2011 National Wetland Condition Assessment (NWCA)

Jill Minter
U.S. EPA Region 8 Wetlands Program

Michael Scozzafava
U.S. EPA Office of Wetlands, Oceans, and Watersheds

National Aquatic Resource Surveys (NARS)

- **Independent reviews highlight monitoring limitations**
  - Incomplete data for full range of needs
  - Inability to support statistically-valid characterization of nation's waters
- **ASIWPCA report on "Water Quality Monitoring Programs"**
  - Monitoring is fundamental, yet first to be cut
  - Funding shortfall exceeds $100 million
- **EPA Monitoring Initiative**
  - Increase to base 106 grant
  - $10 million for enhancing state monitoring programs
  - $8.5 million for collaboration on statistical surveys

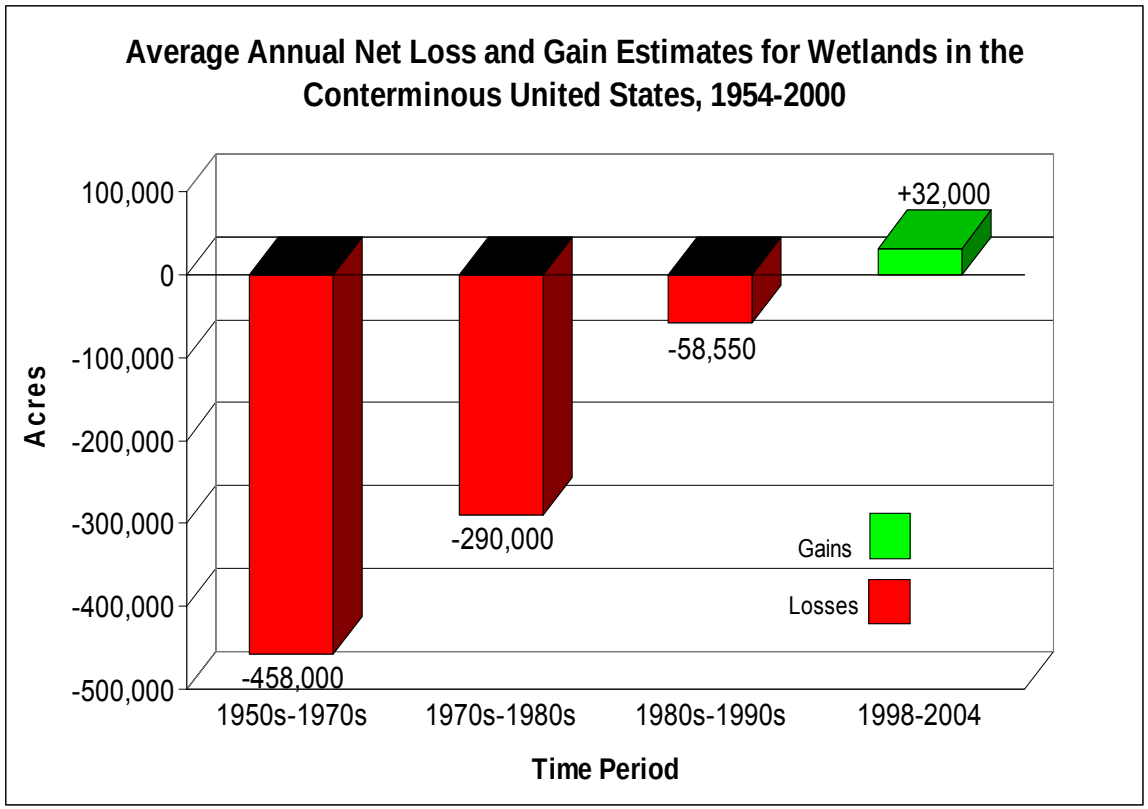
National Aquatic Resource Survey Schedule

	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Lakes	Field	Lab, data	Report	Research	Design	Field	Lab, data
Rivers	Design	Field	Lab, data	Report*	Research	Design	Field
Streams	Research	Design	Field	Lab, data	Report	Research	Design
Coastal	Report	Research	Design	Field	Lab, data	Report	Research
Wetlands	**Research**	**Research**	**Research**	**Design**	**Field**	**Lab,data**	**Report**

*The rivers and streams results will be combined into one report issued in 2011, that covers condition of both rivers and streams and changes in stream condition since the baseline report that was finalized in 2006.

What is the Condition of the Nation's Wetlands?

Existing sources of information do not provide a sufficient answer to this question.



2005 FWS Wetland Status & Trends Report
(Trends in Wetland Acreage)

2004 CWA 305b Report

- 10 States reported
- 1.8 million acres
- 1.5% of the estimated 107 million acres in the conterminous United States

National Wetland Condition Assessment Goals

1. Produce a national report that describes the ecological condition of the nation's wetlands.

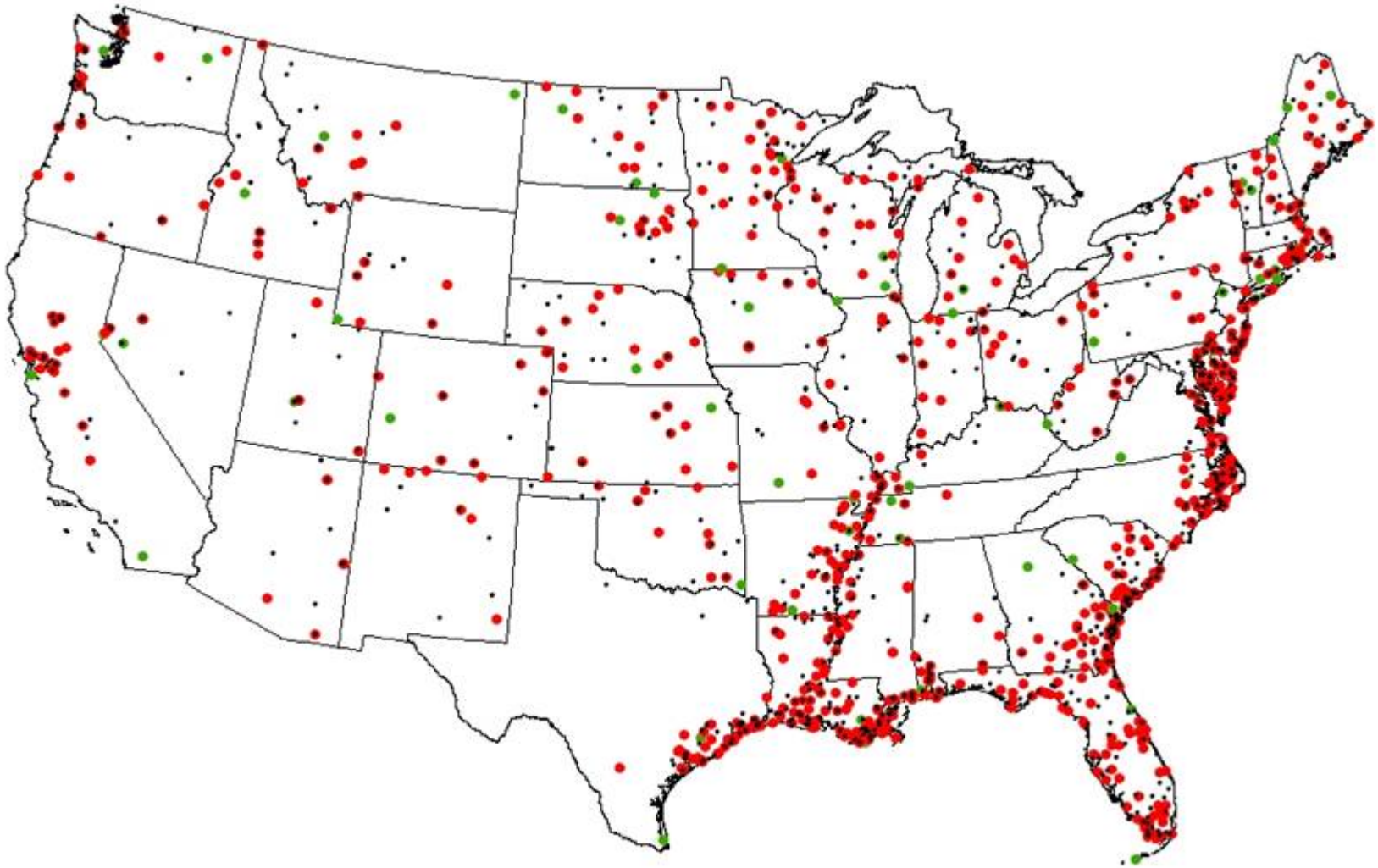
2. **Help States and Tribes build capacity and implement wetland monitoring and assessment programs.**

3. Advance the science of wetlands monitoring and assessment.

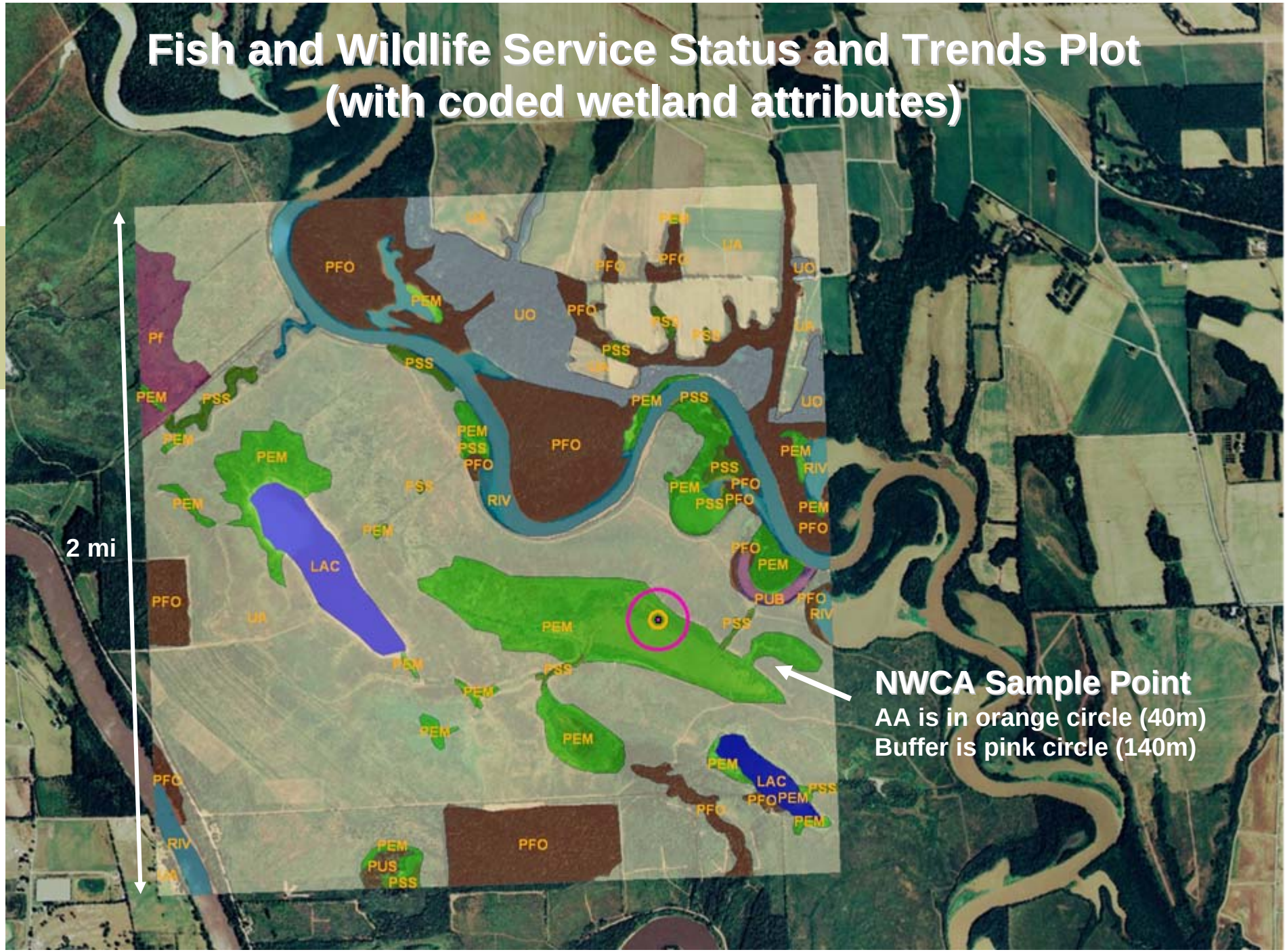
Using the NWCA Results

- Establish the **national baseline** of wetland condition.
- Coordinate with the U.S. FWS Wetland (acreage) Status and Trends program.
- Enhance State and Tribal wetland monitoring programs
- Identify wetland types and geographies that are especially degraded
- Identify the stressors most commonly associated with degraded wetland conditions.
- Inform development of ecologically-meaningful performance standards to direct restoration and improvement activities.
- Explore ways to quantify the ecosystem services that are derived from wetlands and their restoration.

2011 NWCA Site Map



Fish and Wildlife Service Status and Trends Plot (with coded wetland attributes)



Number of Sites by Wetland Type

FWS Status and Trend Category	Common Examples	Number of Sites
Estuarine Intertidal Emergent	▪Saltwater Marsh	**127**
Estuarine Intertidal Forested/Shrub Scrub	▪Mangrove Forest ▪Swamp Tupelo	**127**
Palustrine Forested	▪Bottomland Hardwoods ▪Cypress Swamps	**133**
Palustrine Shrub/Scrub	▪Bogs ▪Pocosins	**130**
Palustrine Emergent	▪Fringe Wetlands ▪Freshwater Marsh ▪Wet Meadows	**127**
Palustrine Unconsolidated Bottom / Aquatic Bed (*some subcategories***)**	▪Prairie Potholes/Kettles ▪Natural Ponds ▪Created Ponds	**130**
Palustrine Farmed (*not currently in crop production***)**	▪Agricultural Fields with natural wetland characteristics	**126**

Summary of Field and Laboratory Logistics and Protocols

Acknowledgments:

Mary Kentula, Teresa Magee, Janet Nestlerode, EPA ORD
Regina Poeske and Mary Anne Theising, EPA Regional Offices

Larry West, Lenore Vasilas, Chris Smith, Phil King, Richard Ferguson, Mike Wilson, Richard Pullman, Rebecca Burt, Jon Hempel, Thomas Reinsch, NRCS

John Galbraith, VTU and Mike Vepraskas, NCSU

Elizabeth Riley, Gregg Serenbetz, and Chris Faulkner, EPA OW
National Wetland Monitoring and Assessment Work Group
Dynamac, Inc.

NWCA Field Crews

- States, Tribes, or Contractors
  - Federal Partners where possible

- Four Person Crew: One Day for Sampling
  - Vegetation Team – All Vegetation Sampling
    - Botanist/Ecologist – Education and Training in Botany
    - Botanist Assistant – No specific expertise

  - AA/Buffer Team – All Other Indicators
    - No specific expertise required
    - Wetland delineation experience recommended
    - Soils experience recommended but not required

Biological Indicators for the NWCA

Indicator Type	Details
Vegetation	▪ Wetland vegetation is an expression of the underlying wetland structure. ▪ Collect species presence and abundance in 5 10x10m plots distributed across the Assessment Area ▪ Probable Indicator is a Multi-Metric Index of Biological Integrity (VIBI)
Algae	▪ Algae respond more rapidly than plants (e.g. excess nutrients) and can indicate recent wetland inundation ▪ Standardized collection across all wetland types. ▪ Probable Indicator is indicator species or Multi-Metric Index of Biological Integrity (IBI).

Abiotic Indicators for the NWCA

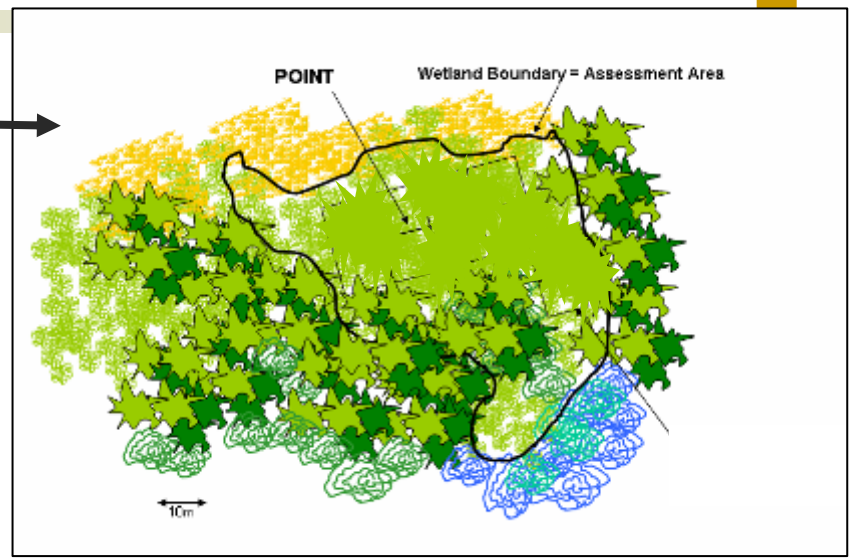
Indicator Type	Details
Hydrology & Water Chemistry	■ Hydrologic dynamics influence biological community composition and indicate disturbance. ■ Difficult to assess hydrology in one site visit; water for chemistry sampling not always present. ■ Hydrologic surrogates and water chemistry when possible.
Buffer/Stressors	■ Buffer disturbance will impact wetland biological communities. ■ Aerial photos and site verification.
Rapid Assessment Method	■ 3 Indices: Buffer, Stress, Condition ■ 30 – 60 minutes to start sampling day ■ Calibrate with Intensive Data nationally
Soils	■ See slide

Remaining Planning Activities: 2009 - 2010

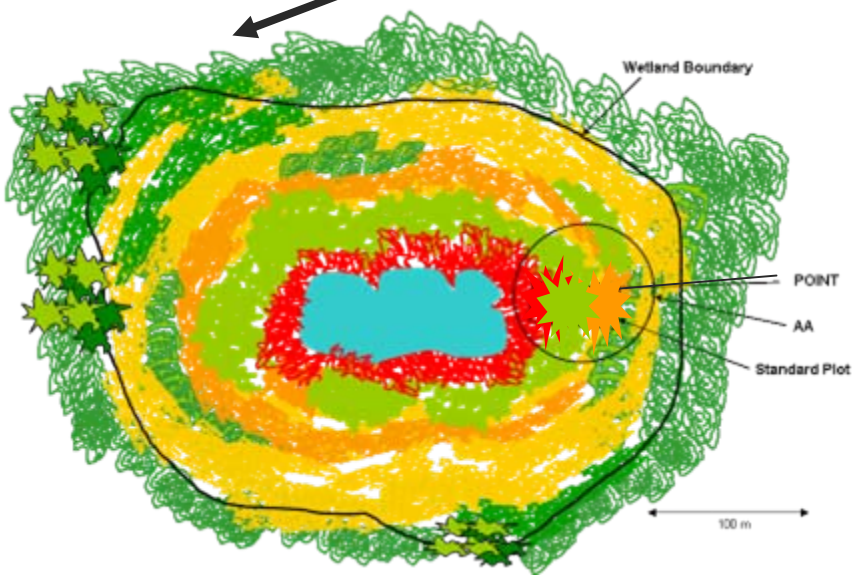
Indicators	Reference Condition	Survey Design	Survey Administration
Refine FOM based on testing comments (By 4/1/2010) **NWQMC Field Demonstration Workshop (April 2010)** EPA ORD Technical Review Workshop (Spring 2010) Final FOM (Fall 2010)	**Draft Data Analysis Plan** (Winter 2010) Develop approach to defining reference condition Identify targeted reference sites Facilitate State and Tribal Workgroup Cross-walk with field methods	**Select Sample Locations** (Fall 2009) **Distribute site packets** (March 2010) Develop site reconnaissance procedures Initiate Site Reconnaissance Process	**Communicate with States and Tribes** (Always) Coordinate with Regions on State and Tribal 106 work plans (Spring 2010) One-on-One meetings as needed (Spring – Summer 2010)

Variations on the Assessment Area

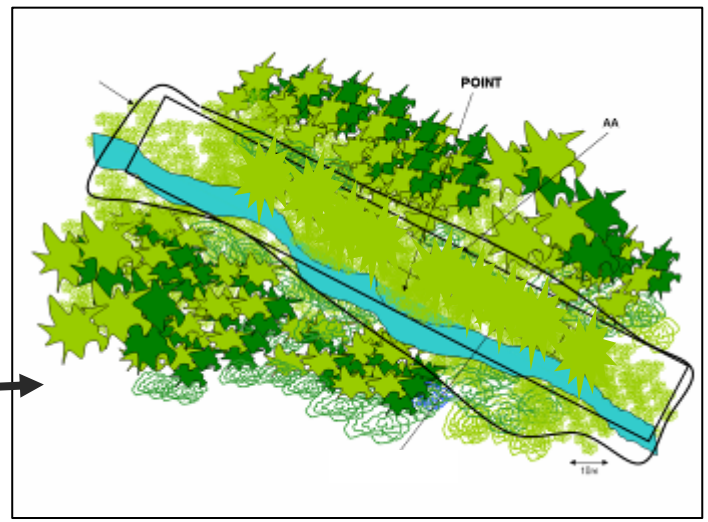
Alternate Layout



Standard Arrangement



Alternate Layout



Vegetation

Rationale:

- The composition and abundance of hydrophytic vegetation is an expression of the underlying wetland structure.
- The vegetative community responds to many physical, chemical, or biological disturbances.

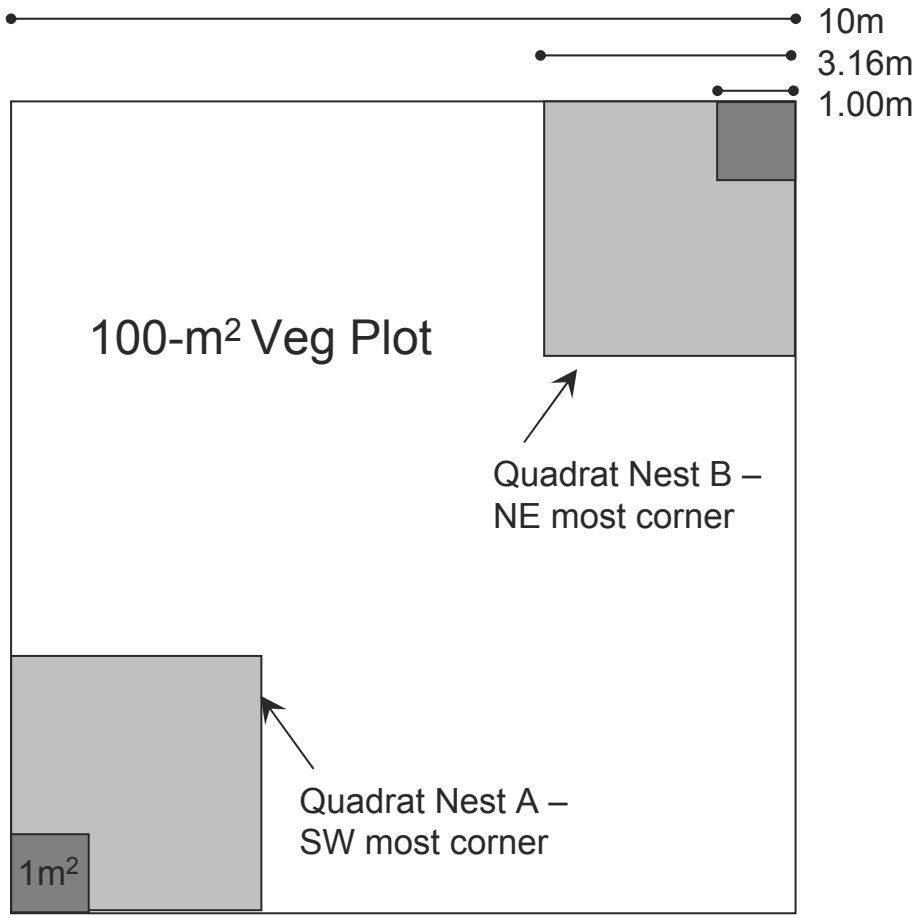
Protocol:

- Adapting the Peet, et. al Flexible Plot Methods
  - OH, NC, MN, CO NHP all use this.
- Field Measures
  - Full Species Inventory
  - Percent Cover

Potential Indicators

- Vegetation IBI (CO, OH, MN, NC, ND, others)
- Floristic Quality Assessment Index (FQAI)
- Vegetation O/E Model (Rocky Mountain National Park)

Vegetation Plot



Vegetation Data

- Species Occurrence
- Percent Cover

Soils

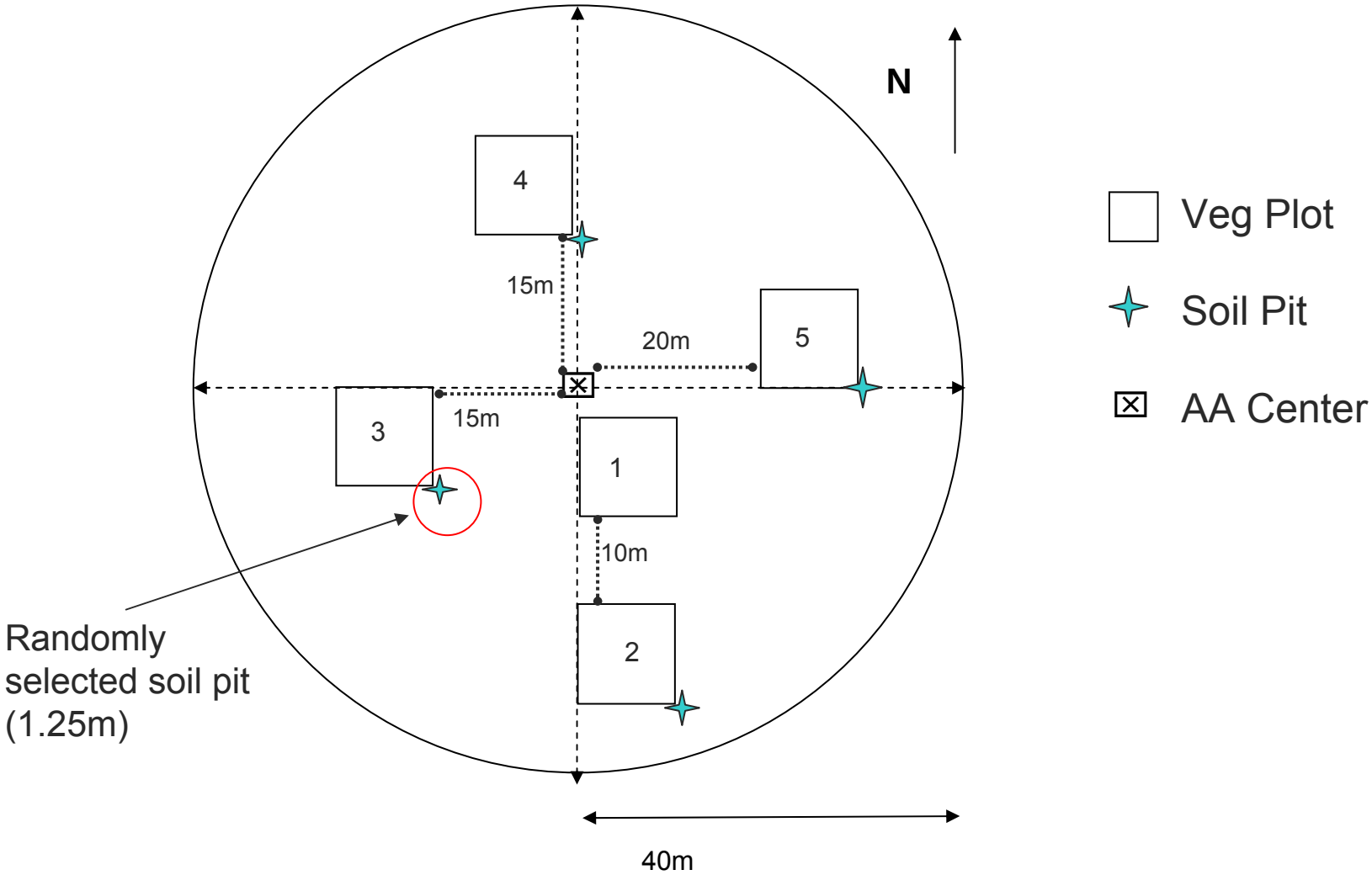
Rationale and Focus:

- Soil characteristics are indicative of wetland hydrology and the ability to sustain biological communities.
- Our focus is ***wetland ecological integrity***

Field Protocol:

- 4 soil pits, sample from randomly selected pit
- Soil Profile (60cm) from randomly selected pit
  - Verify to 1.5 meters with auger
  - Verified by State Soil Scientist before submitted
- Bulk Density
  - Hammered Core at most sites (standard)

Standard Veg and Soil Plot Layout – AA ½ hectare circle



Collaboration with NRCS State Soil Scientists is Vital

- Ensure the data we collect is high quality, defensible and useful for EPA and NRCS
  - Training and QA
- Provide Knowledge for Unique Soil Conditions
  - “Tricks of the Trade”
  - Specialized Sampling Equipment

Algae

Rationale:

- Algae respond more rapidly than plants to ecological change in wetlands (e.g. excess nutrients).
- Algae can indicate recent wetland inundation, giving clues to the hydrology.
- Field method can be standardized across all wetland types.

Protocol:

- We are adapting protocols from Maine, MSU, & USGS.
  - Multi-Habitat (plants, soils, water) Composite Sample
  - Laboratory Analysis

Example Metrics:

- Species Composition and Abundance
- Indicator Species

Hydrology & Water Chemistry

Rationale:

- Hydrologic dynamics influence biological community composition, impact biogeochemical processes, and indicate recent or historical disturbances.
- Hydrology is a key attribute that defines wetlands.

Protocol:

- It is difficult to quantitatively assess wetland hydrology with a single field visit.
- We are developing the field and lab protocol based on feedback from states and tribes.
  - Water table at the time of sampling
  - Indirect indicators of inundation and saturation
  - Pore and surface water chemistry

Example Metrics:

- Saturation & Inundation
- Characteristics
- Alterations
- Water Chemistry

Assessment of Wetland Physical Habitat, Buffer and Stressors

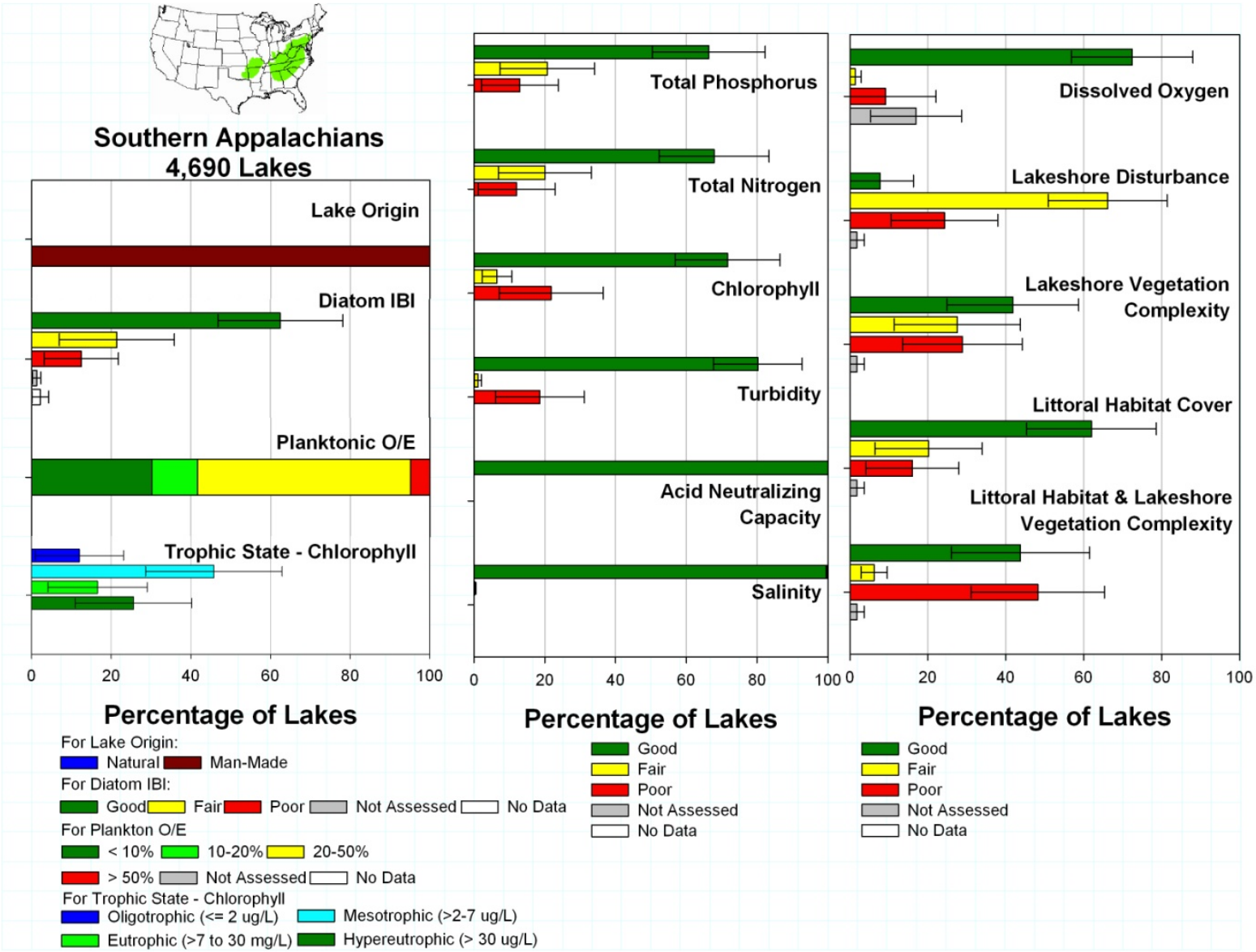
- Test a Rapid Method to:
  - Assess wetland physical habitat and identify stressors.
  - Diagnose indicator performance based on buffer condition.
  - Provide States and Tribes with an easily adapted tool.

USA Rapid Assessment Method Attributes
Landscape
Buffer
Hydrology
Physical Structure
Biological Structure

Key Contact Information

- Contacts: Overall Coordination and Logistics
  - Michael Scozzafava: Scozzafava.michaele@epa.gov, 202-566-1376
  - Gregg Serenbetz: Serenbetz.gregg@epa.gov, 202-566-1253
- NRCS SSS Contact
  - Regina Poeske: poeske.regina@epa.gov, 214-814-2725
- Contacts:Technical Questions
  - Mary Kentula: Kentula.mary@epa.gov, 541-754-4478
  - Teresa Magee: magee.teresa@epa.gov, 541-754-4385
  - Michael Scozzafava: Scozzafava.michaele@epa.gov, 202-566-1376
  - Chris Faulkner: faulkner.chris@epa.gov, 202-566-1185

National Lakes Assessment (2009)



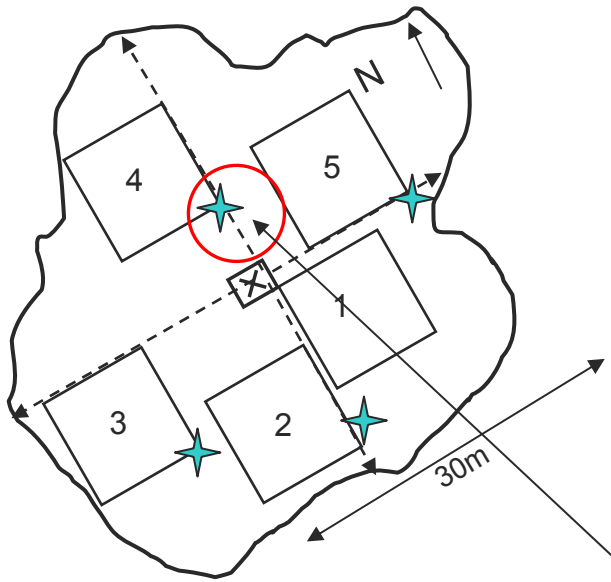
Special Categories

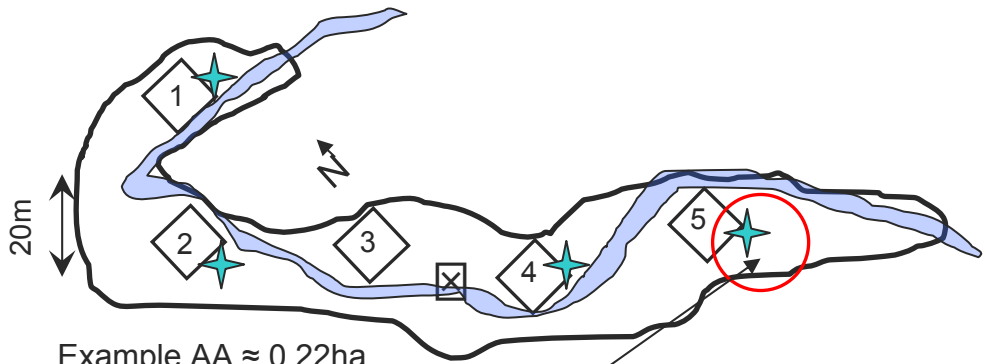
Aquatic Resources that are technically in the sample frame, but have little to no characteristics of natural wetlands. Thus, they will be reported in terms of extent in the frame, but not sampled in the field.

FWS Status and Trend Category	Common Examples
Palustrine Unconsolidated Bottom / Aquatic Bed (*some subcategories***)**	• Industrial ponds (cooling, waste, water retention) • Mining reclamation ponds • Agricultural ponds (livestock, waste, water retention) • Aquaculture ponds (fish farms, commercial cranberry) • Other created ponds without natural wetland features
Palustrine Farmed	• Agricultural fields that are currently, or were very recently, planted with commercial crops

Examples of Soil Pit Locations in a Small Wetland

Example AA ≈ 0.14ha





Example AA ≈ 0.22ha

Veg Plot

Soil Pit

AA Center

Randomly selected soil pit (1.25m)

Soil Parameters Measured

Method	SSL Method	Analyte
PSDA, <2mm, air dry	3A1a1a	Clay, Silt, Sand
Calcium carbonate equivalent, <2mm	4E1a1a1a1	CaCO3
Calcium carbonate equivalent, <20mm	4E1a1a1a2	CaCO3
Total Carbon, Nitrogen and Sulfur	4H2a1-3	C, N, S
pH	4C1a2a1a-b1, 4C1a2a2a-b1	1:1 H20, 1:2 0.01 M CaCl2
Cation exchange capacity	4B1a1b1-4	CEC, $Ca2^{+}$, K^{+}, Mg^{2-}, Na^{+}
Ammonium Oxalate Extraction	4G2a1a1-5	Al, Fe, Mn, P, Si
Electrical Conductivity	4F1a1a1a1	EC
Dithionite-Citrate Extraction	4G1a1-3a-b1	Al, Fe, Mn
Olsen Phosphorus	4D5a1a-b1	P
Mehlich Phosphorus	4D6a1a-b1	P
Trace Elements	4H1a1a1a1-20	Ag, As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, P, Pb, Sb, Se, Sn, Sr, VW, Zn
Bulk Density	3B1a3B1b, 3B1c3B1d	Db_f, Db_{od}, Db_{33}