandum
  – Providing guidance to field offices with respect to use of the NVC standard.

• NPS Vegetation Inventory
  – Field data collection and vegetation classification work.

• NRCS Ecological Site Descriptions
  – Field data, cross-walking to NVC Types
SCIENTIFIC BASIS FOR EcoVeg

Don Faber-Langendoen, Todd Keeler-Wolf, Del Meidinger, Dave Tart, Bruce Hoagland, Carmen Josse, Gonzalo Navarro, Serguei Ponomarenko, Jean-Pierre Saucier, Alan Weakley, and Patrick Comer

• Describe vegetation types at multiple thematic scales, from formations (biomes) to fine-scale associations (biotopes).
• Inventory vegetation and ecosystem patterns within and across landscapes and ecoregions.
• Support status and trends of ecosystems.
• Facilitate interpretation of long-term and short-term vegetation change.
• Track ecosystem responses to invasive species, land use, and climate change.

EcoVeg currently guides the U.S. National Vegetation Classification (NVC), Canadian NVC, Bolivian NVC, and the International Vegetation Classification (IVC), including North America, South America, Africa, and all grasslands.
Crosswalking to the middle and lower levels is necessary to refine and improve map products and to facilitate data sharing among agencies and partners.

For example, the ecological systems classifications used by ReGAP, Landfire, and NatureServe can be crosswalked to or nested within the Macrogroup (Level 5), Group (Level 6) and Alliance (Level 7) levels of the new NVC hierarchy.
**Objectives:** Encourage the application of the NVC Standard in all field offices throughout the bureau. Land Use Plans required to report at Macrogroup level.

**Timeframe** Ongoing

**Benefits:** Standardized map legends for use in land use management planning at a variety of scales. Facilitate the all lands approach to inventory and monitoring.

---

**NVCS classification categories related to planning use scales.** These are only general examples; assessment and planning needs and purposes should dictate the degree of vegetation description needed.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Examples</th>
<th>NVCS Classification Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad-Scale</td>
<td>Global</td>
<td>Climate Change Assessments</td>
</tr>
<tr>
<td></td>
<td>Continental / National</td>
<td>National Trend Assessments</td>
</tr>
<tr>
<td></td>
<td>National /Regional</td>
<td>Trend Assessments</td>
</tr>
<tr>
<td>Mid-Scale</td>
<td>Regional</td>
<td>Regional Plans &amp; Tread Assessments</td>
</tr>
<tr>
<td></td>
<td>Sub-regional, State &amp; Sub-basins</td>
<td>State-level Conservation Assessments &amp; Plans, RMP’s, Sub-basin Assessments</td>
</tr>
<tr>
<td></td>
<td>Activity Plans / Project Plans</td>
<td>Watershed Assessments, County Plans/ BLM Activity Plans / Project Plans</td>
</tr>
<tr>
<td>Fine Scale</td>
<td>Project Plans</td>
<td>Project Assessments &amp; Plans / Special Area Plans (e.g. ACEC's)</td>
</tr>
<tr>
<td></td>
<td>Site Plans</td>
<td>Site Descriptions and Plans</td>
</tr>
</tbody>
</table>
Currently developing an official Vegetation Classification Working Group of the International Association of Vegetation Scientists

**General scope:** vegetation classification at any spatial or organizational scale, particularly the underlying methodologies and standards, ultimately allowing greater understanding and crosswalks among national classification systems.

**Steering Committee**
Scott Franklin (Chair)  
John Hunter (Secretary)  
Flavia Landucci  
Miquel De Cáceres  
Jürgen Dengler  
Pavel Krestov

163 members of 41 countries on 6 continents
1. Development of IAVS WG – Steering committee
2. Increase our international network – Steering committee
3. Comparing and finding commonalities between approaches – Dave Roberts
4. Course scale vegetation classification – Pavel Krestov and Javier Loidi
5. Fine scale vegetation classification – Miquel De Cáceras and Flavia Landucci
6. Appropriate methods for survey and analysis - TBD
7. Publication introducing WG and need for global collaboration for classification – TBD
8. WG Web Page – Miquel De Cáceres

<table>
<thead>
<tr>
<th>Current Chinese Members</th>
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<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yuan Jiang</td>
<td>Liping Li</td>
<td></td>
</tr>
<tr>
<td>Jian Ni</td>
<td>Runguo Zang</td>
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<tr>
<td></td>
<td>China</td>
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<td>China</td>
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</tbody>
</table>
## EcoVeg and Other Hierarchies

<table>
<thead>
<tr>
<th>USNVC</th>
<th>Blaun-Blanquet</th>
<th>Brown et al. 1998</th>
<th>Rübel</th>
<th>Song Yongchang &amp; Map of Veg. for PR China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>L1-Formation Class</td>
<td>Formation</td>
<td>Formation-type</td>
<td>Formation</td>
<td>Type Group Vegetation Type Subtype</td>
</tr>
<tr>
<td>L2-Formation Subclass</td>
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<tr>
<td>L3-Formation</td>
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<tr>
<td>Mid</td>
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<tr>
<td>L4-Division</td>
<td>Division</td>
<td>Biotic Community</td>
<td></td>
<td>Formation Group Formation Subformation</td>
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<tr>
<td>L5-Macrogroup</td>
<td>Class</td>
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<td></td>
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<tr>
<td>L6-Group</td>
<td>Order</td>
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<tr>
<td>Lower</td>
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<tr>
<td>L7-Alliance</td>
<td>Alliance</td>
<td>Series/Alliance Association</td>
<td>Alliance Association</td>
<td>Association Group Association (subassociation)</td>
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<td>L8-Association</td>
<td>Association</td>
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<tr>
<td>USNVC</td>
<td>USNVC Example</td>
<td>China</td>
<td>PR Map &amp; Song Example</td>
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<tr>
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</tr>
<tr>
<td><strong>Upper</strong></td>
<td></td>
<td></td>
<td>Example Comparison that NEEDS Expertise</td>
<td></td>
</tr>
</tbody>
</table>
| Level 1 – Formation Class | Shrub & Grass Vegetation *[mesomorphic]* | | | ????
| Level 2 – Formation Subclass | Temperate & Boreal Shrubland & Grassland | Type Group | Broad-leaved Forest |
| Level 3 - Formation | Temperate Grassland & Shrubland | Vegetation Type | Evergreen Broadleaved Forest |
| **Mid** | | | |
| Level 4 – Division | Great Plains Grassland & Shrubland | Vegetation Subtype/ Formation Group | Typical Evergreen Broad-leaved Deciduous Forest |
| Level 5 – Macrogroup | Tallgrass Prairie Grassland | | |
| Level 6 – Group | Central Tallgrass Prairie | Subformation/ Collective Group | Eastern *Cyclobalanus*
| **Lower** | | | |
| Level 7 – Alliance | Big Bluestem – Indian grass Grassland | Association Group/ Dominance Type | *Cyclobalanus* spp. |
| Level 8 – Association | Big Bluestem – Indian grass / Gayfeather Grassland | Association / Community | *Serissa serisoides/ Cyclobalanopsis glauca* Comm. |
U. S. National Vegetation Classification

Slides stolen from: Marianne Burke, Don Faber-Langendoen, Alexa McKerrow, Todd Keeler-Wolf, & Bob Peet

http://esa.org/vegweb2/