

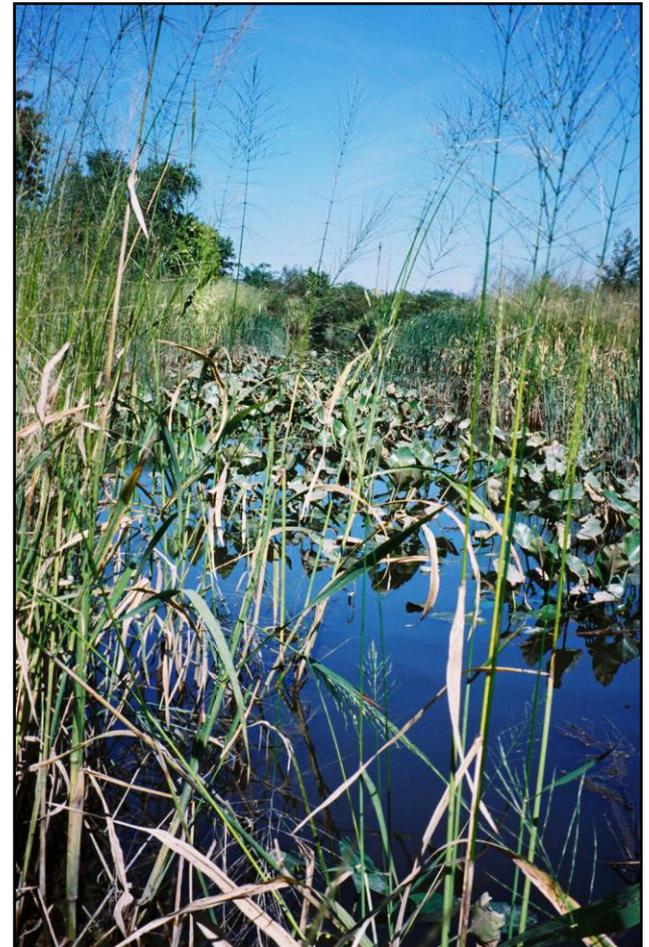
Adaptive Management Techniques for Wetland Restoration Maintenance and Monitoring

DuPont Newport Superfund Site, Newport, Delaware

Katie Eberhart, Senior Project Ecologist
URS Corporation
Fort Washington, PA

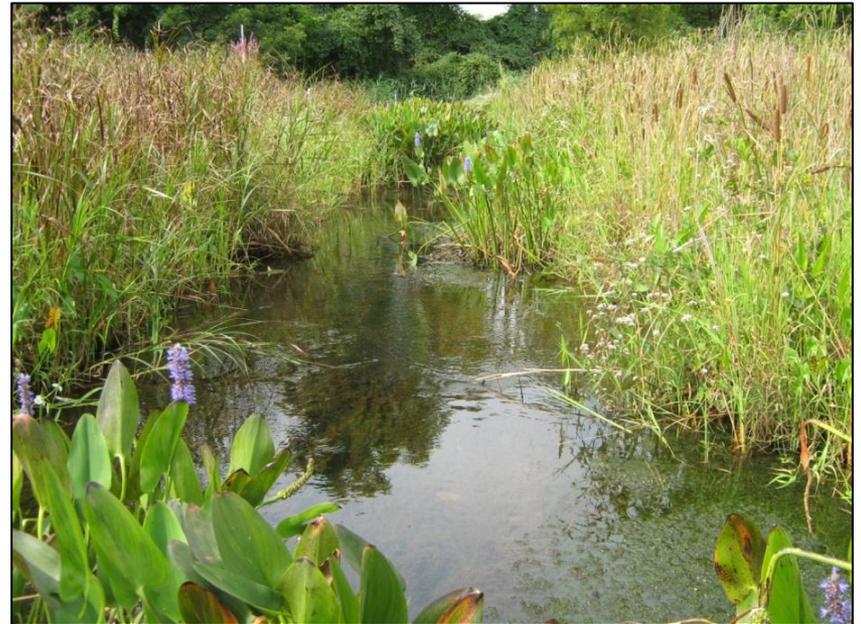
**Maryann J. Nicholson, Principal Technical
Consultant**
DuPont Corporate Remediation Group
Wilmington, DE

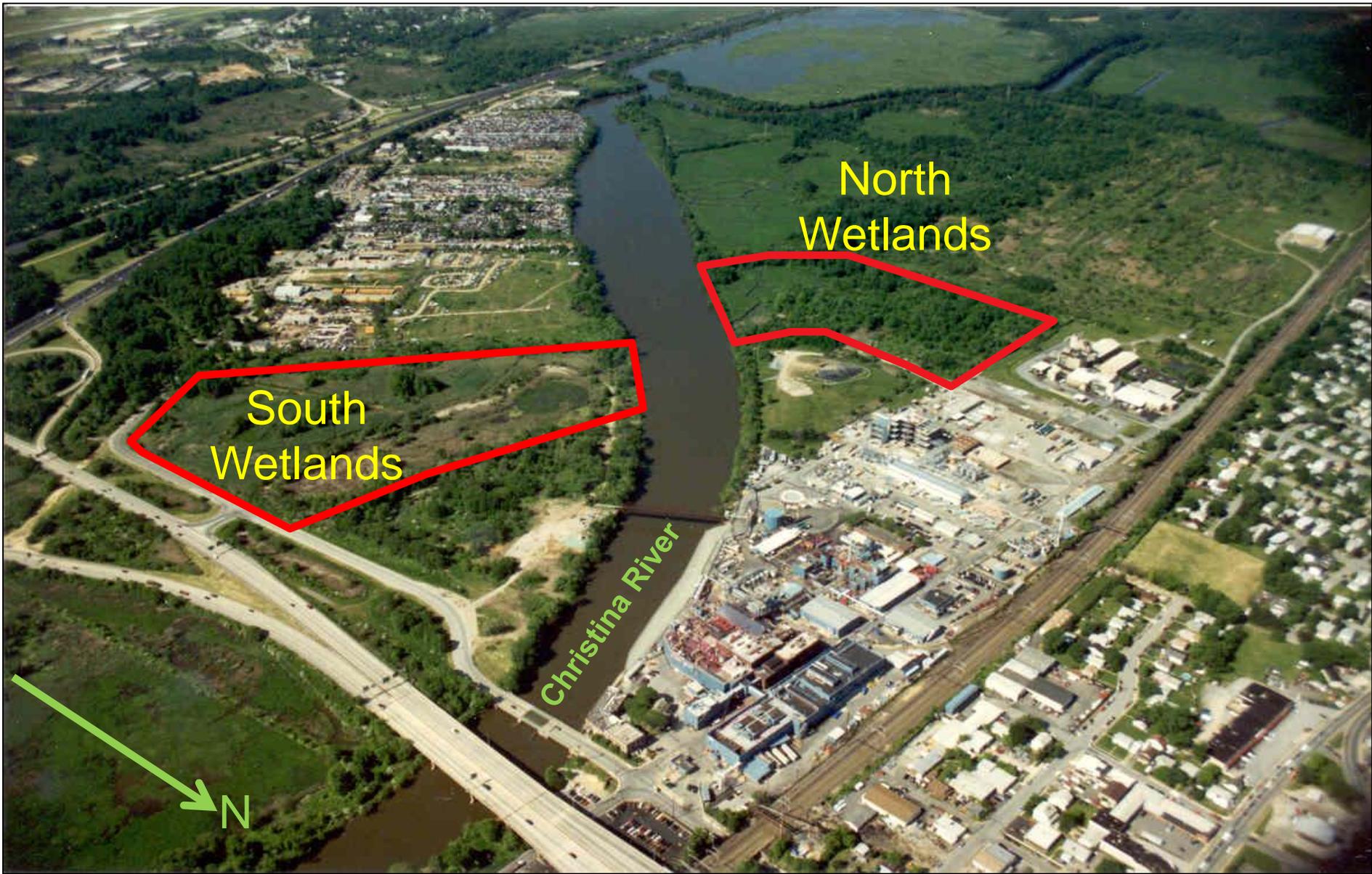
Dina Toto, Project Director
DuPont Corporate Remediation Group
Wilmington, DE



Objectives

- Present adaptive management techniques used during the maintenance and monitoring phase of a wetlands restoration project.
- Provide key learnings





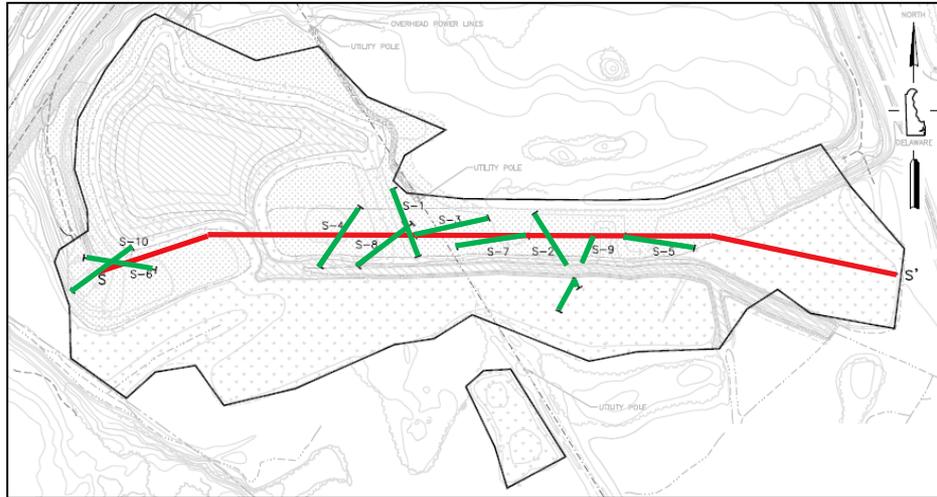
1st Five Years: Post-Restoration Monitoring Objectives

Focused on these restoration factors:

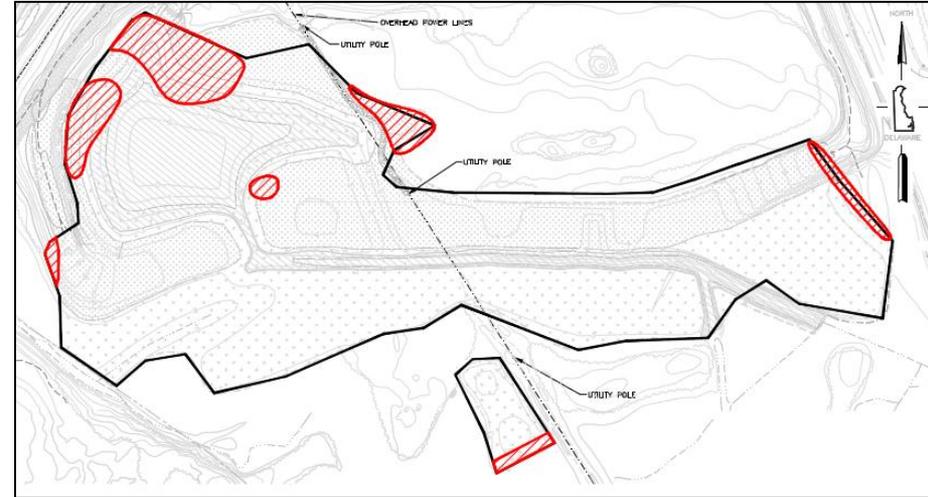
- Integrity of the tide gate/structure and culverts
- Foraged, eroded, or stressed vegetation
- Presence of invasive species
- Erosion of the backfill
- Evidence of wildlife



1st Five Years: Re-Vegetation Surveys



Vegetation



Invasive Species

1st Five Years: Faunal Surveys



Fish



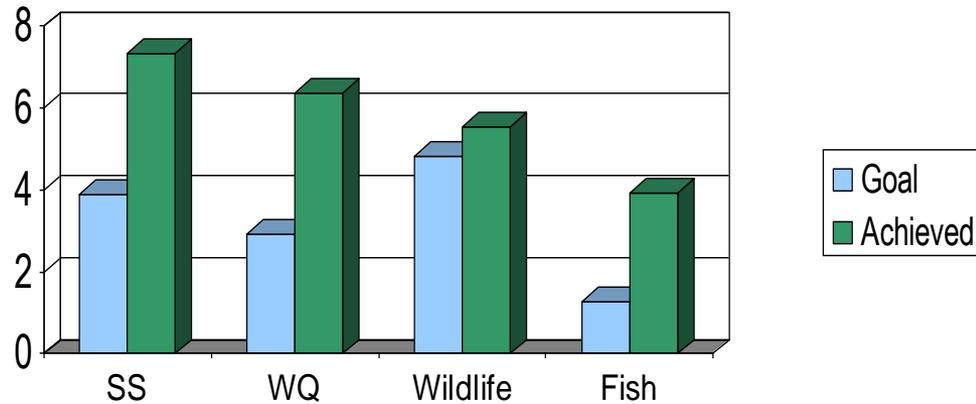
Benthic
Invertebrates



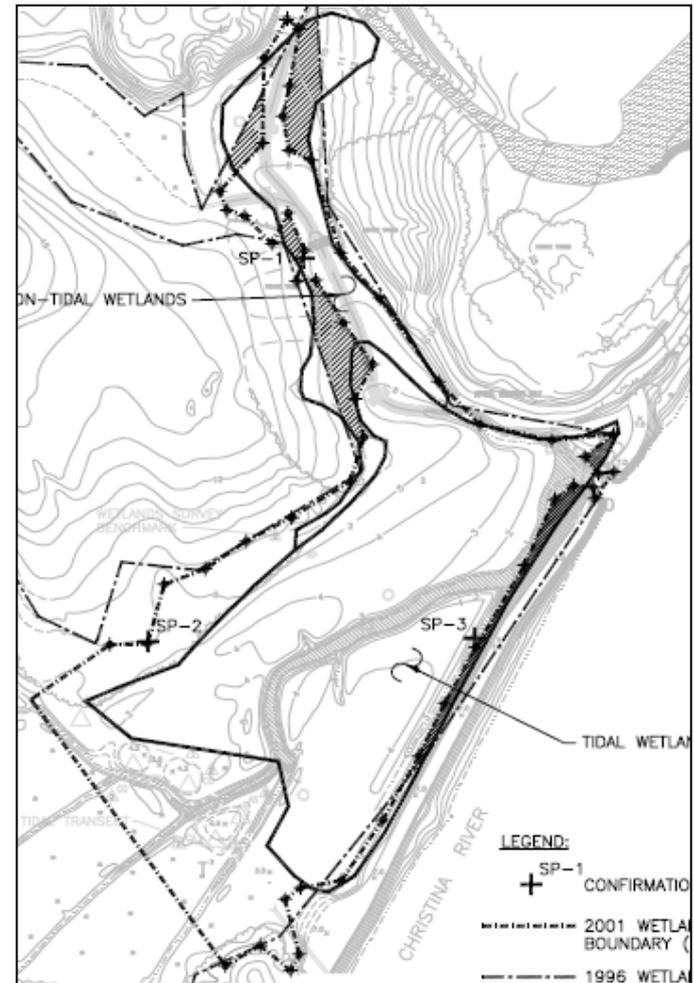
Wildlife

1st Five Years: Other Assessments

SWL EPW Scores



Functional Assessment



Wetland Delineation

1st Five Years: Results

Factor	Result
<p>Success Metrics</p> <ul style="list-style-type: none"> ✓ Backfill stability ✓ Percent cover of vegetation ✓ Percent cover of invasive plant species 	<p>Met within first 5 years</p>
<p>Species Richness - Vegetation</p>	<p>Significant Increase: 10 to 140+</p>
<p>Functional Capacity</p>	<p>Significant Increase: 40% above restoration goals</p>
<p>Wildlife Use</p>	<p>Nesting, breeding and nursery area for resident and migratory wildlife</p>
<p>Acreage</p>	<p>Net increase in the amount of wetland acreage</p>

2nd Five Years – 2012+: Challenges to Restoration Success

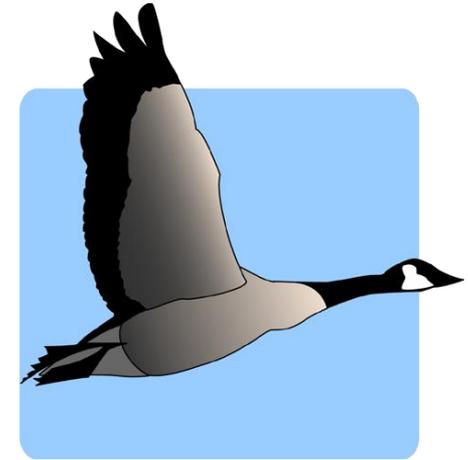
Meteorological



Other



Biological



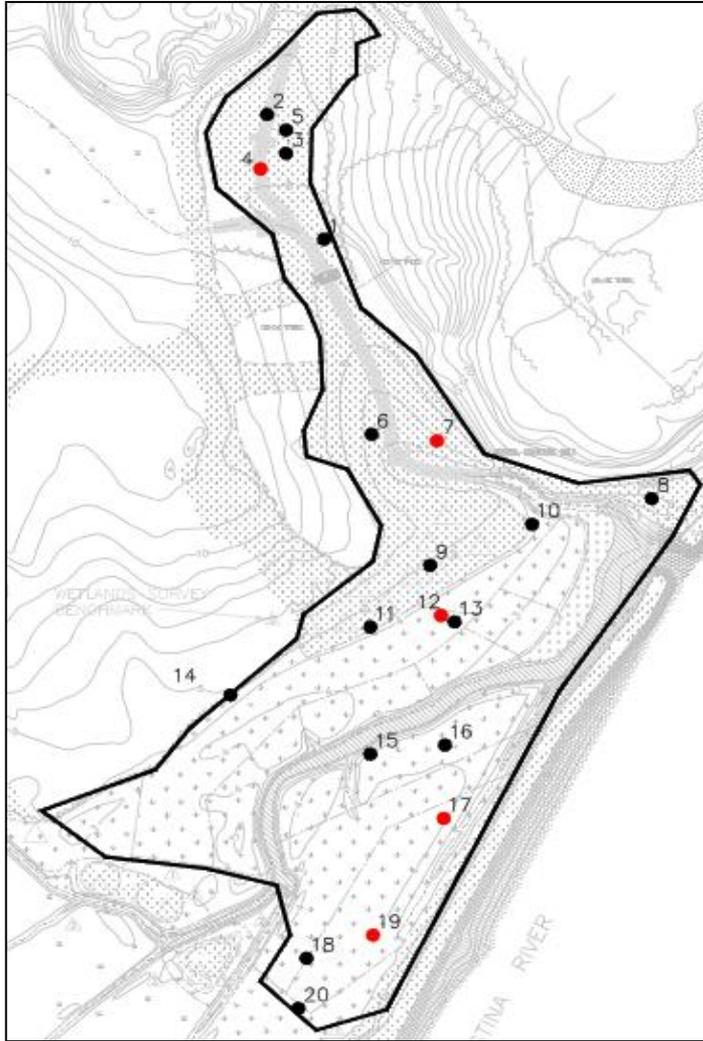
2nd Five Years – 2012+: Invasive Species Management Program



2nd Five Years – 2012: Biological Control Program



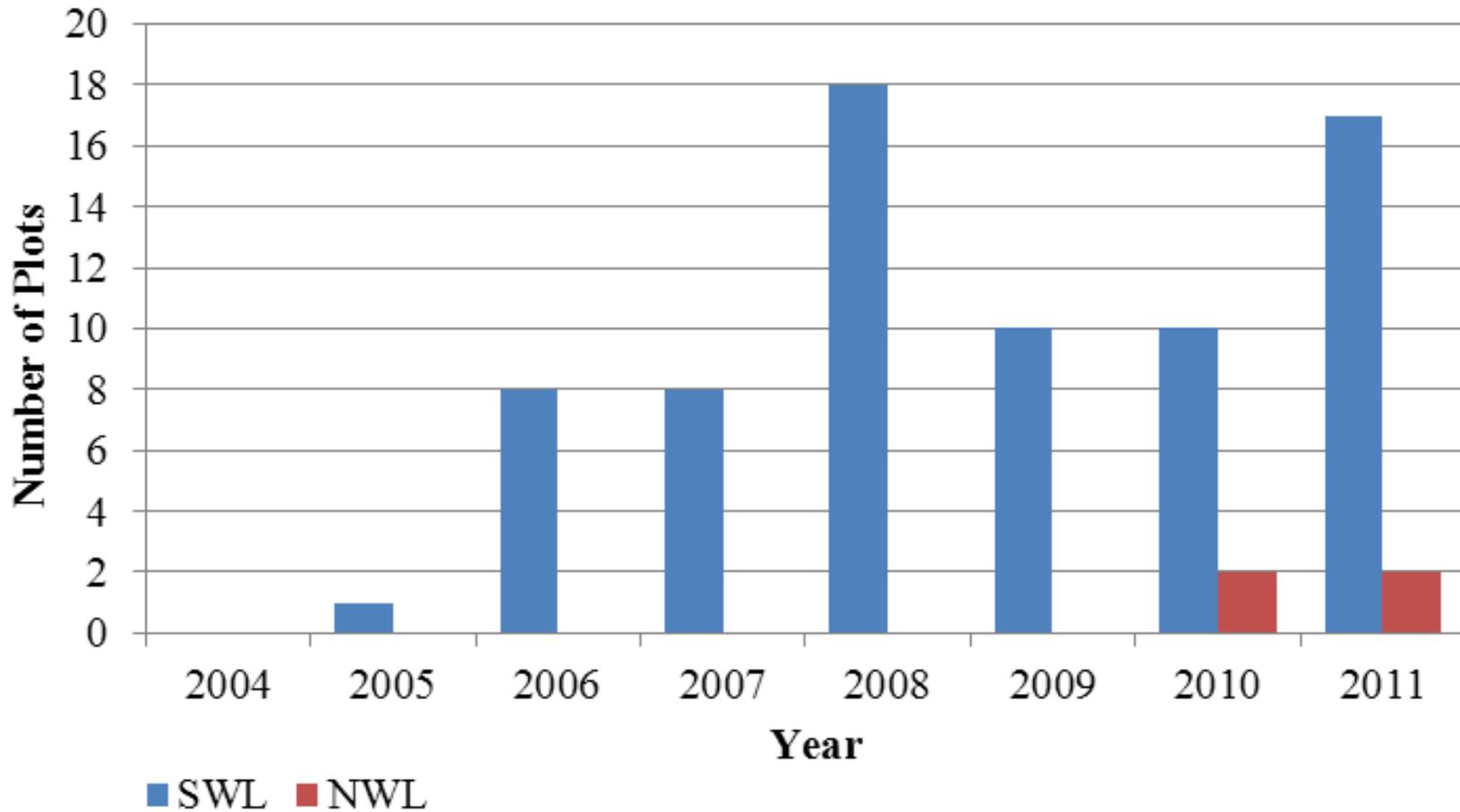
2nd Five Years – 2012: Biological Control Program



2nd Five Years – 2012: Biological Control Program



2nd Five Years – 2012: Biological Control Program



Key Learnings

- Adaptive management approach: focus on the challenges, design actions to test hypotheses, implement the changes, monitor and evaluate them, and then revise as necessary
- Flexible, iterative process
- Routinely assess project approach and be willing to adjust the program accordingly
- Develop and maintain positive working relationships to benefit project execution

Key Learnings

- Document findings regularly to provide context for evaluating progress over time
- Apply corrective actions as needed, or not
- Goal is long-term success

Questions

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