# History of the ESA Panel on Vegetation Classification and United States National Vegetation Classification System

Scott B. Franklin, Biological Sciences, University of Northern Colorado, Greeley, CO; Robert K. Peet, Department of Biology, University of North Carolina, Chapel Hill, NC; David Roberts, Department of Ecology, Montana State University, Bozeman, MT; Orie L. Loucks, Miami University, Oxford, OH; Michael Jennings, Department of Geography, University of Idaho, Moscow, ID; Alexa McKerrow, Core Science Analytics, Synthesis & Libraries, United States Geological Survey, Raleigh, NC; Don Faber-Langendoen, Conservation Science Division, NatureServe,

The Partners

This poster gives a concise history of the ESA Vegetation Classification Panel and development of the National Vegetation Classification from concept to completion.

Implementation of the

Standard includes five

the Partners.

core activities shared by

## FGDC Vegetation Subcommittee and Panel Partners

The objective of a natural-scientific vegetation classification is to both provide a suitable summary of types and their relationships to each other and a tool for stewardship and research. Intuitively, baseline knowledge of what exists on the landscape aids management decisions, and hundreds of site-specific classifications exist. These specialized classifications use different methods to collect data, different criteria for classifying, and different criteria for describing classified units. The United States, therefore, developed the Federal Geographic Data Committee to come up with standards for classifying the Nation's resources. To this end, several subcommittees were established to focus on specific resources, and the Vegetation Subcommittee was charged with 1) defining and adopting standards for vegetation data collection and analysis, 2) facilitating inter-agency collaboration and inter-agency product consistency, 3) fostering accuracy, consistency, and clarity in the classification, 4) establishing a national set of standards for classifying existing vegetation, 5) developing minimum metadata requirements, and 6) collaborating state, federal and international efforts (FGDC 2008). The FGDC Vegetation Subcommittee was established in 1991 and developed partnerships with NatureServe and ESA's Vegetation Classification Panel. The first memorandum of understanding was signed in April 1999.

## Where did the Panel come from? (started in 1993)

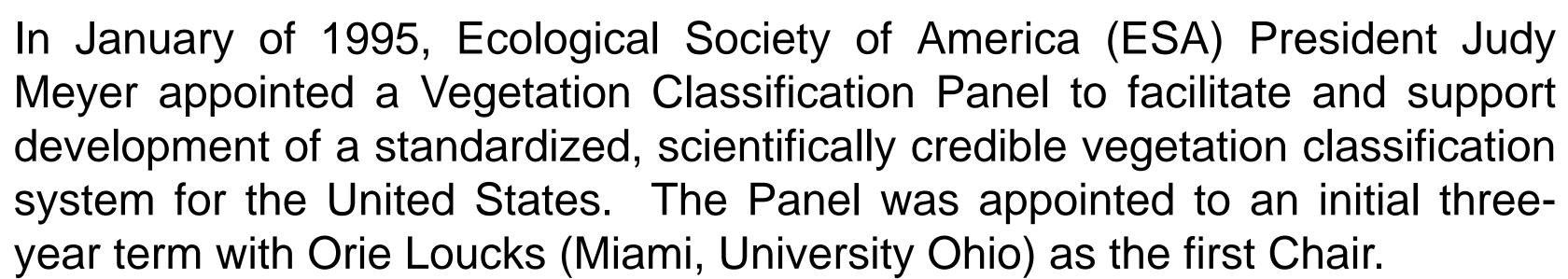
In 1993, Bob Peet organized a symposium at ESA titled "Vegetation Classification in Contemporary Ecology." The goal of the symposium, and a coordinated workshop developed by Dennis Grossman, was to learn about the various classification programs in the United States, look for cooperation of these programs, and potentially develop a national classification. Follow the symposium, Peet (1994) suggested "what we need now is (1) an enthusiastic willingness to collaborate, (2) an agreed upon set of methods for collecting data, and (3) a shared appreciation of the broad value of this sort of research for conservations, management, and for simply understanding natural systems and processes." In 1994, Jerry Franklin subsequently established a special committee for this effort (see letter below).

The Keological Society of America

vement in national and continental vegetation classifications. I am appointing

Dr. Michael Jennings, National Coordinator of GAP Analysis, Idaho Fish and Wildlife Cooperative Research Unit, University of Idaho, Moscow, ID 83843; 208-885-7223 Dr. Robert K. Peet, Professor, Biology Department, University of North Carolina, Chapel Hill, NC

Center, USDA-ARS, 800 Park Blvd., Plaza 4, Suite 105, Boise, ID 83712; 208-334-1363 Dr. Marilyn Walker, Director of Facility for Regional Ecosystem Analysis, INSTAAR, Campus Box 45 Boulder, CO 80309; 303-492-5276



The first official meeting of the Panel was at Rice University in conjunction with IAVS, where the Panel also coordinated an NSF-funded Symposium and workshop, "Broad-scale North American Mapping and Classification.

During subsequent years, Panel members participated in several meetings to face the challenge of standardizing classification research and disseminating the Standards (symposia & field trips).



Portland Field Trip, 2012



Membership History

The Panel became an official standing committee of ESA in 2009 (see ESA By-law below)

11.2. Standing committees that report to the Vice President for Science.

D) Vegetation Classification Panel. The Vegetation Classification Panel is responsible for (1) facilitating and supporting the development, implementation, and use of a standardized vegetation classification for the United States; (2) guiding professional ecologists in defining and adopting standards for vegetation sampling and analysis in support of the classification; (3) collaborating with partner organizations to maintain scientific credibility of the classification through oversight of a peer review system; and (4) promoting and facilitating international collaboration in development of vegetation classifications and associated standards.

## Developing the National Vegetation Classification (1993-2015)

The Panel and partners worked first to develop a national standard of vegetation classification, published in 1997 (originally developed from the physiognomically-based UNESCO hierarchy) and revised in 2008 through an international subcommittee, the Hierarchy Revisions Working Group. The Standard supports the use of a consistent national vegetation classification system (NVCS) to produce uniform statistics in vegetation resources from vegetation cover data at the national level. The Standard outlines an eight-level hierarchical classification system that is dynamic (see below)

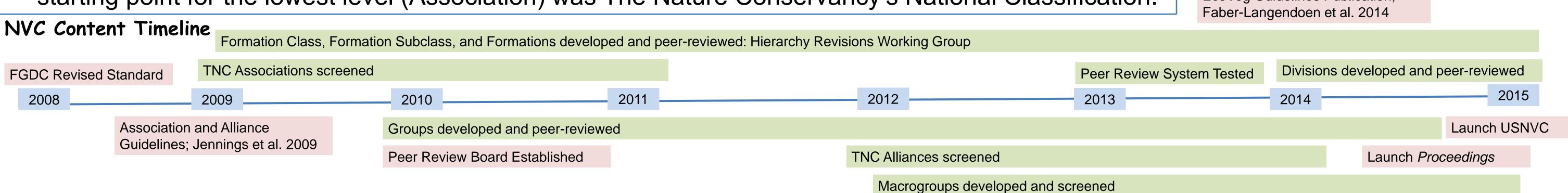
and based on existing vegetation

and based on existing vegetation.	
Revised Hierarchy	Example
Upper	
Level 1 – Formation Class	Shrubland & Grassland [mesomorphic]
Level 2 – Formation Subclass	Temperate & Boreal Shrubland & Grassland
Level 3 - Formation	Temperate Grassland, Meadow & Shrubland Formation
Mid	
Level 4 – Division	Great Plains Grassland & Shrubland
Level 5 – Macrogroup	Great Plains Tallgrass Prairie & Shrubland
Level 6 – Group	Central Great Plains Tallgrass Prairie Group
Lower	
Level 7 – Alliance	Big Bluestem - Indiangrass Herbaceous
Level 8 – Association	Big Bluestem - Switchgrass - Little Bluestem - (Tharp's Spiderwort) Herbaceous Vegetation

**Conceptual Framework of Hierarchy** cological Conte Full composition

## Implementing the Standard (formally started in 2008)

Development of content (descriptions of all classification types) has been the bulk of the tasks for Partners between 2006 and 2015 when the USNVC should be launched. Adequate data for a plot-based classification of vegetation do not exist in the US; thus, the starting point for the lowest level (Association) was The Nature Conservancy's National Classification. EcoVeg Guidelines Publication;



#### Core Activities: Maintaining Dynamic Content & Supporting Data

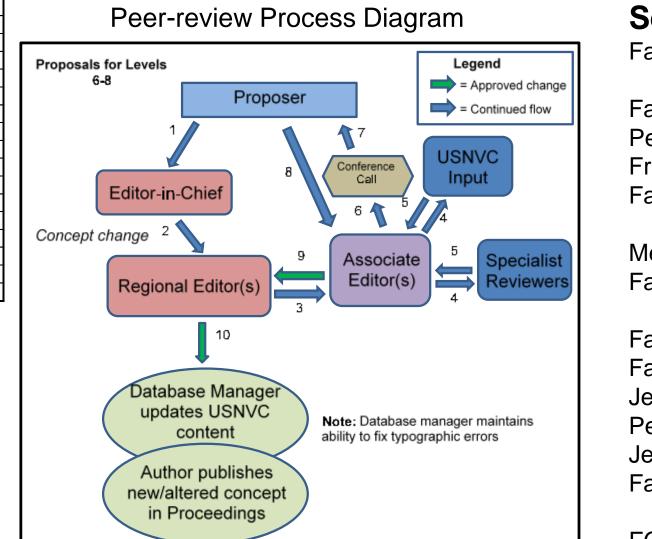
This activity involves not only maintaining a database with the descriptions of all types at all levels, currently maintained by NatureServe, with a browser launched in 2014, but also a database of plot records (VegBank established in 2002) used to substantiate the USNVC.

#### Core Activities: Submit Proposals and Review Proposals

In addition, all vegetation communities will change over time, and climate change and exotic invasions are likely to produce novel communities. For this reason, any classification must be dynamic. Thus, the USNVC is a dynamic content standard with provisions for formal peer-reviewed modifications at all levels of the hierarchy (Jennings et al. 2009; Faber-Langendoen et al. 2009). A peer-review process was developed in 2014 that incorporates a Peer Review Board and local vegetation experts (Franklin et al. 2012).

### **Core Activity: Document Changes**

Accepted changes are published in the *Proceedings*, launched in 2014, and revised type descriptions are subsequently incorporated into the USNVC; thus a dynamic content.



#### Selected Publications Related to the Development of the NVC

- Faber-Langendoen, D., T. Keeler-Wolf, D. Meidinger, D. Tart, B. Hoagland, C. Josse, G. Navarro, S. Ponomarenko, J.-P. Saucier, A. Weakley, P. Comer. 2014. EcoVeg: A new approach to vegetation description and classification. Ecological Monographs (in press).
- Faber-Langendoen D., Comer P., Josse C., 2012. An Introduction to the International Vegetation Classification. NatureServe, Arlington, Va
- Peet, R.K., M.T. Lee, M.D. Jennings, & D. Faber-Langendoen. 2012. VegBank a permanent, open-access archive for vegetation-plot data. Biodiversity and Ecology 4: 233-241. Franklin, S., D. Faber-Langendoen, M. Jennings, T. Keeler-Wolf, O.L. Loucks, A. McKerrow, R. Peet, D. Roberts & A. McKerrow. 2012. Building the United States National Vegetation Classification. Annali di Botanica 2:1-9. Faber-Langendoen, D., D. Tart, C. Josse, T. Keeler-Wolf, D. Meidinger, G. Navarro, J.-P. Saucier, B. Hoagland, S. Ponomarenko, A. Weakley, P. Comer. in prep. Guidelines for a vegetation-ecologic approach to vegetation
- description and classification. HRWG (Hierarchy revisions Working group, 2011. Descriptions of Global Formation Types. Contributing authors: Faber-langendoen D., Josse C., Hoagland B., Navarro G., Keeler-Wolf T., Meidinger D., Helmer E, Fults G., Huber O., Ponomarenko S., Saucier J-P., Tart D., Weakley A. Federal Geographic Data Committee, FGDC Secretariat, U.S. Geological Survey, Reston, Va, and NatureServe, Arlington, Va Faber-Langendoen D., Snow K., Russo M., Hall M., Kittel G., Schulz K., Pyne M., Nordman C., Menard S., Drake J., Sneddon L., Gawler S., 2011. Screening Provisional Associations for inclusion in the U.S. National
- Vegetation Classification Types. NatureServe, Arlington, Va Faber-Langendoen, D. et al. (2011). Macrogroups and Groups for the Revised U.S. National Vegetation Classification (lower 48 states). March 2011. NatureServe, Arlington, VA. + Appendices.
- Faber-Langendoen, D., D.L. Tart, and R.H. Crawford. 2009. Contours of the revised U.S. National Vegetation Classification standard. Bulletin of the Ecological Society of America 90:87–93. Jennings, M.D., D. Faber-Langendoen, O.L. Loucks, R.K. Peet, and D. Roberts. 2009. Standards for Associations and Alliances of the U.S. National Vegetation Classification. Ecological Monographs 79:173-199. Peet R.K., 2008. A Decade of Effort by the ESA Vegetation Panel leads to a New Federal Standard. ESA Bulletin 89, 210-211.
- Jennings, M.D., D. Faber-Langendoen, R.K. Peet, O.L. Loucks, D.C. Glenn-Lewin, A. Damman, M.G. Barbour, R. Pfister, D.H. Grossman, D. Roberts, D. Tart, M. Walker, S.S. Talbot, J. Walker, G.S. Hartshorn, G. Waggoner, Faber-langendoen D., Tart D., Gray A., Hoagland B., Huber O., Josse C., Karl S., Keeler-Wolf T., Meidinger D., Ponomarenko S., Saucier J.P., Velázquez-Montes A., Weakley A., 2008. Guidelines for an Integrated Physiognomic-floristic Approach to Vegetation Classification. Hierarchy revisions Working group, Federal Geographic Data Committee, Vegetation Subcommittee, Washington, D. C., USA. FGDC. 2008. National Vegetation Classification Standard, Version 2 FGDC-STD-005-2008 (version 2). Vegetation Subcommittee, Federal Geographic Data Committee, FGDC Secretariat, U.S. Geological Survey. Reston, VA. Grossman, D.H., D. Faber-Langendoen, A.S. Weakley, M. Anderson, P.S. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. Patterson, M. Pyne, M. Reid, and L. Sneddon. 1998. International Classification of
- Ecological Communities: Terrestrial Vegetation of the United States. Volume I. The National Vegetation Classification System: Development, Status, and Applications. The Nature Conservancy, Arlington, VA. Anderson, M., P. Bourgeron, M. Bryer, R. Crawford, L. Engelking, D. Faber-Langendoen, M. Gallyoun, D.H. Grossman, K. Goodin, S. Landaal, K. Metzler, K.D. Patterson, M. Pyne, M. Reid, L. Sneddon, and A.S. Weakley. 1998. International Classification of Ecological Communities: Terrestrial Vegetation of the United States. Volume II: List of Vegetation Types. The Nature Conservancy, Arlington, VA. 502 pp. Loucks, O.L. 1996. 100 Years After Cowles: A National Classification for Vegetation. Bull. Ecol. Soc. Amer.. pp. 75-76.