

Webinar Series: Part 2 The National Vegetation Classification and Plant Resources

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Based on
Design Manual:
**Engineering
With Nature
Using
Native Plant
Communities**



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Sustainable uses of native plants

- Provide wildlife habitats and migration routes
- Protection of water quality and water supply
- Produce oxygen and protect air quality
- Regulate temperatures
- Nutrient cycling
- Reduction of sedimentation and erosion into waterways
- Commercial uses (food, fiber, medicine, resins, and building supplies)



Importance of Surveys

- Establish a scientifically defensible baseline
- Once you understand what the plant communities present on a site, can use this information For Mitigation and/or Restoration projects.
- This approach will be more successful and cost effective in the long term. Native plant establishment will also reduce on-going maintenance cost because they are more adapted to their environment.
- Can monitoring the site using the same methodology.



NVCS Methodology- a National Standard for Vegetation Classification

- NVCS accepted as the standard approach to be used by all U.S. federal agencies
- Signed MOU in 1999 by:
 - Ecological Society of America
 - The Nature Conservancy
 - U.S. Geological Survey(National Biological Information Infrastructure)
 - U.S. Federal Geographic Data Committee (FGDC)
- Further developed by the National Heritage Network in each state



state

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National Vegetation Classification System



- Provides species and ecological information
- Protocol transforms data to conservation-relevant information; basis for sound, scientifically based ecosystem management
- Large existing network of information



National Vegetation Classification System (continued)



- Floristic taxonomic units of plant communities that are crucial to habitat delineation: alliance level and community association type
- Ability to place local inventory efforts and conservation priorities in a national and global context



Methodology

- **Plots data**
 - Vegbank database consists of actual plot and stand records
- **Transects data**
- **Stand data**
- **GIS mapping**
 - National Spatial Data Infrastructure; national standards for the floristic level of vegetation classification in the U.S. to the association and alliance levels



NVCS

- Floristic units arranged under a hierarchy based on physiognomic characteristics of their dominant vegetation (4 physiognomic and 2 vegetative levels)
- NVSC designed for classification and mapping (at multiple scales)
- Structural uniformity is assessed by
 1. Evaluating all layers of vegetation
 2. Assessment of general uniformity and consistency of species composition



Levels of the Terrestrial Vegetation Classification Hierarchy

- System
- Physiognomic class
- Physiognomic subclass
- Formation Group
- Formation
- Alliance
- Community element



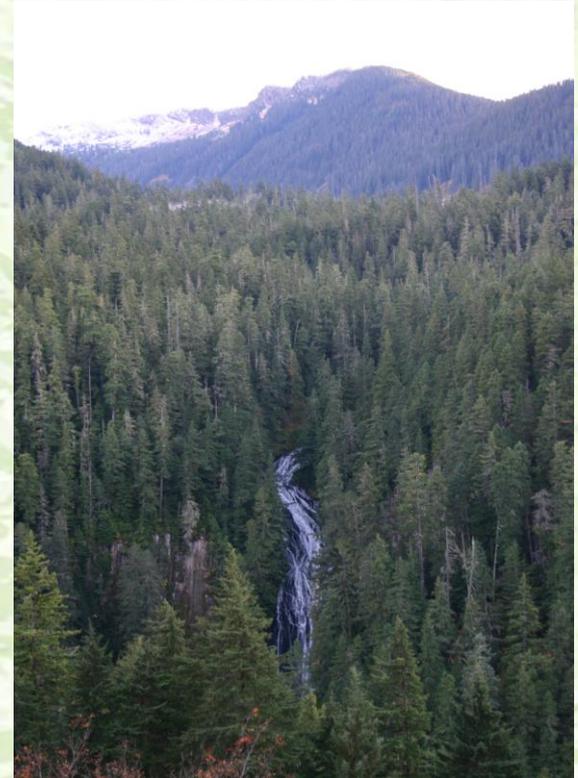
System Level

- **Types of Systems: 1) Terrestrial, 2) Aquatic 3) Subterranean and 4) Marine**
- **Each System is structurally complete**



Physiognomic Class & Subclass

- **Class**
 - **Example: Forest**
 - **Determined by Height and percentage of cover**
- **Subclass**
 - **Example: Evergreen Forest**
 - **Corps Level 1 inventory**



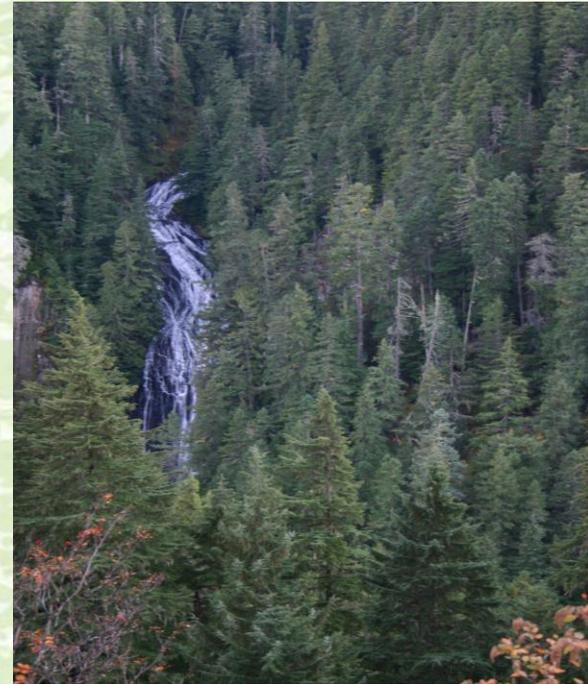
Formation Group

- **Formation group - Combination of climate, leaf morphology and leaf phenology**
- **Example: Sub alpine evergreen needle-leaved forest**



Formation

- **Ecological grouping based on broadly defined environmental factors; elevation, hydrologic regime and additional structural factors such as crown shape and life-form of the dominant lower stratum**
- **Example: Needle-leaved evergreen woodland with conical crowns**



Alliance



- Uniform group of plant associations, sharing one or more diagnostic species
- Equivalent to the “cover type” (Society of American Foresters)
- Described by diagnostic species
- Example: *Tsuga mertensiana* (Mountain Hemlock) Forest Alliance



Communities

- **Community is the basic unit of vegetation classification**
- **Composed of individual plant associations and repeating complex of plant associations**
- **Community elements of the NVCS are related to a set of environmental factors rather than to a particular site**



Communities (*continued*)

- Community element may be composed of a complex of plant associations that constitutes a functioning ecological unit if the associations always occur together.
- “Community element” and “plant association” are both used to refer to the community element.
- Example: *Tsuga mertensiana* / *Vaccinium deliciosum*



Standard reference for the National Vegetation Classification System

Grossman D.H., Faber-Langendoen D., Weakley A.S., Anderson M., Bourgeron P., Crawford R., Goodin K., Landaal S., Metzler K., Patterson K.D., Pyne M., Reid M., and Sneddon L. 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.”



How to Incorporate Survey Data

- Survey data is the baseline
- Incorporate into ecosystem restoration and mitigation projects
- Replicate the native plant communities and plant similar number of species to achieve biodiversity
- Monitor threatened and endangered species populations
- Monitor and treat invasive species
- Monitor ecosystem restoration project sites



Ecosystem Restoration

- Restores function
 - Sustainable Landscapes
- Restores connectivity
 - Buffer strips
 - Green corridors
- Green infrastructure



Planting riparian corridor ...
and 2 years later (below)



Planting Techniques,

- **Site preparation**
- **Fertilization and lime treatment**
- **Seed Mixes and Seed storage**
- **Seed Treatments**
- **Interseeding**
- **Mosaic seeding**
- **Planting herbaceous plants, shrubs and trees**



Sources to Obtain Native Plant Materials

Sources:

- Native seed companies and native plant nurseries
- NRCS Plant Material Centers
- Hand-collecting seed and storing in native seed banks
- Topsoil stockpiling and protection to keep it from drying
- Native plant rescues and local harvesting



Conservation Techniques

- **Methods**
 - Survey the existing plant communities
 - Replicate the native plant communities in reference area to the extent possible
 - Achieve bio-diversity by planting similar number of species as the specific community
 - Achieve genetic diversity by propagation of a number of individuals in existing plant populations



The importance of maintaining genetic diversity and integrity

- Vegetative propagation and tissue culture from plants from a single parent or small group, can result in lower genetic diversity.
- In small populations genetic drift can cause the loss of heritable traits and decrease diversity.
- Genetic integrity means maintaining a healthy population by allowing for genetic diversity.
 - WRP Technical note: Steever, W., and Perkins, E. 2000



Further sources of information

- **Websites**
 - **Plants Database**
- **Active groups**
 - **Plant Conservation Alliance**
 - **Extension Service**
 - **Master gardeners**
 - **Garden Clubs of America**
 - **Botanical gardens**
 - **Herbaria at universities and their sponsored websites of on-line collections**



Active Workshops with groups such as the Boy Scouts of America, schools, and other civic organizations can increase the Corps public relations



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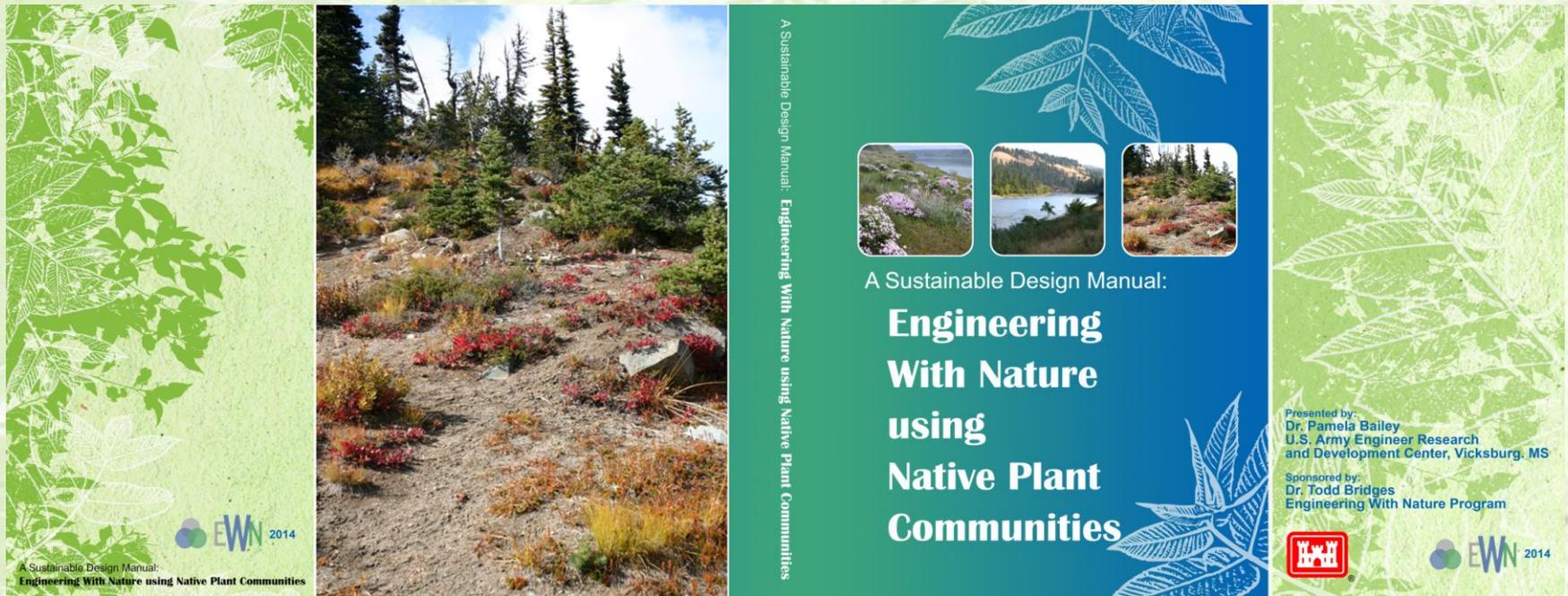
Conclusions

- Corps lands have significant plant resources; we need to know what we have.
- The National Vegetation Classification System can be used as a tool for resource management, provides a defensible baseline for successful ecosystem restoration and mitigation projects, and can be used to monitor after construction.
- Survey - Plan - Design - Construct - Monitor - Maintain



For a free download of the Design Manual;

<http://el.erdc.usace.army.mil/ewn/pdfs/EWN%20Design%20Manual.pdf>



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WHAT IS ENGINEERING WITH NATURE?

The U.S. Army Corps of Engineers (USACE) Engineering With Nature (EWN) Program enables more sustainable delivery of economic, social, and environmental benefits associated with water resources infrastructure. EWN directly supports USACE's "Sustainable Solutions to America's Water Resources Needs: Civil Works Strategic Plan 2011 - 2015" and contributes to the achievement of its Civil Works Mission and Goals. EWN is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaborative processes.

UPCOMING EVENTS

11-15 May	Coastal Sediments 2015 San Diego, California
22-25 June	Western Dredging Association and Texas A&M Dredging Summit and Expo Houston, Texas
19-22 October	Dredging 2015 Conference Savannah, Georgia

WHAT'S NEW

- [Natural and Nature-Based Features Report Newly Released](#)
- [EWN and Buffalo District Collaborative Meeting December 2014](#)
- [EWN and Galveston District Collaborative Meeting October 2014](#)
- [Regional Sediment Management \(RSM\) and Engineering With Nature \(EWN\) Working Meeting July 2014](#)
- [More What's New](#)

EWN NEWS

- [Natural and Nature-Based Features Report Newly Released!](#)
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Engineering With Nature

The U.S. Army Corps of Engineers (USACE) initiative known as Engineering With Nature (EWN) is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes (Figure 1). EWN seeks to apply science to our engineering to improve the decision-making process and expand the range of benefits that can be achieved through our projects. The projects and tool development through EWN directly supports a number of USACE plans and directives including the USACE Civil Works Strategic Plan, the USACE Campaign Plan, and USACE Environmental Operating Principles. As a leading practice, EWN is being pursued through innovative research, field demonstrations, communicating lessons learned, and active engagement with field practitioners and USACE partners and stakeholders.

Utilizing plant communities within the built environment to create sustainable landscapes

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Questions???



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