Monitoring and Maintenance

Lesson Objectives

- Define monitoring and maintenance
- Understand importance of monitoring
- Identify major components to monitor
- Understand the two basic approaches to monitoring
- Determine frequency and duration of monitoring
- Utilize monitoring information

Monitoring

Long-term assessment of wetland restoration project:

- Provides data on whether or not a site is developing in a way that will achieve project goals and objectives
- Indicates progress towards target criteria or performance standards
- Provides information on changes over time
- Identifies potential problems

Maintenance

- Performance of management activities necessary to ensure the proper operation of installed components
  - Manipulations necessary to maintain biological and structural components
  - Includes preventive and corrective actions
- Monitoring directs maintenance activities
- Continuous process

Importance of Monitoring

- Method to assess progress towards:
  - Planned goals and objectives
  - Targeted plant/wildlife community
  - Targeted wetland functions

- Provides information detect and correct problems
- Use “lessons learned” to improve future projects

What to Monitor?

- Major wetland components to measure:
  - Hydrology
  - Vegetation
  - Wildlife
- Monitoring efforts should be directly linked to the target criteria
- Supporting structural components
- Document initial site conditions (baseline) to compare and evaluate changes

Monitoring

Structural Components

Flashboard risers, berms, etc.

Biological Components

Wildlife use, vegetation, etc.

Wetlands Reserve Program

Programmatic Purposes

Easements, site restrictions, CUA's

How to Monitor

Two basic approaches to monitoring:

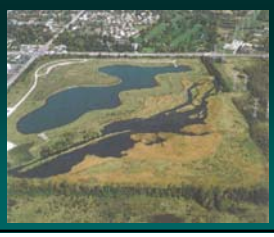
- Qualitative methods
  - Observational
  - General view of change

- Quantitative methods
  - Numerical
  - Detailed (target criteria)
  - Expensive and time consuming

Qualitative Methods

Aerial photography

- Hydrology: extent, drainage patterns
- Vegetation: community type, % coverage, canopy dev.
- Other Information: surrounding land use, disturbance, etc.



Quantitative Methods

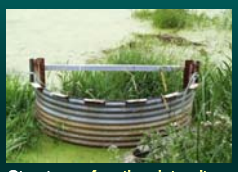
Establish permanent ground-level photo points:

- Take photos at same location and direction
- Record site conditions and document changes
- Take photos before, after, then annually
- Assess hydrology, vegetation, habitat features

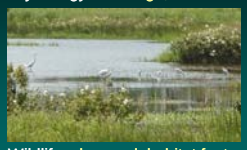
Qualitative Methods

General Observations

Hydrology: coverage, extent



Structures: function, integrity



Wildlife: observed, habitat features

Vegetation: type, species, condition

Quantitative Methods

Hydrology

Surface Water Levels (inundation)

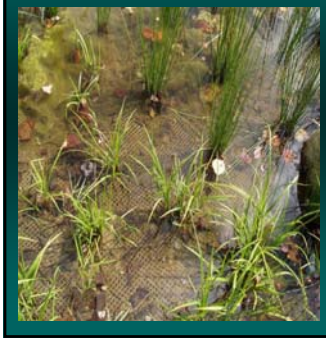
- Staff gauge
- Simple design (PVC pipe)

Ground Water Levels (saturation)

- PVC observation well
- Piezometer

Quantitative Methods

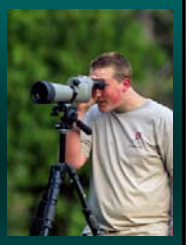
Vegetation

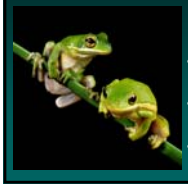


- Quadrat and transect
- Species composition
- Structural features
  - Density
  - Frequency

Quantitative Methods

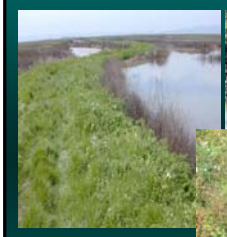
Wildlife

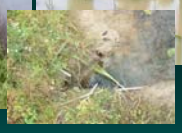




- Surveys: visual sightings and point counts
- Trapping: species diversity and abundance
- Index Models: HSI, functional assessment

Monitoring Structures





- Dikes: cover, erosion, animal damage, etc.
- Water control structures: functioning properly, integrity, beaver activity, etc.
- Operational status: boards installed/removed

Monitoring Easements

- Restoration activities:
  - Revegetation
  - Hydrology
- Management/Maintenance:
  - Structural components
  - Vegetative components
- Compatible Use Agreements:
  - Followed as authorized
- Violations:
  - Non-compatible uses
  - Encroachment, trash, etc.

How Often to Monitor

- Frequency of monitoring: depends on many factors
- Early stages of development: monitor frequently
- Site stabilized: decrease frequency
- Potential problems/structural components: increase frequency

How Long to Monitor

- Restored wetlands: may take decades to achieve desired wetland functions
- Project site fully functional: continue to be a dynamic system that will vary over time
- Monitoring: long-term activity
- Maintenance: continuous process

Utilizing Monitoring Information

- Summarize and evaluate data at least annually
- Compare data to target standards

Utilizing Monitoring Information

- Adaptive Management: Process of evaluating and refining wetland restoration project in light of new information
- Monitoring: Provides information on which decisions are based

Utilizing Monitoring Information

- Wetland restoration sites will change over time
- Changes may be different from what was intended or expected
- Are unexpected changes within ecological norms?

Long Term Management

Required to keep the site functioning as it was designed to function

Management is necessary to:

- Maintain existing structures
- Maintain desirable plant community
- Address problems
- Address unexpected events

Remedial Measures

- Significant corrections to a site may be needed
- Typical problems that require remedial measures:
  - Hydrology not being properly restored
  - Revegetation failures
  - Rapid invasions by invasive species

Summary

- Defined and discussed:
  - Monitoring and maintenance
- Monitoring methodology:
  - Two basic approaches
  - Major wetland parameters
  - Structures, easements
  - Frequency and duration
- Utilizing monitoring information:
  - Adaptive management
  - Long-term management
  - Remedial measures
- Final take home message