

# The United States National Vegetation Classification and International Collaborations

Scott B. Franklin

University of Northern Colorado, Greeley CO



Vegetation  
Classification Panel

<http://esa.org/vegweb2/>



[www.usnvc.org](http://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

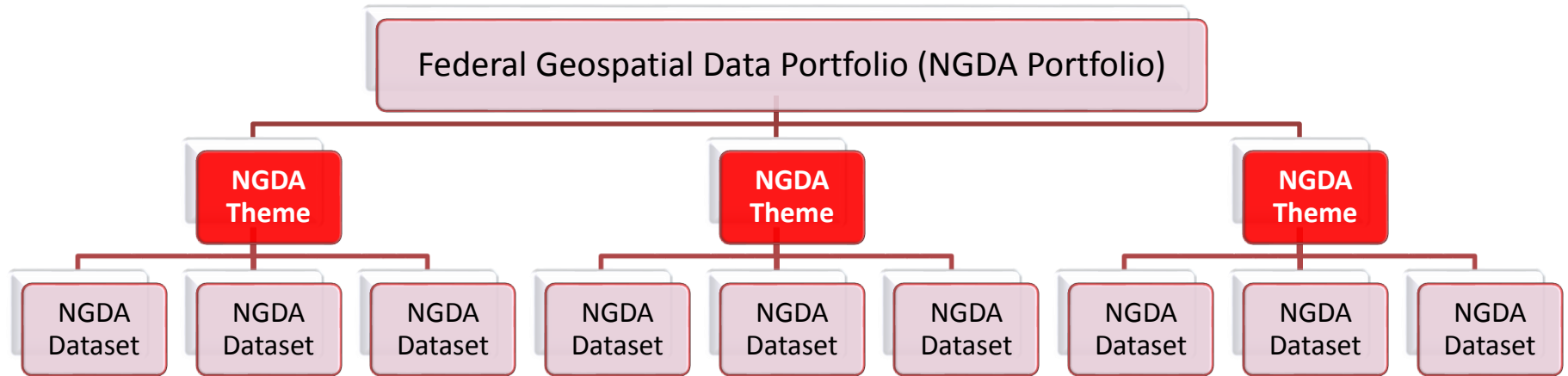
# Why a National Classification?

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



- 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

# FGDC Vegetation Subcommittee

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



# 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

FGDC-STD-005-2008 (Version 2)



**NATIONAL VEGETATION CLASSIFICATION  
STANDARD, VERSION 2**

Vegetation Subcommittee  
Federal Geographic Data Committee

February 2008

# How does the NVC Classify Vegetation?

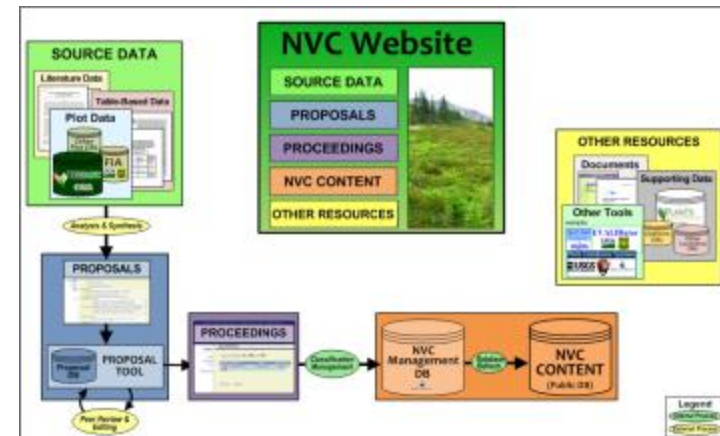
- The classification is hierarchical and incorporates the physiognomic (top 3 levels), general floristic-biogeographic (mid 3 levels), and detailed floristic (lowest 2 levels) criteria, guiding all criteria by ecological considerations.
- **Type Concept:** Extensive concepts describe the full membership 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.



# From Natural to Cultural

## Natural Vegetation

Growth forms and floristic characteristics reflect ecological and biogeographic variables

## Ruderal Vegetation

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

## Cultural Vegetation

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 impor-



# 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

*Ecological Monographs*, 79(2), 2009, pp. 173–199  
© 2009 by the Ecological Society of America

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

MICHAEL D. JENNINGS,<sup>1,2,7</sup> DON FABER-LANGENDOEN,<sup>3</sup> ORIE L. LOUCKS,<sup>4</sup> ROBERT K. PEET,<sup>5</sup> AND DAVID ROBERTS<sup>6</sup>

*Ecological Monographs*, 84(4), 2014, pp. 533–561  
© 2014 by the Ecological Society of America

## EcoVeg: a new approach to vegetation description and classification

DON FABER-LANGENDOEN,<sup>1,11</sup> TODD KEELER-WOLF,<sup>2</sup> DEL MEIDINGER,<sup>3,12</sup> DAVE TART,<sup>4</sup> BRUCE HOAGLAND,<sup>5</sup> CARMEN JOSSE,<sup>1</sup> GONZALO NAVARRO,<sup>6</sup> SERGUEI PONOMARENKO,<sup>7</sup> JEAN-PIERRE SAUCIER,<sup>8</sup> ALAN WEAKLEY,<sup>9</sup> AND PATRICK COMER<sup>10</sup>

# EcoVeg Approach\*

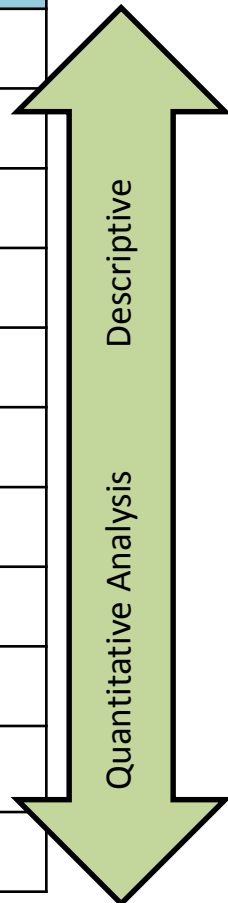
Classify **existing** vegetation in context of ecological factors.

- **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.

# EcoVeg Hierarchy: Natural Vegetation

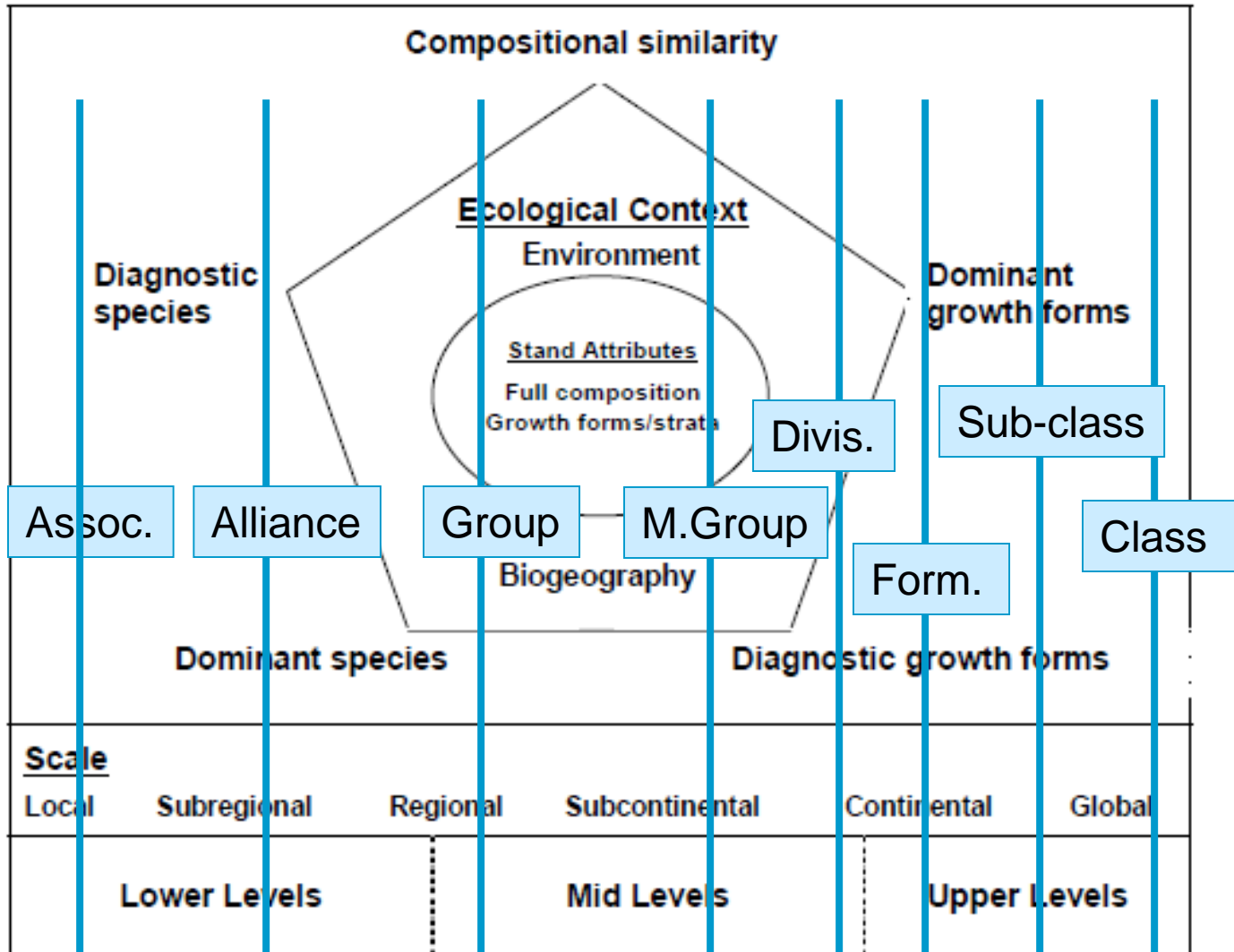
Analytical  
Methods

Hierarchy Levels	Example
<b>Upper</b>	
Level 1 – Formation Class	Shrubland & Grassland
Level 2 – Formation Subclass	Temperate & Boreal Shrubland & Grassland
Level 3 - Formation	Temperate Grassland & Shrubland
<b>Mid</b>	
Level 4 – Division	Great Plains Grassland & Shrubland
Level 5 – Macrogroup	Great Plains Tallgrass Prairie
Level 6 – Group	Central Great Plains Tallgrass Prairie
<b>Lower</b>	
Level 7 – Alliance	Big Bluestem – Indian grass Mesic Prairie
Level 8 – Association	Big Bluestem – Indian grass / Gayfeather Prairie



# 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

Guideline	Level	
	Division	Macrogroup
Definition (FGDC 2008)	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.	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.
Biogeography/floristics	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.	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.
Diagnostic species	A large suite of strongly diagnostic species (large number of character species among the diagnostic species; species have high fidelity but variable constancy).	Multiple sets of strong diagnostic species, including many strong differential and character species. Constant species become more important; at least 25% constancy expected.
Growth forms	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).	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.
Climate	Continental macroclimate. Separates formations by continental or major intercontinental climatic patterns.	Subcontinental mesoclimate. Indicative of primary regional gradients in vegetation, e.g., latitudinal, altitudinal, continentality (major zonal or strong azonal gradients).
Disturbance regime/succession	Variable range of disturbance regimes consistent with continental expression of formation.	Broadly consistent, but variable disturbance regimes indicative of subcontinental climate (e.g., floods, large-scale fires).
Edaphic/hydrology	Broad range of conditions consistent with continental expression of formation (e.g., the divisions span floodplain and swamp conditions).	Broad range of conditions, sometimes reflective of broad topo-edaphic interactions with climate (e.g., large-scale droughty soils with or without fires) or broad-scale specialized geological substrates.

# EcoVeg Hierarchy: Cultural Vegetation

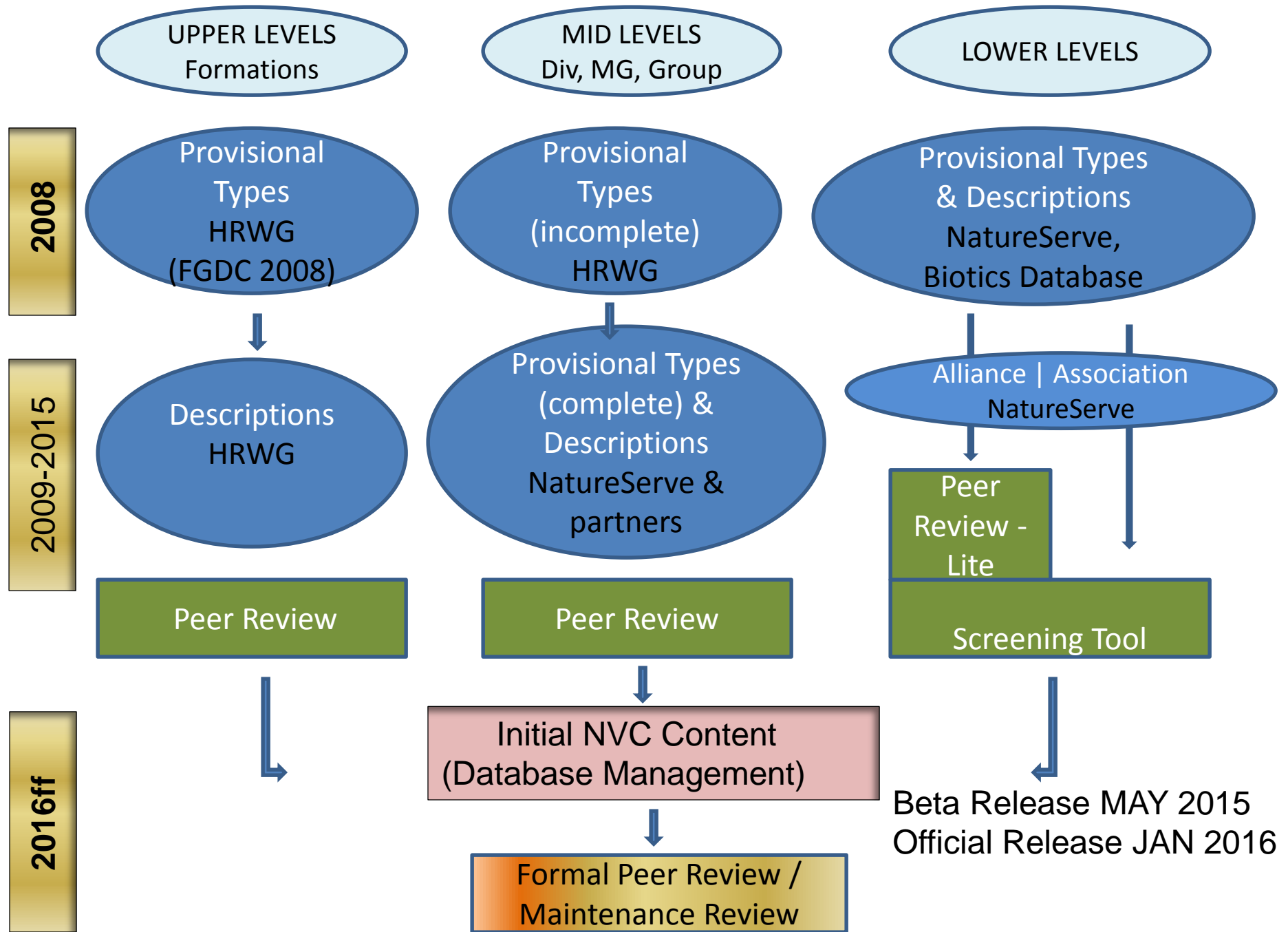
Hierarchy Levels	Example
<b>Upper</b>	
Level 1 – Class	Anthromorphic Vegetation
Level 2 – Subclass	Herbaceous Agricultural Vegetation
Level 3 - Formation	Row and Close Grain Crop
Level 4 - Subformation	Graminoid Row Crop
<b>Mid</b>	
Level 5 – Group	Tropical and Temperate Corn Crop
Level 6 – Subgroup	Temperate Corn Crop
<b>Lower</b>	
Level 7 – Type	<i>Zea mays</i> Crop
Level 8 – Subtype	<i>Zea mays</i> var. <i>saccharata</i> – <i>Zea mays</i> var. <i>rugosa</i> Crop

# Peer Review Board - ESA Panel

## Building the USNVC & Maintaining the USNVC

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

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



# 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?

# Concept Review Form Example

Criteria specific to Group:	Criteria Guidance	Scoring yes (y) no (n) uncertain (u)
1. Does the group contain appropriate number of diagnostic and dominant species from the dominant strata or growth form?	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)	y/n/u  <u>yes</u>
Comment	<u>&lt; 5 diagnostics listed However, other diagnostics not mentioned are <i>Ephedra nevadensis</i>, <i>Salazaria mexicana</i>, <i>Menodora spinosa</i>, and <i>Thamnosma montana</i>. <i>Yucca schidigera</i> and <i>Coleogyne</i> are not entirely characteristic since in other groups (but not as a diagnostic)</u>	
2. Are there diagnostic species from other than the dominant strata?	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.	y/n/u  <u>yes</u>
Comment	<u>Yes <i>Yucca brevifolia</i> in tree layer (since a scrub) , many of the additional species mentioned in detailed comments are good differentials and characteristics, mostly in shrub stratum</u>	

# Narrative Evaluation via SharePoint Example

3. Xeromorphic Scrub & Herb Vegetation (Semi-Desert)  
3 A.1. Warm Semi-Desert Scrub & Grassland  
3 A.1 a. North American Warm Desert Scrub & Grassland  
MG088. Mojave-Sonoran Semi-Desert Scrub

## [Peer Review] [837244] G296. Mojave Mid-Elevation Mixed Desert Scrub Group

LeadResp / Assignment: West / Keith  
Reviewers: LAC, W

### OVERVIEW

**Database Code for Type:** G296

**Scientific Name:** *Yucca (brevifolia, schidigera)* - *Coleogyne ramosissima* Mixed Desert Scrub Group

**Common Name (Translated Scientific Name):** (Joshua Tree, Mojave Yucca) - Blackbrush Mixed Desert Scrub Group

**Colloquial Name:** Mojave Mid-Elevation Mixed Desert Scrub Group

**Hierarchy Level:** Group

**Placement in Hierarchy:** MG088. Mojave-Sonoran Semi-Desert Scrub

### Type Concept:

This group represents the extensive desert scrub in the transition zone above *Larrea tridentata* - *Ambrosia dumosa* desert scrub and below the lower montane woodlands (700-1800 m elevation) that occurs in the eastern and central Mojave Desert, and portions of the western Mojave. It is also common on lower piedmont slopes in the transition zone into the southern Great Basin. The vegetation in this group is quite variable. *Larrea tridentata* may be absent or present to codominant in some examples, but typically does not dominate. Characteristic and sometimes dominant species include *Coleogyne ramosissima*, *Eriogonum fasciculatum*, *Ephedra nevadensis*, *Grayia spinosa*, *Lycium* spp., *Menodora spinescens*, *Nolina* spp., *Peucephyllum schottii*, *Opuntia acanthocarpa*, *Salazaria mexicana*, *Viguiera parishii*, *Yucca brevifolia*, or *Yucca schidigera*. Less common are stands with scattered Joshua trees and a saltbush short-shrub layer dominated by *Atriplex canescens*, *Atriplex confertifolia*, or *Atriplex polycarpa*, or occasionally *Hymenoclea salsola*. In some areas in the western Mojave, *Juniperus californica* is common with the yuccas. *Grayia spinosa* is a common codominant shrub in disturbed stands. Desert grasses, including *Achnatherum hymenoides*, *Achnatherum speciosum*, *Muhlenbergia porteri*, *Pleuraphis jamesii*, *Pleuraphis rigida*, or *Poa secunda*, may form an herbaceous layer. Scattered *Juniperus osteosperma* or warm desert scrub species may also be present. Other good indicators include the shrubs or sub-shrubs: *Sphaeralcea ambigua*, *Stephanomeria pauciflora*, *Psoralea arborescens*, *Encelia virginensis*, *Muhlenbergia porteri*, *Psoralea fremontii*, *Salvia mojaviensis*, *Martonia utahensis*, *Buddleia utahensis*

### Classification Comments:

#### Similar NVC Types:

#### Diagnostic Characteristics [highly recommended]:

The presence of *Yucca brevifolia* or *Yucca schidigera* are diagnostic of this type, as is *Coleogyne ramosissima* which is often a dominant (but not strongly diagnostic) species. The widespread desert shrub *Larrea tridentata* may be absent or present to codominant in some stands, but typically does not dominate here as it does at lower elevations. This is a diverse group, and stands may also be dominated or codominated by *Ephedra nevadensis*, *Eriogonum fasciculatum*, *Grayia spinosa*, *Lycium andersonii*, *Juniperus californica*, *Menodora spinescens*, *Nolina parryi*, *Peucephyllum schottii*, *Salazaria mexicana*, and *Viguiera parishii*. *Calcophiles* such as *Martonia utahensis*, *Buddleia utahensis* occur in the limestone mountains of the central and eastern Mojave in this zone and *Stephanomeria pauciflora*, *Psoralea arborescens*, *Encelia virginensis*, *Muhlenbergia porteri*, *Psoralea fremontii*, *Salvia mojaviensis* are also good character species of the group, though may not form dominant stands.

#### Rationale for Nominal Species or Physiognomic Features:

*Yucca brevifolia*, *Yucca schidigera*, and *Coleogyne ramosissima* are conspicuous (tree yucca) or often dominant (blackbrush) in this mixed desert scrub group. Many other species may dominate, but several

**Comment:** *Yucca schidigera* is more widespread and ranges to the coast of San Diego Co, not strictly MOJAVE.

**Comment:** *Coleogyne* ranges well beyond the Mojave, a better diagnostic would be *Salazaria mexicana*, *Thamnosia montana*.

**Formatted:** Highlight

**Comment:** this is debatable depending on which ecological boundary is used. if you don't include *Coleogyne*, then it does not overlap with the Great Basin desert. I think the desert's boundaries should be defined largely by vegetation indicators.

**Comment:** characteristic of Mojave/Great Basin transition, not really of the entire group.

**Comment:** *Poa* is really not characteristic of the Mojave it also occurs widely in the northern Sonoran desert.

**Deleted:** characteristic and either

**Deleted:** few are as




# 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 U.S. National  
Vegetation 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

**USNVC Hierarchy Explorer**

Explore the classification by searching the NVCS database by **keywords**, by **selecting a subset of the hierarchy**, or by **selecting states on the map**. These criteria can be used in combination or separately.

Search by Keyword:

**Download**

Download the NVCS database  
(6MB, *Delimited Text Format*)

## Plot Data



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Map Key: plots [Larger Map](#)

1-49	50-99	100-249
250-999	1,000-3,000	3,000+

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**Data in VegBank**

Plots	86,840
—Classified Plots	71,739
—to NVC communities	7,367
Plant Concepts	291,922
—accepted by USDA	97,017
—and on plots	8,493
Community Concepts	23,945
—in the NVC	8,887
—and on plots	8

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## Concept Descriptions



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**Highlights**

## USNVC Proceedings

### USNVC Proceedings

Find proceedings by typing a title, author, or keyword into the search box below

# Explore The Classification



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## USNVC Hierarchy Explorer

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Search by Keyword:  ⓘ

Download

Download the NVCS  
database  
(6MB, Delimited Text  
Format)

Searched Colorado  
fro Class-Division;  
Only showing one  
Class

### ▼ 1 Mesomorphic Tree Vegetation Class ⓘ

#### ▼ 1.B Temperate & Boreal Forest & Woodland Subclass ⓘ

- ▼ 1.B.1 Warm Temperate Forest & Woodland Formation ⓘ
  - ▼ 1.B.1.Nd Madrean & Southwest Great Plains Warm Temperate Woodland & Scrub Division ⓘ
- ▼ 1.B.2 Cool Temperate Forest & Woodland Formation ⓘ
  - ▼ 1.B.2.Na *Acer saccharum* - *Fagus grandifolia* - *Quercus rubra* Forest & Woodland Division ⓘ
  - ▼ 1.B.2.Nb Rocky Mountain Cool Temperate Forest Division ⓘ
  - ▼ 1.B.2.Nc Western North American Cool Temperate Woodland & Scrub Division ⓘ
- ▼ 1.B.3 Temperate Flooded & Swamp Forest Formation ⓘ
  - ▼ 1.B.3.Na *Populus deltoides* - *Fraxinus* spp. - *Acer* spp. Eastern North American Flooded & Swamp Forest Division ⓘ
  - ▼ 1.B.3.Nc *Populus angustifolia* - *Populus balsamifera* - *Picea engelmannii* Rocky Mountain & Great Basin Montane Flooded & Swamp Forest Division ⓘ
  - ▼ 1.B.3.Nd *Populus fremontii* - *Platanus wrightii* - *Celtis laevigata* Southwest North American Flooded Forest Division ⓘ

Clicked on one  
Division

- ▼ 1.B.2.Nb Rocky Mountain Cool Temperate Forest Division [↗](#)
  - ▼ M022 *Abies concolor* - *Pseudotsuga menziesii* - *Picea pungens* Forest Macrogroup [↗](#)
    - ▼ G225 *Abies concolor* - *Picea pungens* - *Pseudotsuga menziesii* Mesic Southern Rocky Mountain Forest Group [↗](#)
      - ▼ A0165 *Picea pungens* Forest Alliance [↗](#)
        - CEGL000387 *Picea pungens* / *Carex siccata* Forest [↗](#)

Example Type  
Concept for one  
Association

## Association Detail Report: CEGL000387

### *Picea pungens* / *Carex siccata* Forest

Print Report

Collapse All :: Expand All

**Translated Name:** Blue Spruce / Dry-spike Sedge Forest

**Colloquial Name:**

#### ▼ Type 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 sideslopes. 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 siccata* clearly dominates the herbaceous layer. *Poa fendleriana* and *Bromus ciliatus* are also common graminoids, typically at low cover. Forb cover is very sparse in this vegetation type. *Antennaria parvifolia*, *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

##### Vegetation Hierarchy

<b>Class</b>	1 Mesomorphic Tree Vegetation Class
<b>Subclass</b>	1.B Temperate & Boreal Forest & Woodland Subclass
<b>Formation</b>	1.B.2 Cool Temperate Forest & Woodland Formation
<b>Division</b>	1.B.2.Nb Rocky Mountain Cool Temperate Forest Division
<b>Macrogroup</b>	1.B.2.Nb.1 <i>Abies concolor</i> - <i>Pseudotsuga menziesii</i> - <i>Picea pungens</i> Forest Macrogroup
<b>Group</b>	1.B.2.Nb.1.d <i>Abies concolor</i> - <i>Picea pungens</i> - <i>Pseudotsuga menziesii</i> Mesic Southern Rocky Mountain Forest Group
<b>Alliance</b>	1.B.2.Nb.1.d <i>Picea pungens</i> Forest Alliance

[www.vegbank.org](http://www.vegbank.org)

The screenshot shows the VEGBANK website with a search bar at the top containing 'plots'. Navigation links include HOME, FAQ, SUBMIT DATA, ABOUT, MY ACCOUNT, and SITE MAP. The main content area is divided into several sections:
 

- Find Plots:** Includes links for 'Browse plots', 'Simple search', 'Search with a map', and 'Advanced plot search'. Below is a map of the United States with colored regions.
- Plant Taxa:** Links for 'What is a plant concept?', 'Browse plants', 'Search plants', and 'Submit plants'.
- Plant Communities:** Links for 'What is a community?', 'Search communities', and 'Submit communities'.
- Supplemental Data:** Links for 'People', 'Stratum methods', 'Cover methods', 'Projects', 'References', and 'Search supplemental data'.
- Data in VegBank:** A table showing counts for various categories: Plots (86,840), Classified Plots (71,739), NVC communities (7,367), Plant Concepts (291,922), accepted by USDA (97,017), and on plots (8,481); Community Concepts (23,945), in the NVC (8,887), and on plots (8).
- Recently Added Plots:** A table listing projects like 'Virginia Heritage', 'West Virginia NHP', 'NJ Mark Wong', and 'CDFG lands Region4 2004-2005' with their respective dates.
- Tools:** Links for 'Map your own plots', 'VegBranch client database', and 'Data matrix normalizer'.

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**

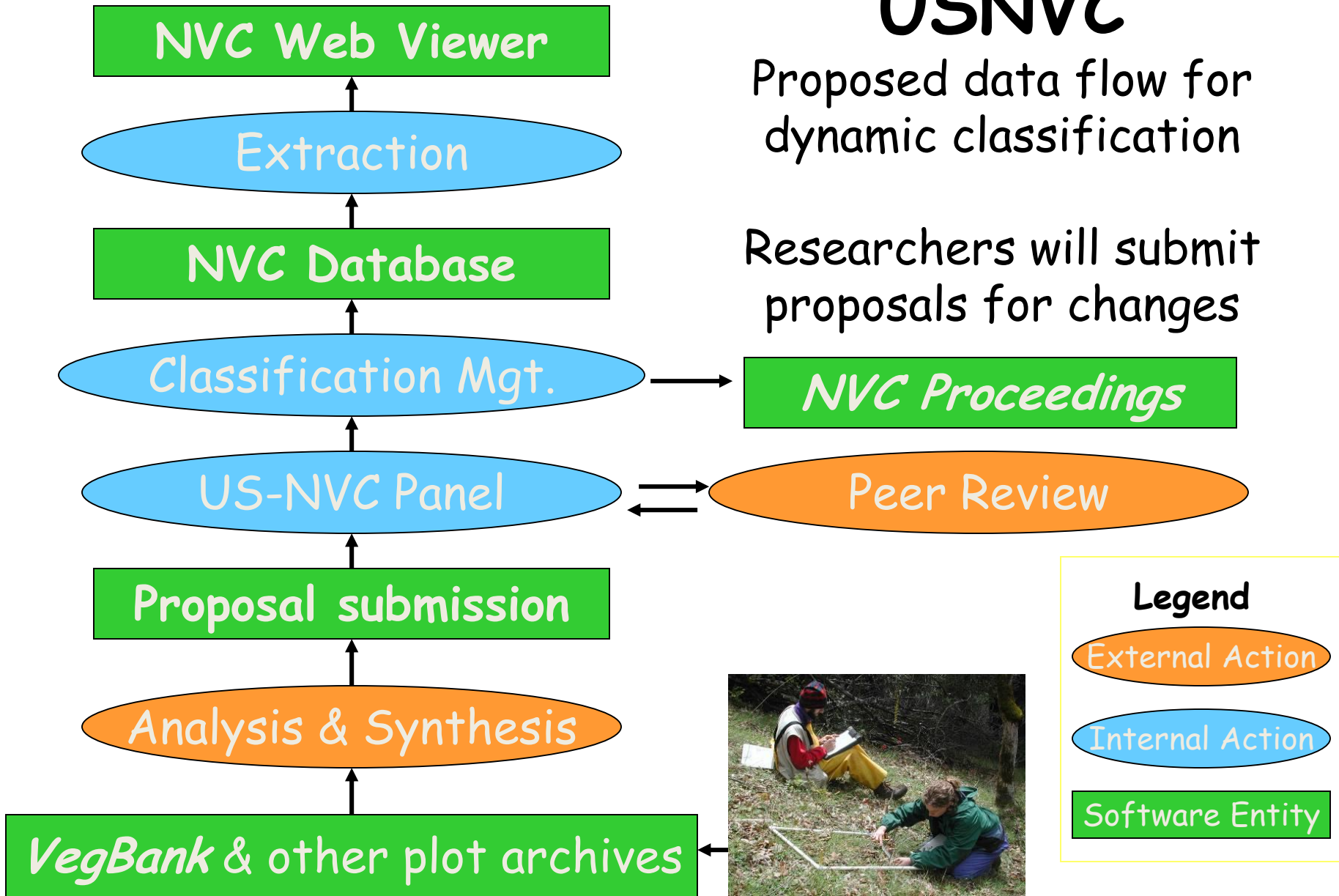
add all query results to datacart, add plots on page to datacart, drop plots on page from datacart

Add/Drop	Author Code	Plants Found on Plot		Plot Communities
		Plot Location	Change plant label: ?	
Plot #1	001-Schieb-90a Colorado, United States » Details...	» <i>Bouteloua dactyloides</i> ** (37.5%) » <i>Opuntia polyacantha</i> ** (37.5%) » <i>Bouteloua gracilis</i> ** (7.5%) » <i>Aristida purpurea</i> ** (7.5%) » <i>Gutierrezia sarothrae</i> ** (7.5%)	Current Interpretation, Scientific Name without authors	No data
Plot #2	001-01-Brandt6.9 Colorado, United States » Details...	» <i>Bouteloua gracilis</i> ** (62.5%) » <i>Bouteloua dactyloides</i> ** (37.5%) » <i>Pascopyrum smithii</i> ** (3.5%) » <i>Opuntia polyacantha</i> ** (3.5%) » <i>Chrysothamnus viscidiflorus</i> ** (3.5%)		No data
Plot #3	001-01-Brandt6.5 Colorado, United States » Details...	» <i>Agropyron cristatum</i> ** (37.5%) » <i>Yucca glauca</i> ** (37.5%) » <i>Bouteloua gracilis</i> ** (37.5%) » <i>Vulpia octiflora</i> ** (17.5%) » <i>Hesperostipa comata</i> ** (17.5%)		No data
Plot #4	001-01-Brandt2.7 Colorado, United States » Details...	» <i>Bouteloua gracilis</i> ** (85%) » <i>Opuntia polyacantha</i> ** (3.5%) » <i>Lichen</i> ** (1.5%) » <i>Bouteloua hirsuta</i> ** (0.505%) » <i>Bouteloua dactyloides</i> ** (0.505%)		No data
Plot #5	001-Schieb-7A Colorado, United States » Details...	» <i>Pascopyrum smithii</i> ** (37.5%) » <i>Bassia scoparia</i> ** (3.5%) » <i>Artemisia filifolia</i> ** (3.5%) » <i>Chenopodium sp.</i> ** (3.5%) » <i>Ambrosia psilostachya</i> ** (1.5%)		No data
Plot #6	001-Schieb-4A Colorado, United States » Details...	» <i>Bouteloua dactyloides</i> ** (37.5%) » <i>Pascopyrum smithii</i> ** (17.5%) » <i>Opuntia polyacantha</i> ** (3.5%) » <i>Astragalus sp. #2</i> ** (0.505%) » <i>Salsola tragus</i> ** (0.505%)		No data
Plot #7	001-01-Brandt2.1 Colorado, United States » Details...	» <i>Agropyron cristatum</i> ** (62.5%) » <i>Unknown sp.</i> ** (62.5%) » <i>Vulpia octiflora</i> ** (37.5%) » <i>Bromus tectorum</i> ** (37.5%) » <i>Pascopyrum smithii</i> ** (17.5%)		No data

# USNVC

Proposed data flow for dynamic classification

Researchers will submit proposals for changes



# Maintaining Dynamic Content

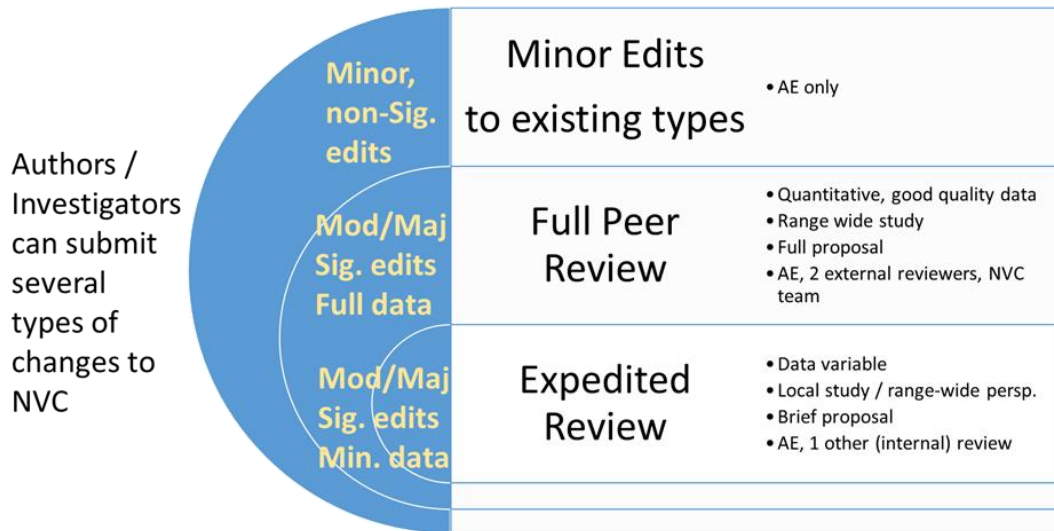
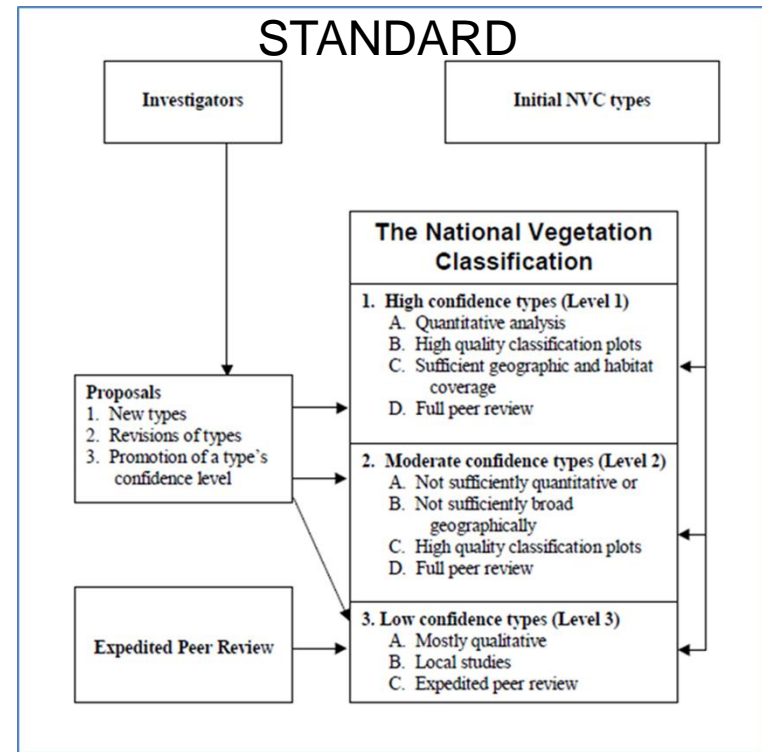
## Peer Review Board

Editor-in-Chief

Regional Associate Editors

Associate Editors

Determine **type** of review and coordinate



Authors / Investigators can submit several types of changes to NVC

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

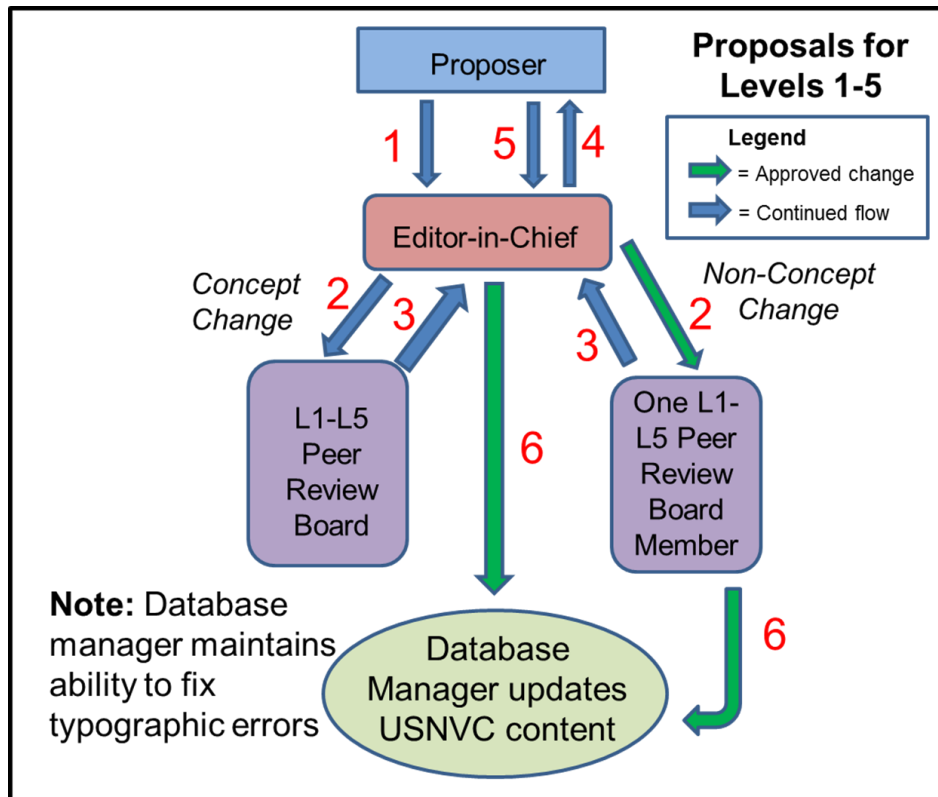
	Region
WEST	Warm Desert
	Californian
	Cool Semi-Desert
	Vancouverian (North Pacific)
	Rocky Mountain
GREAT PLAINS	Great Plains
EAST	Laurentian-Acadian
	Central Interior-Midwest
	Appalachian- Northeast
	Southeast Coastal Plain
CARIBBEAN	Caribbean
BOREAL	Boreal-Subarctic
ARCTIC	Arctic / Alpine
POLYNESIA	Hawaii

# Peer Review Process

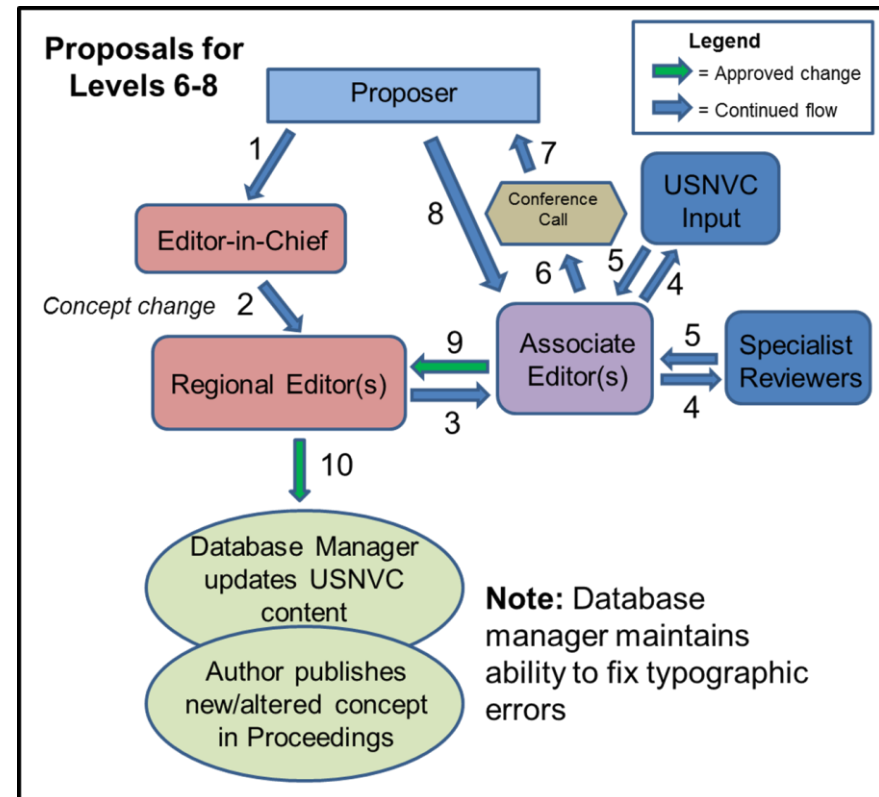
Essentially similar to journal submission, but with more interaction among reviewers/authors: proposal of change is submitted

Goal is to **improve NVC**

5-Year Timeframe



Continuous Review: Annual Update





# 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

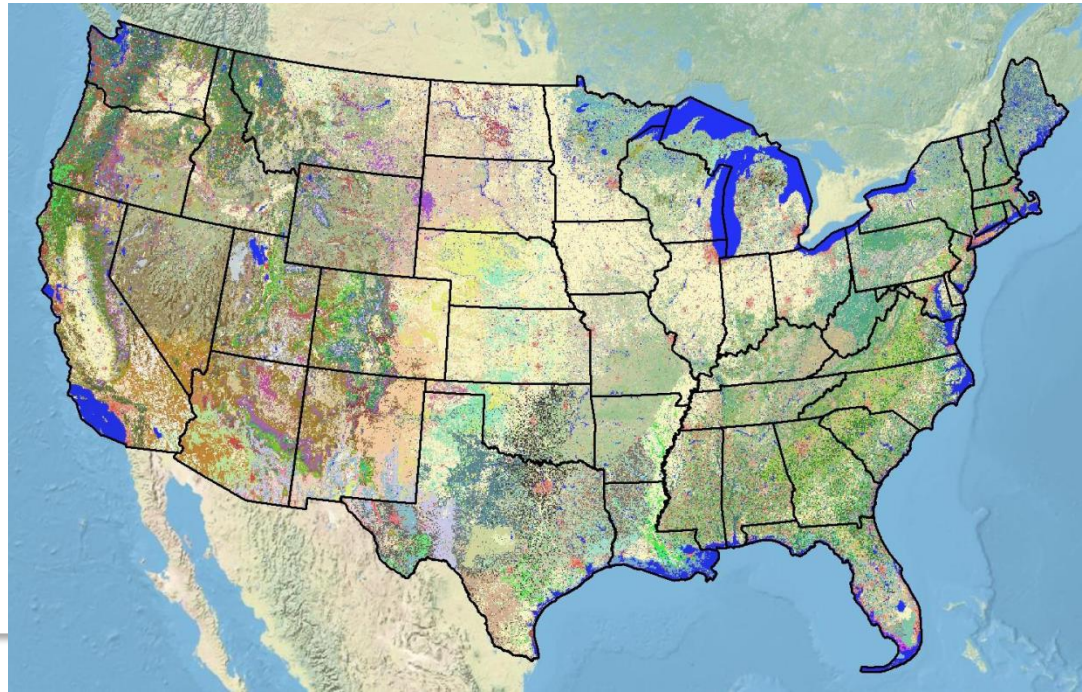
- describe vegetation types at multiple thematic scales, from formations (biomes) to fine-scale associations (biotopes).
- inventory vegetation and ecosystem patterns within and across landscapes and ecoregions.
- support status and trends of ecosystems.
- facilitate interpretation of long-term and short-term 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.



# Bureau of Land Management – Guidance to Field Offices

- 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.**

Scale	Examples	NVCS Classification Categories
Broad-Scale	Global	Climate Change Assessments Class
	Continental / National	National Trend Assessments Sub-class
	National /Regional	Trend Assessments Formation
Mid-Scale	Regional	Regional Plans & Tread Assessments Division
	Sub-regional, State & Sub-basins	State-level Conservation Assessments & Plans, RMP's, Sub-basin Assessments Macrogroup
	Activity Plans / Project Plans	Watershed Assessments, County Plans/ BLM Activity Plans / Project Plans Group
Fine Scale	Project Plans	Project Assessments & Plans / Special Area Plans (e.g. ACEC's) Alliance
	Site Plans	Site Descriptions and Plans Association

# International Collaborative Efforts



*Applied Vegetation Science* 18 (2015) 543–560

## SYNTHESIS

### A comparative framework for broad-scale plot-based vegetation classification

Miquel De Cáceres, Milan Chytrý, Emiliano Agrillo, Fabio Attorre, Zoltán Botta-Dukát, Jorge Capelo, Bálint Czúcz, Jürgen Dengler, Jörg Ewald, Don Faber-Langendoen, Enrico Feoli, Scott B. Franklin, Rosario Gavilán, François Gillet, Florian Jansen, Borja Jiménez-Alfaro, Pavel Krestov, Flavia Landucci, Attila Lengyel, Javier Loidi, Ladislav Mucina, Robert K. Peet, David W. Roberts, Jan Roleček, Joop H.J. Schaminée, Sebastian Schmidlein, Jean-Paul Theurillat, Lubomír Tichý, Donald A. Walker, Otto Wildi, Wolfgang Willner & Susan K. Wisser

# GIVD

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.



WRITE BACK WRITE BACK



### How a national vegetation classification can help ecological research and management

Peer-reviewed letter

The elegance of classification lies in its ability to compile and systematize various terminological conventions and masses of information that are unattainable during typical research projects. Imagine a discipline without standards for collection, analysis, and interpretation; unfortunately, that describes much of 20th-century vegetation ecology. With differing meth-

### 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

# Tasks and Leaders of VCWG

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

## **Current Chinese Members**

Yuan	Jiang	China
Liping	Li	China
Jian	Ni	China
Runguo	Zang	China

# EcoVeg and Other Hierarchies

USNVC	Blaun-Blanquet	Brown et al. 1998	Rübel	Song Yongchang & Map of Veg. for PR China
Upper				?????????
L1-Formation Class L2-Formation Subclass L3-Formation	Formation	Formation-type	Formation	Type Group Vegetation Type Subtype
Mid				
L4-Division L5-Macrogroup L6-Group	Division Class Order	Biotic Community		Formation Group Formation Subformation
Lower				
L7-Alliance L8-Association	Alliance Association	Series/Alliance Association	Alliance Association	Association Group Association (subassociation)

# Example Comparison that NEEDS Expertise

USNVC	USNVC Example	China	PR Map & Song Example
<b>Upper</b>			
Level 1 – Formation Class	Shrub & Grass Vegetation <i>[mesomorphic]</i>	????????	
Level 2 – Formation Subclass	Temperate & Boreal Shrubland & Grassland	Type Group	Broad-leaved Forest
Level 3 - Formation	Temperate Grassland & Shrubland	Vegetation Type	Evergreen Broadleaved Forest
<b>Mid</b>			
Level 4 – Division	Great Plains Grassland & Shrubland	Vegetation Subtype/ <i>Formation Group</i>	Typical Evergreen Broad-leaved Deciduous Forest
Level 5 – Macrogroup	Tallgrass Prairie Grassland		
Level 6 – Group	Central Tallgrass Prairie	Subformation/ <i>Collective Group</i>	Eastern <i>Cyclobalanus</i>
<b>Lower</b>			
Level 7 – Alliance	Big Bluestem – Indian grass Grassland	Association Group/ <i>Dominance Type</i>	<i>Cyclobalanus</i> spp.
Level 8 – Association	Big Bluestem – Indian grass / Gayfeather Grassland	Association / <i>Community</i>	<i>Serissa serisoides</i> / <i>Cyclobalanopsis glauca</i> Comm.



# U. S. National Vegetation Classification



Financial Support  
of Panel:



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



**Vegetation  
Classification Panel**

<http://esa.org/vegweb2/>



[www.usnvc.org](http://www.usnvc.org)