



Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Mapping and Using Ecological Units for Landscape Management and Restoration

- David Lytle, Forest Management, PhD, Range Management and Vegetation Ecology Director
- Robert Colter, PhD, National Soils Program Leader
- Sarah Anderson, PhD, Landscape Ecologist
- Estella Smith, Alabama Forest Soil Scientist

Agenda

- Introduce the National Hierarchical Framework of Ecological Units (the Hierarchy) and Terrestrial Ecological Unit Inventory (TEUI);
- Demonstrate how the Hierarchy and TEUI supports landscape management and restoration by providing ecological context and understanding while tracking outcomes;
- Explore the TEUI through an innovative hub site web viewer.

Facilitate management and restoration of ecosystems

- Nature and distribution of ecosystems
- Associated patterns and processes
- Hierarchical, nested, systematic method
- Associations of ecological factors at different geographic scales.



National Hierarchical Framework of Ecological Units

- The landscape and land unit scales of the Hierarchy are referred to as Terrestrial Ecological Unit Inventory
- Ecological systems are composed of multiple abiotic and biotic factors.



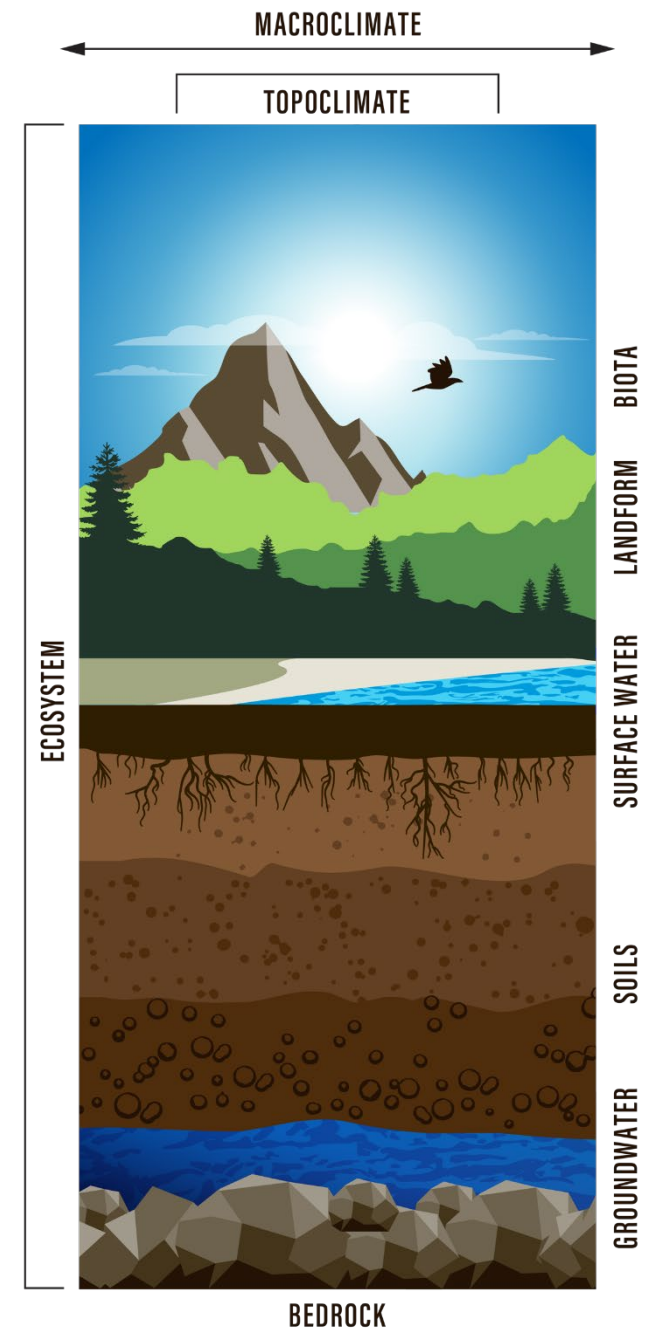


The Hierarchy is needed to:

- Improve our efforts in national, regional, and forest level planning
- Achieve consistency in ecosystem management across National Forests and regions
- Advance our understanding of the nature and distribution of ecosystems
- Facilitate Forest Service and interagency data sharing and analysis
- Help land managers evaluate inherent capabilities of land and water resources and the effects of management on them
- Monitor and evaluate climate change impacts to ecosystems at different scales

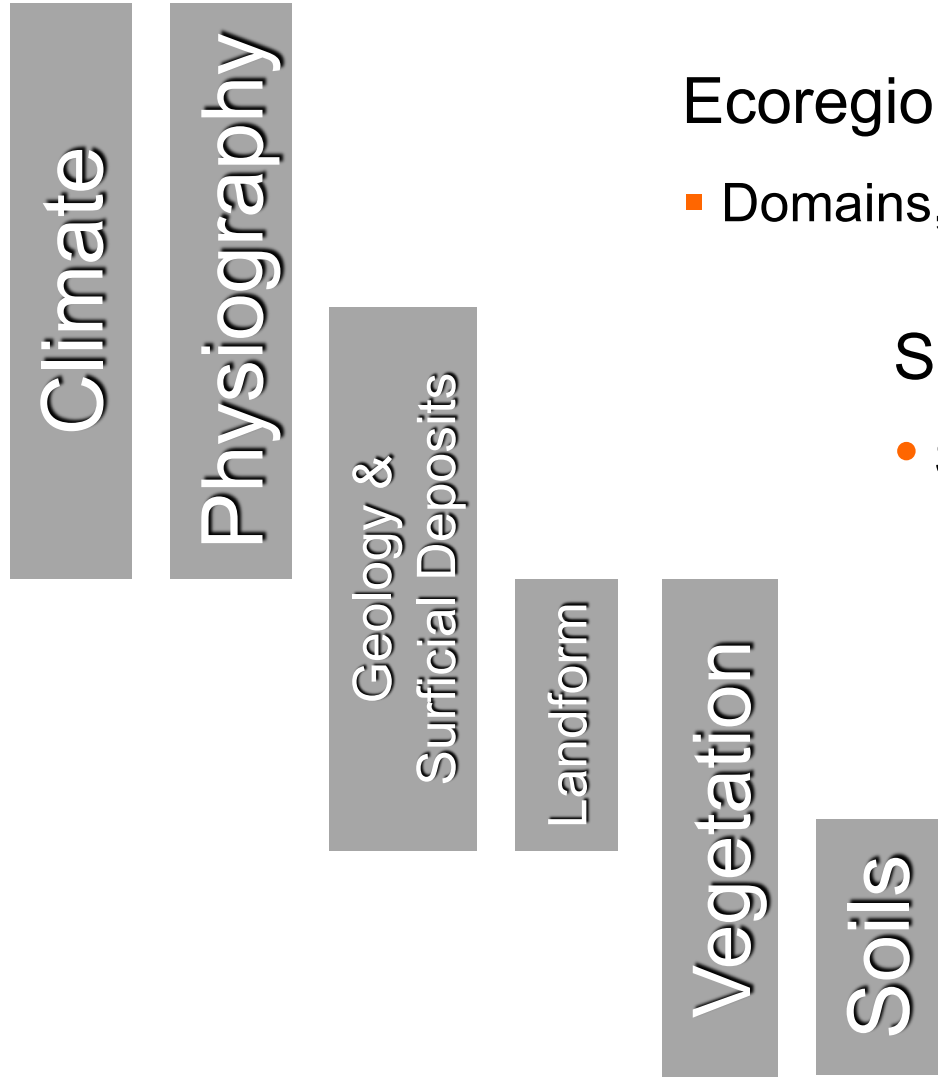
Ecological units delimit areas of different biological and physical potential

- Developing analysis area boundaries based on existing conditions, management emphasis, watersheds, etc. will not change the applicable ecological unit boundaries
- Ecological units can be aggregated or divided as needed to focus on relevant issues and concerns



The framework is a nested system of ecological units

Environmental Factors



Hierarchical Framework

Ecoregions

- Domains, Divisions, Provinces

Subregions

- Sections, Subsections

Landscapes





- ◆ Landtype Associations

Land Units

- Landtypes, Landtype Phases

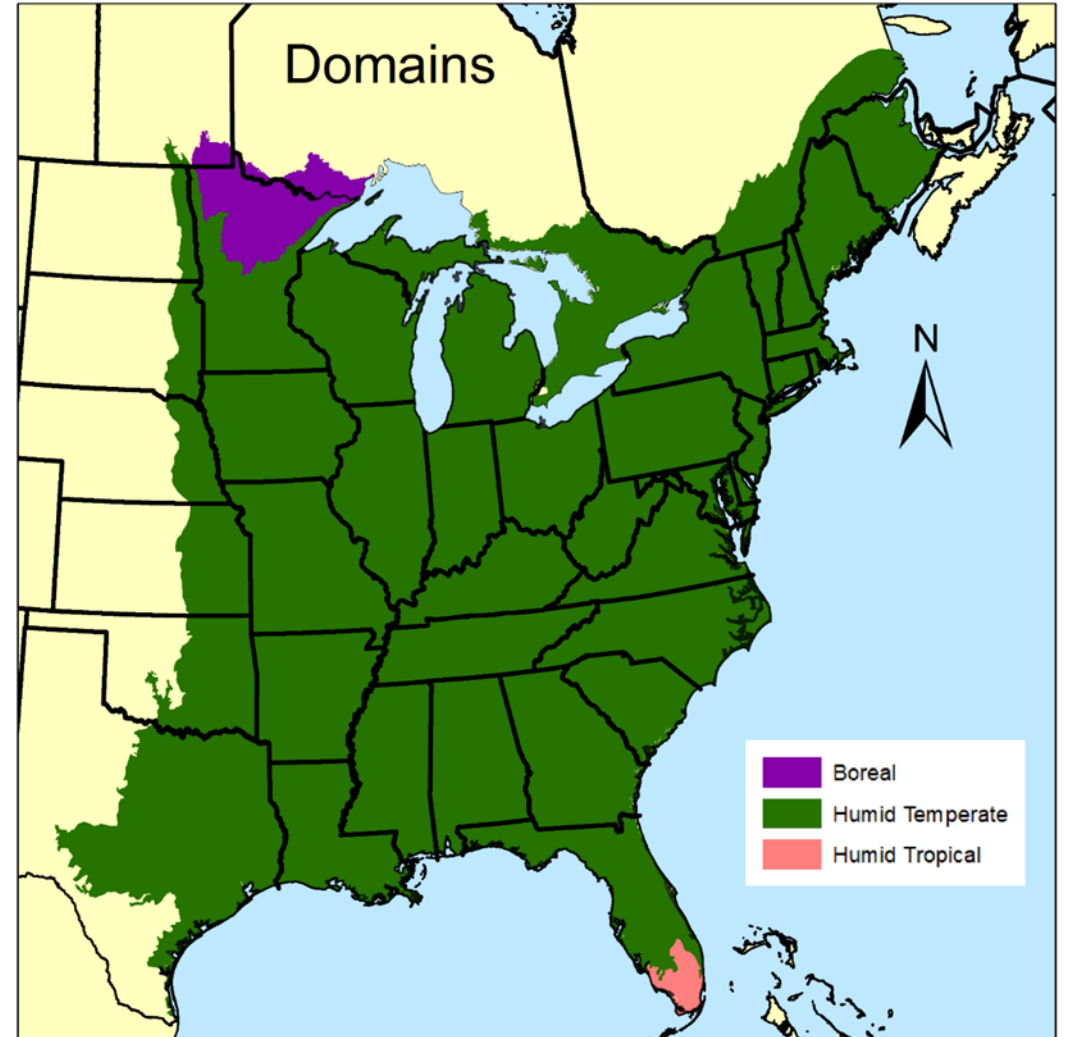
Hierarchy consist of several scales

THE NATIONAL HIERARCHY OF ECOLOGICAL UNITS

PLANNING SCALE (Ecological Unit)	SIZE/RANGE	OBJECTIVE/USE
 ECOREGION Global (Domain) Continental (Division) Regional (Province)	Millions to ten thousands of square miles	Broad applicability for modeling and sampling; Large area planning and assessment; International planning
 SUBREGION (Section) (Subsection)	Thousands to tens of square miles	Strategic, multi-forest, statewide, and multi-agency analysis and assessment
 LANDSCAPE (Landtype Association)	Thousands to tens of acres	Forest or areawide planning and water- shed analysis
 LAND UNIT (Landtype Phase)	Hundreds to less than ten acres	Project and management area planning and analysis

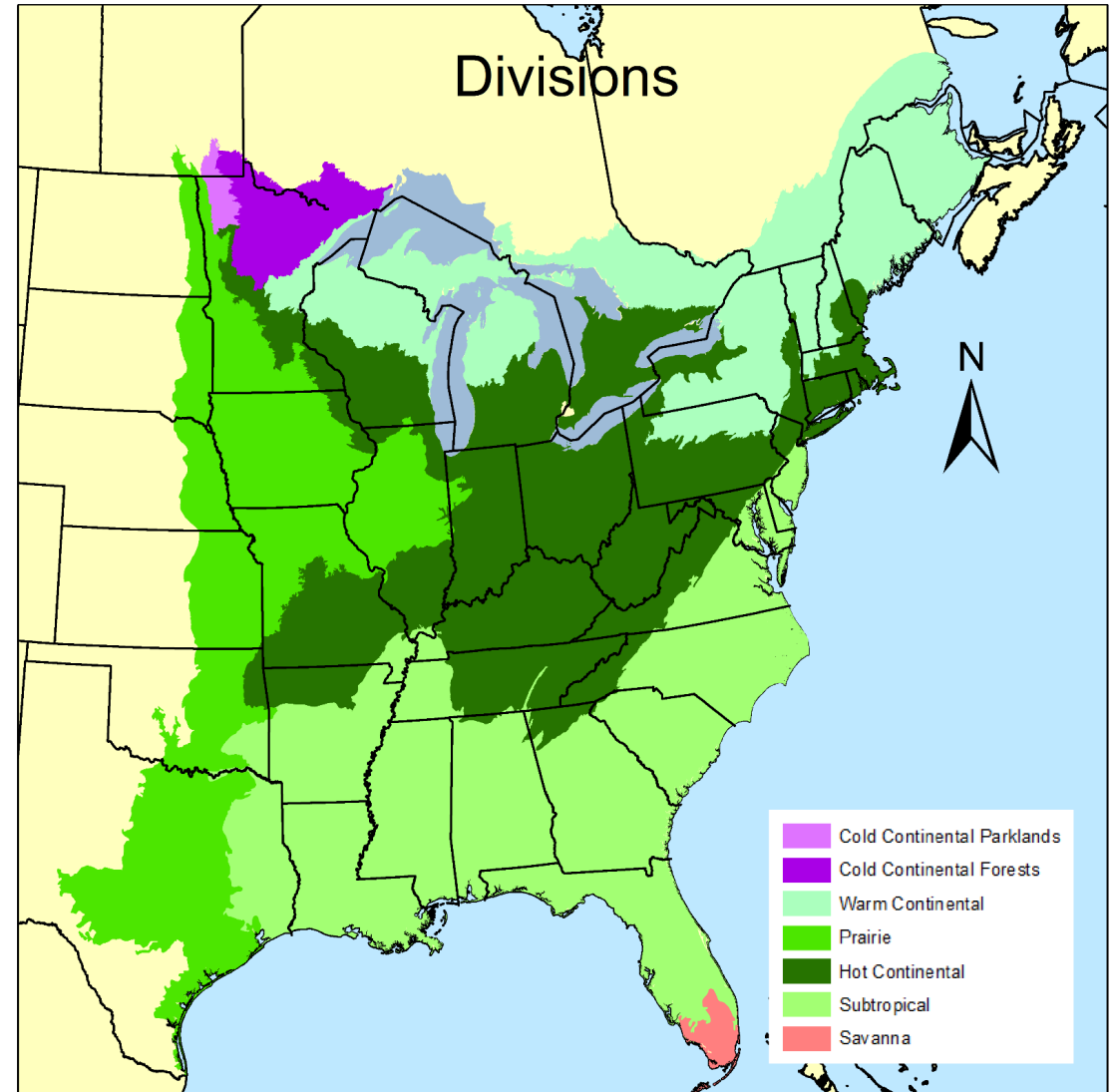
Domains

- **Domains are subcontinental divisions of broad climatic similarity**



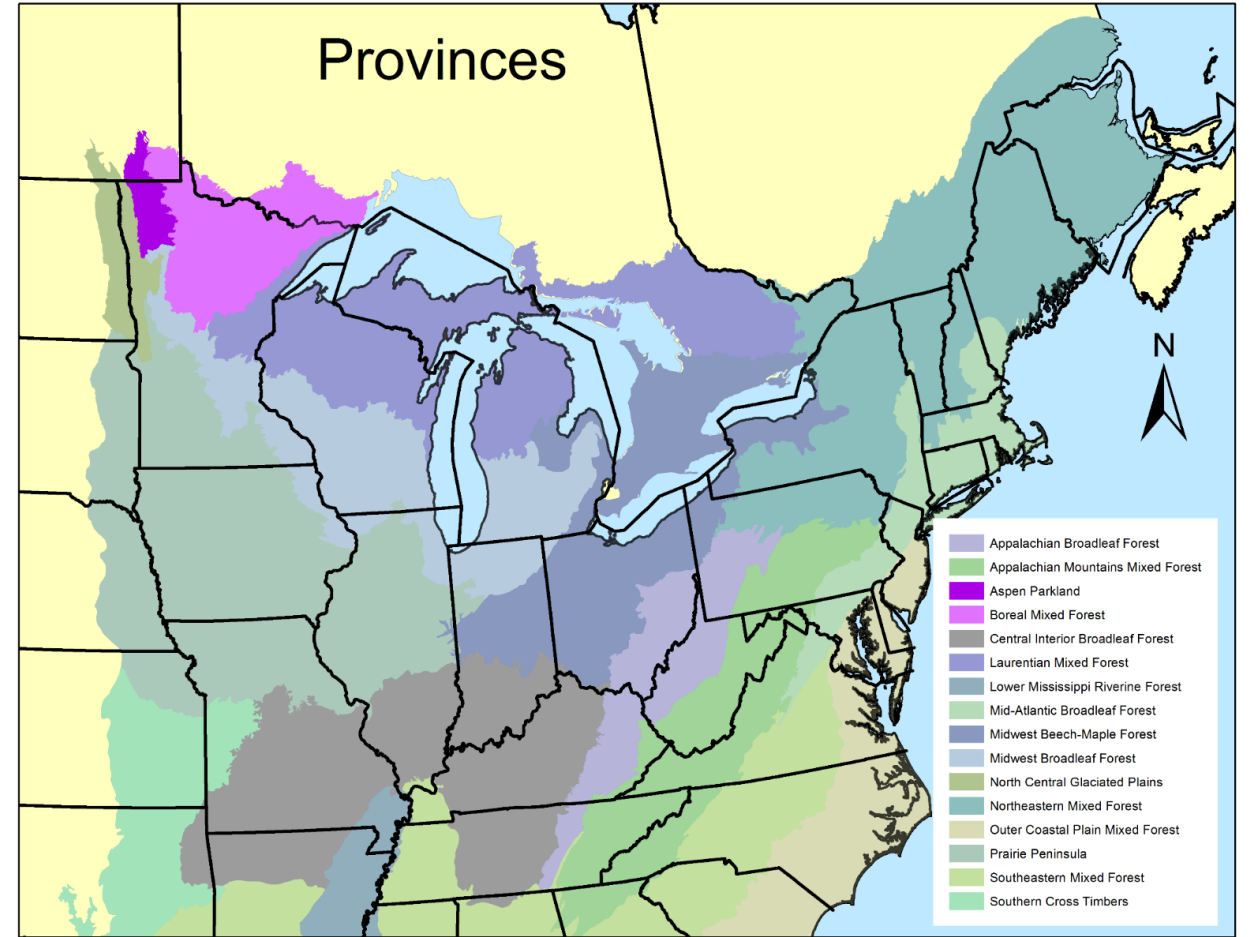
Divisions

- Divisions further subdivided based on areas of similar vegetation (prairie vs. forest)
- Regional Climatic Types



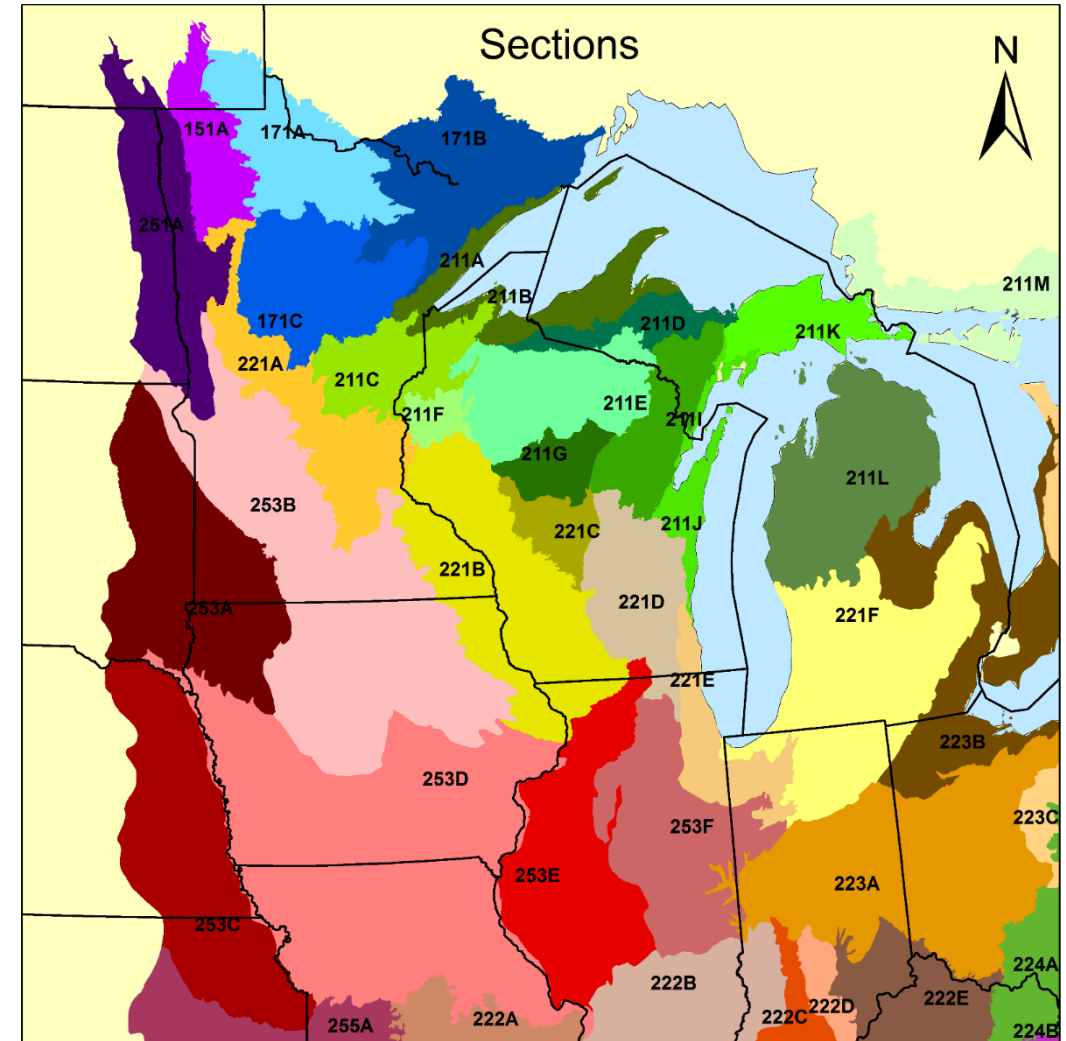
Provinces

- **Dominant Potential Natural Vegetation**
 - Highlands or mountains with complex vertical climate-vegetation-soil zonation



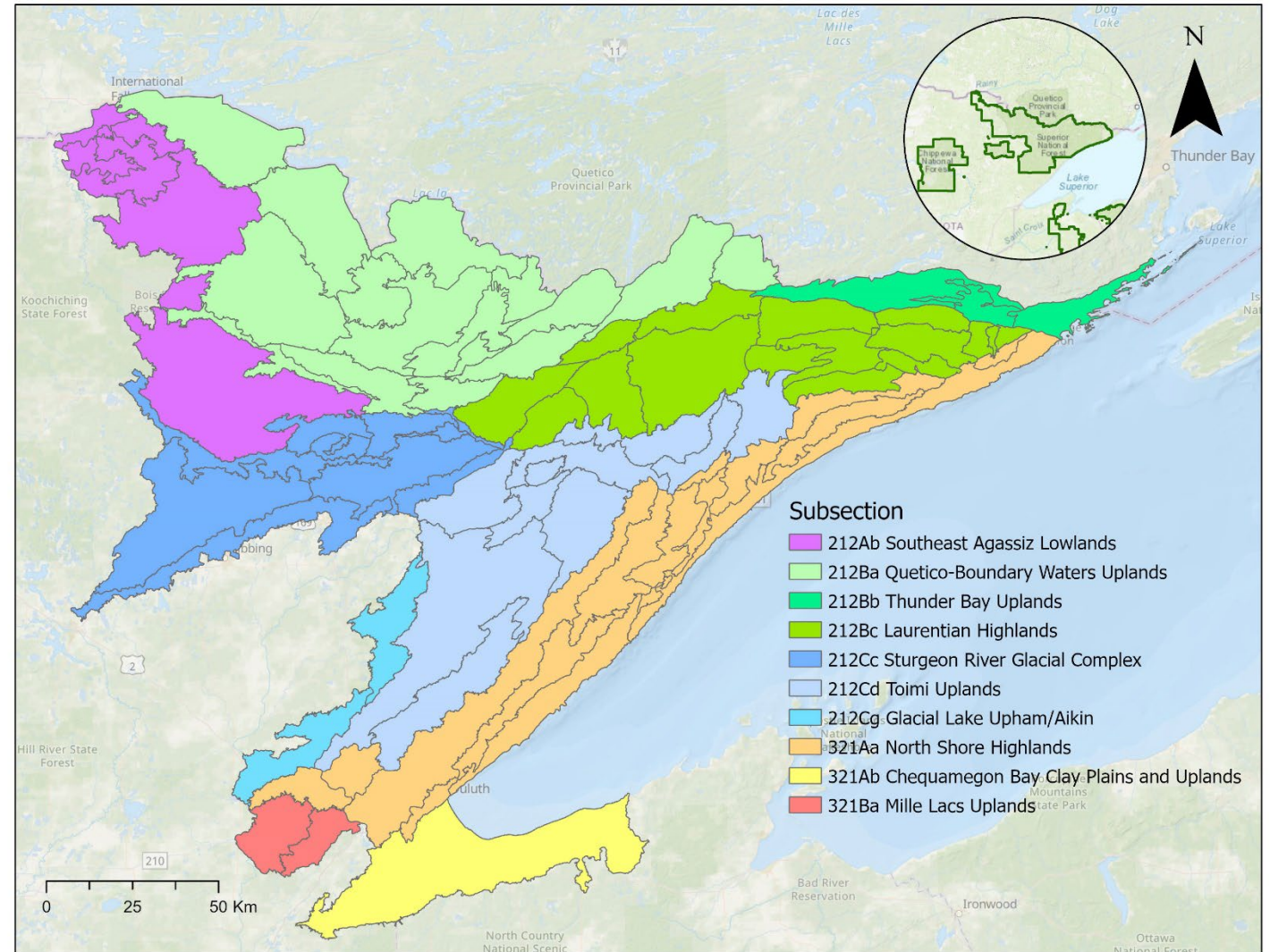
Sections

- Geomorphic province, geologic age, stratigraphy, lithology.
- Regional climatic data.
- Phases of soil orders, suborders, or great groups. Potential natural vegetation.
- Potential natural communities (FSH 2090)



Subsections

- Smaller areas within Sections with similar surficial geology, lithology, geomorphic process, soil groups, subregional climate, and potential natural communities
- Subsection boundaries usually correspond with discrete changes in geomorphology.



Why Ecological Units?

- Easier decisions
- Ecologically defensible
- Gained efficiency through ecological addressing
- Record which management activities work and what don't
- Transfer successes into future plans; avoid duplicating mistakes
- Land management questions differ spatially and require hierarchical frameworks
- Understanding ecological and hydrological processes, disturbance regimes, habitat and vegetation patterns, & successional pathways

