December 7, 2016

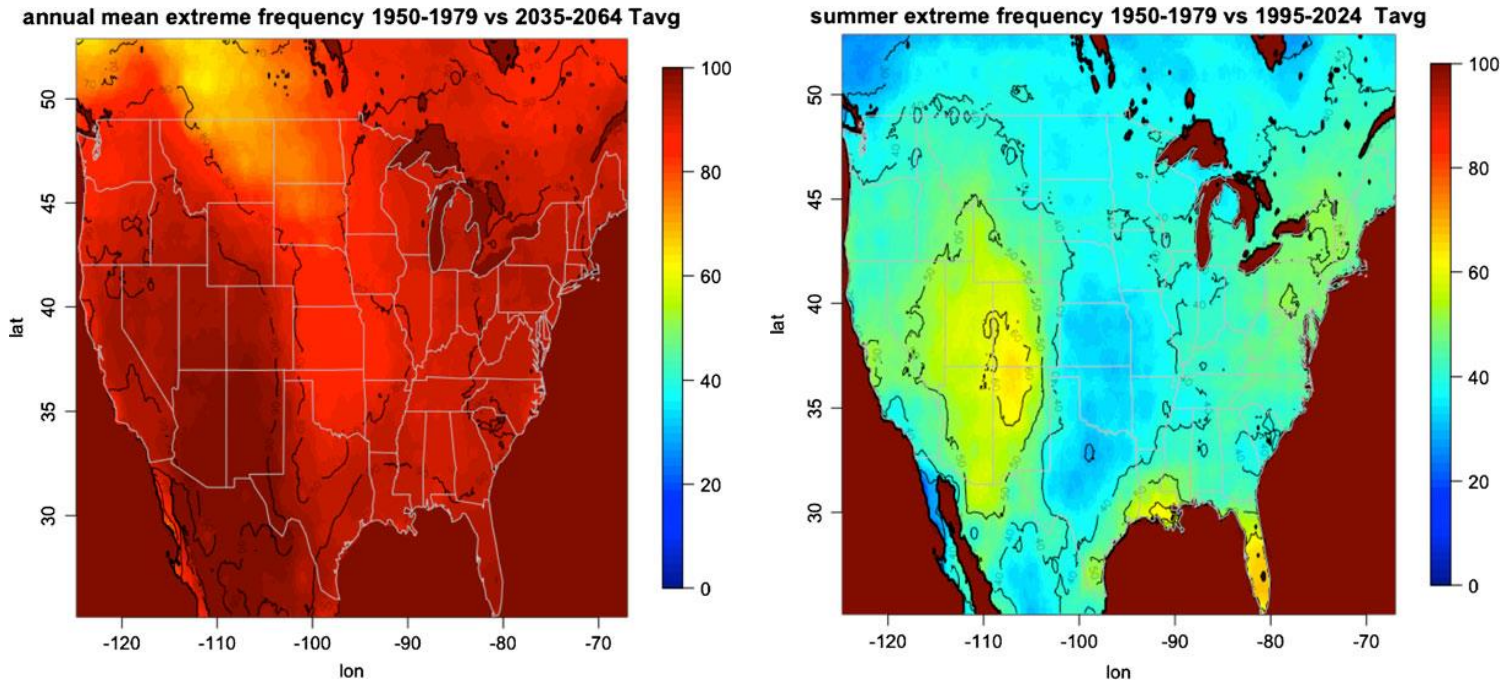
Seventh Western Native Plant Conference

Revegetation with an emphasis on pollinator conservation: resources for practitioners

Lynda Moore and Matt Horning, US Forest Service

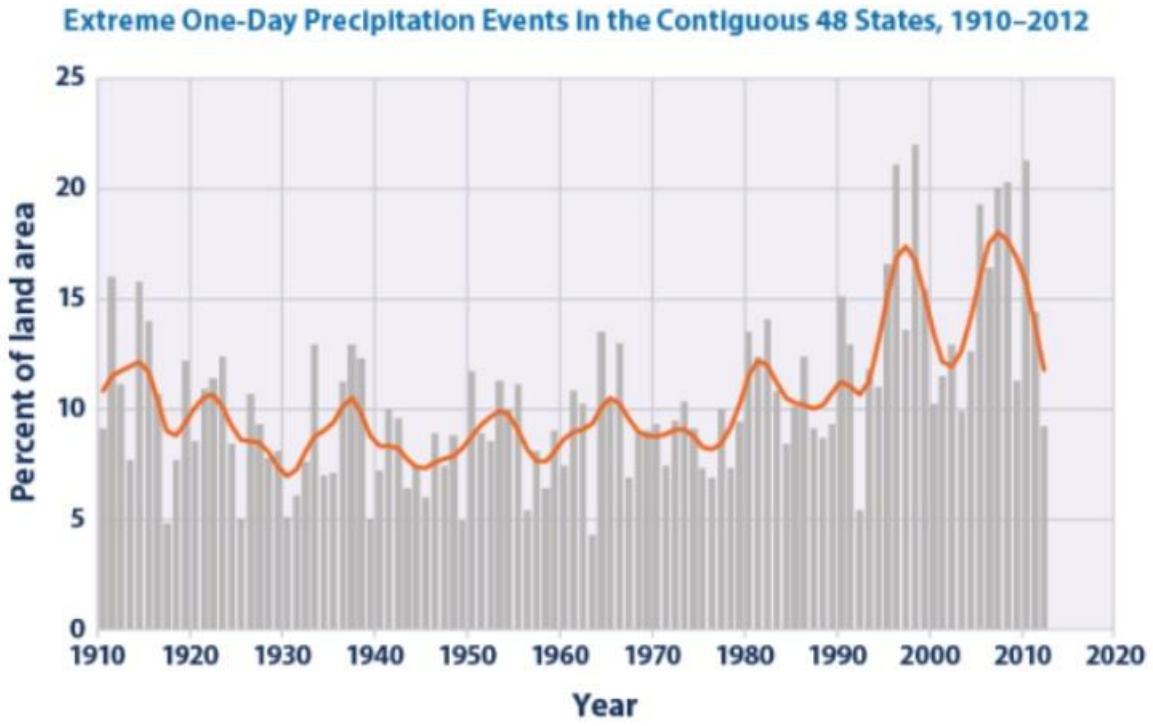
U.S. Department of Transportation
Federal Highway Administration

Increased frequency of previously rare extremes



Duffy and Tebaldi 2012. Climate change 111:487-495

Increased frequency of extreme precip events



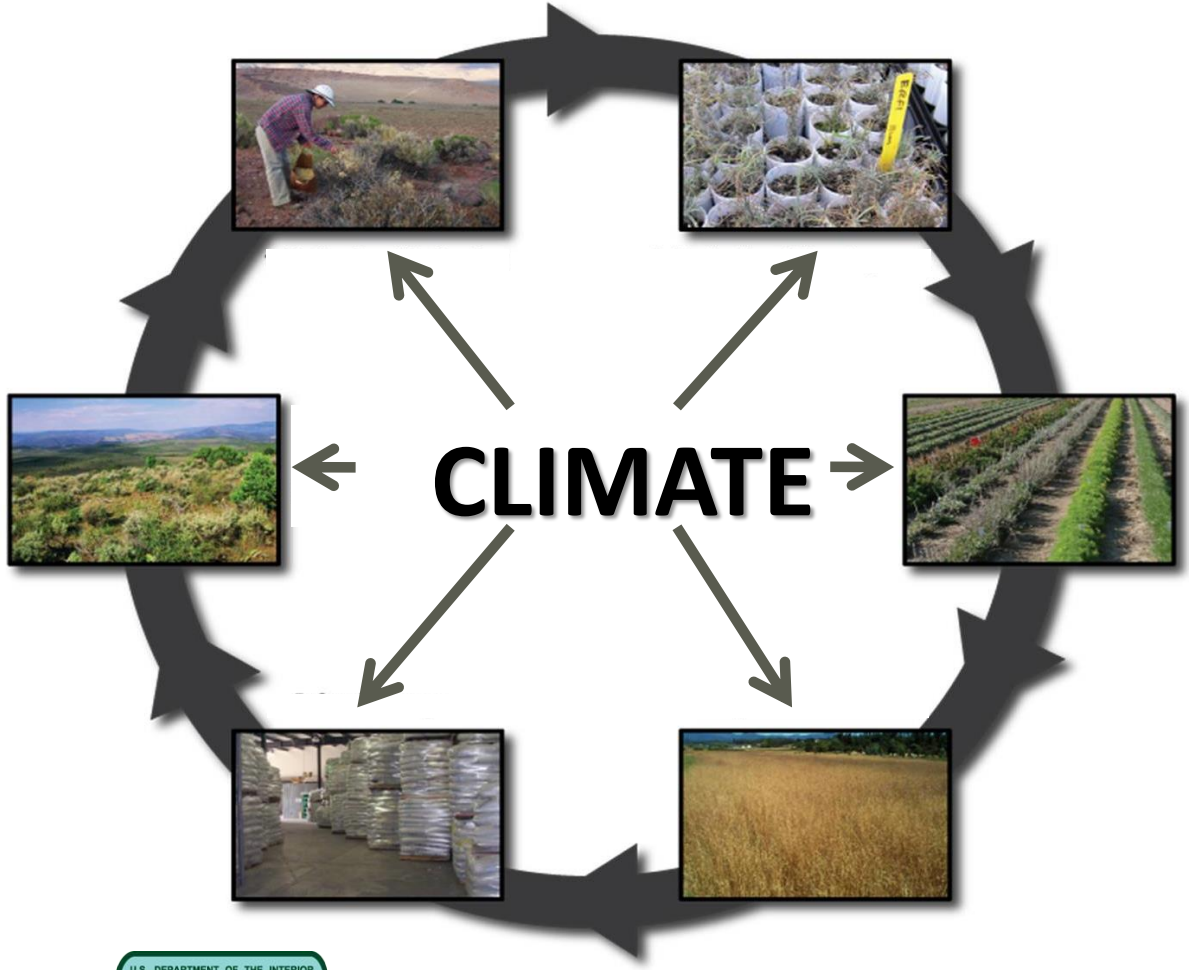
Source: NOAA/EPA

Implications for pollinators

- **Direct**
  - Thermoregulation
  - Altered physiology
- **Indirect**
  - Host plant species phenology (mismatch)
  - Nectar availability
- **Migration as a possible response**
  - Habitat and connectivity will be critical

Revegetation in a new context

- Seed sourcing
- Costs for farms and nurseries
- Out-planting windows
- Project design features



BLM Native Plants Materials Development Process

ROADSIDE REVEGETATION

An Integrated Approach to Establishing Native Plants and Pollinator Habitats

Pollinator health task force

Presidential memorandum "creating a federal strategy to promote the health of honey bees and other pollinators"

- June 2014

National strategy to promote the health of honey bees and other pollinators

- May 2015

Pollinator partnership action plan

- June 2016

"Restore or enhance 7 million acres of land for pollinators over the next 5 years."

U.S. Forest Service Genetic Resource Management and Climate Change: Genetic Options for Adapting National Forests to Climate Change

- **<u>Strategic Goal 1.1</u> Develop and deploy plant materials that will be resilient to climate change.**

- **<u>Strategic Goal 1.2</u> Manage for uncertainty and adaptation through natural selection by placing an increased emphasis on genetic diversity (species and seed sources)…**

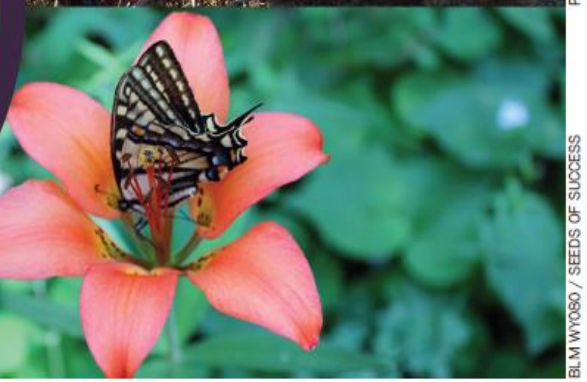
Vicky Erickson, Carol Aubry, Paul Berrang, Tom Blush, Andy Bower, Barb Crane, Tom DeSpain, David Gwaze, Jim Hamlin, Matt Horning, Randy Johnson, Mary Mahalovich, Monty Maldonado, Richard Sniezko, Brad St. Clair. 2012. Washington, DC: USDA Forest Service, Forest Management.

INTERAGENCY SEED STRATEGY

BLM NM930 / SEEDS OF SUCCESS / MIKE HOWARD

PHILLIP ADAMS / USGS

OR DEPT. OF FISH & WILDLIFE



BLM WY080 / SEEDS OF SUCCESS

VISION

The right seed in the right place at the right time.

MISSION

To ensure the availability of appropriate seed to provide healthy and productive plant communities in a changing climate.

United States Department of Agriculture

- Agricultural Research Service
- Forest Service
- National Institute of Food and Agriculture
- Natural Resources Conservation Service

U.S. Department of Transportation
Federal Highway Administration

USGS
science for a changing world

Smithsonian Institution

United States Botanic Garden

GOAL 3

Develop tools that enable mangers to make timely, informed seeding decisions for ecological restoration.

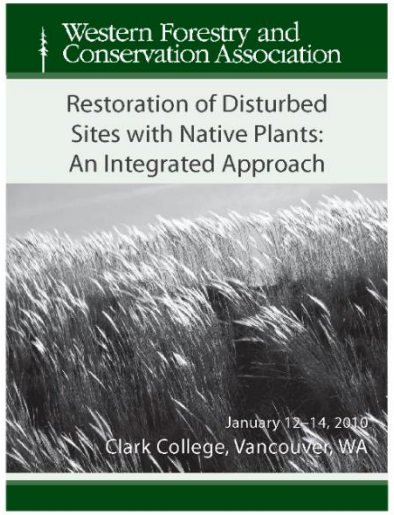
Technical resource:

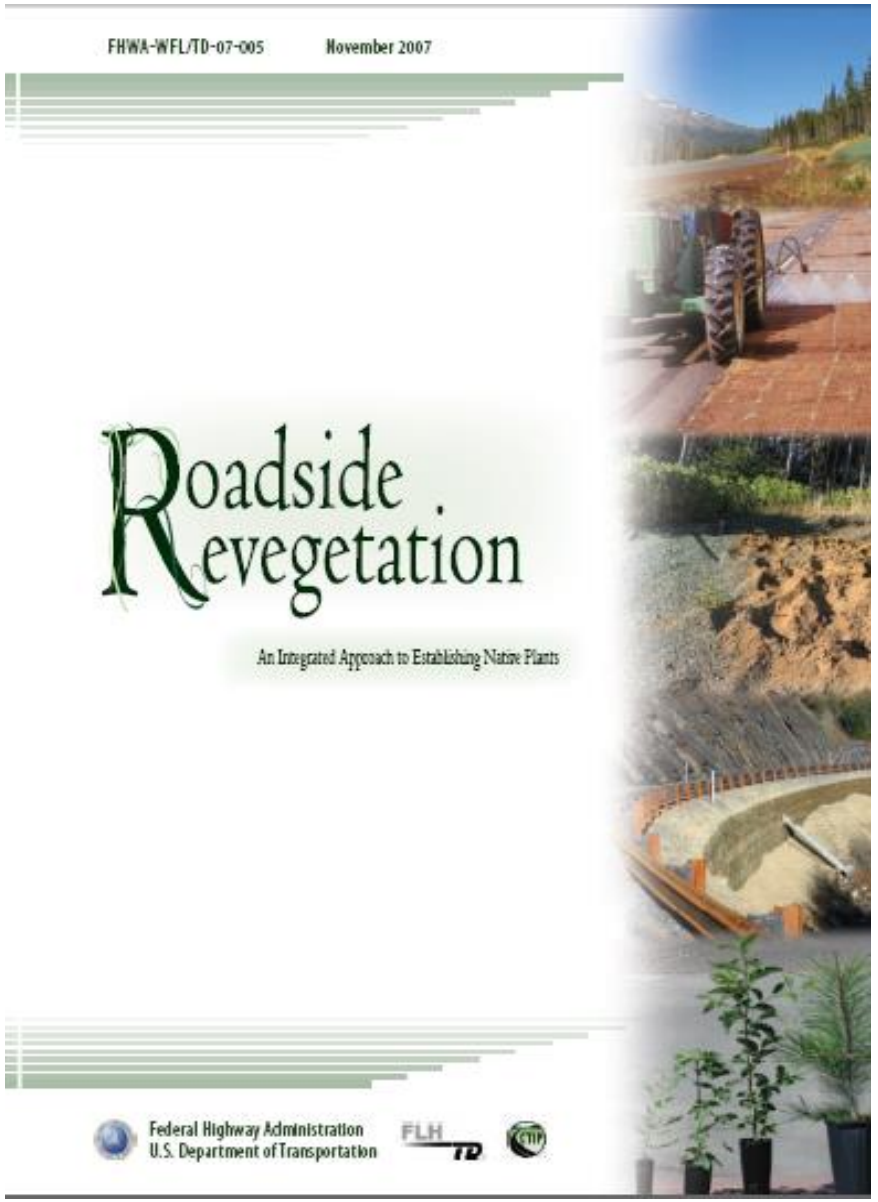
FHWA revegetation manual

The original manual

David Steinfeld, Scott Riley, Kim Wilkinson, Thomas Landis, and Lee Riley

- Published 2007
- Western US-centric
- Applicable to any highly disturbed sites
- Powerful training resource





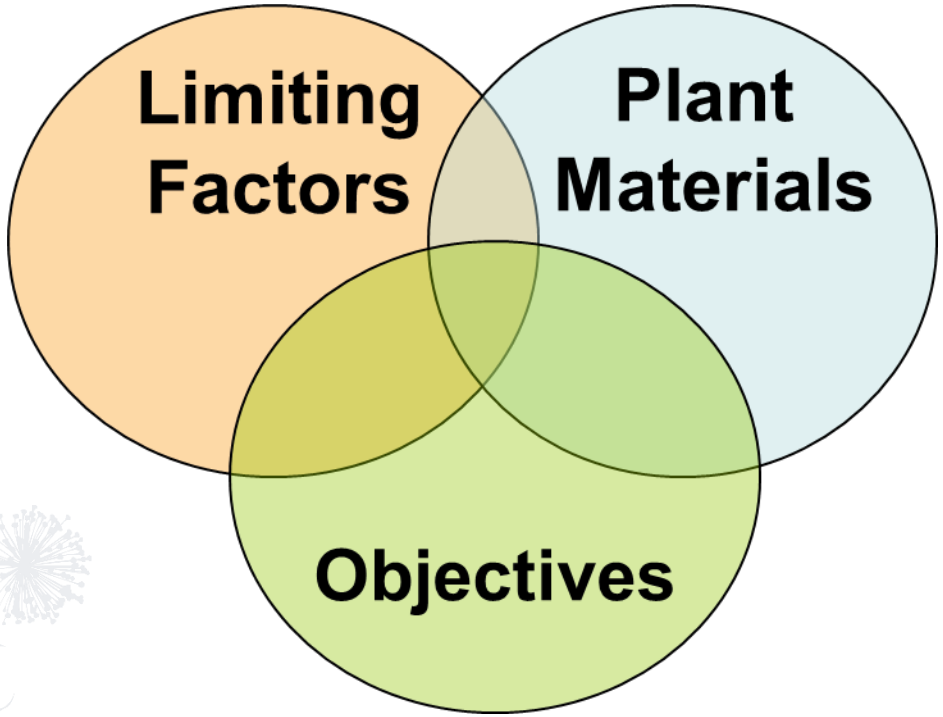
ROADSIDE REVEGETATION

An Integrated Approach to Establishing Native Plants and Pollinator Habitats

Revegetation as a process

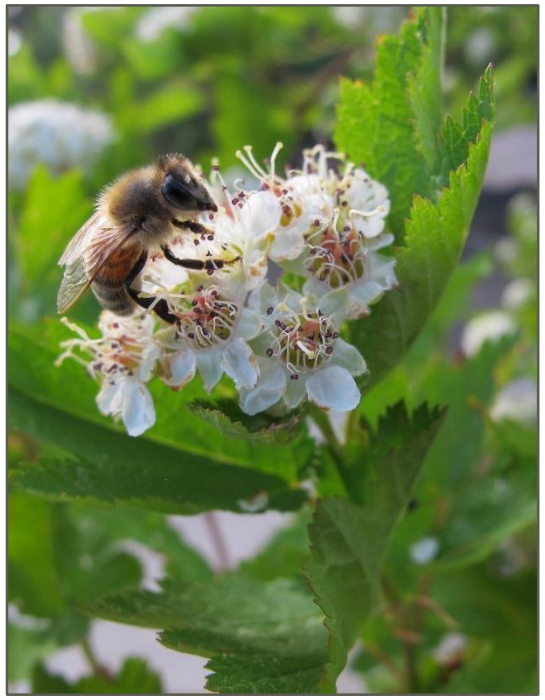
Key components: Implementation guides

- Soil and site treatments
- Obtaining plant materials
- Installing plant materials
- Post installation care of plant materials



Phase	Tasks
Project Orientation & Inventory	Determine objectives
	Define preliminary DFCs (success criteria)
	Define cooperators
	Gather prefield information (maps, data etc)
	Identify revegetation units
	Select reference sites
	Inventory vegetation, soils, climate
Site Analysis	Identify limiting factors & site resources
	Identify mitigating measures
	Select species
	Identify target plant requirements
Develop the Revegetation Plan	Compare and select revegetation strategies
	Finalize DFCs (success criteria)
	Develop & share revegetation plan
Implementation	Develop contracts and oversee work
	Install treatments
	Keep records
	Carry out quality control
Monitoring & Maintenance	Develop monitoring plan based on DFCs (success criteria)
	Collect and evaluate data
	Write monitoring report
	Apply maintenance and corrective measures as needed
	Organize and file project data
	Share lessons learned

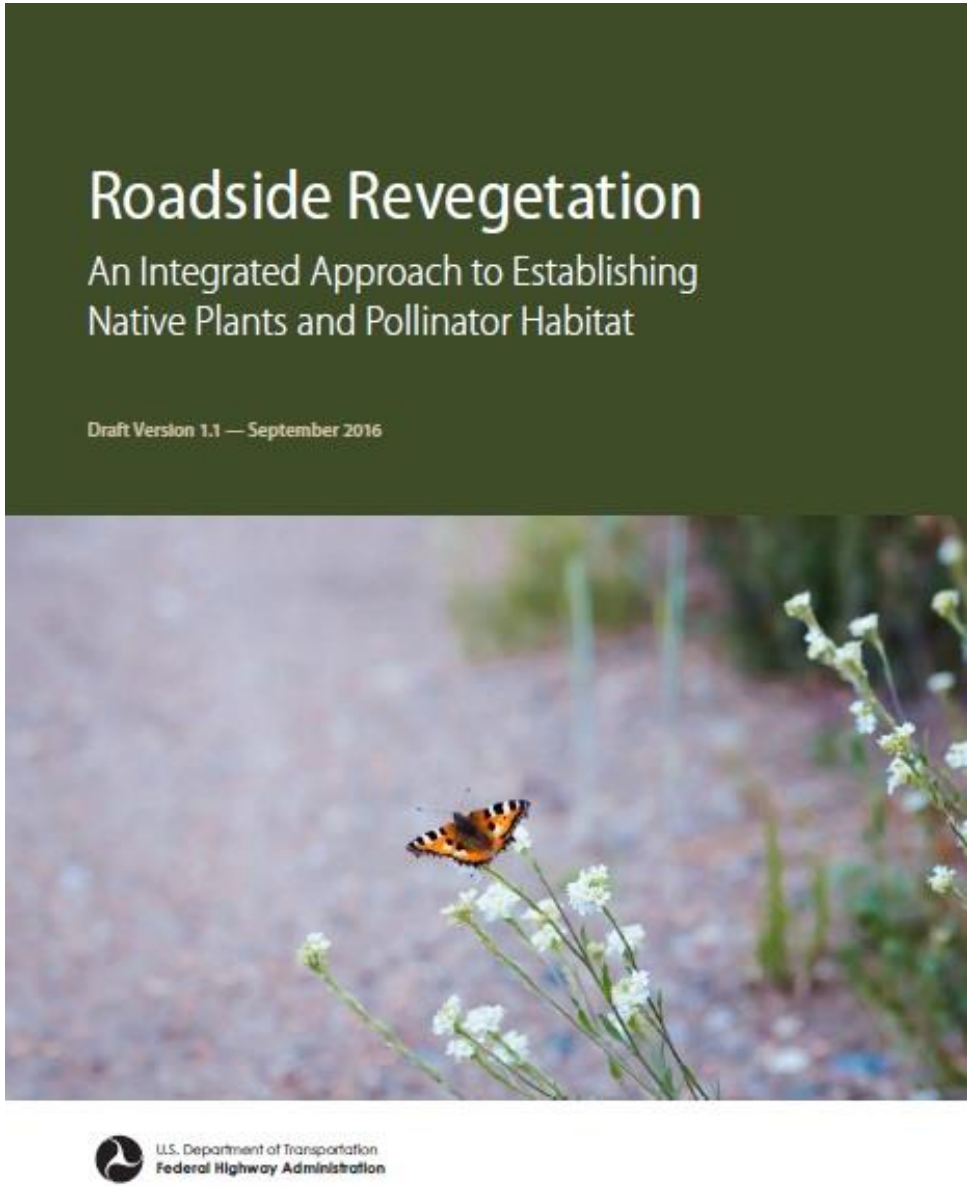
Incorporating pollinator needs



- **Food, water, shelter**
  - Implications for project design and maintenance
  - Unique requirements compared to other project objectives
- **Objectives**
  - Provide practitioners technical information for creating pollinator habitat with native plants

Ongoing modifications

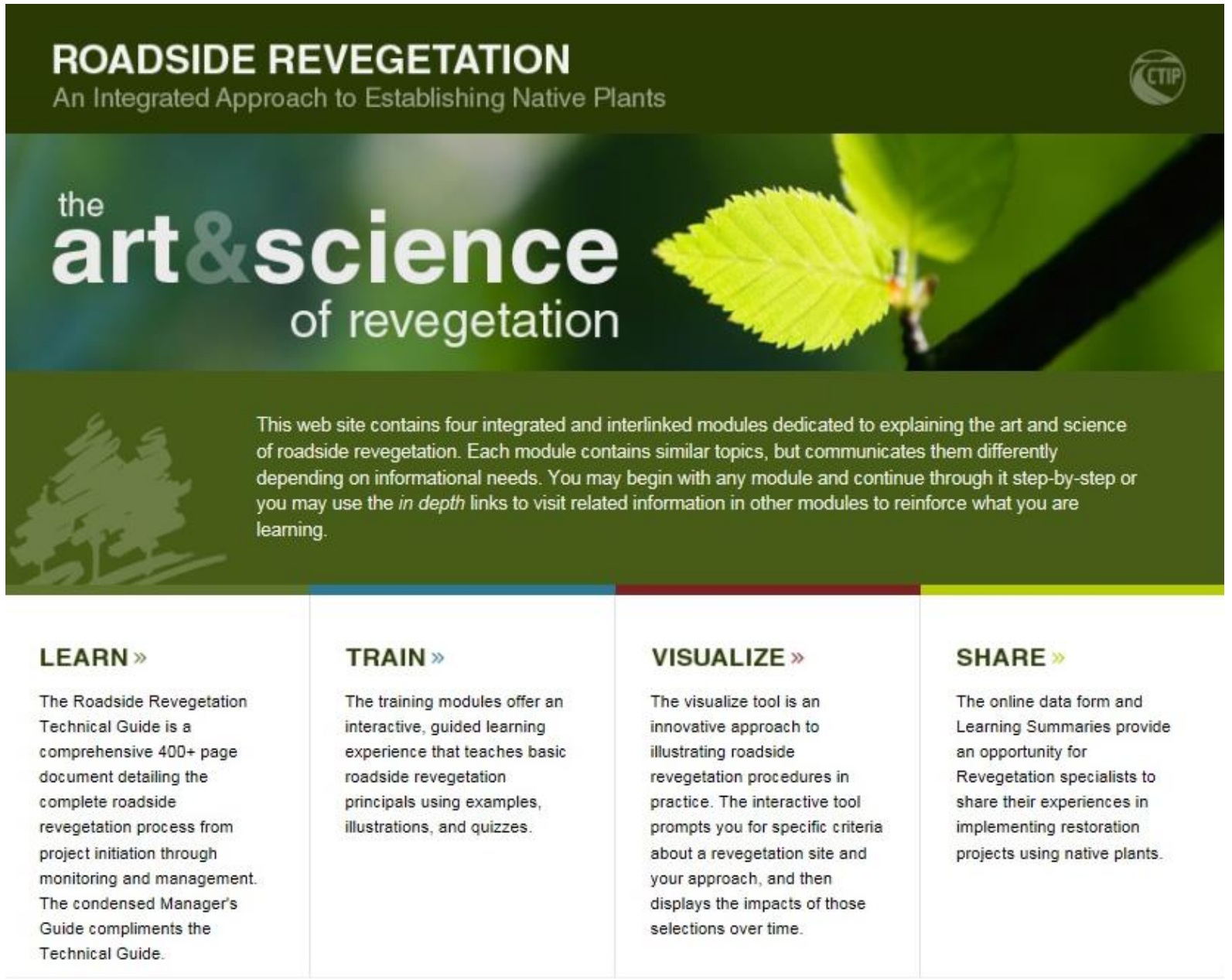
- National in scope
- Discussion of pollinators and their importance
- Nectar and shelter needs
- Phenology
- Plant palette selection
- Incorporation of FHWA and Xerces Society BMP's
  - Pollinator-specific objectives in project design
  - Vegetation maintenance



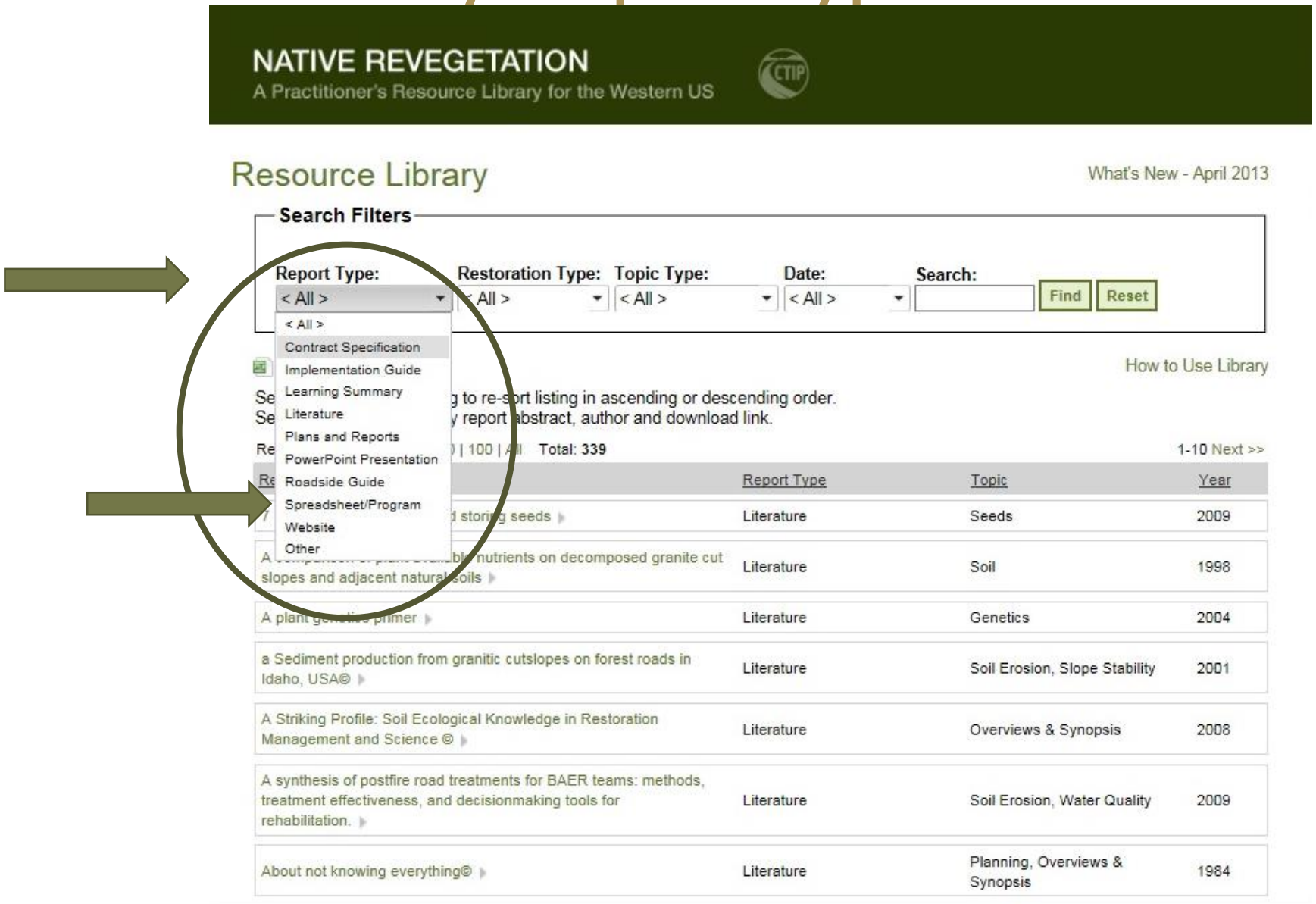
Online resources:

www.nativerevegetation.org

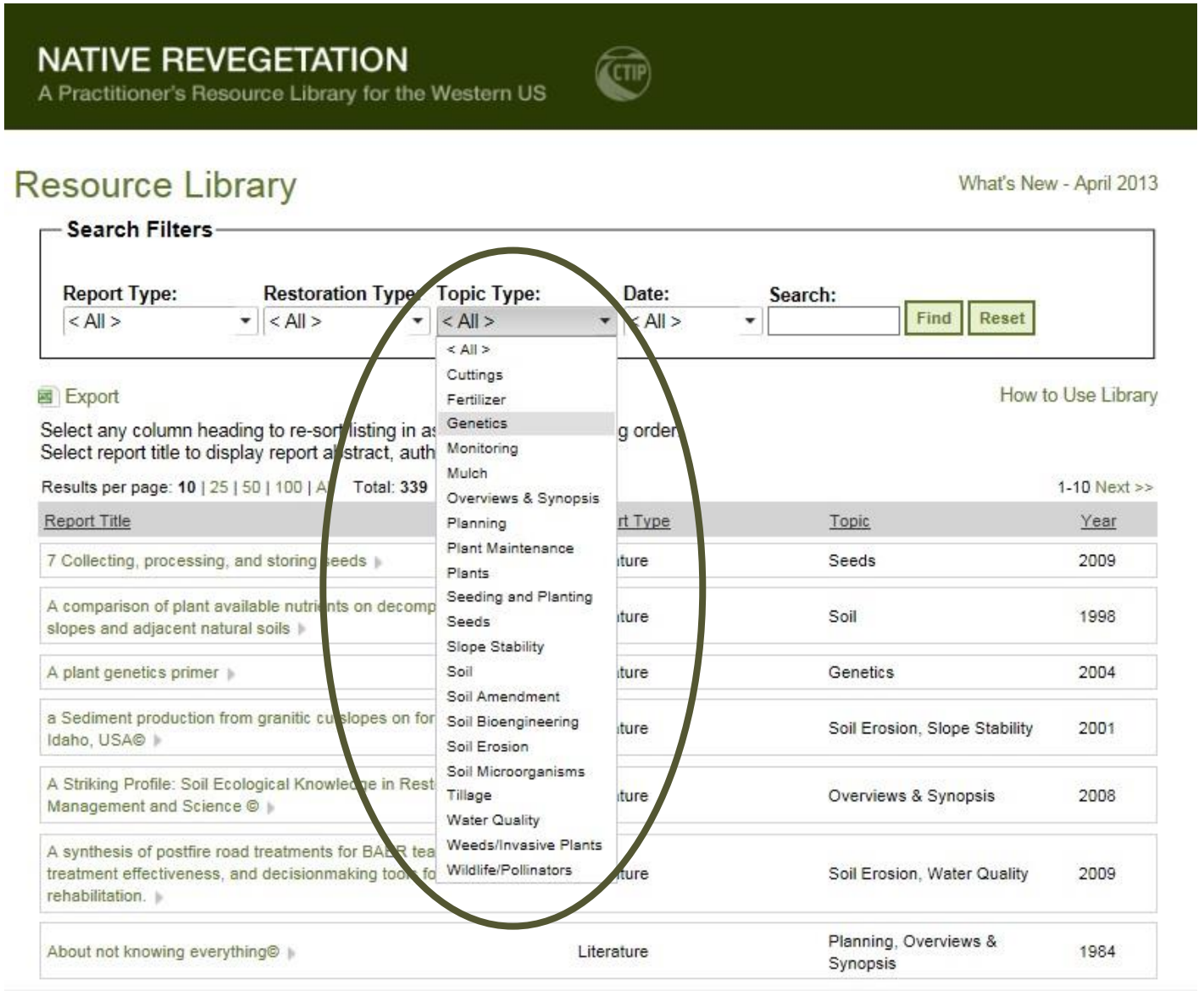
www.nativerevegetation.org



www.nativeregetation.org
Resource Library- report types



www.nativeregetation.org
Resource Library- topics



www.nativeregetation.org
Resource Library- revegetation guide(s)

Technical Guide » Table of Contents

print page download page

Table of Contents

Select Chapter

Online application:

Ecoregional Revegetation Application (ERA)

Ecoregional Revegetation Application

- **Audience**
  - Revegetation practitioners/project designers
  - All agencies/sectors
  - National in scope

- **Objectives**
  - Support the inter agency seed strategy and pollinator health initiatives
  - Support the native plants materials infrastructure
  - Assist revegetation practitioners in project design and implementation

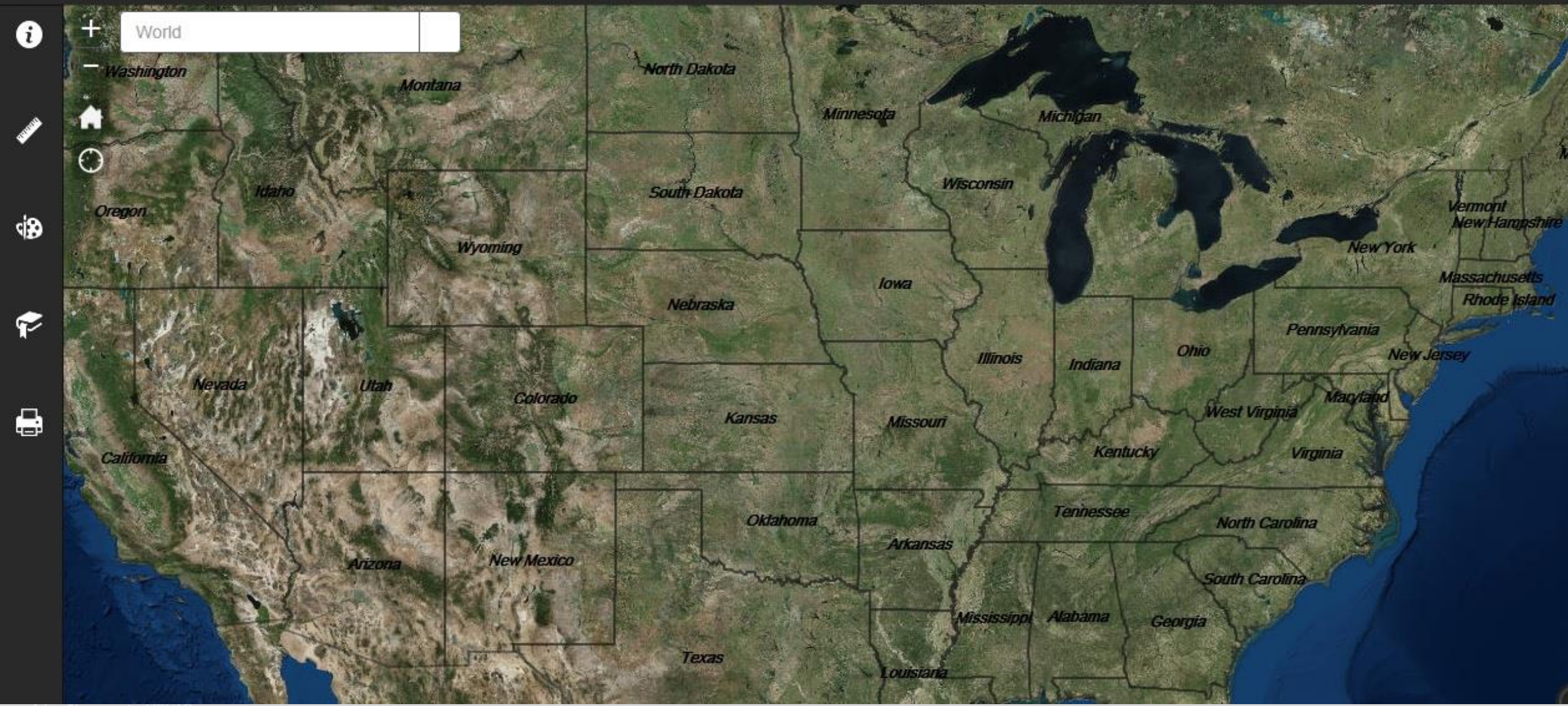
Ecoregional Revegetation Application

- **Data sources: pollinator-friendly species**
  - Xerces Society
  - Pollinator Partnership (pollinator.org)
- **Data sources: workhorse species (use and commercial availability)**
  - State DOT plant lists
  - The Chicago Botanic Garden (Abbey White and Andrea Kramer)
- **Validation with regional experts**
  - USFS and BLM botanists
  - State DOT Landscape architects
  - Others (USDA PLANTS database, literature)

Ecoregion
Height
Flower color
Showy
Flowering period
Sun exposure
Soil moisture
Soil texture
Salt tolerance
Palatability
Active growth period
Pollinator value
Benefits to Pollinators
Pollinator supported
Propagation
Commercial Availability

ERA: Ecoregional Revegetation Assistant

Roadside Revegetation Website



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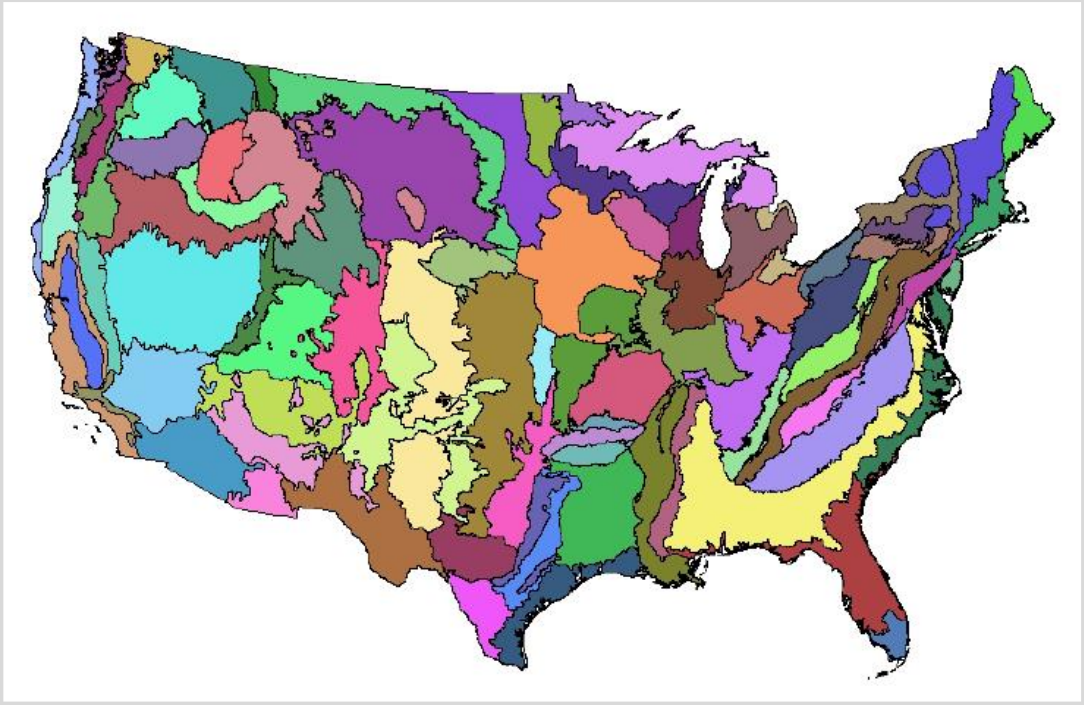
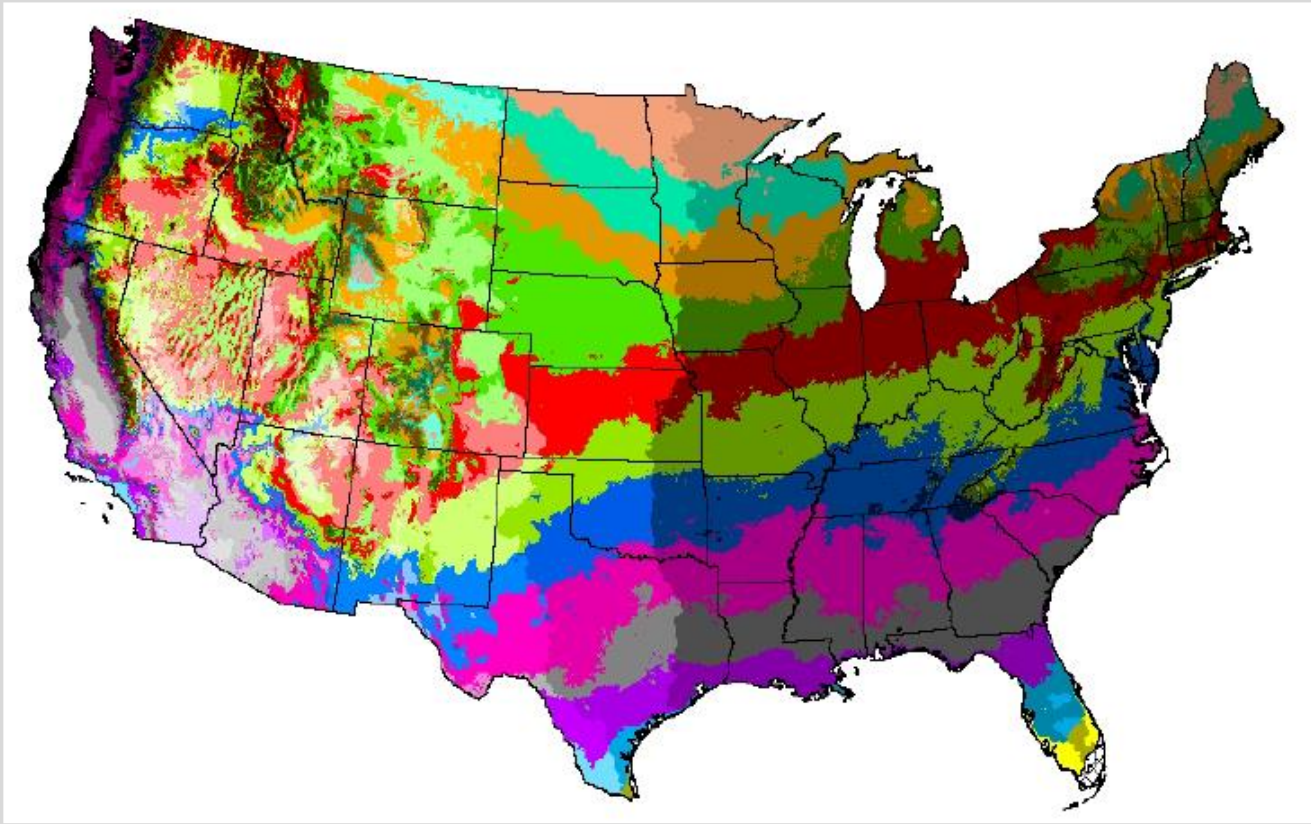


Omernik’s Level III Ecoregions

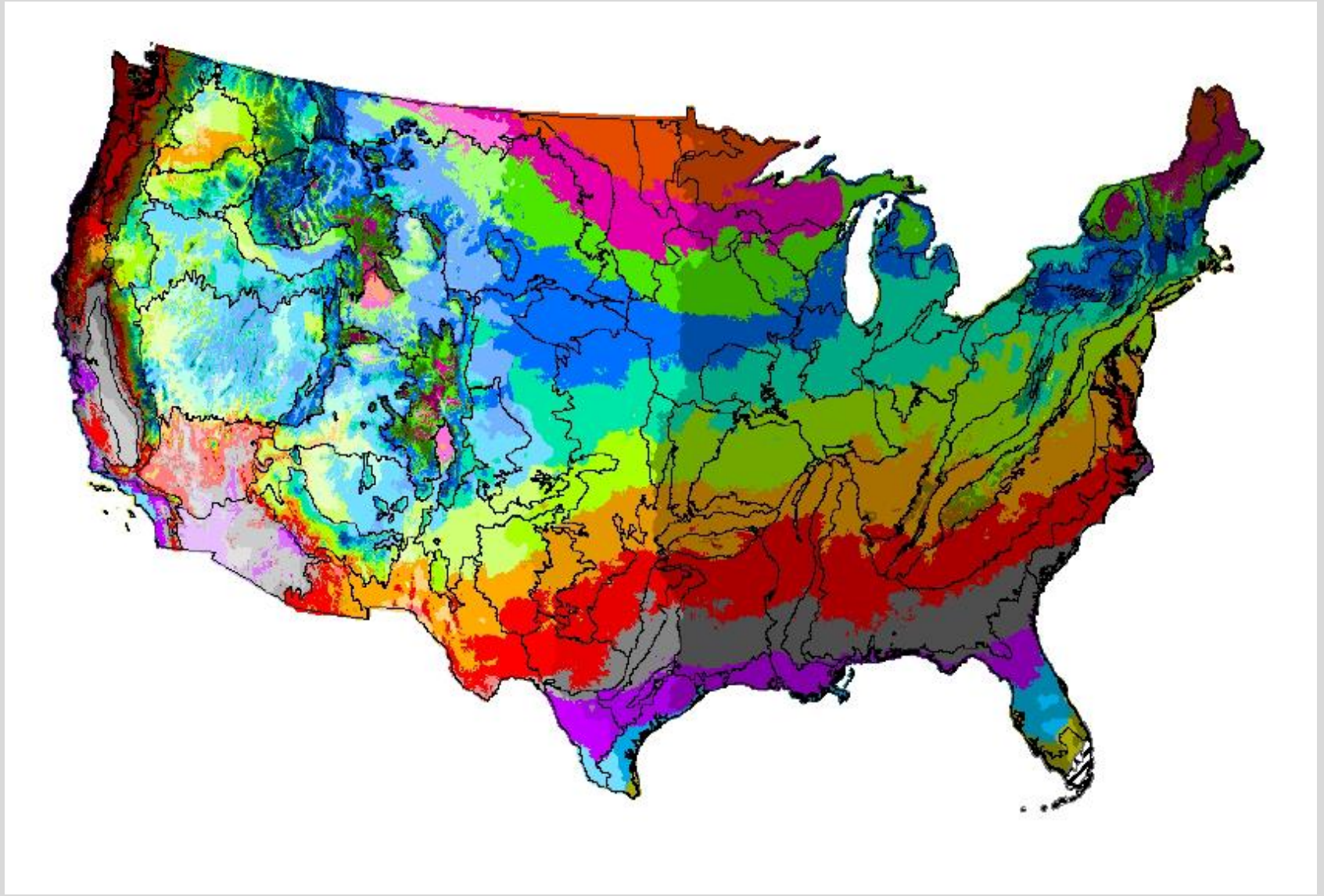
+



Provisional Seed Zones

Courtesy of A. Bower

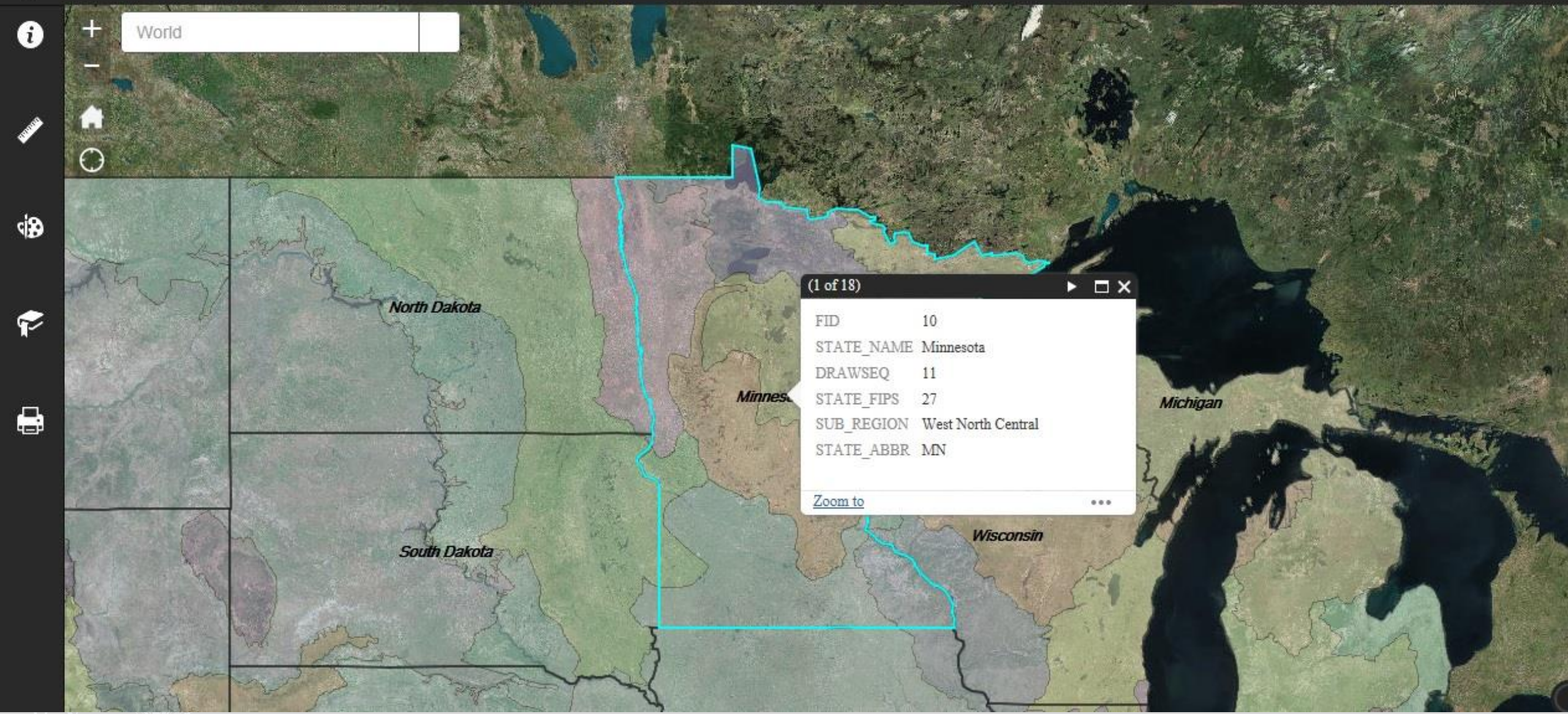
Provisional Seed Zones + Omernik's Level III Ecoregions

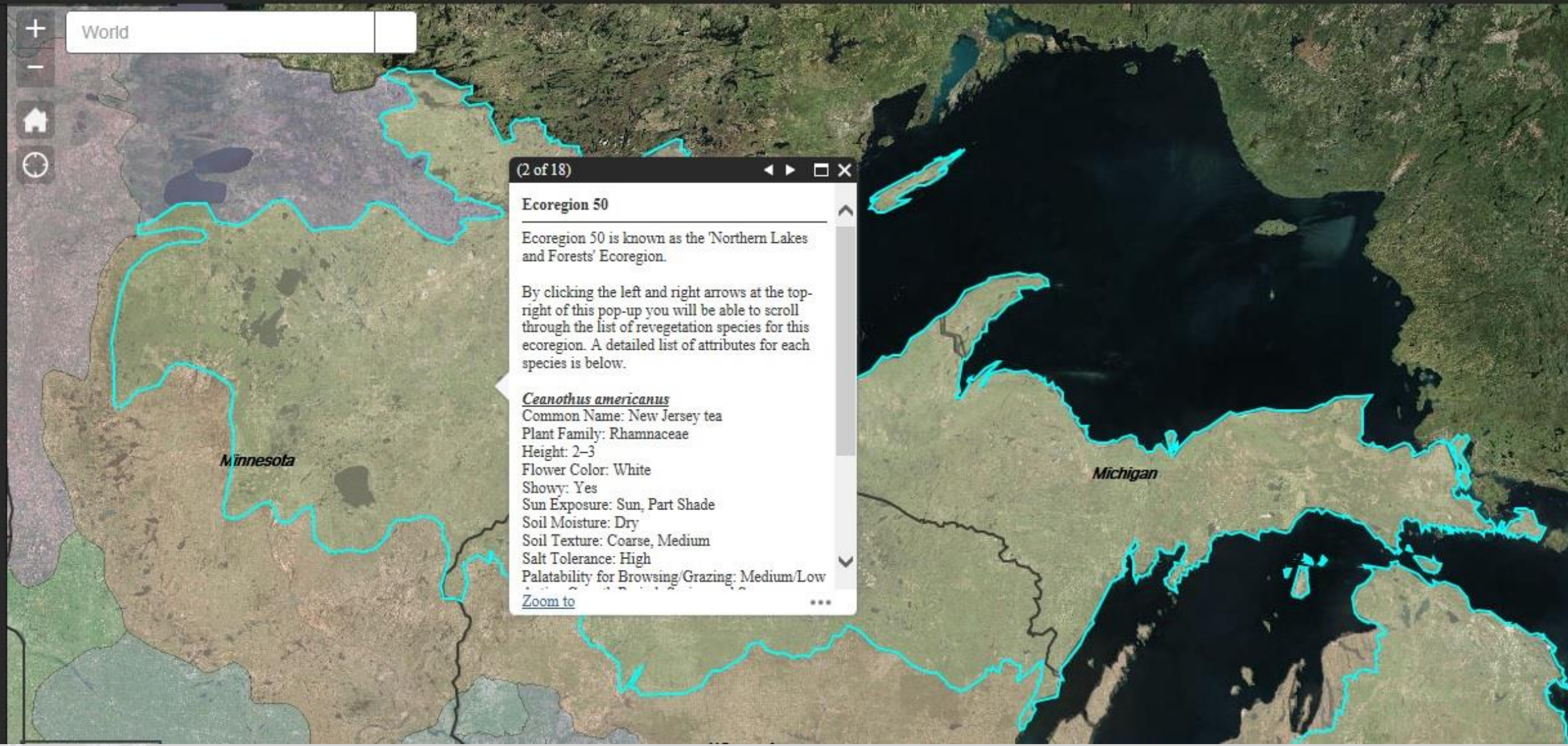


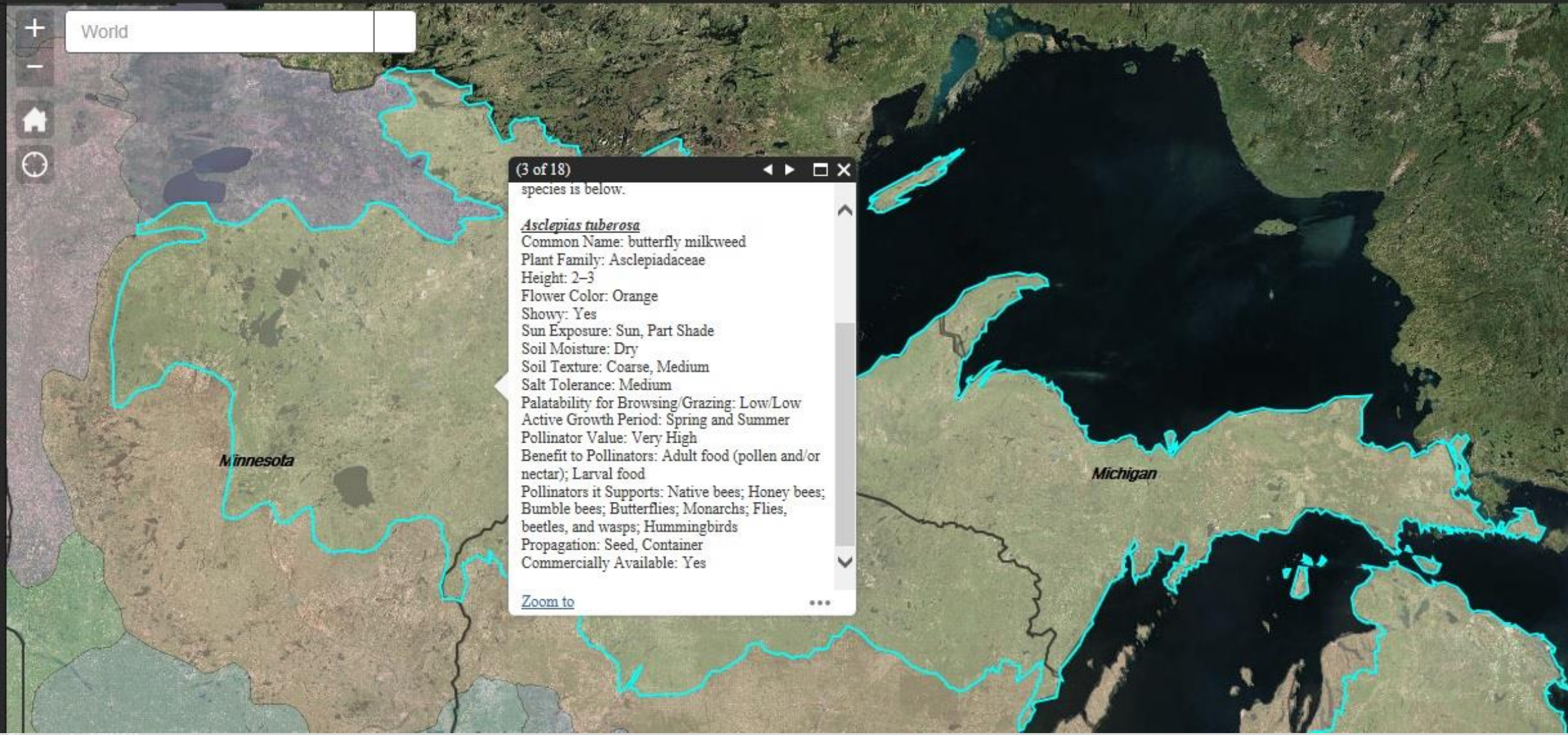
Courtesy of A. Bower

ERA: Ecoregional Revegetation Assistant

Roadside Revegetation Website

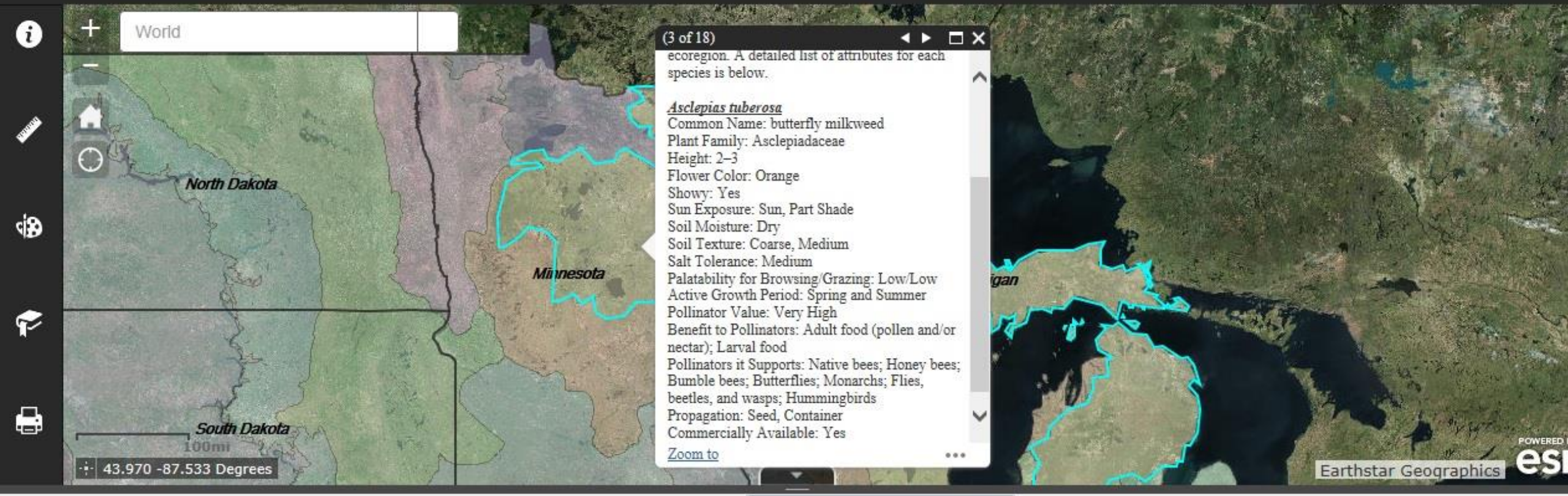



World
(2 of 18)
Ecoregion 50
Ecoregion 50 is known as the 'Northern Lakes and Forests' Ecoregion.
By clicking the left and right arrows at the top-right of this pop-up you will be able to scroll through the list of revegetation species for this ecoregion. A detailed list of attributes for each species is below.
Ceanothus americanus
Common Name: New Jersey tea
Plant Family: Rhamnaceae
Height: 2–3
Flower Color: White
Showy: Yes
Sun Exposure: Sun, Part Shade
Soil Moisture: Dry
Soil Texture: Coarse, Medium
Salt Tolerance: High
Palatability for Browsing/Grazing: Medium/Low
Zoom to
Minnesota
Michigan


World
(3 of 18)
species is below.
Asclepias tuberosa
Common Name: butterfly milkweed
Plant Family: Asclepiadaceae
Height: 2–3
Flower Color: Orange
Showy: Yes
Sun Exposure: Sun, Part Shade
Soil Moisture: Dry
Soil Texture: Coarse, Medium
Salt Tolerance: Medium
Palatability for Browsing/Grazing: Low/Low
Active Growth Period: Spring and Summer
Pollinator Value: Very High
Benefit to Pollinators: Adult food (pollen and/or nectar); Larval food
Pollinators it Supports: Native bees; Honey bees; Bumble bees; Butterflies; Monarchs; Flies, beetles, and wasps; Hummingbirds
Propagation: Seed, Container
Commercially Available: Yes
Zoom to
Minnesota
Michigan

ERA: Ecoregional Revegetation Assistant

Roadside Revegetation Website



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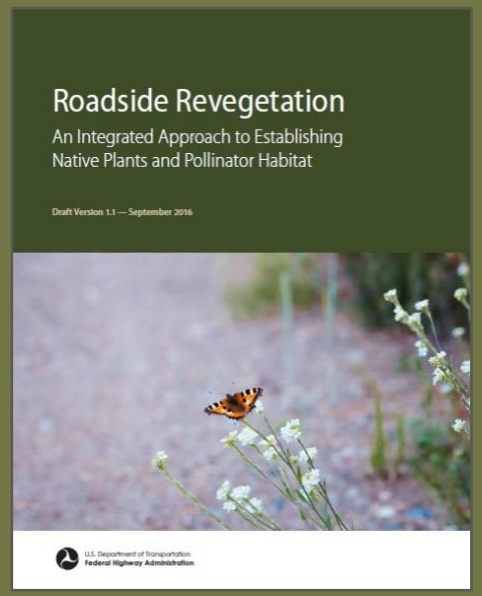
Options | Filter by Map Extent | Zoom to | Clear Selection | Refresh

plant_fami	all_states	eco_region	height__fe	flower_col	showy	flowering	sun_exposu	soil_moist	soil_textu	salt_toler	palatabili	active_gro
Asclepiadaceae	IA,KS,MN,MO,O	46,47,50,51,52	2–3	Orange	Yes	Jun–Aug	Sun, Part Shade	Dry	Coarse, Medium	Medium	Low/Low	Spring an Summer


ROADSIDE REVEGETATION
An Integrated Approach to Establishing Native Plants
the
art&science
of revegetation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Draft Version 1.1 — September 2016
U.S. Department of Transportation
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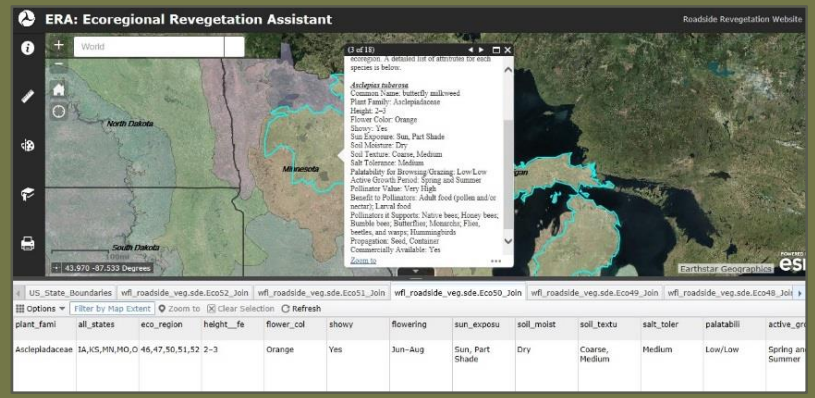
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North Dakota
Minnesota
South Dakota
US_State_Boundaries
wfl_roadside_veg.sde.Eco52_Join
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wfl_roadside_veg.sde.Eco50_Join
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wfl_roadside_veg.sde.Eco48_Join
plant_fami
all_states
eco_region
height__fe
flower_col
showy
flowering
sun_exposu
soil_moist
soil_textu
salt_toler
palatabili
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Acknowledgements

- Federal Highways Administration (FHWA)
  - Amit Armstrong
  - Erin Chipps
  - Deirdre Remley
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  - Robin Christians
  - Shane Roberts
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  - Matt Horning
  - Lynda Moore
  - Mark Skinner
  - David Steinfeld (Native Restoration Consulting)
- Chicago Botanic Garden
  - Abbey White
  - Andrea Kramer

www.nativerevegetation.org

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