Mapping and Characterization of Riparian Wetlands along the Upper Esopus Creek, Ulster County, NY

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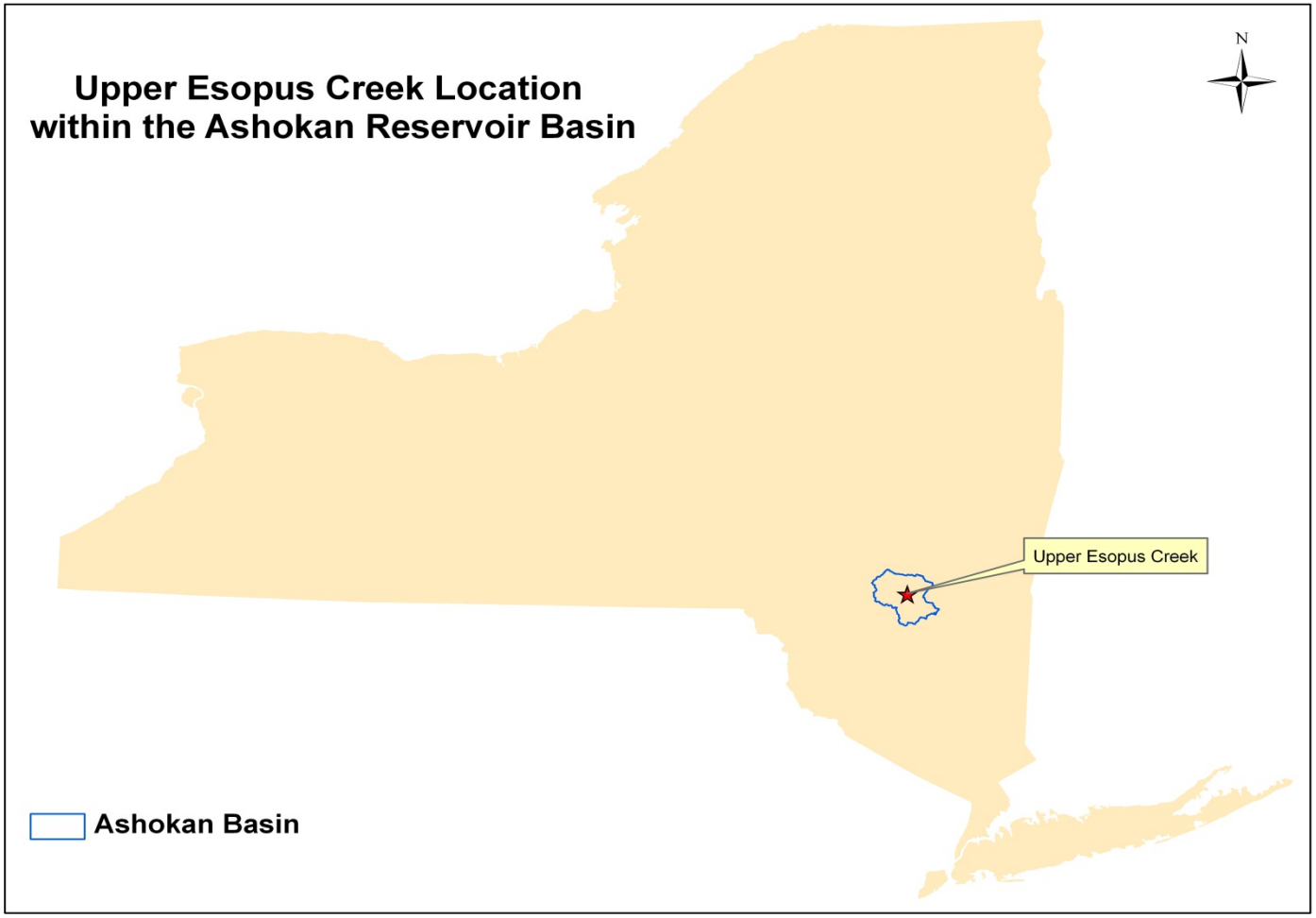
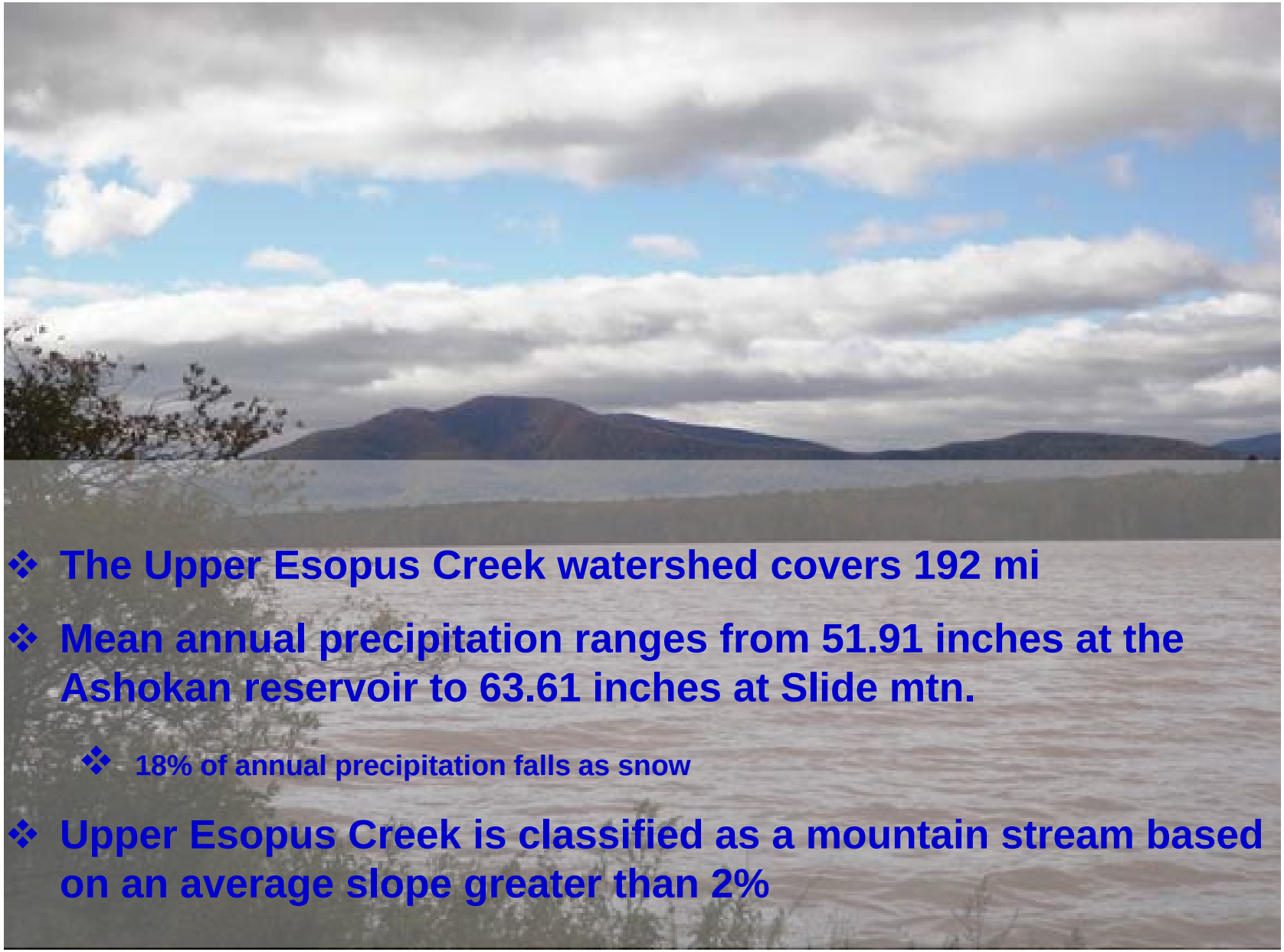
Project Background

- **Recommended in the Upper Esopus Creek Management Plan**
  - Completed in 2007 through a partnership with DEP, Cornell Cooperative Extension, and U.S. Army Corps of Engineers Research Development Center
  - Wetland information needed for assessment of condition and health of the riparian corridor
  - www.ashokanstreams.org
- **Wetland assessment kicked off in early July of 2009**

Ashokan Basin

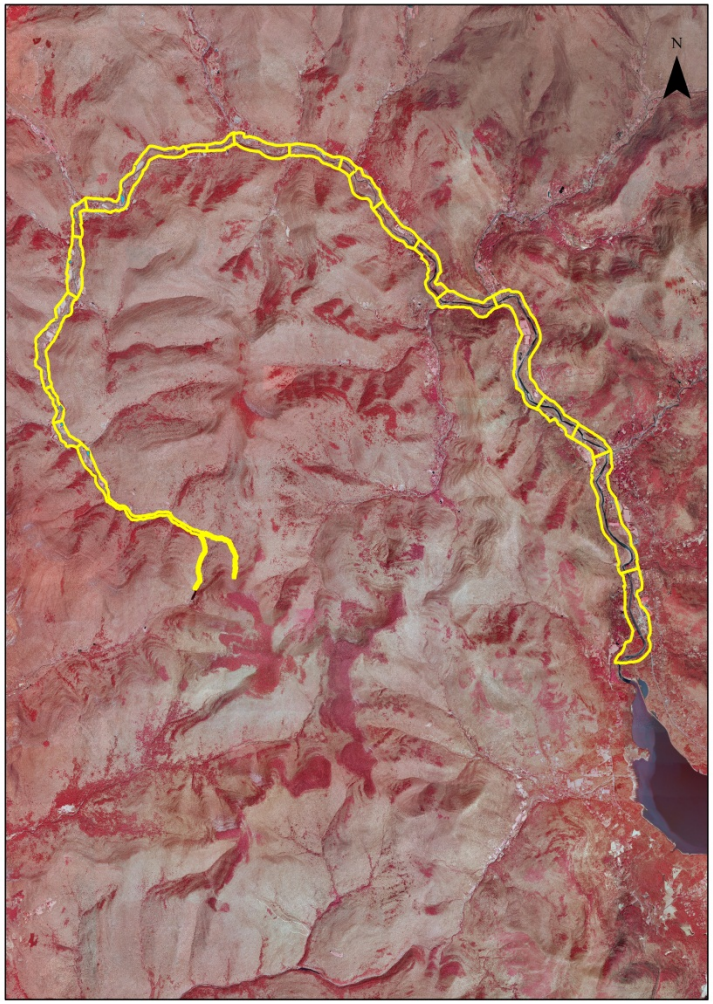


Upper Esopus Creek Watershed



- The Upper Esopus Creek watershed covers 192 mi
- Mean annual precipitation ranges from 51.91 inches at the Ashokan reservoir to 63.61 inches at Slide mtn.
  - 18% of annual precipitation falls as snow
- Upper Esopus Creek is classified as a mountain stream based on an average slope greater than 2%

Riparian Corridor



Project Goals

- Map and inventory wetlands within the riparian corridor
- Document geomorphic settings and describe biological attributes of each wetland
- Record occurrences of exotic invasive species

Imagery Review

- **Desktop interpretation of 2001 and 2009 color-infrared leaf off photography**

- **Review footage from helicopter flights**

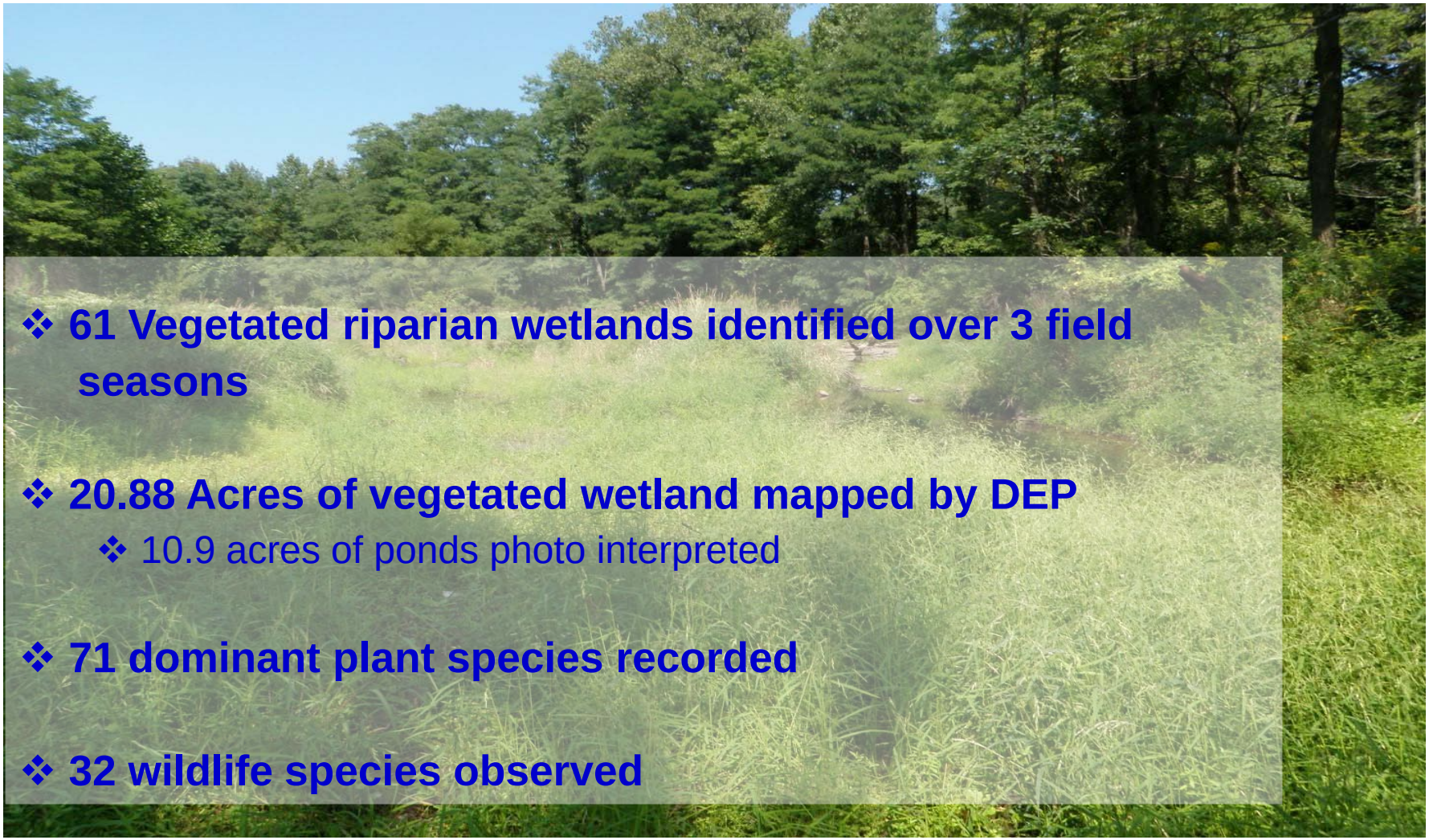
Methods

- **Marked all vegetated NWI wetlands within corridor for field visits**
  - Currently no NYS DEC mapped wetlands
  - Ponds were identified using 2009 Color Infrared Photography
- **Used landownership parcel information to send out access permission letters**
- **Determinations based on 87 ACOE Manual**
- **Also assessed geomorphic setting, wetland and buffer condition, and noted wildlife**

Field Work

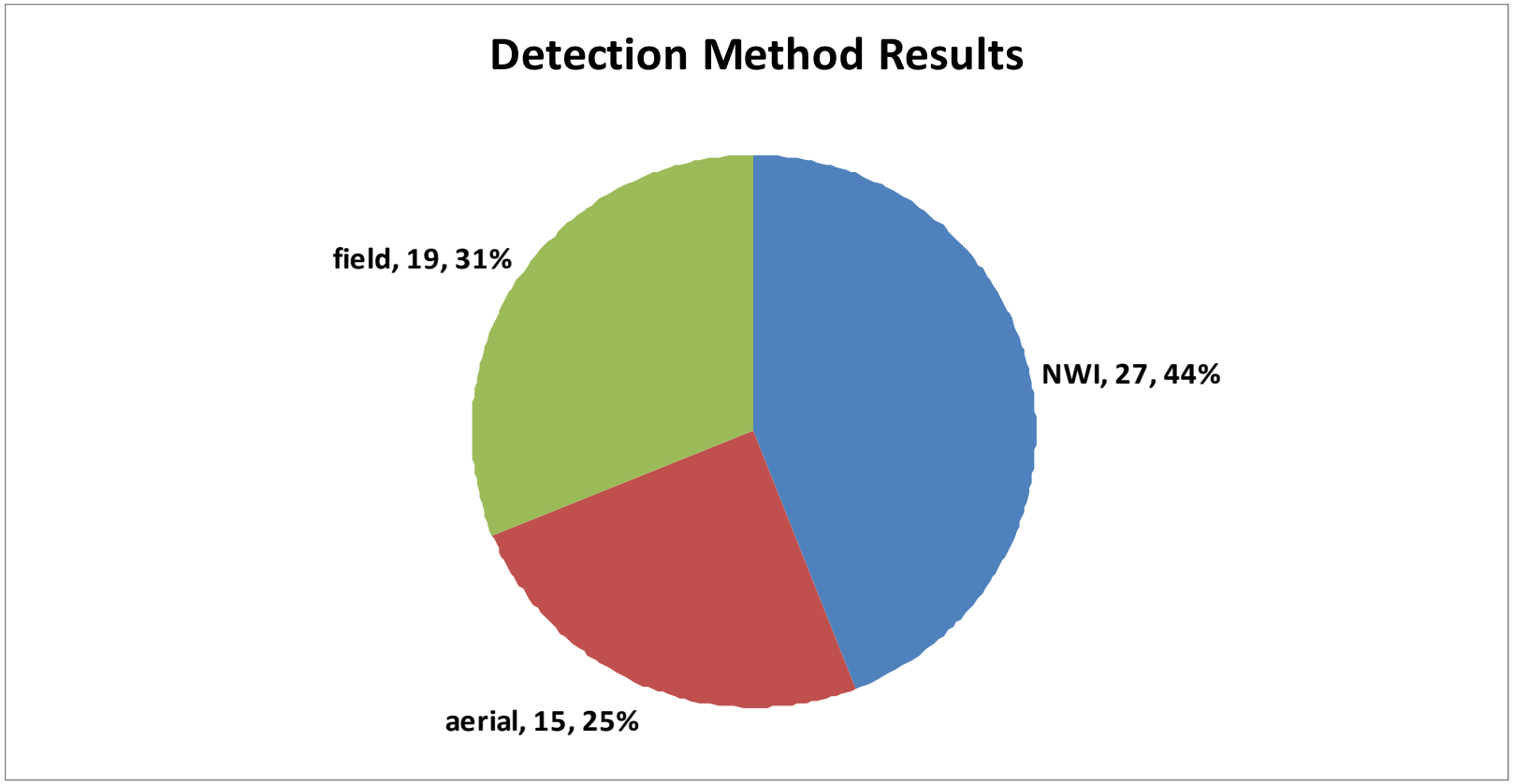
- **Hiked from the headwaters downstream**
  - Recruited 2 student interns from U.C.C.C.
- **Wetland areas were GPS'd and photos taken**

Results

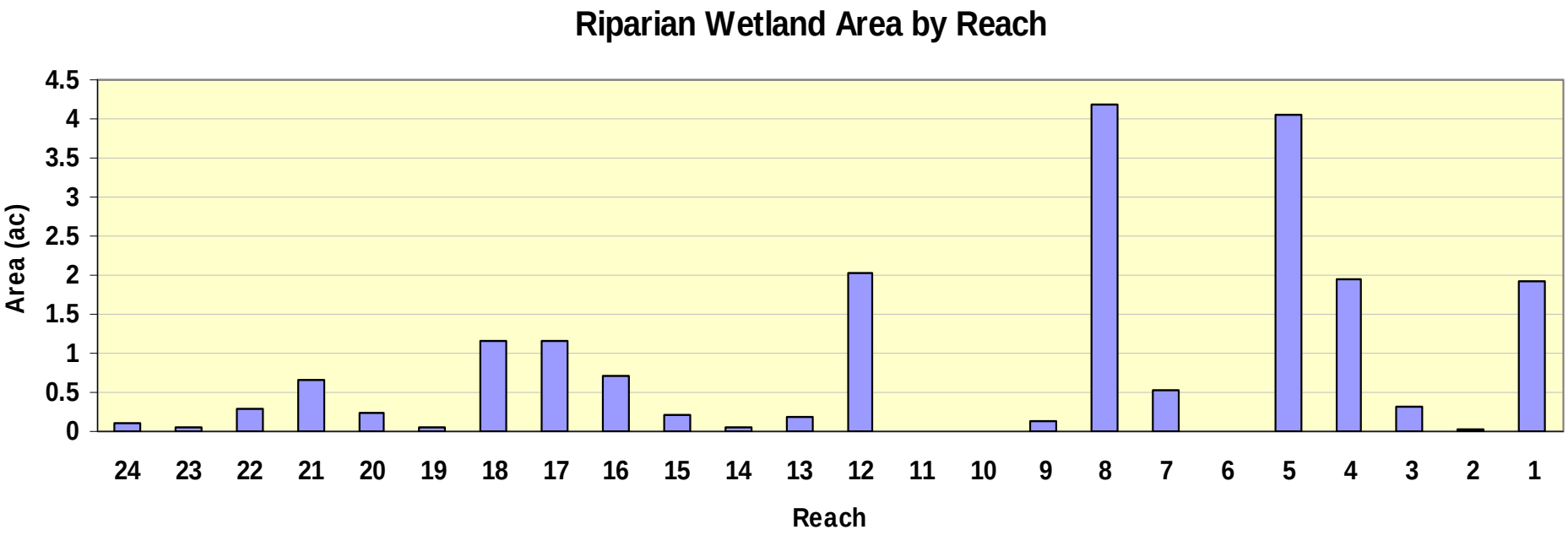


- **61 Vegetated riparian wetlands identified over 3 field seasons**
- **20.88 Acres of vegetated wetland mapped by DEP**
  - 10.9 acres of ponds photo interpreted
- **71 dominant plant species recorded**
- **32 wildlife species observed**

Wetlands Detection

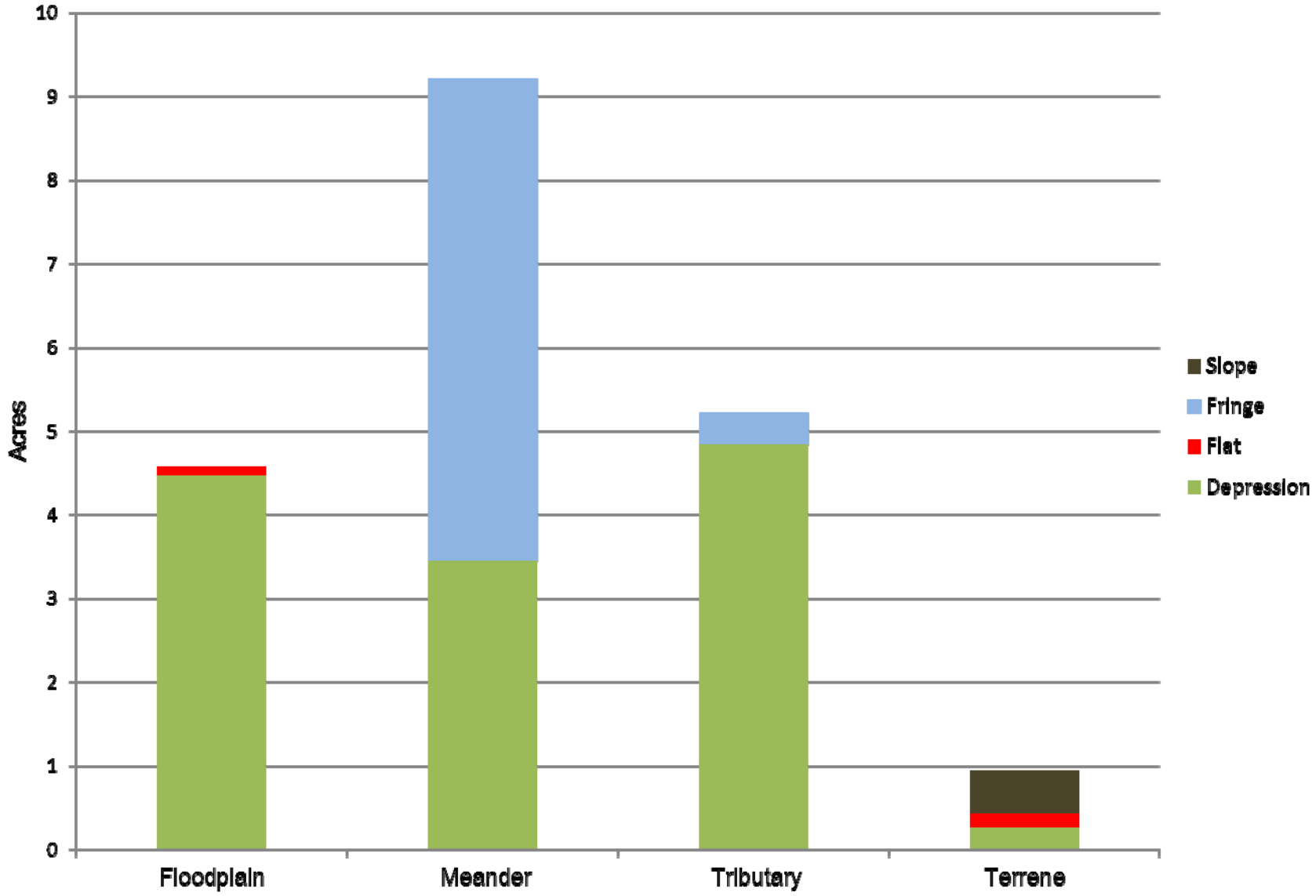


Vegetated Wetland acreage by Reach

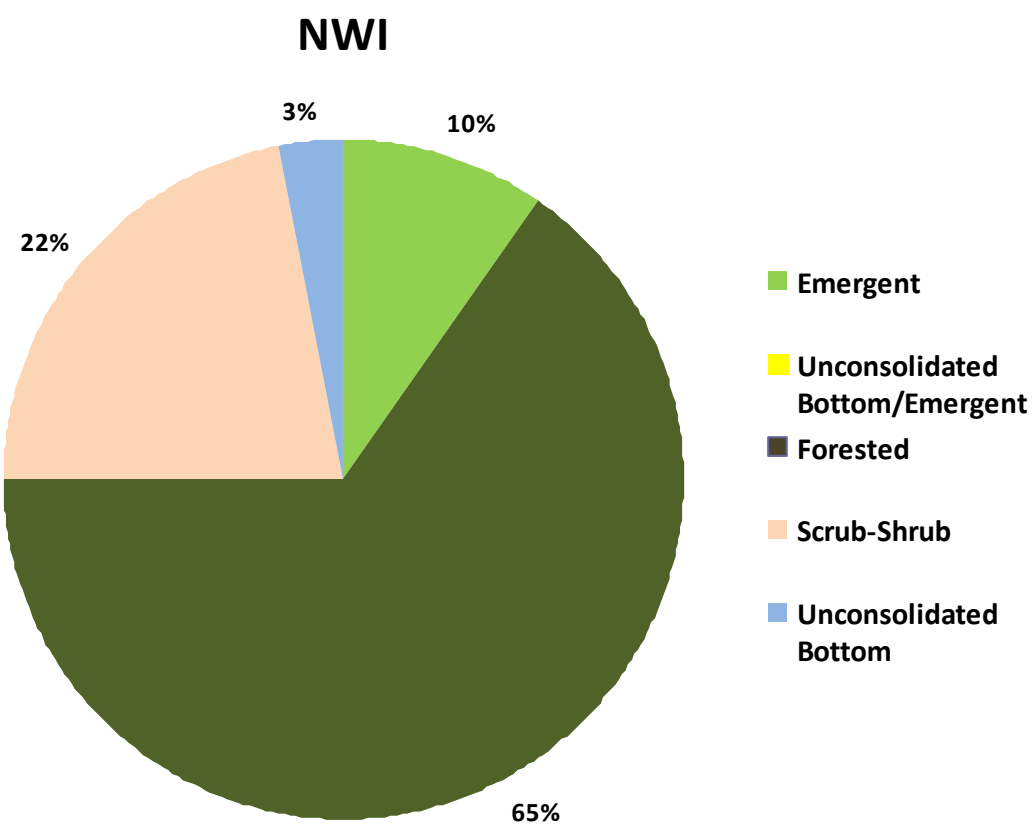


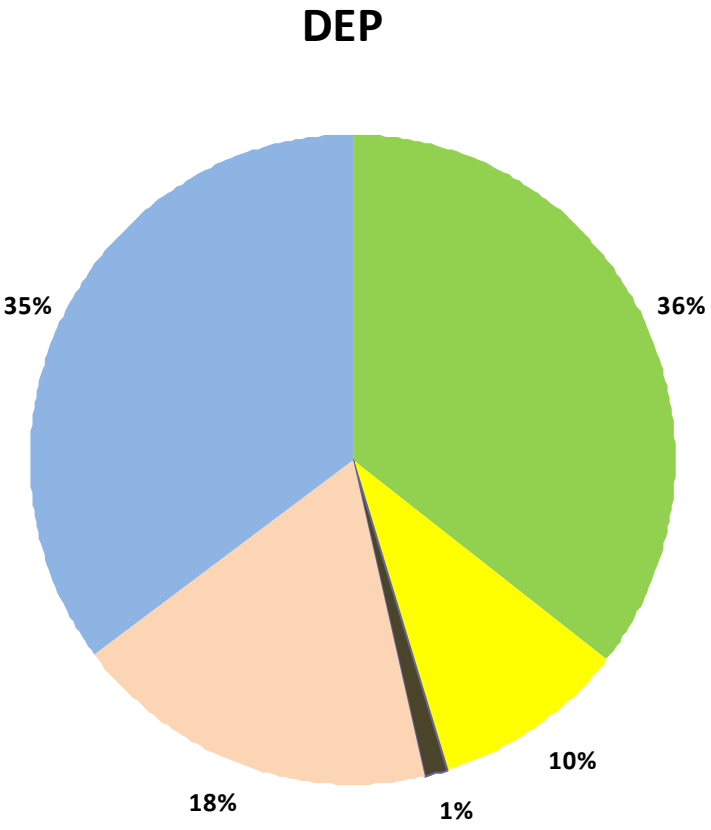
- **Vegetated wetlands comprise approximately 0.67% of the riparian corridor**
- **Individual reaches range from 0 to 2.3% cover by vegetated wetlands**

Geomorphic Settings



Wetland Cover Classes



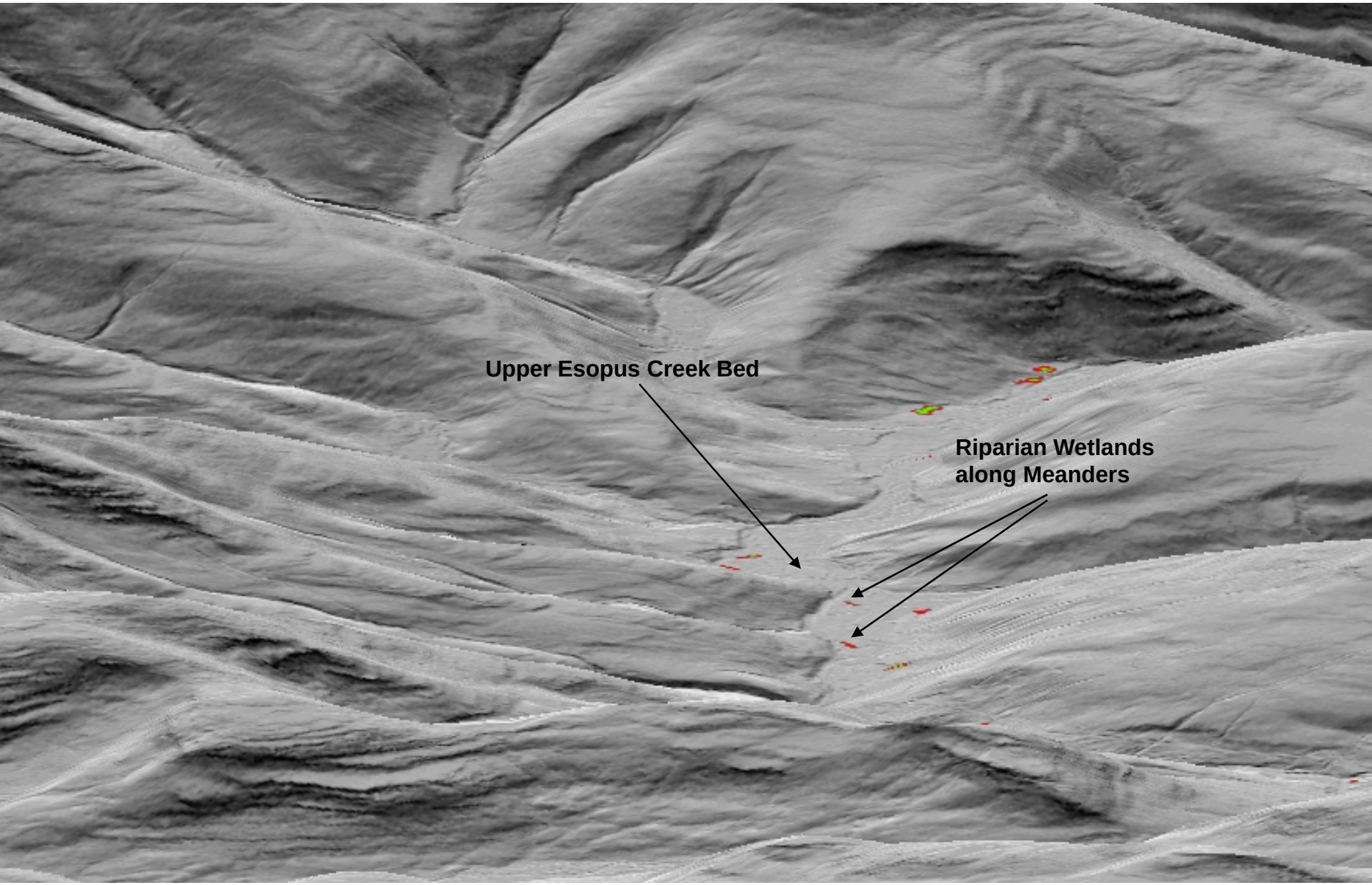


Depressional Forested Wetland Reach 18

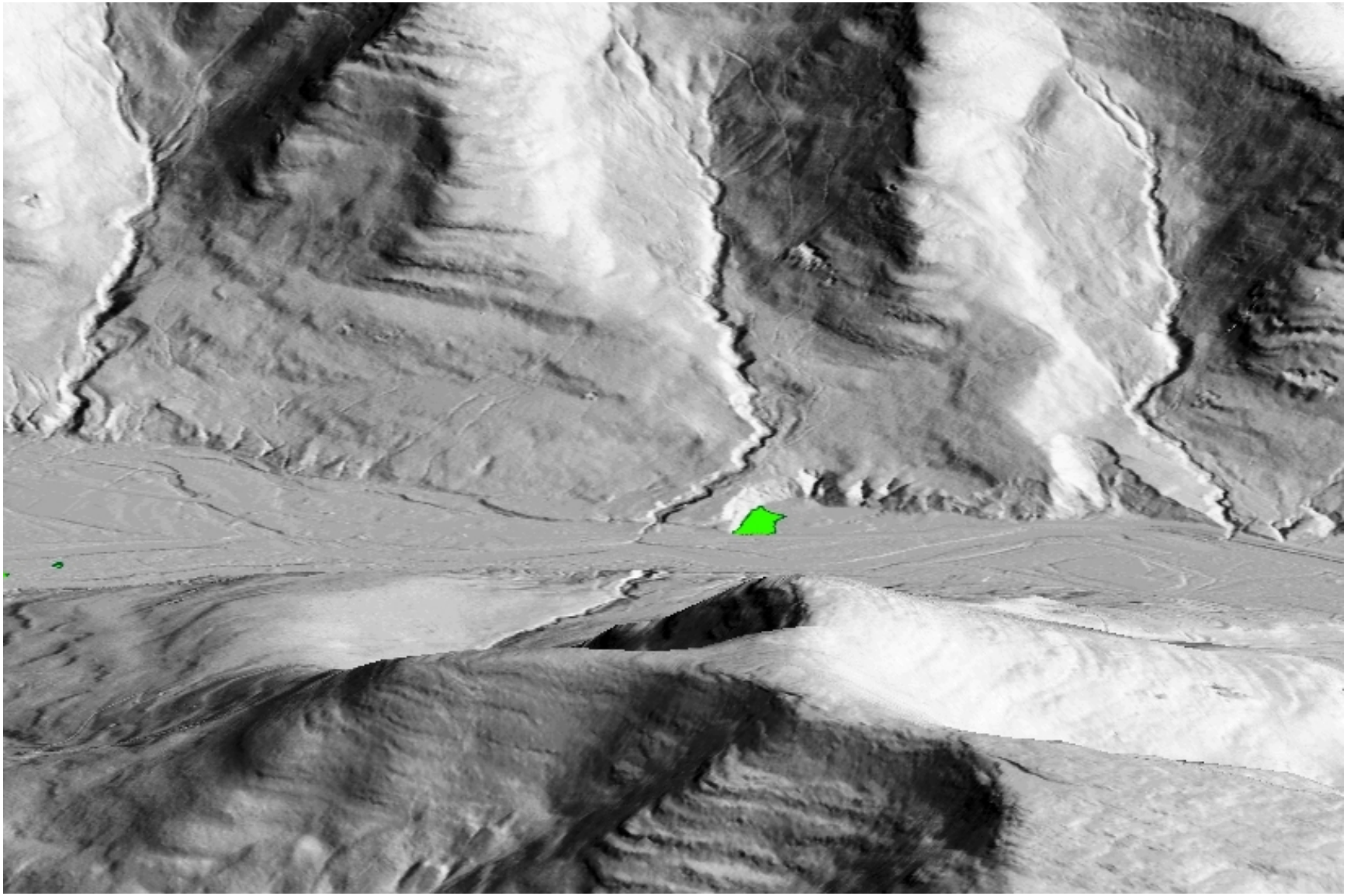
Emergent Fringe Wetland Reach 7

Slope Wetland Reach 22

LiDAR View of Reaches 19 & 18



Wetland 4b 3 meter DEM



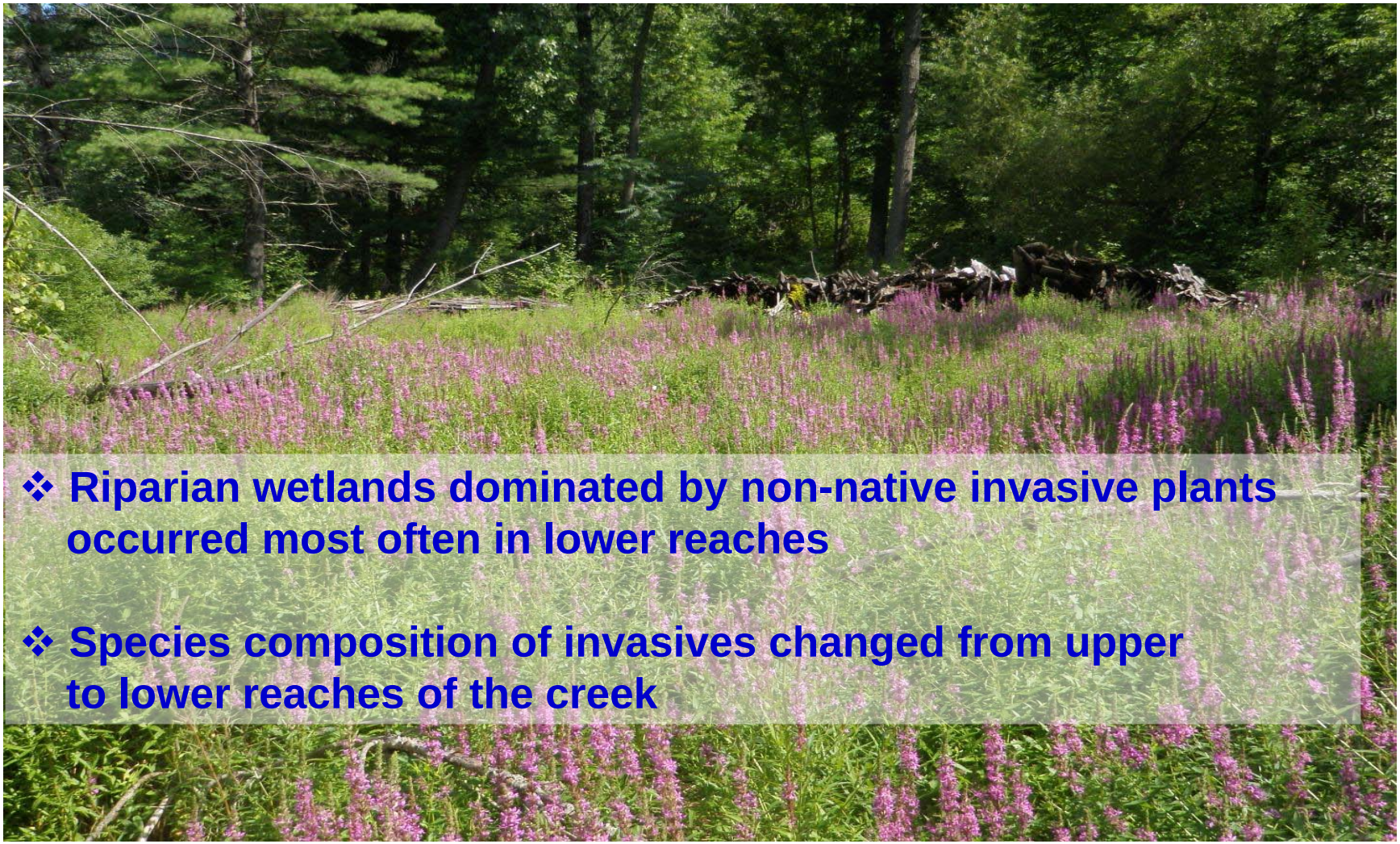
Riparian Wetland Plants

Clockwise: *Myosotis scorpioides, Scirpus cyperinus, Onoclea sensibilis*

Dominant Species

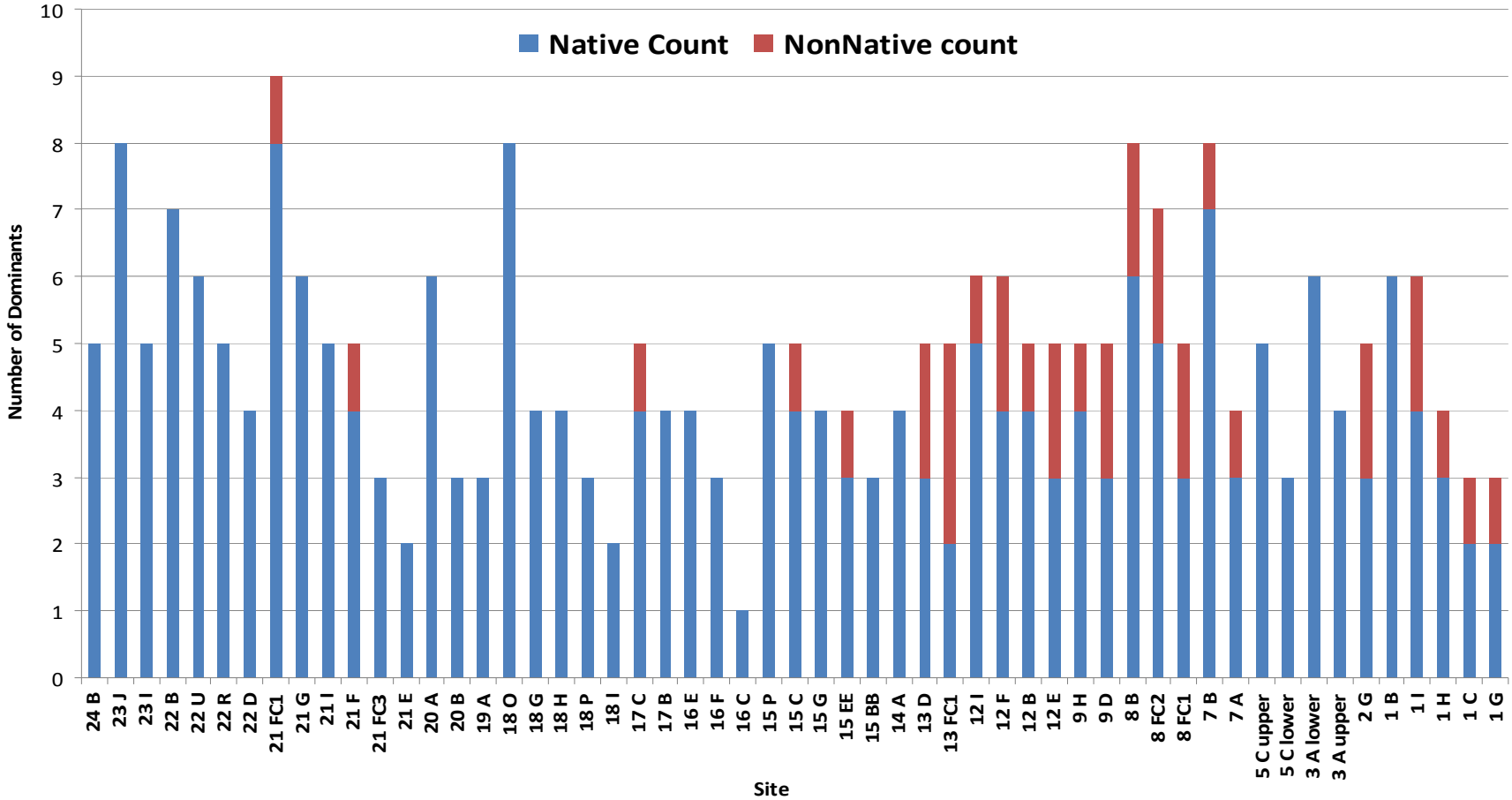
Dominant Species	Total Number of Sites
Onoclea sensibilis (sensitive fern)	**21**
Impatiens capensis (spotted jewelweed)	**17**
Scirpus cyperinus (bulrush)	**17**
Myosotis scorpioides (true forget-me-not)	**14**
Lythrum salicaria (purple loosestrife)	**12**
Euthamia graminifolia (flat-topped goldenrod)	**10**
Salix spp. (willow)	**10**
Juncus effusus (soft rush)	**9**
Persicaria sagittata (arrow-leaved tearthumb)	**9**
Solidago gigantea (late goldenrod)	**9**

Wetland Invasive Species

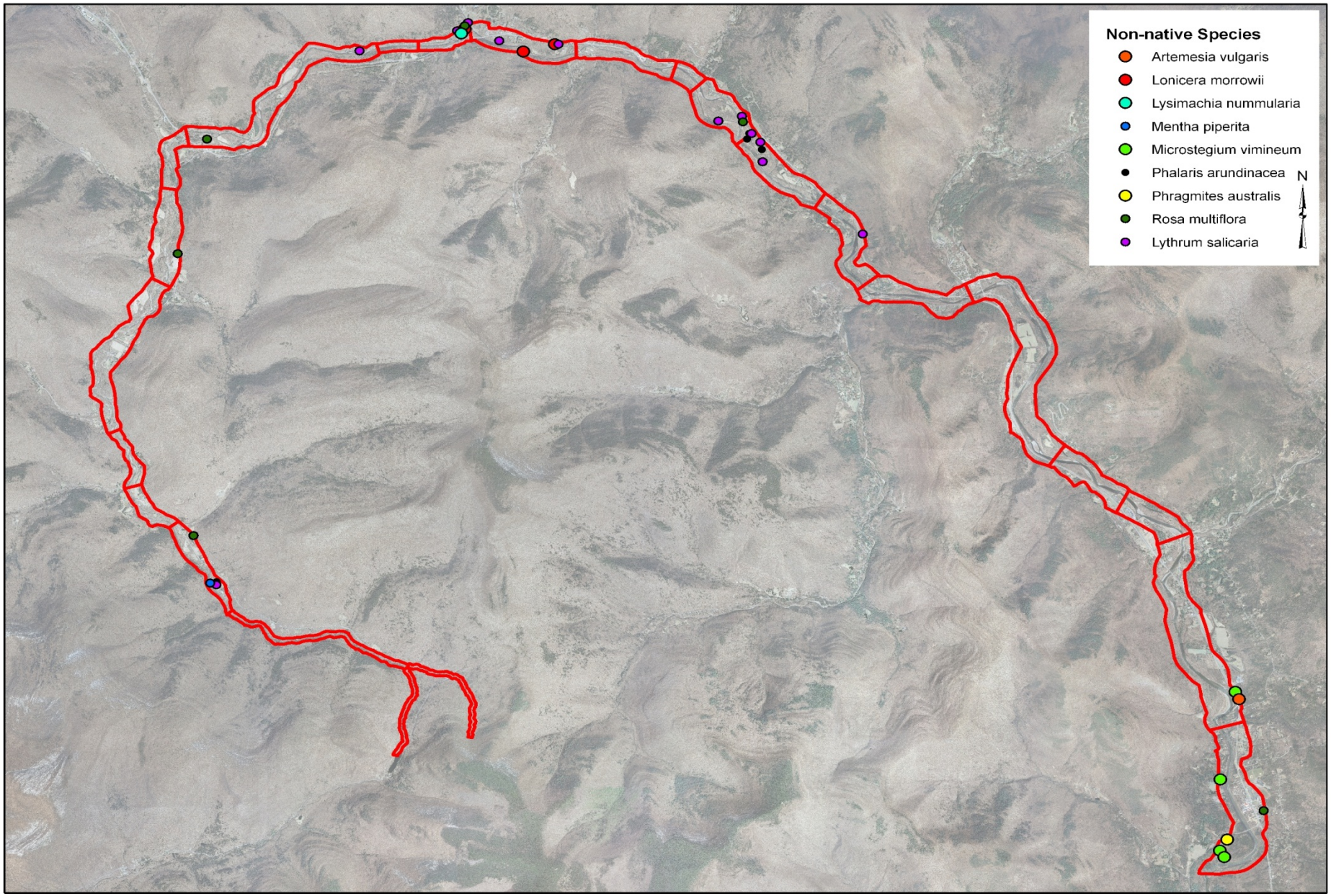


- Riparian wetlands dominated by non-native invasive plants occurred most often in lower reaches
- Species composition of invasives changed from upper to lower reaches of the creek

Native/Non-Native Dominants in Wetlands



Non-native Dominants in Wetlands



Japanese Knotweed (*Fallopia japonica*)

Didymo (“Rock Snot”)

Photo by NYC DEP 2009

Photo by Tim Daley, PA DEP

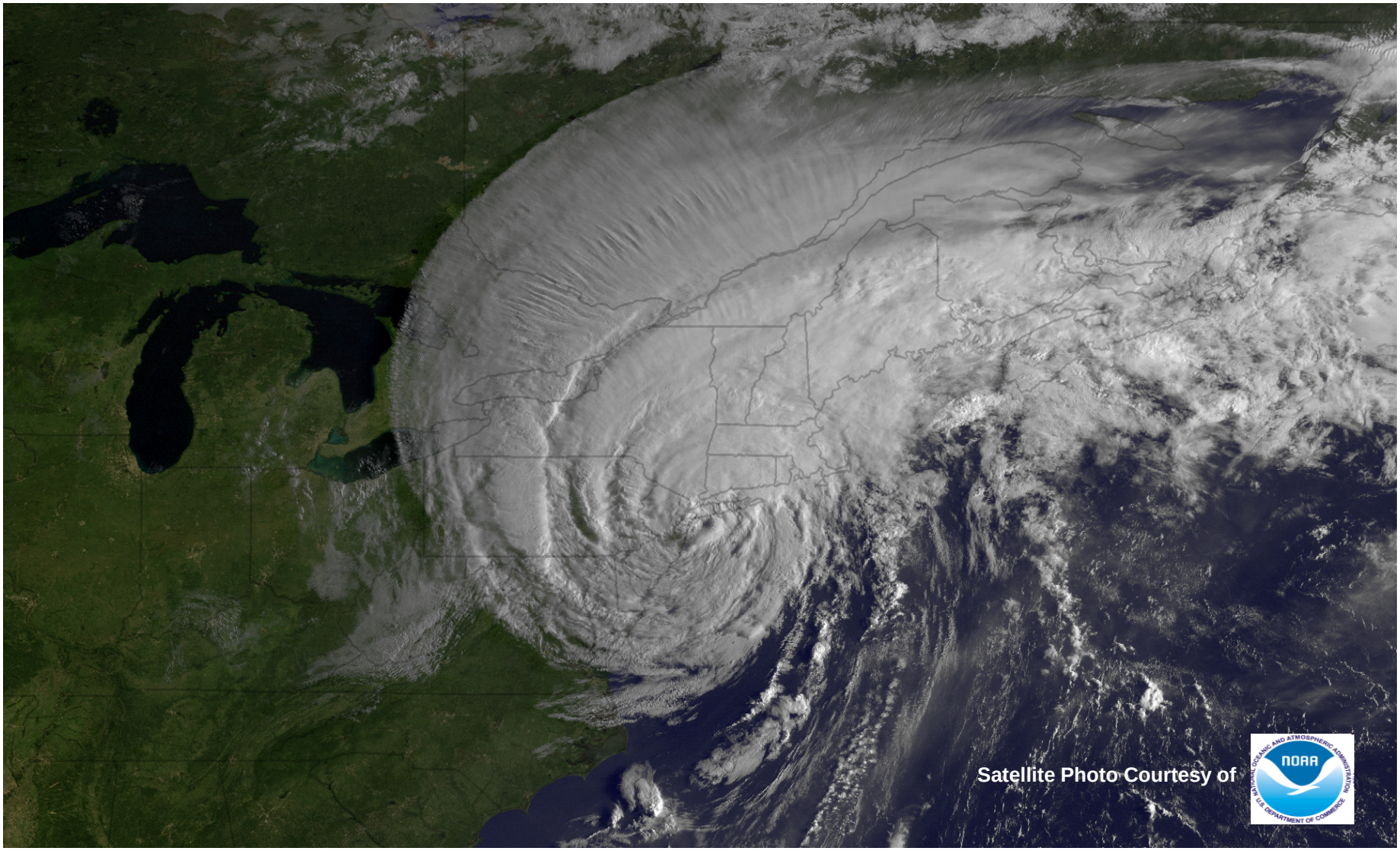
Didymo

- Didymo (*Didymosphenia geminata*) is a freshwater diatom native to the European Alps region and northern Canada
- Algae is invasive and covers rocks on the bottom of streams and shallow lakes
- Poses a significant threat to the aquatic ecosystem
- Didymo can be spread by sticking to any surface it comes in contact with
- Algae discovered in the Upper Esopus creek in 2009 by DEC
- NYC DEP implemented a disinfection protocol for field equipment including waders to help prevent the spread
- No Didymo identified during wetlands assessment

Wildlife

Wildlife

Tropical Storms Irene and Lee



Post Storms

Photo taken 9-1-2011 by D. Davis SMP

Post Storms

Photo taken 9-1-2011 by D. Davis SMP

Before

Photo taken 9-2-2010

After

Photo taken 9-14-2011

Impacts on Wetlands Reach 12

Post Storm

Photo taken 9-1-2011 by D. Davis SMP

Post-Storm Summary

- **We observed impacts from Tropical Storms Irene and Lee on a few wetland sites in September of 2011**
  - Extensive sediment and gravel deposition
  - Washouts of barriers/hydrologic controls such a beaver dams and gravel bars
  - Stream channel alterations changing the flow through wetlands

- **Wetland impact observations based upon sites established prior to the storm only**

- **Areas of riparian wetland creation yet to be examined**

Acknowledgment

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Jonathan Tuscanes, DEP GIS

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Questions?