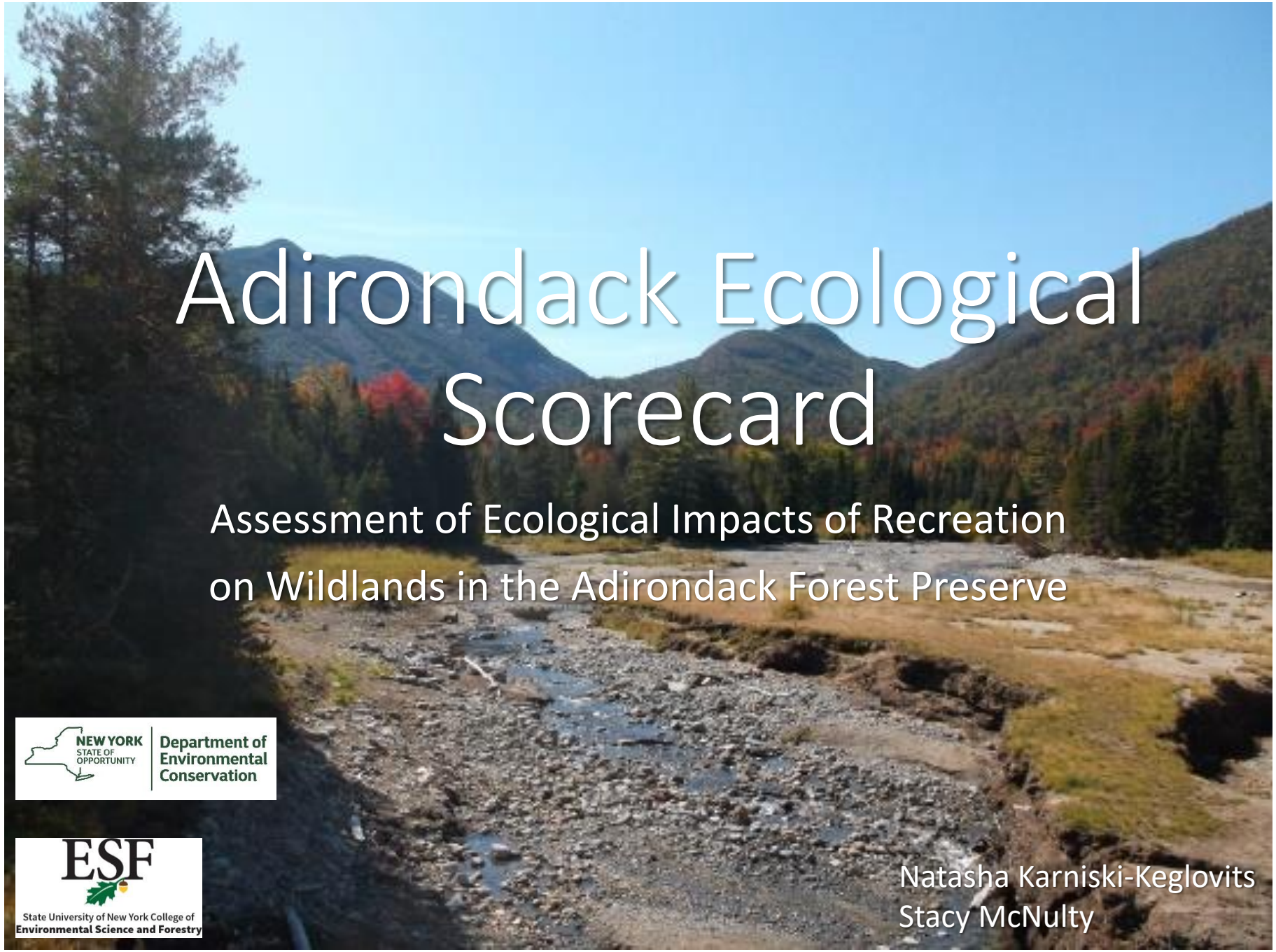


Adirondack Ecological Scorecard

Assessment of Ecological Impacts of Recreation on Wildlands in the Adirondack Forest Preserve

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

ESF State University of New York College of Environmental Science and Forestry

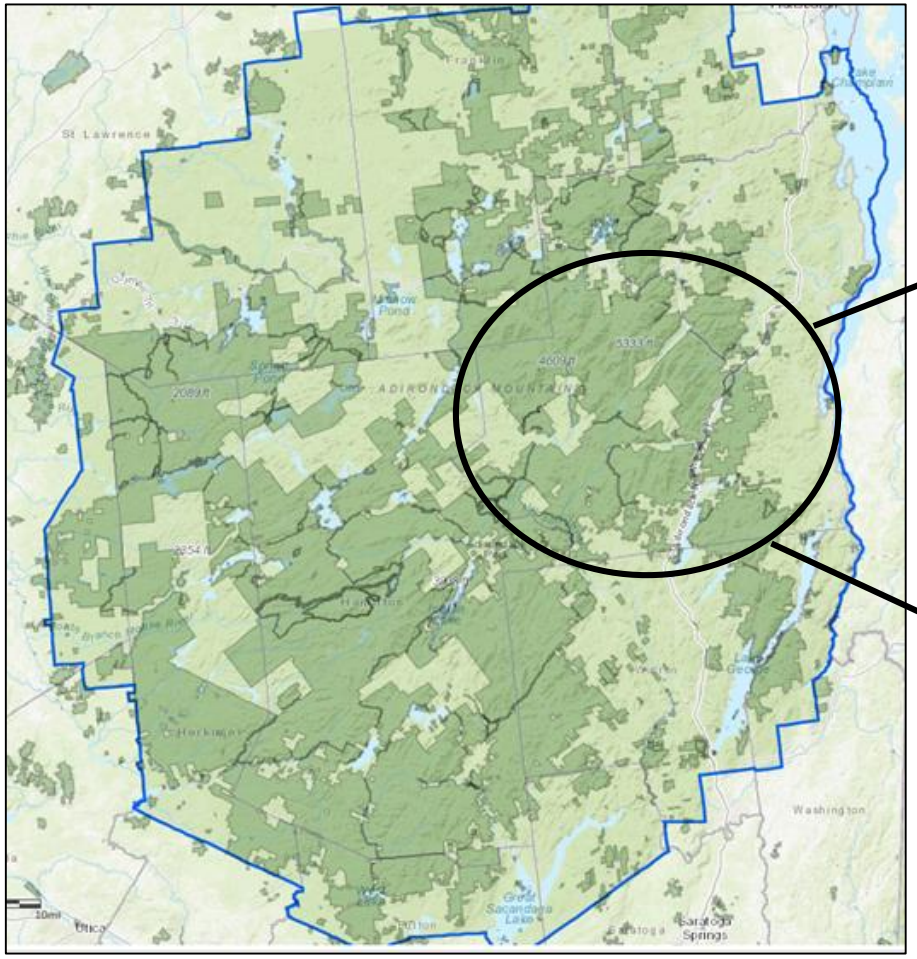
Natasha Karniski-Keglovits
Stacy McNulty

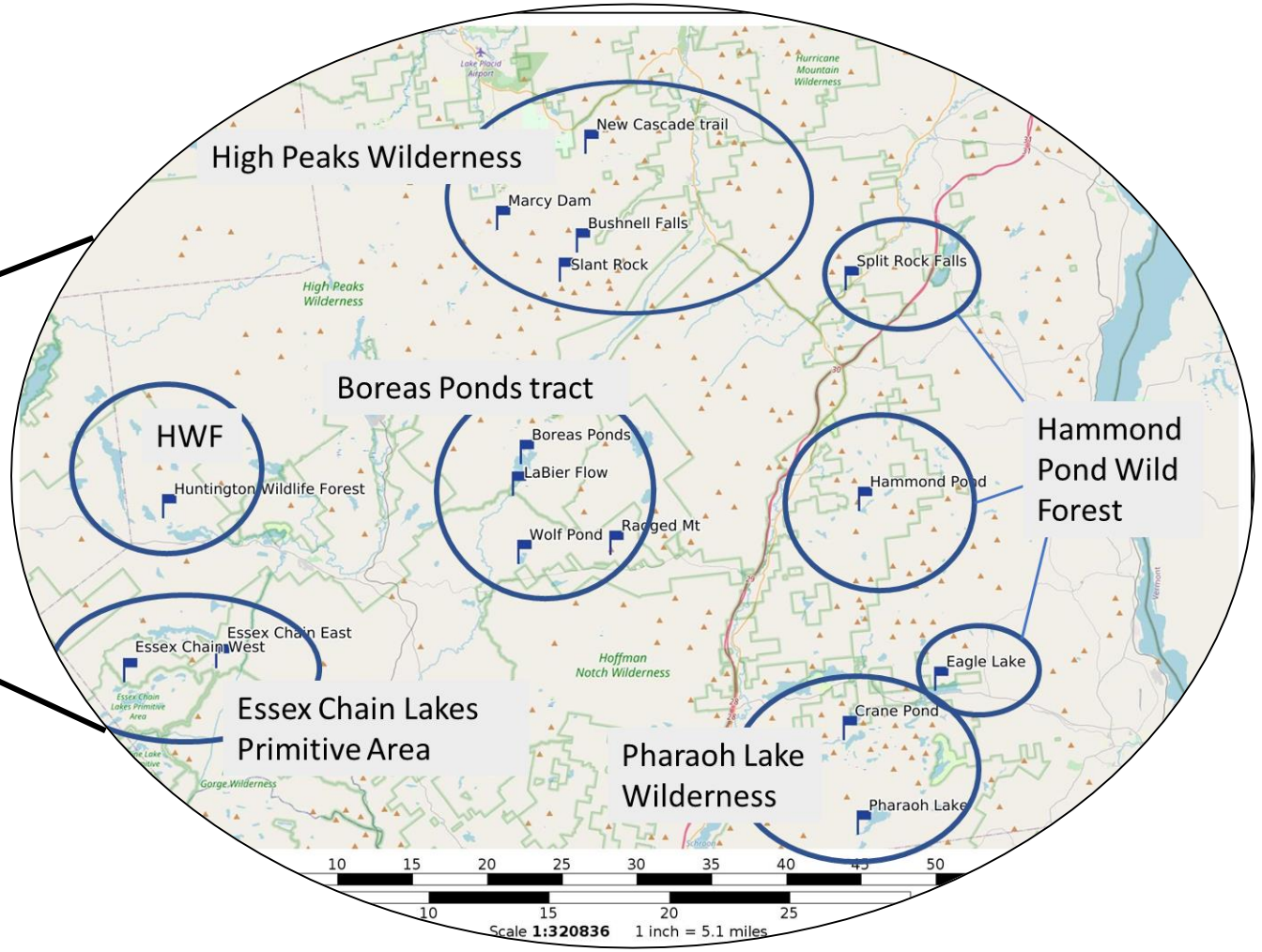
Ecological Scorecard Project Objectives

The science-based tool will enable DEC and ESF to:

- Monitor environmental changes and trends
  - Assess recreation impact on ecological processes
  - Detect and monitor the spread of invasive species
- Identify information gaps
- Identify priority actions and assess the effectiveness of these actions

Ecological Scorecard Units of Focus



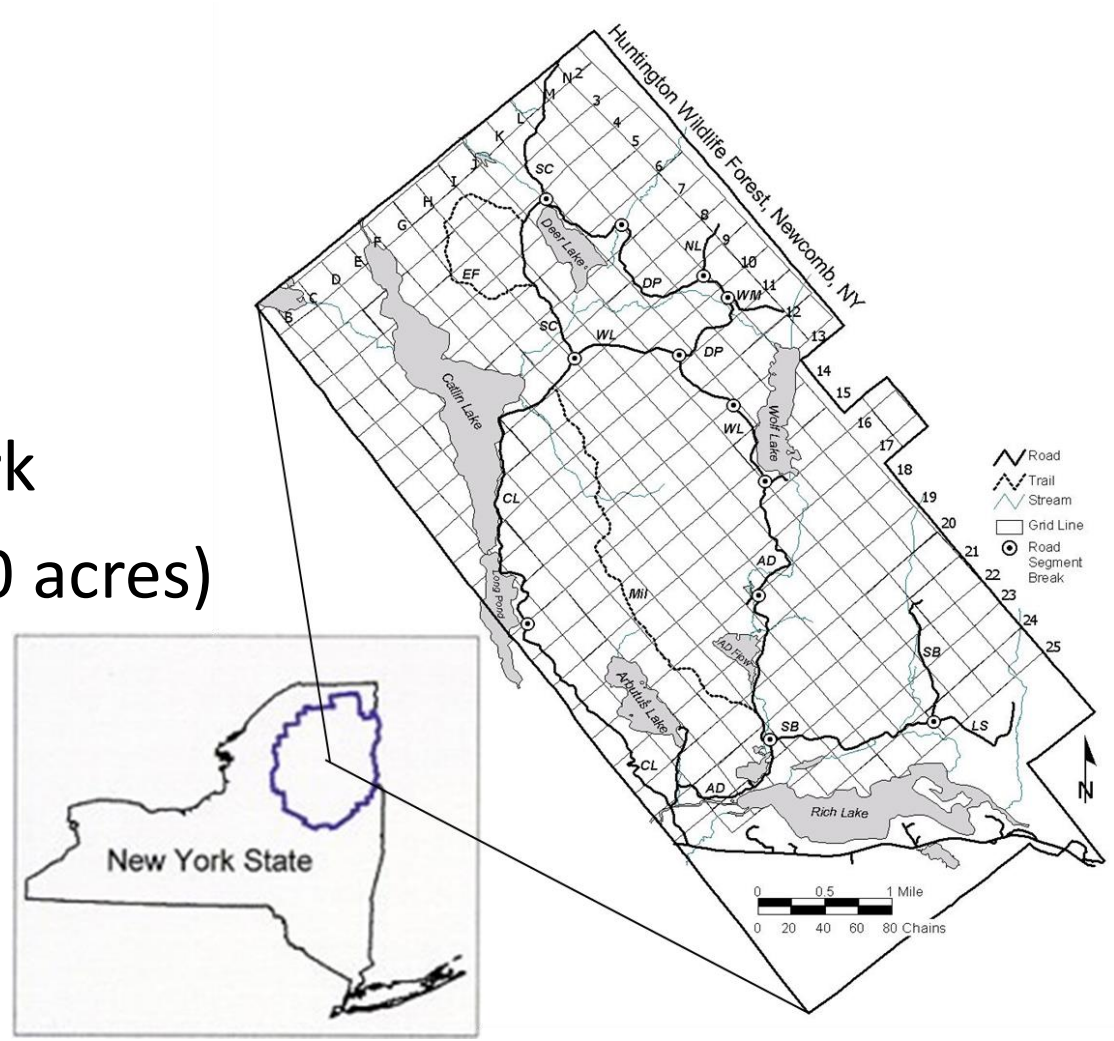


Ecological Scorecard Project Objectives (continued)

- SUNY ESF's Huntington Wildlife Forest (HWF) will:
  - Serve as a control site to understand, predict and respond to trends
  - Provide background data going back as far as 85 years

HWF – Control Data

- Adirondack Long-term Ecological Monitoring Program (ALTEMP)
  - Small mammals (1983 – present)
  - Songbirds (1984 – present)
  - Amphibians (2001 – present)
  - Loons (1987 – present)
  - Weather data (1940 – present)
- Geographic center of the Adirondack Park
- Minimal recreation (gated access; 15,000 acres)



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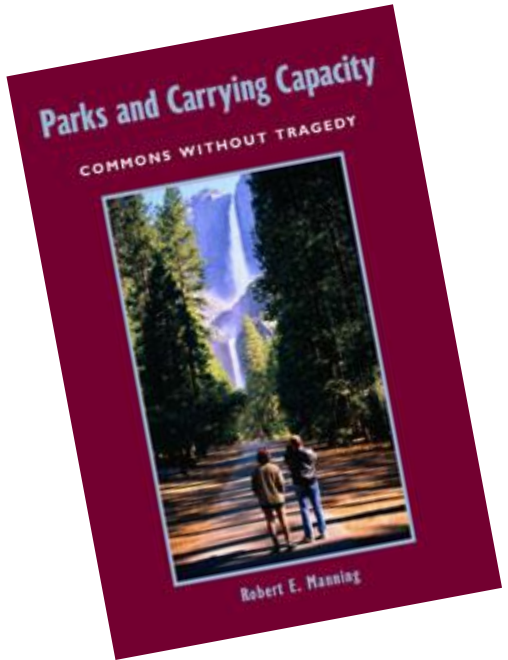
Ecological Indicators

- Indicators are elements and processes in the park ecosystems that help indicate the overall health or condition of park resources
- National Park Service “Vital Signs” program
- Manning, Robert E. “Parks and Carrying Capacity: Commons without tragedy”. 2007.

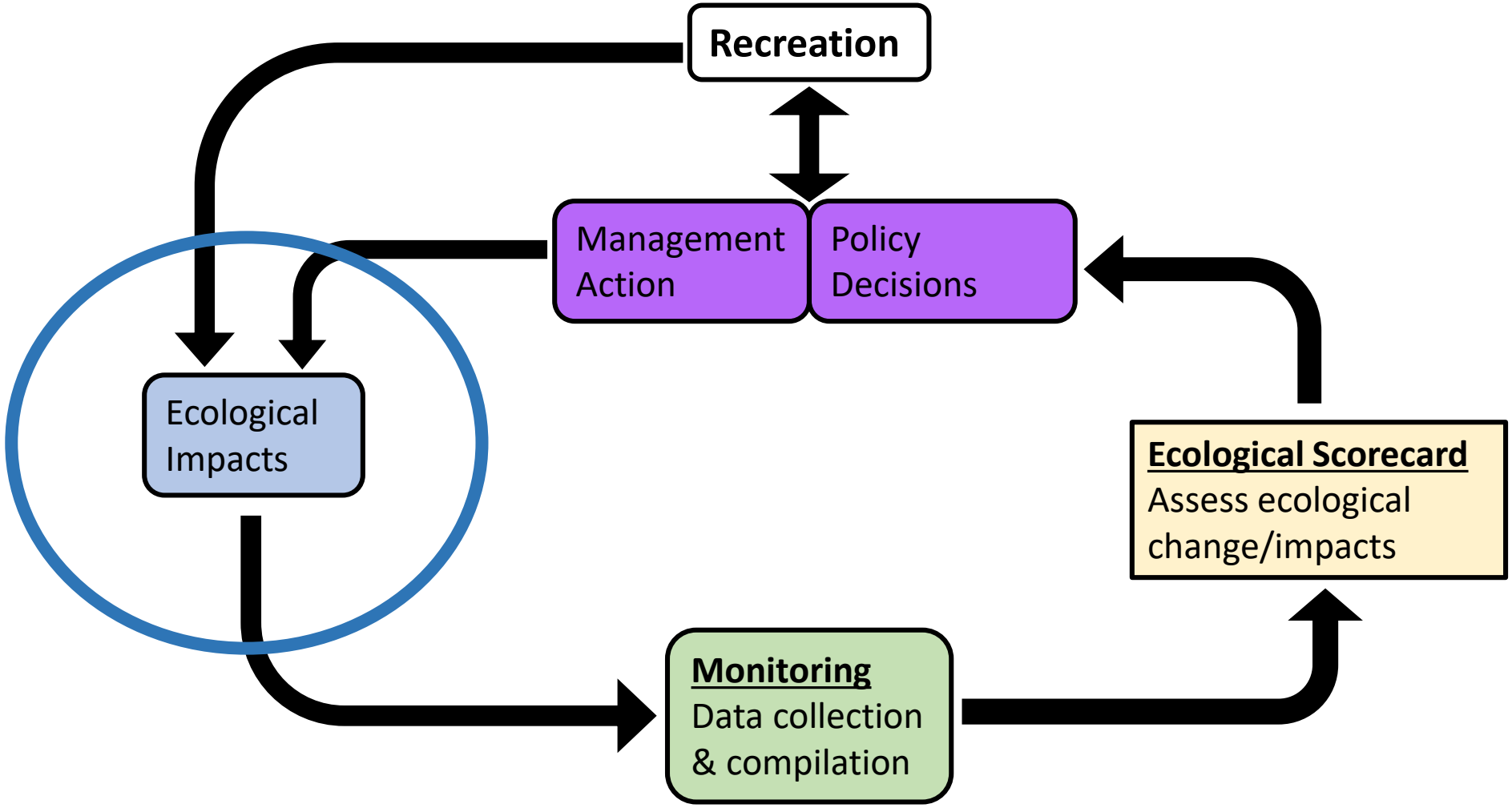


National Park Service, Inventory and Monitoring Division

Summary of select indicators of natural resource condition (and examples of specific measures) that are being monitored by the U.S. National Park Service long-term ecological monitoring program (from Fancy and Bennetts 2012).

Indicator Category	Example Measures (varies by network)	Number of Parks
Weather and climate	Temperature, precipitation, wind speed, ice on/off dates	246
Water chemistry	pH, temperature, dissolved oxygen, conductivity	211
Vegetation complexes	Plant community diversity, relative species/guild abundance, structure/age class, incidence of disease	101
Mammals	Species composition, distribution, abundance	93
Stream/river channel characteristics	Channel width, depth, and gradient, sinuosity, channel cross-section, pool frequency and depth, particle size	89
Invasive/exotic animals	Invasive species present, distribution, vegetation types invaded, early detection at invasion points	29
Coastal/oceanographic features and processes	Rate of shoreline change, sea surface elevations, area and degree of subsidence through relative elevation data	29

Adaptive management flow chart



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Monitoring matrix – concern level

CONCERN LEVEL	Primary geographic areas of concern						
Ecological areas of concern	**Boreas Tract_Vanderwhacker Mountain Wild Forest**						
	LaBier Flow	Ragged Mountain	Gulf Brook Road	Branch Rd (+ The Branch)	Wolf Pond area	Four Corners parking area	Boreas Pond
Soils, vegetation (climbing)							
Soils: erosion, compaction							
Wetland health							
Invasives							
Water Quality							
Forest pests							
Vegetation							
Sound							
Small mammals							
Songbirds							
Amphibians							
Fish							
Ticks							
Stream health							
Loons							
Earthworms							
Trash/pollution							

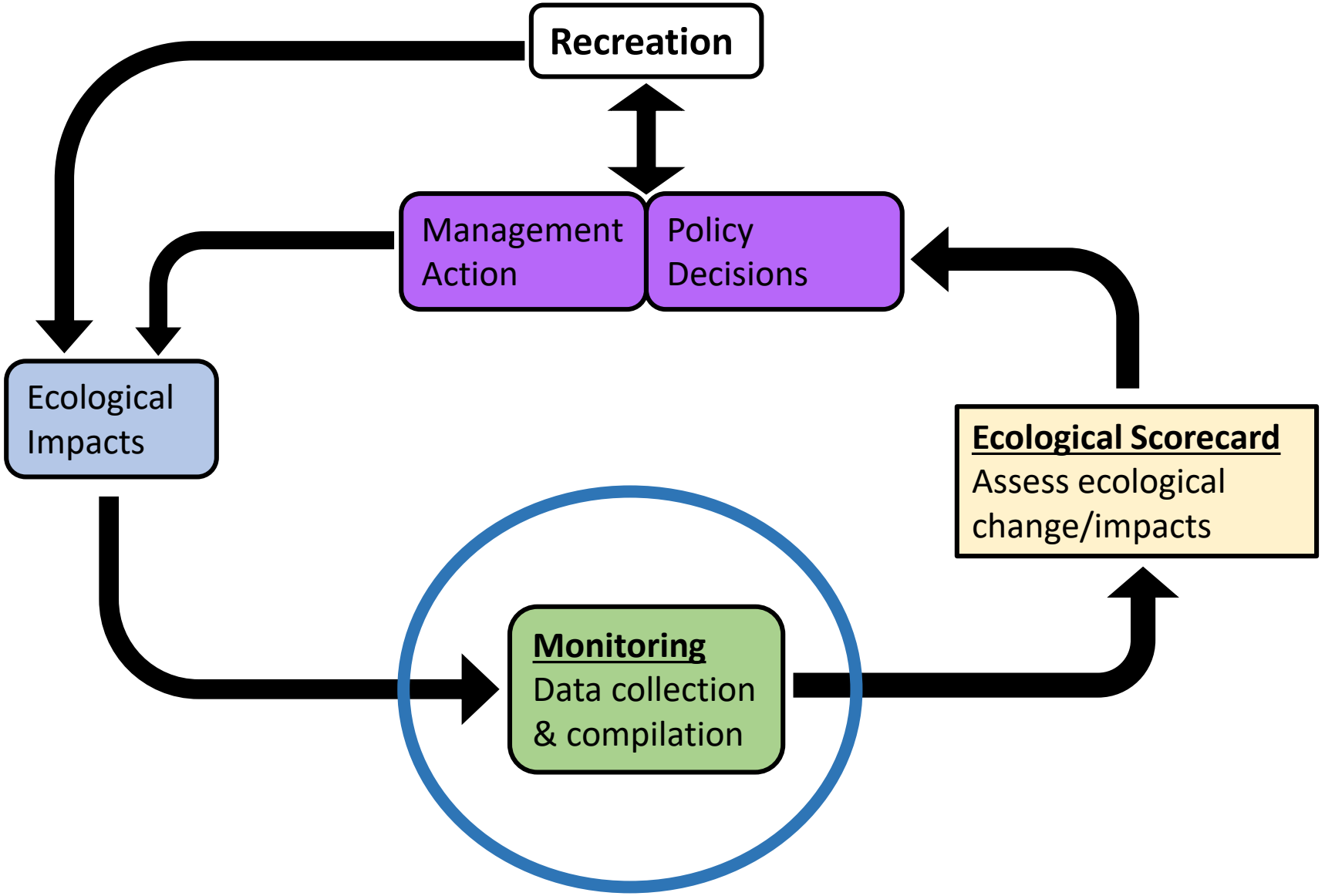
KEY: Concern Level

Red – High

Yellow – Medium

Blue – Low

Gray – N/A


Recreation
Management Action
Policy Decisions
Ecological Impacts
Ecological Scorecard
Assess ecological change/impacts
Monitoring
Data collection & compilation

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Monitoring: Data collection

- Indicator Variables
  - Invasive plants
    - Terrestrial
    - Aquatic
  - Forest pests
  - Non-native species
    - Earthworms
    - Ticks

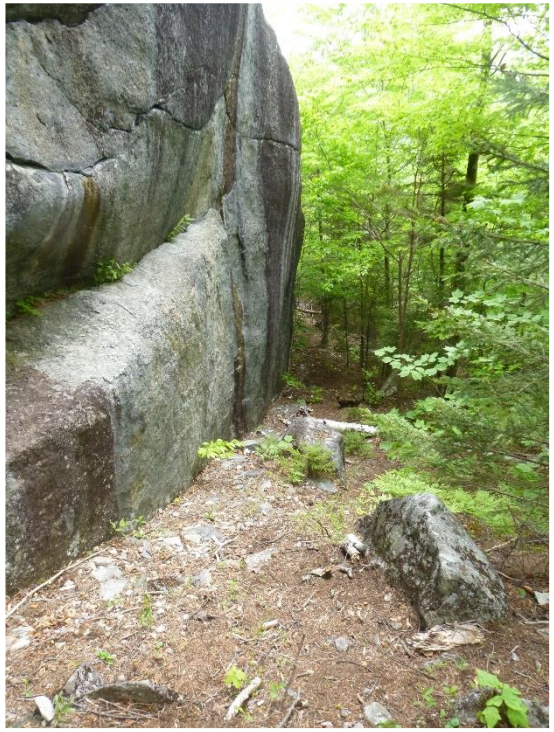
Purple loosestrife at Hammond Pond

Conducting a tick drag

Monitoring: Data collection

- Indicator Variables, continued
  - Climbing impacts (e.g., soils, vegetation, lichen)

Bare soil at base of climbing locations



Compared to →

Vegetation at base of non-climbing cliffs

Monitoring: Data collection

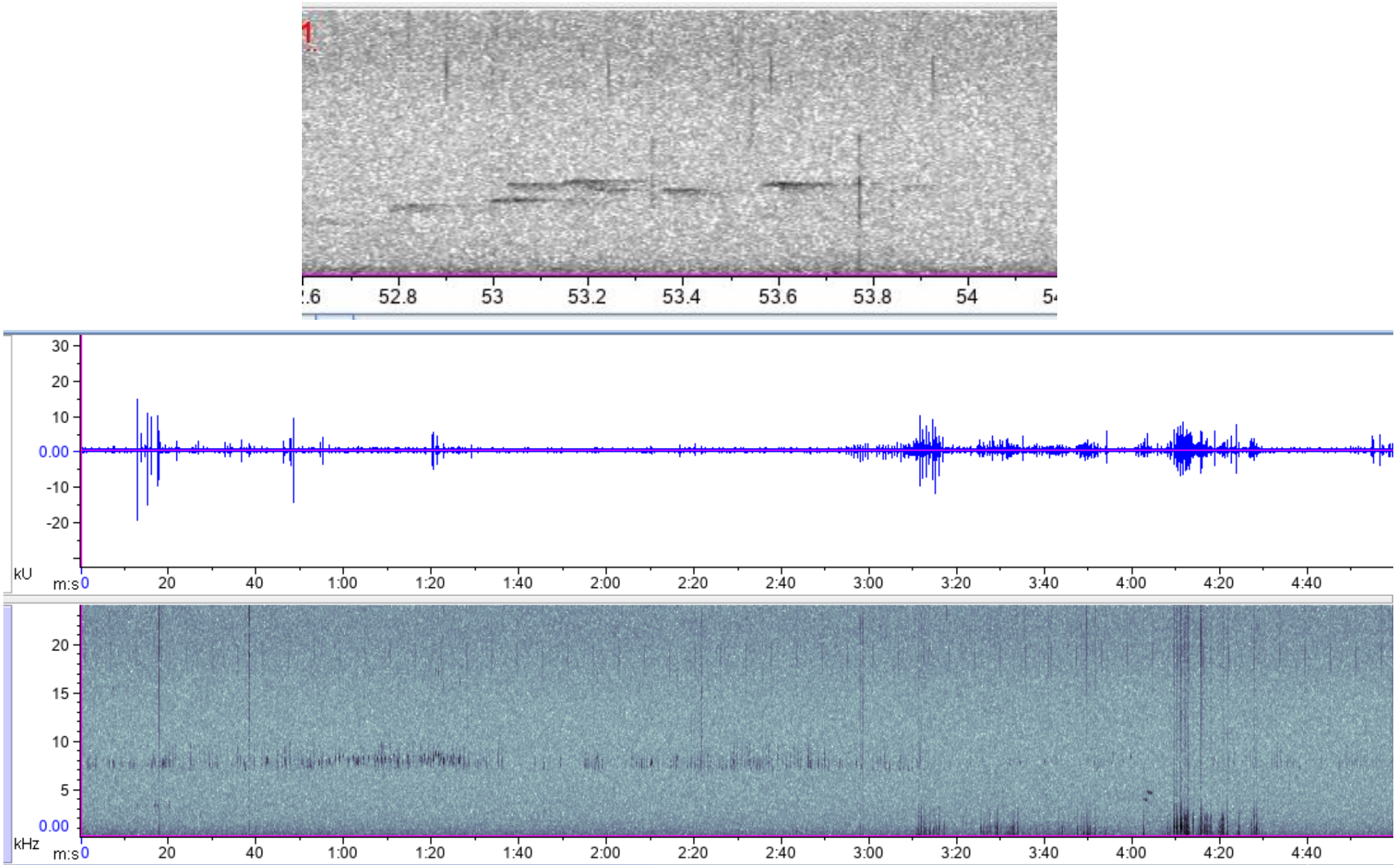
- Indicator Variables, continued
  - Wildlife
    - Songbirds (2020)
    - Amphibians
    - Loons
  - Stream health
    - Visual surveys
    - Macroinvertebrate sampling

Salamander

Macroinvertebrate sampling

Monitoring: Data collection

- Indicator Variables, continued
  - Sound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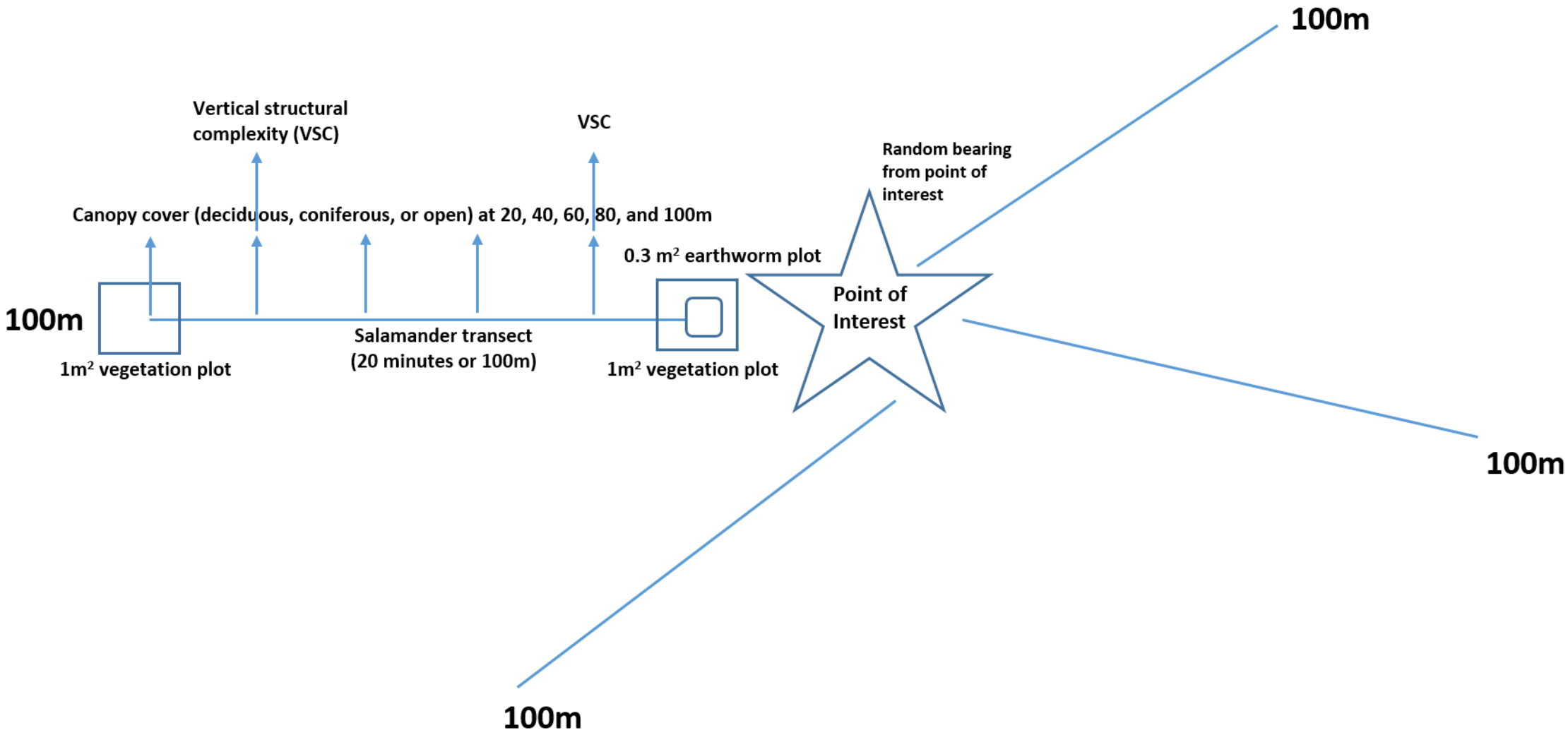
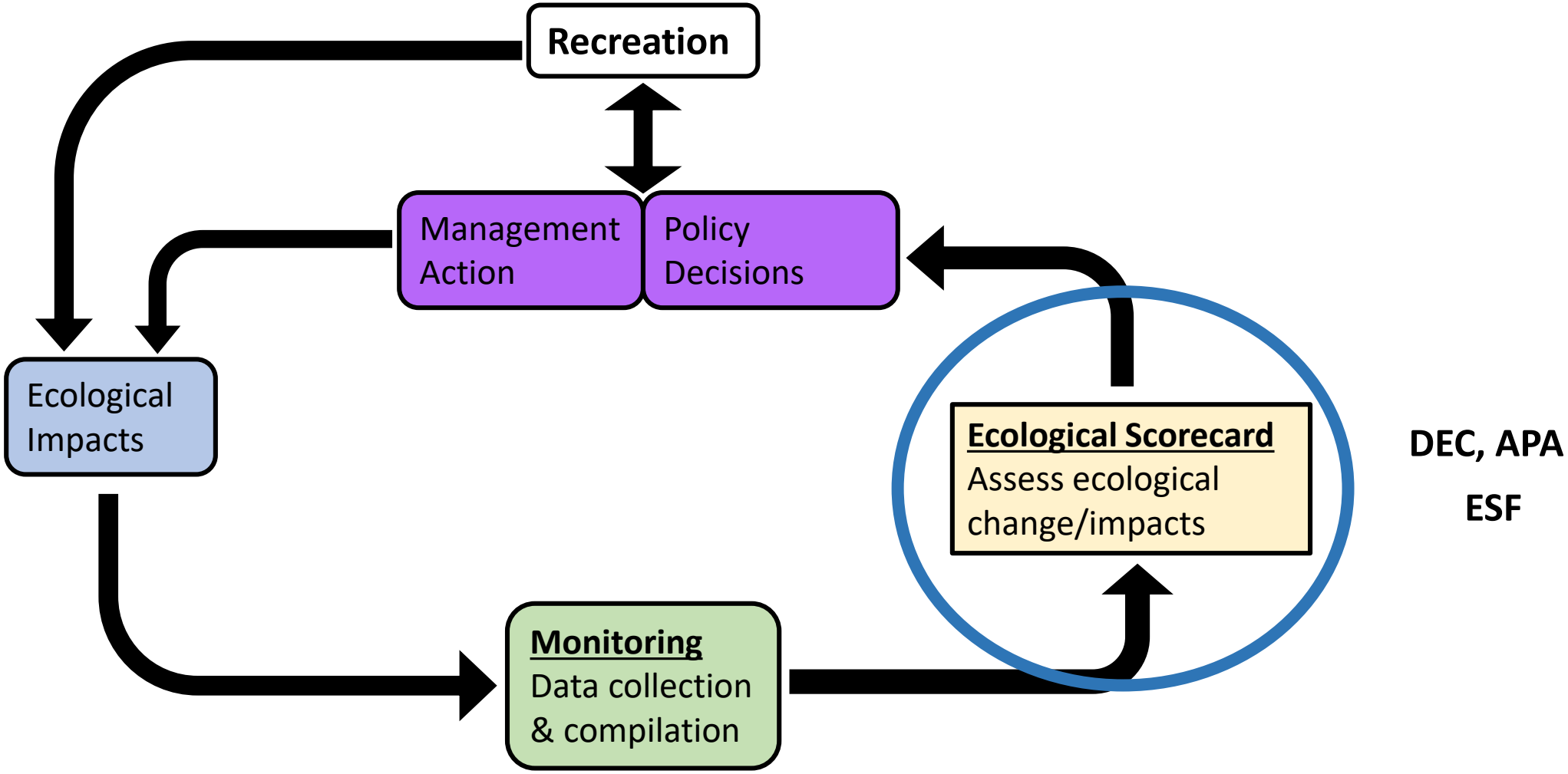
Monitoring: Data Collection

- **Vegetation Sampling**
  - Dominant cover types
    - One meter^2 plots
    - Describes general ground-cover
  - Vertical structural complexity (VSC)
    - One meter high x one foot wide cloth
    - Percent of cloth covered by plants at two heights, 20 m away
    - Higher complexity is generally desirable
  - Plant species composition
  - Canopy cover

Cluster sampling

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Example of adaptive process

Wolf Pond
Boreas Ponds Tract

Wolf Pond – Pre-sampling summary

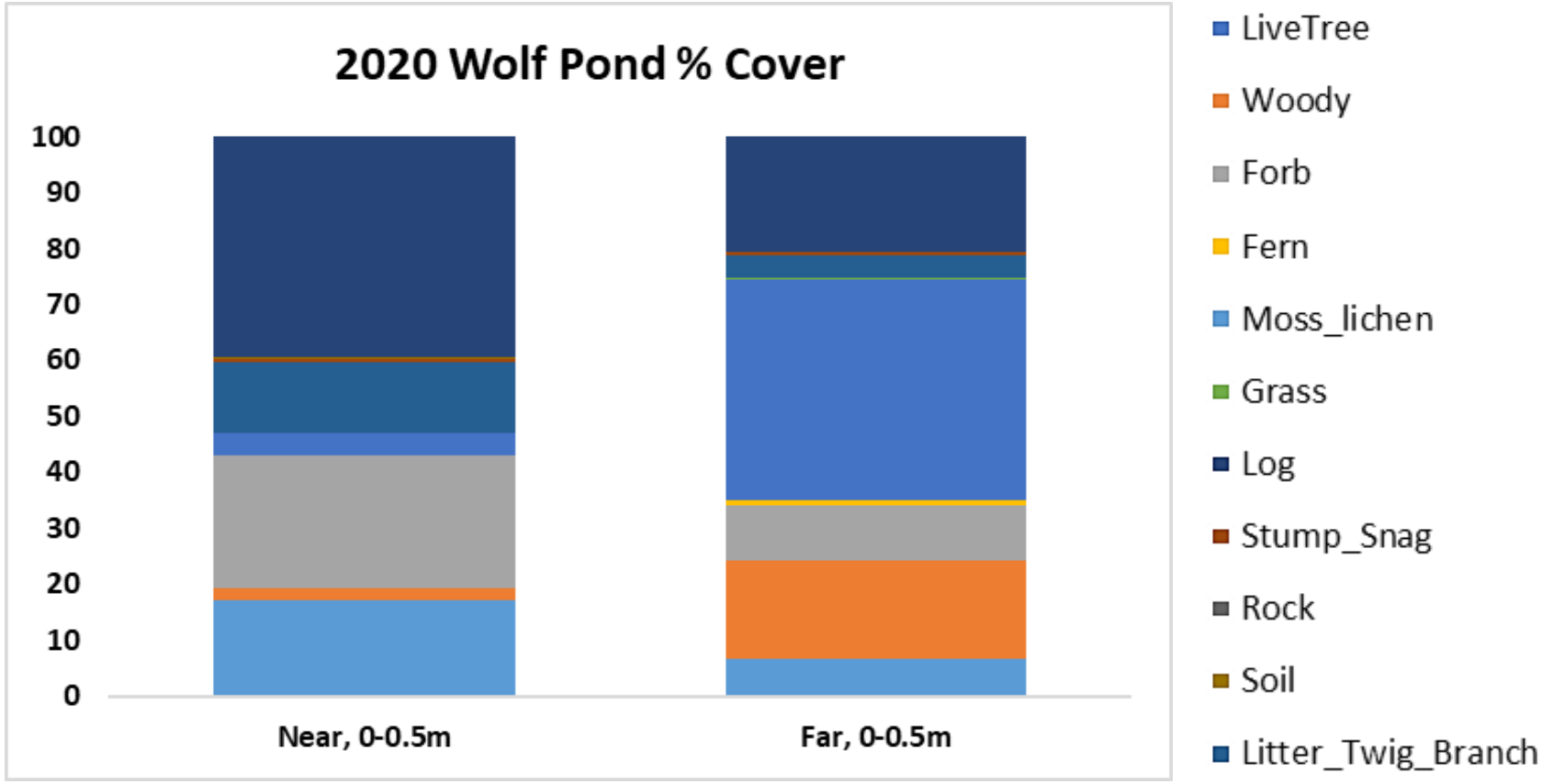
- New trail
- Manager feedback
  - Condition: good
- Concern: Medium

Sampling at Wolf Pond

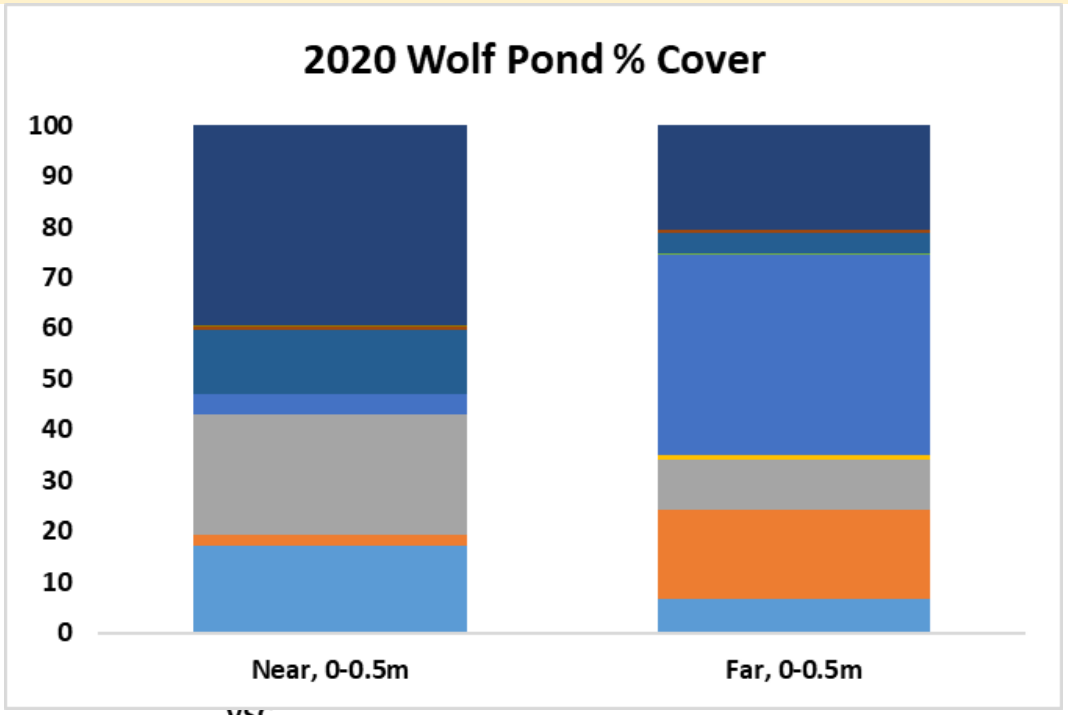
- Vegetation: dominant cover-types, VSC, species composition, canopy cover
- Salamanders
- Songbirds
- Invasives
- Ticks
- Earthworms
- Loons

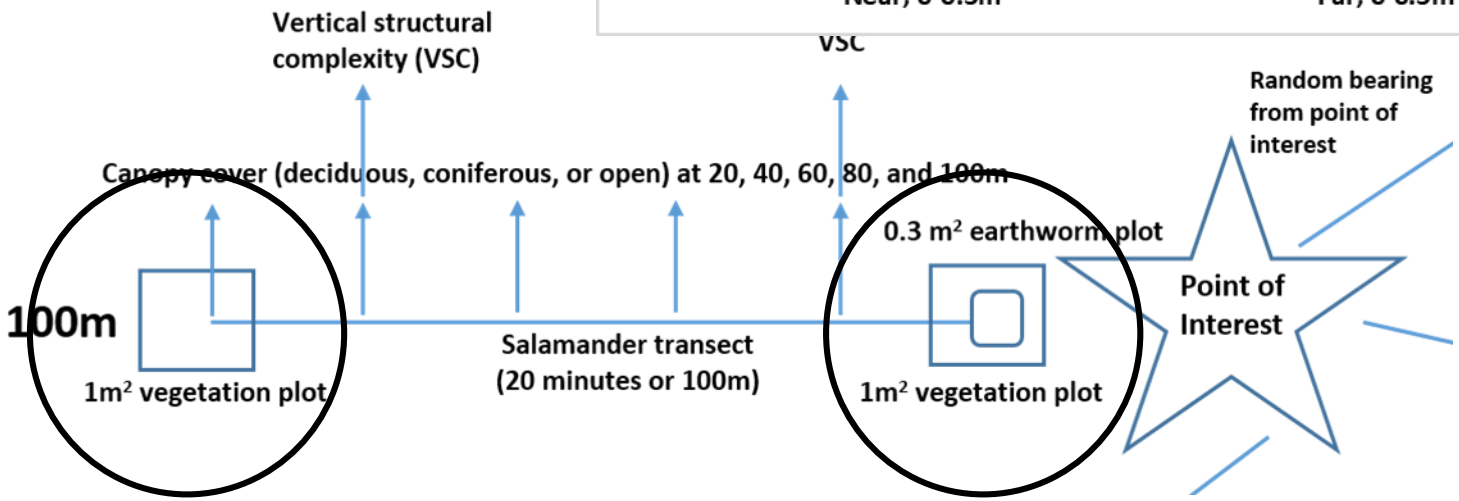
Wolf Pond vegetation – cover type

- Good vegetation cover outside the lean-to footprint
- Good variation in dominant cover types



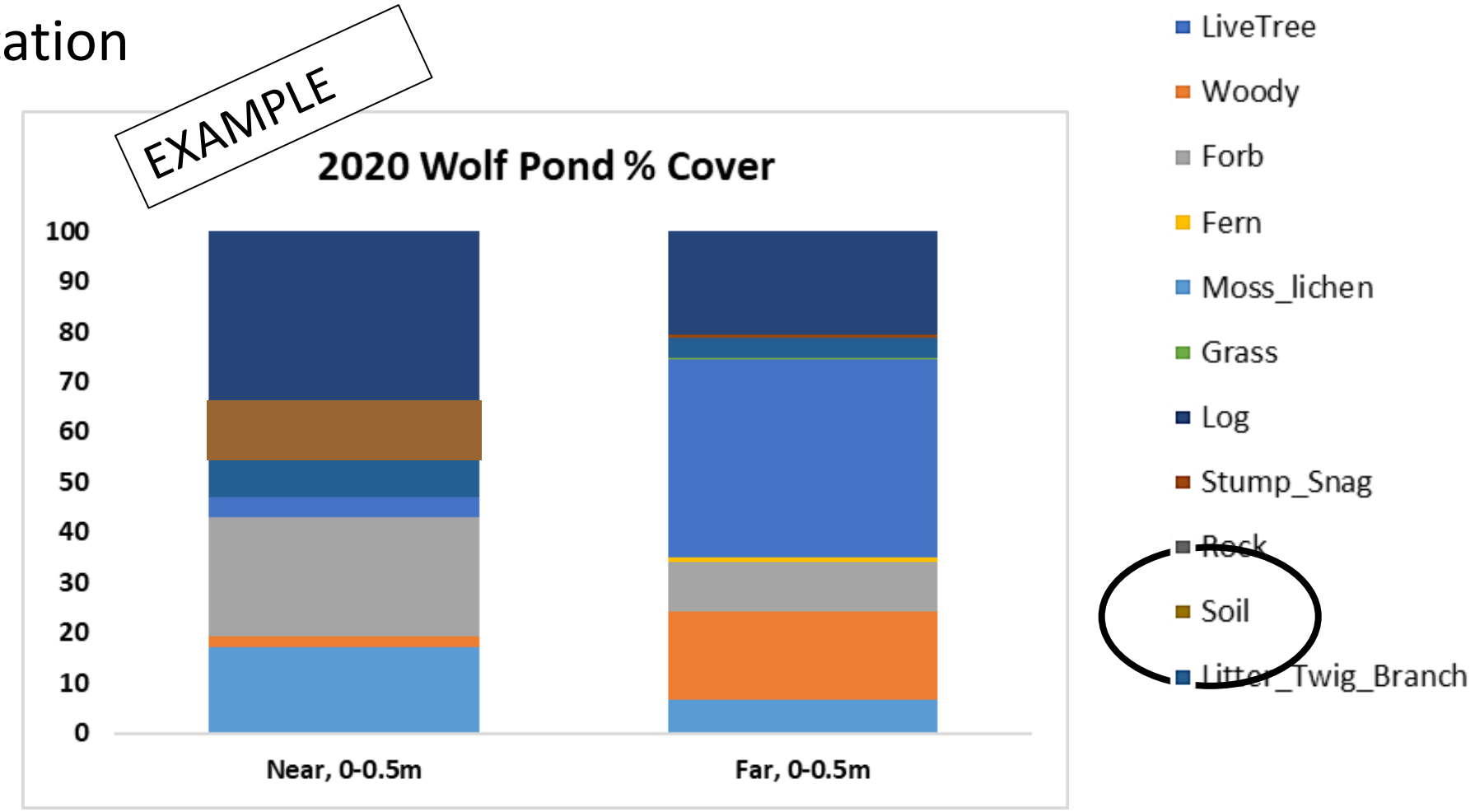
Wolf Pond vegetation – cover type



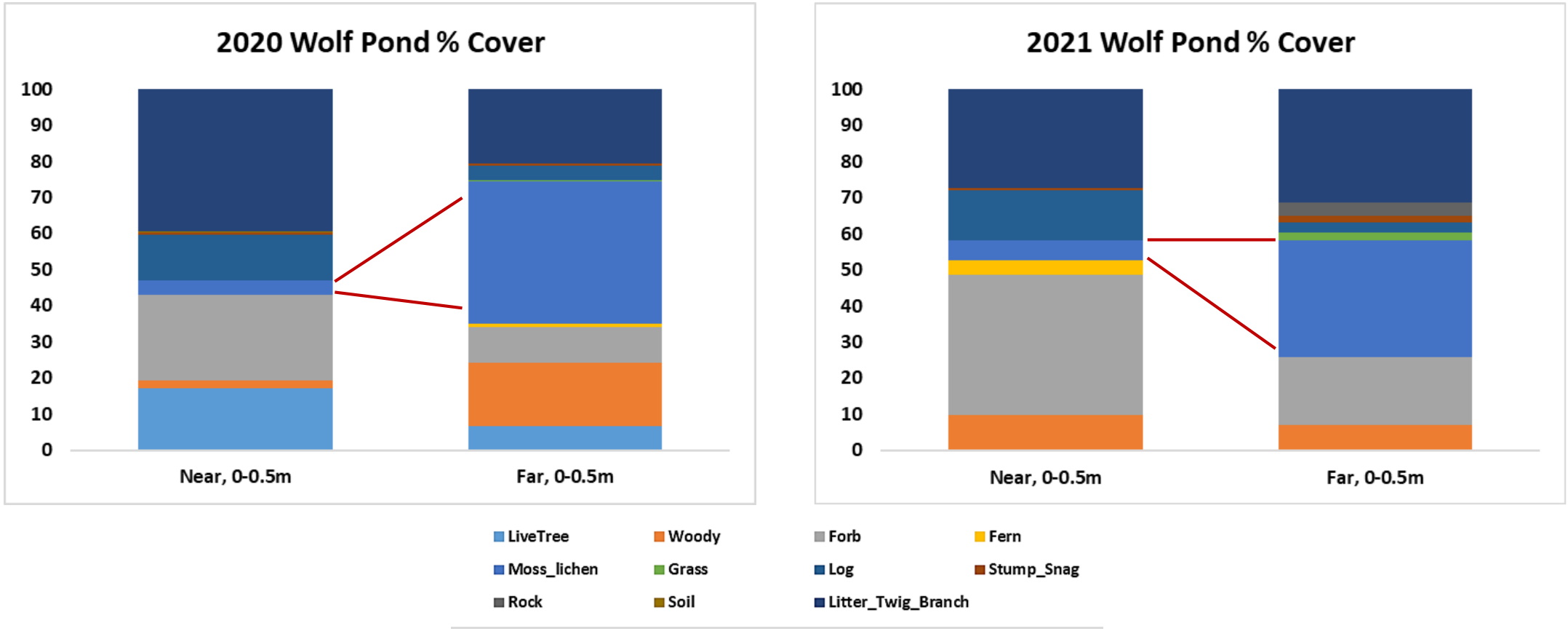


Wolf Pond vegetation – what to watch for

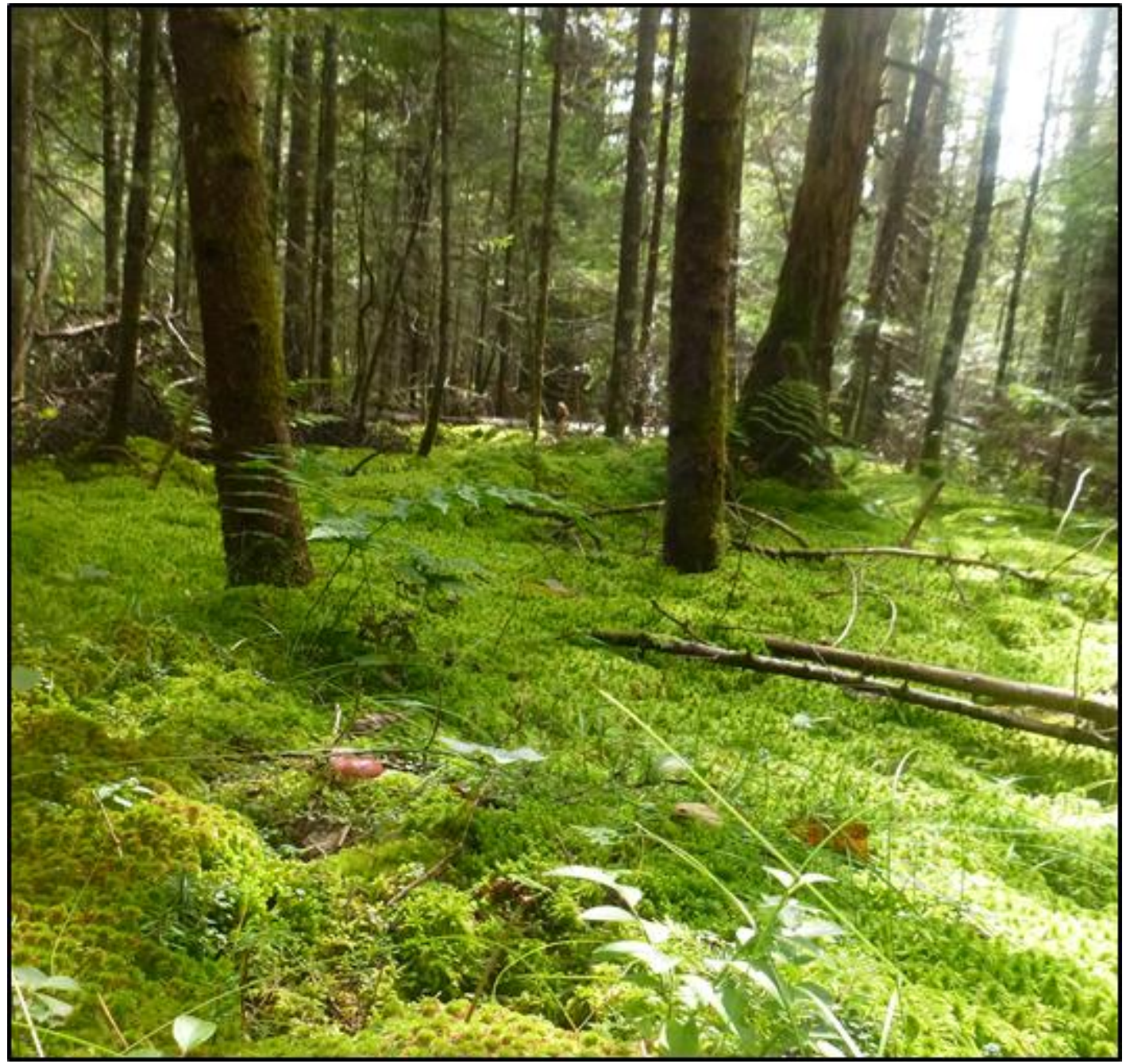
- Increase in bare soil
- Decrease in vegetation
- Decrease in moss



2020/21 Comparison - % Cover



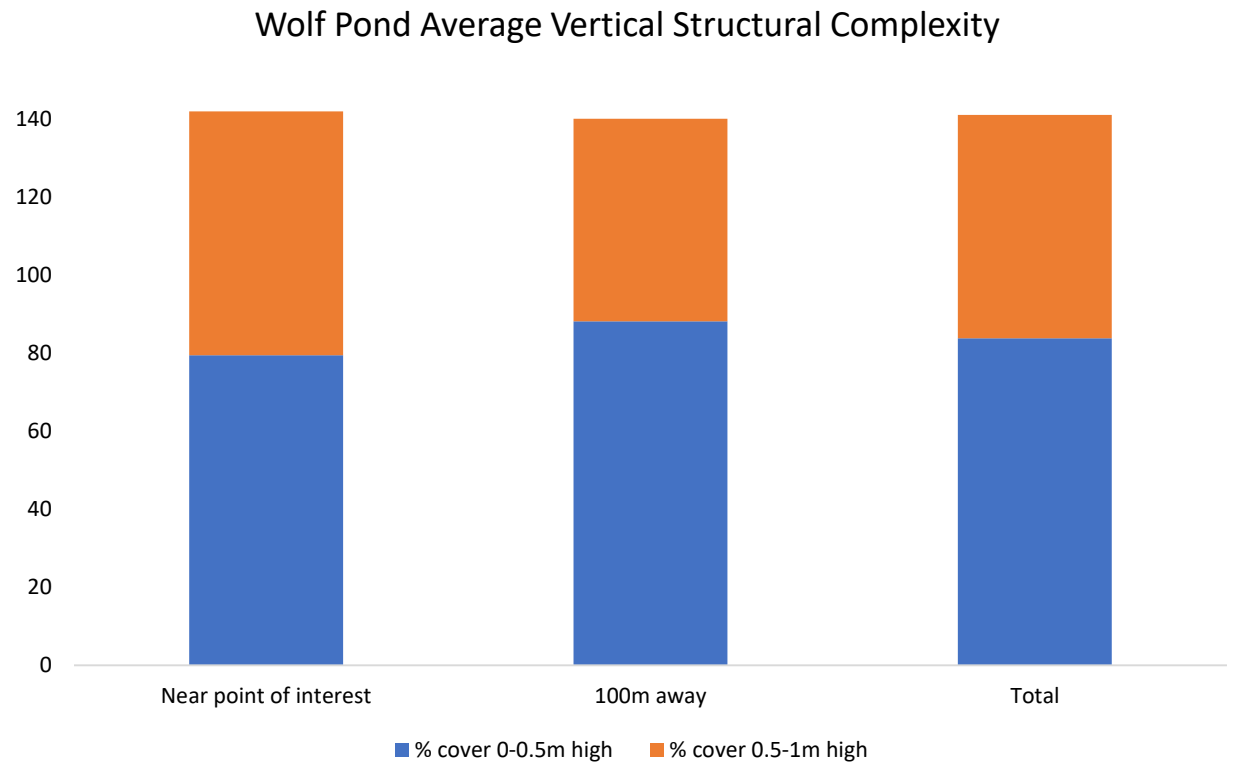
Note the composition within plots is very similar. Importantly, Moss/lichen is much lower near the point of interest compared to far away.



Vertical Structural Complexity (VSC)

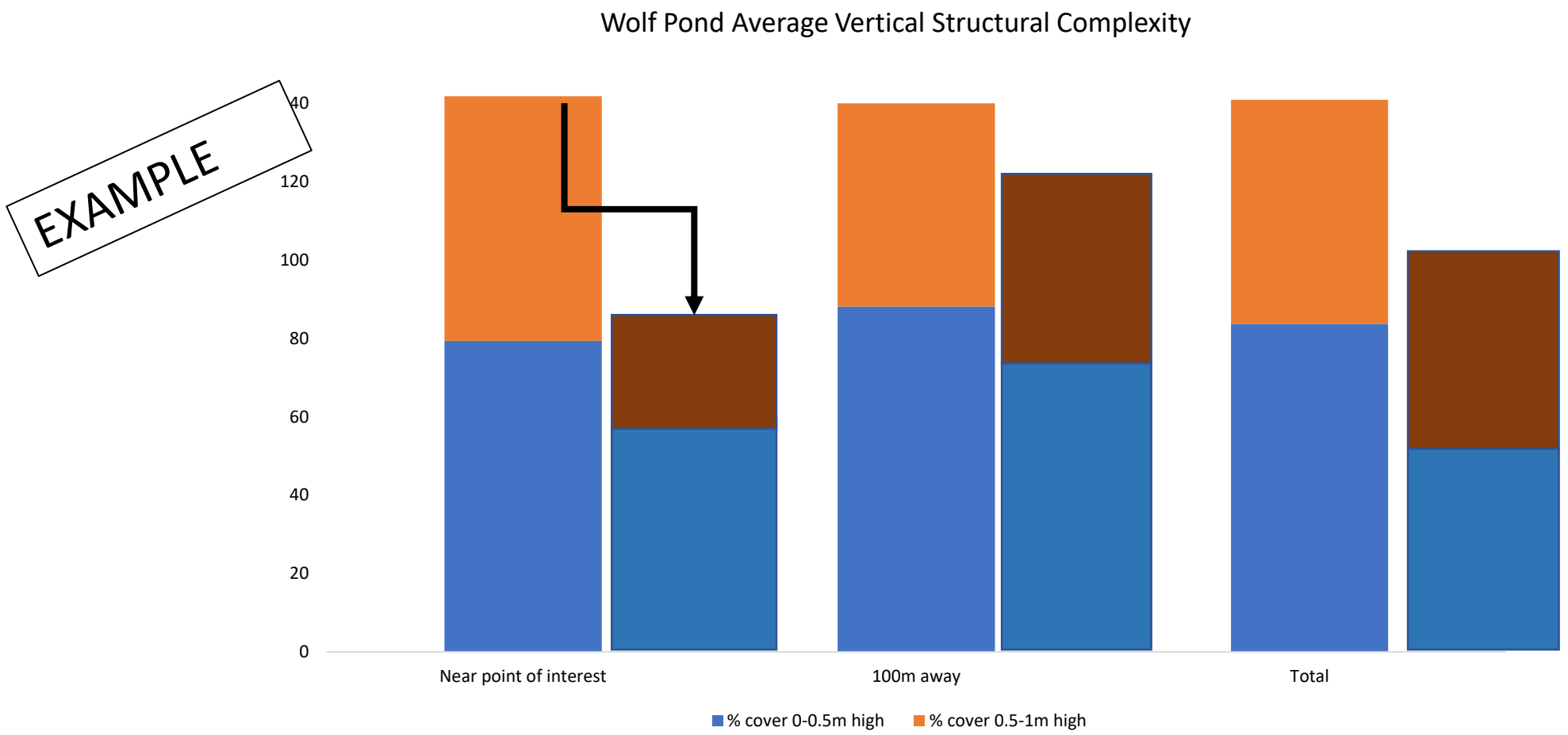
Wolf Pond vegetation - VSC

- Vertical structural complexity is high –80% for complexity close to the ground (0-0.5m)
- Vegetation data supports assessment that the area is in good shape right now

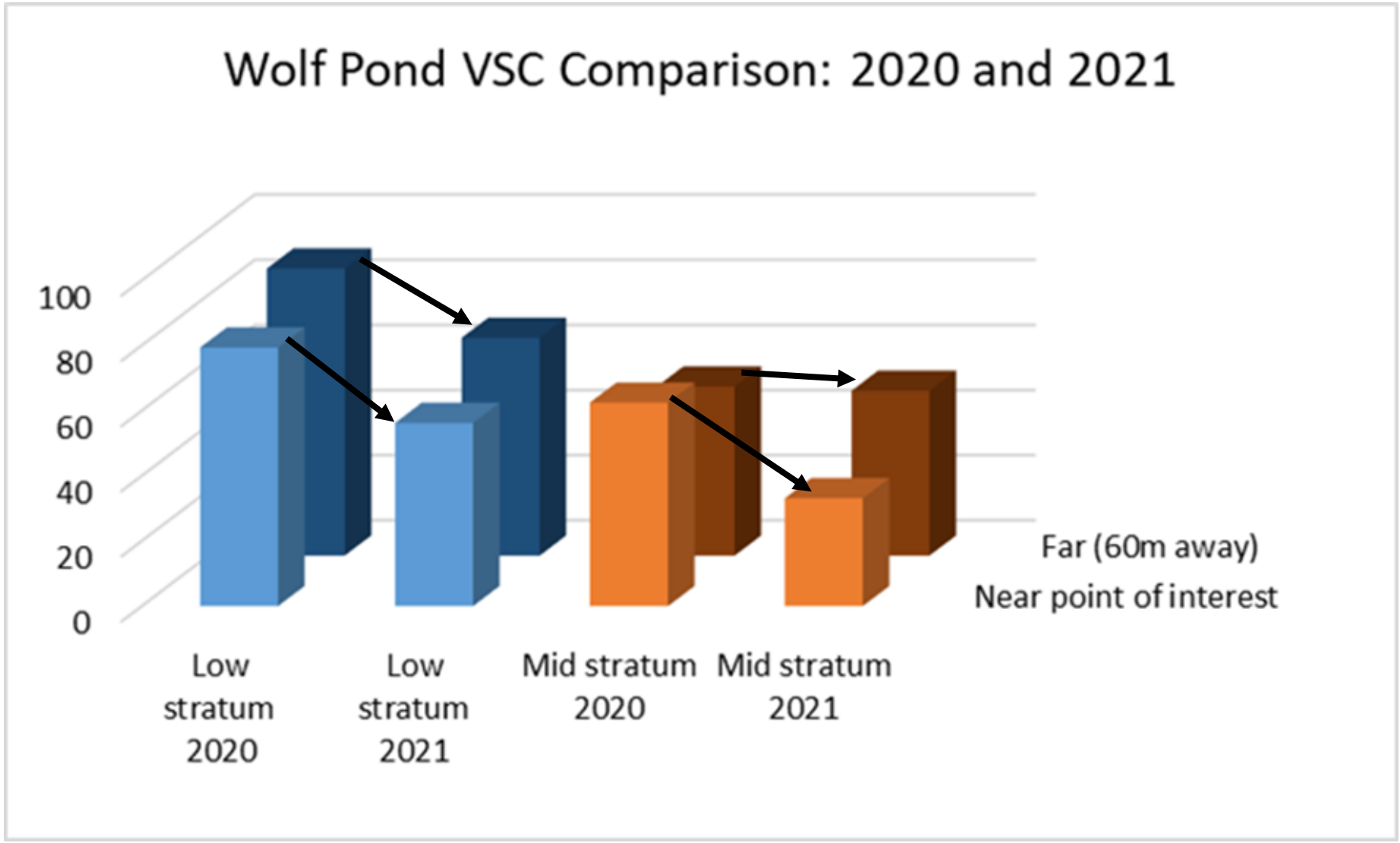


Wolf Pond vegetation – what to watch for

- Decrease in vertical structural complexity



2020/2021 Comparison - VSC



Monitoring Matrices

Start filling in condition matrices

CONDITION STATUS 2020	Primary geographic areas of concern
Ecological areas of concern	Boreas Ponds Tract
	Wolf Pond
Soils, vegetation (climbing)	
Soils: erosion, compaction	
Wetland health	
Invasives	X
Water Quality	
Forest pests	X
Vegetation	X
Sound	X
Small mammals	
Songbirds	X
Amphibians	X
Fish	
Ticks	X
Stream health - visual	Wolf Brook
Loons	X
Earthworms	X
Trash/pollution	X

2020 → 2021

CONDITION STATUS 2021	Primary geographic areas of concern
Ecological areas of concern	Boreas Ponds Tract
	Wolf Pond
Soils, vegetation (climbing)	
Soils: erosion, compaction	
Wetland health	
Invasives	X
Water Quality	
Forest pests	X
Vegetation	X
Sound	X
Small mammals	
Songbirds	
Amphibians	X ↑
Fish	
Ticks	X ↑
Stream health - visual	Wolf Brook
Loons	X
Earthworms	X
Trash/pollution	X

Condition Status

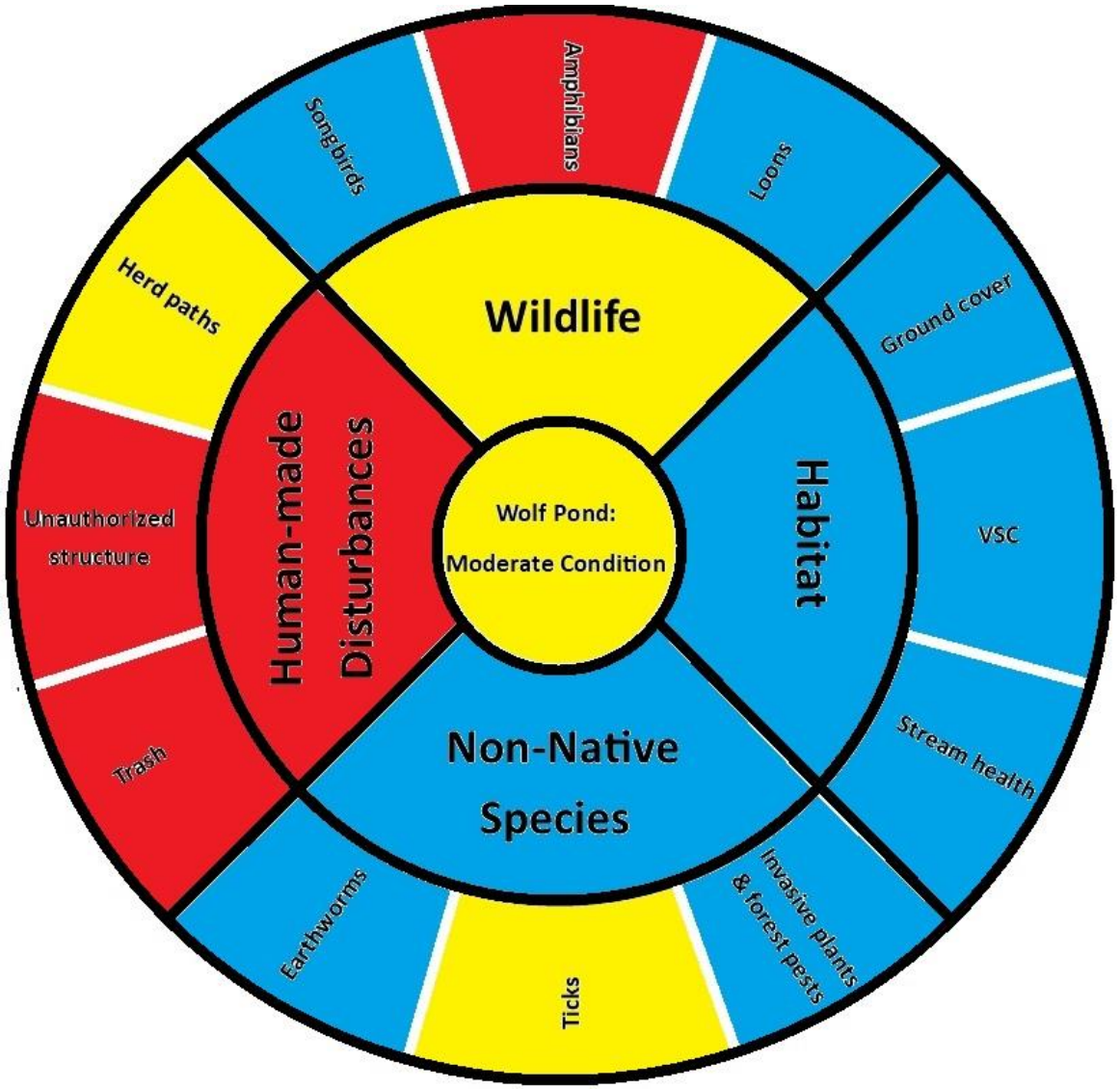
Red – Degraded

Yellow – Moderate

Blue – Good condition

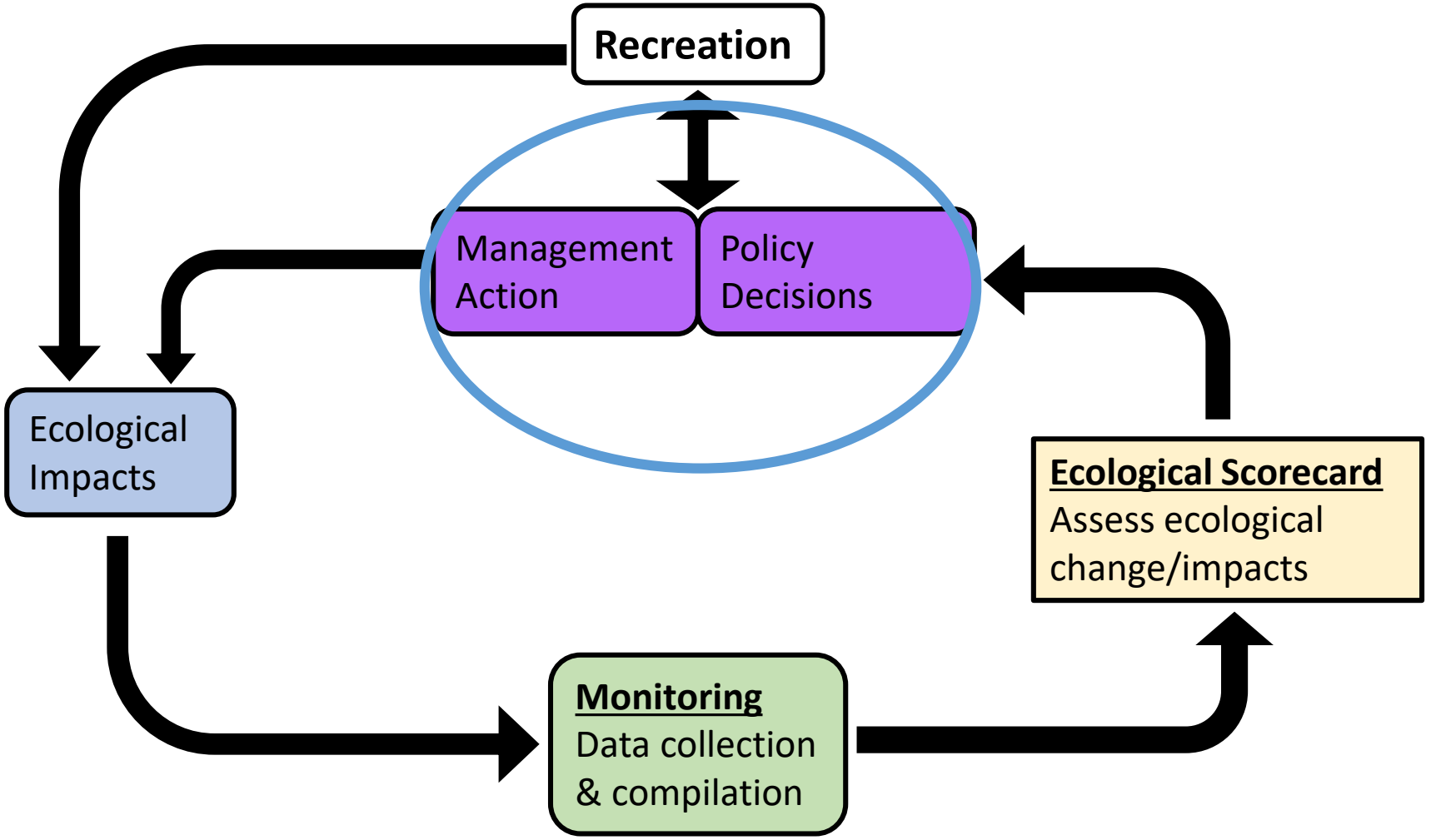
Gray – Unknown

Site Assessment (2020)



Wolf Pond indicators

- Steady stream of visitors during sampling
- Trash
- Herd paths to outlet
- Log “bridge” to vegetation mat containing fragile plants
- Many ticks (4 nymphs, 1 adult) in parking/picnic area compared to adjacent sites
- No earthworms
- No invasives
- Pair of loons on Wolf Pond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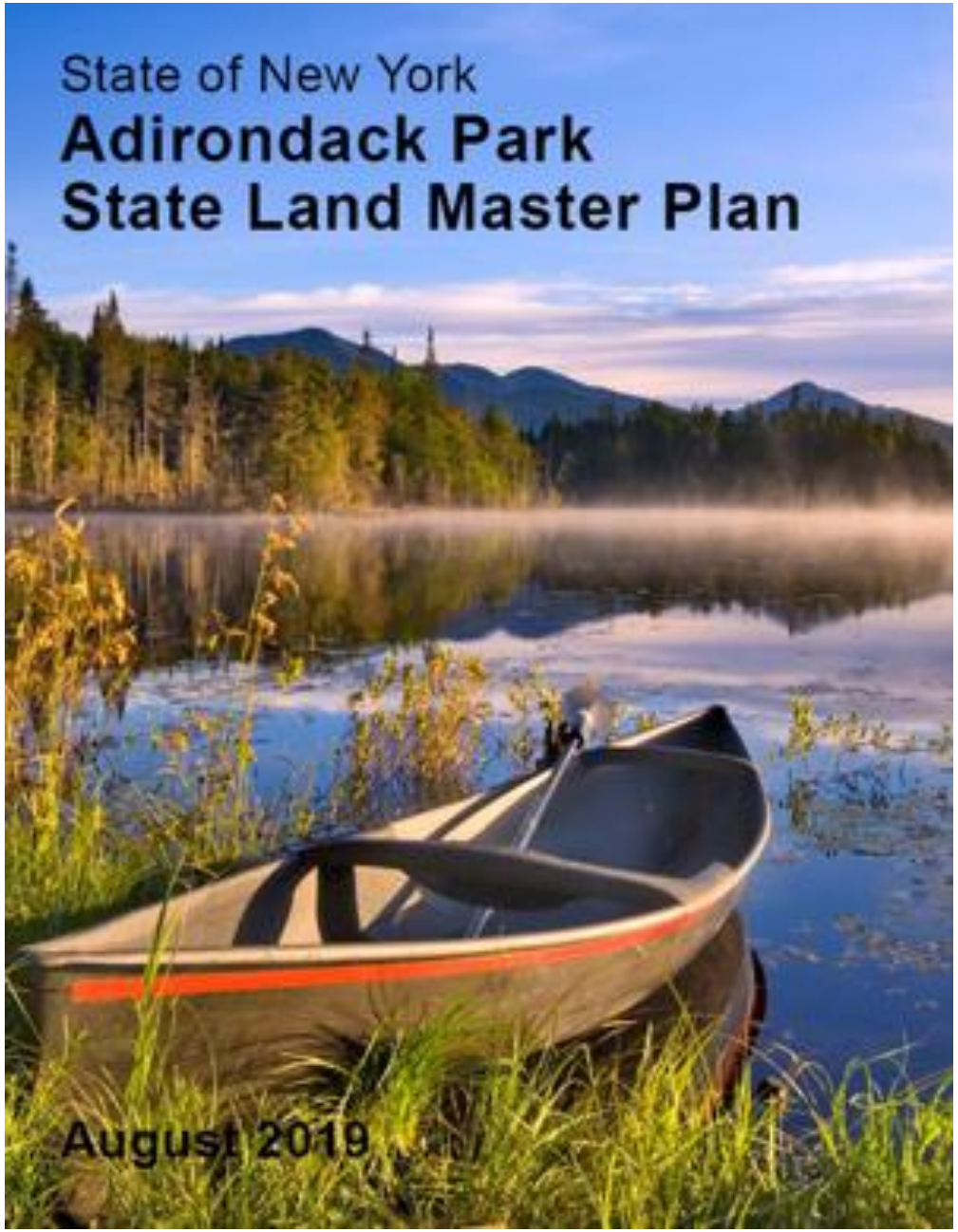
State of New York
Adirondack Park
State Land Master Plan
August 2019

Indicator variables and potential action items

Area of concern	Potential indicators (measureable variables)	Rationale for inclusion as indicator	Potential action items
Vegetation	• Vertical structural complexity (VSC) • Dominant cover-species • Vegetation damage	Vegetation is a basis of habitat for species and important to monitor for changes. Trampling vegetation (both on and off trails) decreases vegetation, and can result in plants with reduced height, stem length, leaf area, flower and seed production, and carbohydrate reserves. Disturbed areas tend to have decreased plant biomass, less cover, shorter structure, and altered species composition[15]. For conceptual model see Figure 3.	• **Periodic/temporary site closure for vegetation recovery** • **Build trails to avoid wettest soils, where plants are highly susceptible to damage; reroute or close vulnerable trails during mud season[15]** • **Discourage use and development of herd paths (signs, hiker education, brush in existing paths)**

Potential action items

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  - Brush in existing herd paths
  - Remove existing log “bridge” to wetland mat or adding signage about fragile plants

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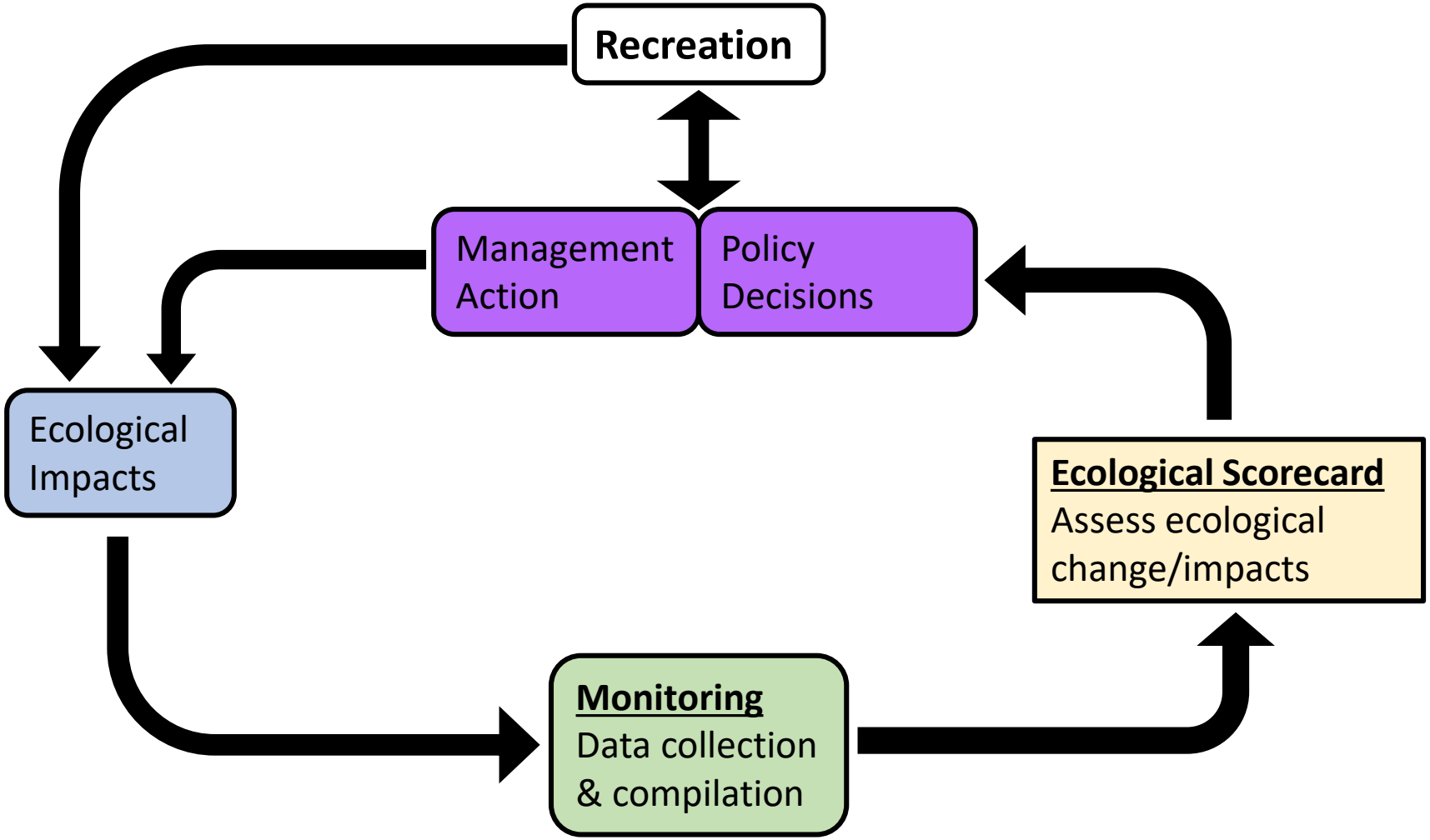
    - Brush in existing herd paths
    - Remove existing log “bridge” to wetland mat or adding signage about fragile plants
- Hiker education/Informational signage
    - Install sign at trail head with tick and Lyme information
    - Signage for fishing informational signage if earthworms are found in future surveys
    - Loon signage if nest is found in future surveys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