SNEP Cranberry Bog Restoration Workshop (September 12, 2024)

Workshop Summary Memo

September 23, 2024

SNEP hosted a Cranberry Bog Restoration Workshop at the Waquoit Bay National Estuarine Research Reserve (WBNERR) in Falmouth, MA on June 12, 2024 from 10:00am to 3:00pm. A summary of registration and attendance is as follows:

Attendee Organization Type	#	%
Academic	2	3
Consulting firm	11	19
Federal government	8	14
State government	12	21
Municipality	6	10
Other	19	33
Total	**58**	**100%**

The primary goals and objectives of this workshop were:

1. To share out status and trends of cranberry bog restoration projects to date with regards to existing monitoring data.
2. To identify headwinds and where collaborations can occur with water quality and ecological monitoring.
3. To discuss the techniques being contemplated and implemented for nitrogen reduction, water quality improvement, and habitat improvement.
4. To have a clearer idea of where/how proponents, practitioners and agencies can work together on restoration projects.
5. To identify continued gaps in information that still exist after the workshop.

This memo summarizes the main points presented and discussed during the workshop. Key points of the workshop are summarized below and provided in more detail in the Breakout Session Summaries section.

Symposium Files

1. The following materials are provided as appendices to this document:

    - Appendix 1: Workshop Agenda
    - Appendix 2: Group Discussion Summaries

Slides from speakers' presentations will be posted to the SNEP website: https://www.epa.gov/snep/southeast-new-england-program-workshops

Appendix 1:

SNEP Cranberry Bog Restoration Workshop Agenda

9:45am - 10:00am Arrival and Networking

10:00am – 10:15am Welcome and Introduction

EPA Welcome – Haley Miller, EPA Southeast New England Program

DER remarks – Bill Giuliano, MA Division of Ecological Restoration's Cranberry Bog Restoration Program

10:15am – 11:15am Session 1: Case Studies and Completed Projects

Moderator – Alex Hackman, Mass Audubon

Windswept Bog Wetland Restoration Project, Nantucket Island, MA: Lessons Learned from Taking a Phased Implementation Approach (Karen Beattie, Nantucket Conservation Foundation)

Restoring the Childs River: Water Quality Trends, Insights, and Questions for Consideration (Jordan Mora, Association to Preserve Cape Cod; Ryan Clark, WBNERR)

Cold Brook Eco-Restoration Partnership: Re-wilding Through Compromise and Consensus (Michael Lach, Harwich Conservation Trust)

Mattapoisett Bogs Wetland Restoration Project, Mattapoisett, MA: Lessons Learned from a Newly

Restored Site (Sara Quintal, Buzzards Bay Coalition)

11:15am – 11:30am Break

11:30am – 12:30pm Session 2: Ongoing Work, Balancing Differing Goals and Site Prioritization

Moderator – Eric Ford, MA Division of Ecological Restoration

Cranberry Agriculture's Role in Watershed Nutrient Management (Rachel Jakuba, Buzzards Bay

Coalition)

Nitrogen Attenuation Potential of Restored Riparian Cranberry Bogs (Sarah Klionsky, Boston University)

Restoring Wetlands on Cranberry Farmland to Reduce Downstream Nitrogen Loads in Marstons Mills, Barnstable, MA (Laura Erban, EPA Office of Research and Development)

Ecological Restoration Design and Implementation: A Balancing Act (Nick Nelson, Inter-Fluve)

12:30pm – 1:30pm Lunch Break

1:30pm – 1:35pm Lightning Spotlight: Introduction to the Living Observatory Community Platform

(Glorianna Davenport, Living Observatory, Inc.)

1:35pm – 2:30pm Session 3: Working Together: Identifying Gaps and Opportunities for the Planning,

Implementation and Monitoring of Cranberry Restoration Projects

2:30pm – 3:00pm Closing and Next Steps

Appendix 2:
Group Discussion Summaries

Group 1

Q1: What have been the most useful parameters for monitoring project "success" to fate?

a. Big picture: Success is a variable term and may be defined differently for each project
   - Important to align parameters with project objectives

b. Increase in fish passage
   - 1 year monitoring may be OK for fish presence/absence and spawning evidence, but longer-term data needed to track trends (e.g. losses due to sedimentation)

c. Habitat enhancement; habitat complexity
   - Vegetation : Monitor for 3 years minimum, much longer needed for transitional areas, such as areas transitioning to forest at edge of restoration area
   - Vertebrates: birds, turtles

d. Water quality
   - Not much success with water quality monitoring, but best results with:
     - Temperature (e.g., bi-weekly)
     - Dissolved oxygen
     - Nitrate (more long-term data needed)

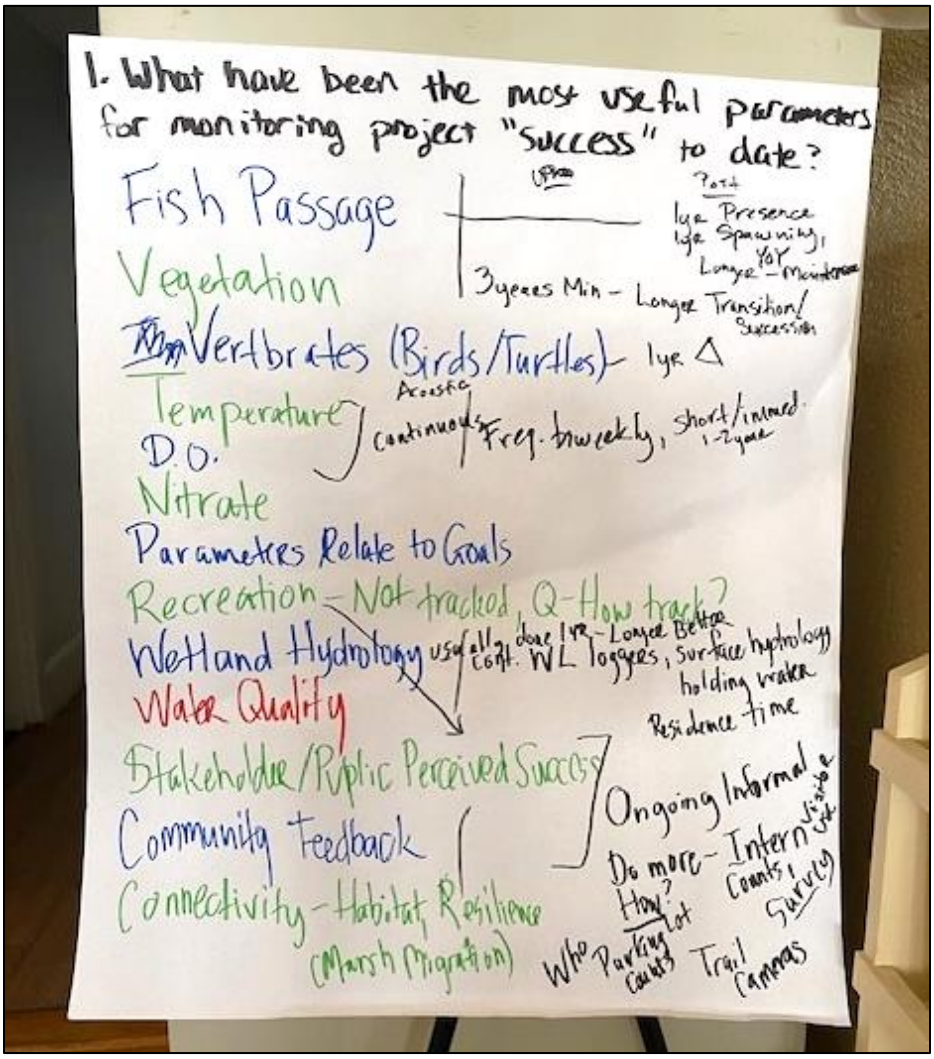
e. Recreational access (not for all sites)
   - Hard to track at sites with diffuse access / multiple access points

f. Wetland hydrology
   - Multiple years of data needed to weather variability (e.g., drought years, wet years)
   - Continuous water-level loggers (pre- and post-restoration)
   - Is surface holding water during the growing season?

g. Stakeholder reaction to restoration
   - Are stakeholder satisfied or not? Why?
     - How to define "actual" success vs. public perception of success?
     - How to obtain community feedback (ongoing challenge)?
     - Community feedback and perception is difficult to measure. Options include:
       - Interviews/surveys
       - Direct observations via trail counts, trail cameras, etc.

Q2: What parameters have been difficult to measure, have not worked so well or what parameters have been less interesting/ told less of a story?

Note: The group ran out of time and did not specifically discuss this question. However, some aspects of Question 2 were discussed as summarized above under Question 1.



Group 1 Discussion Notes

Group 2

Q1: What have been the most useful parameters for monitoring project "success" to fate?

a. Project goals define your success and therefore your parameters
b. Acres of wetland and streams
    - Water storage and residence time
c. Vegetation
    - Species composition and abundance
    - Wetland vs upland
    - Native vs non-native
    - No specialized equipment needed for monitoring
    - Indicator species
d. Time scale is important to consider
    - Pre vs post restoration
    - Changes over time
e. Soils
f. Before/after phots are incredibly effective for showing change to public and project partners
    - Use the same photo points and views to construct a time series
    - Aerial imagery
g. Hydrology
    - Water table depth
    - Soil moisture
h. Mapping habitat types
i. Elevation metrics
j. Effective communication to build public support and funding

Q2: What parameters have been difficult to measure, have not worked so well or what parameters have been less interesting/ told less of a story?

a. Wildlife is difficult to measure
    - Macroinvertebrates
    - Fish populations
    - Terrestrial and amphibious utilization
    - Mosquito control for some projects

b. Hydrology while helpful can be complex and difficult to track

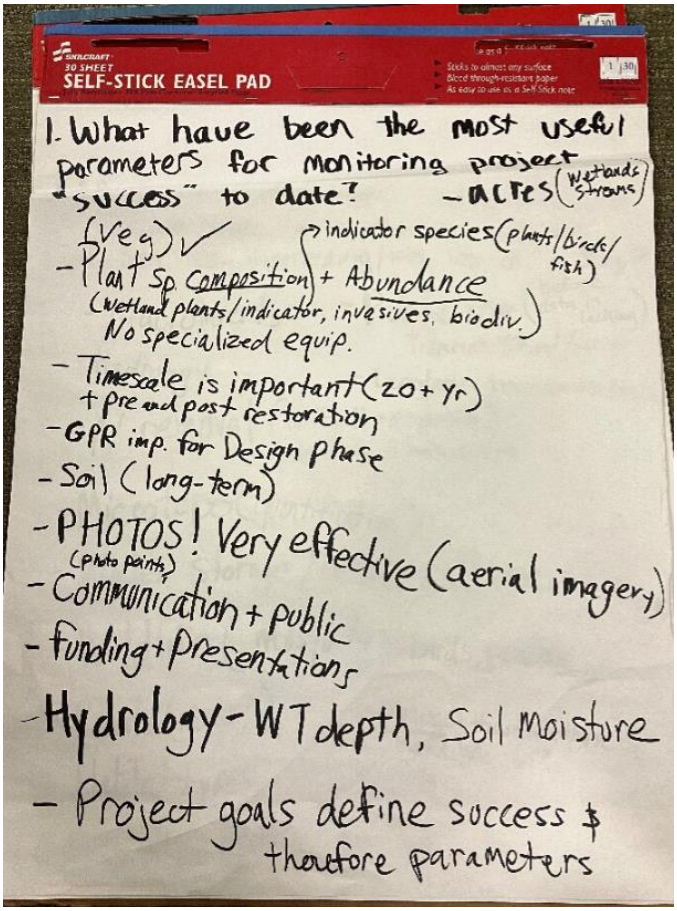
c. Public use is difficult to track since pre restoration data is often lacking

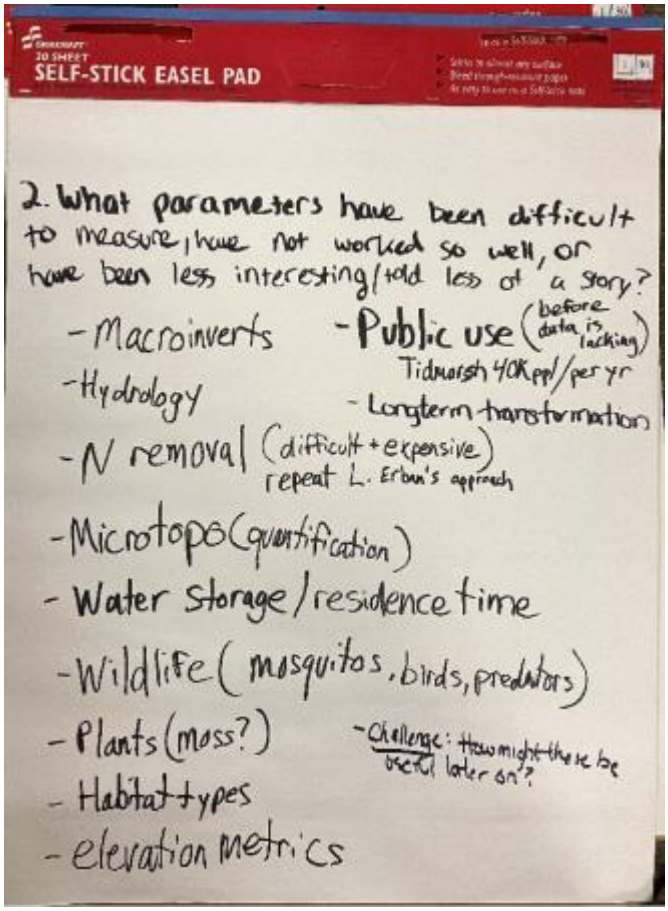
- Ex. Tidmarsh currently experiences 40,000 people per year, but no data exists from pre restoration

d. Nitrogen removal is difficult and expensive to track

e. Quantifying microtopography

f. Classifying non-vascular plants to species level (i.e. moss) has been a challenge





Group 2 Discussion Notes

Group 3

Q3: What factors should be prioritized at future restoration sites with respect to habitat improvement, climate resilience, and nutrient reduction goals?

a. Mosquito breeding habitat
    - Abutters may be concerned about rises in populations/breeding places
    - May monitor mosquito populations pre-/post-rehab for data
    - Mosquito may provide as an additional food source for animal inhabitants
    - Potential needs for some mosquito control if abutters require

b. Self-sustaining sites
    - Minimal maintenance from outside parties
    - No additional investment capital required
        - Unless adjustments or improvements needed post-rehab
    - Minor stewardship or care may be required to maintain habitat

c. Mosaics of habitats
    - Will improve the biodiversity with range of habitat areas
        - Must consider what habitat trying to promote
        - Some habitats work better for species; others for water quality improvement
    - Decrease habitat fragmentation and connect once separated areas
        - Easier animal movement / minimal human encroachment

d. What type of ecosystem/habitat was there before the site was a cranberry bog?
    - Aim to recreate environment pre-cranberry bog environment
        - May not be able to replicate 100%
        - Habitat will change/settle in over time

e. Broad target hydrology
    - Focus on generalized hydrology than trying to micromanage/perfect the plans
        - The micro hydrology/water levels may change overtime
    - Water quality results from design/rehab
        - Track changes due to the new design and rehab

    - Will some WQ issues increase while others decrease (e.g., heavy metals, PFAS, nitrogen)?

f. Public Outreach

- Community stewardship may be needed to manage projects for extended time
    - Get estimate of time/money needed for management of each site
- Set goals for timeline and habitat quality to public/abutters
    - Gain acceptance by community to alter area
- Can we honor the cultural legacy of the area?
- Can it still be used for public use/access
    - What will be the focus for community use (e.g., hiking, hunting, fishing, etc.)?

Q4: What approaches have been successful in navigating local/state/federal permitting for cranberry bog restoration projects?

a. Engage with regulators (Long term goal)

- Invite to conferences/meetings to offer more exposure/understanding of projects

b. Education

- Do people understand the project and the goals planned on being achieved?
- May help speed up process if information is already known before full submission

c. Category 4 classification for Bog rehab?

- May be able to reduce regulations by adding new classification for rehab projects
- Can cut down timeline and number of people that must approve project before proceeding

d. Change chapter 91 to not have to be signed by governor?

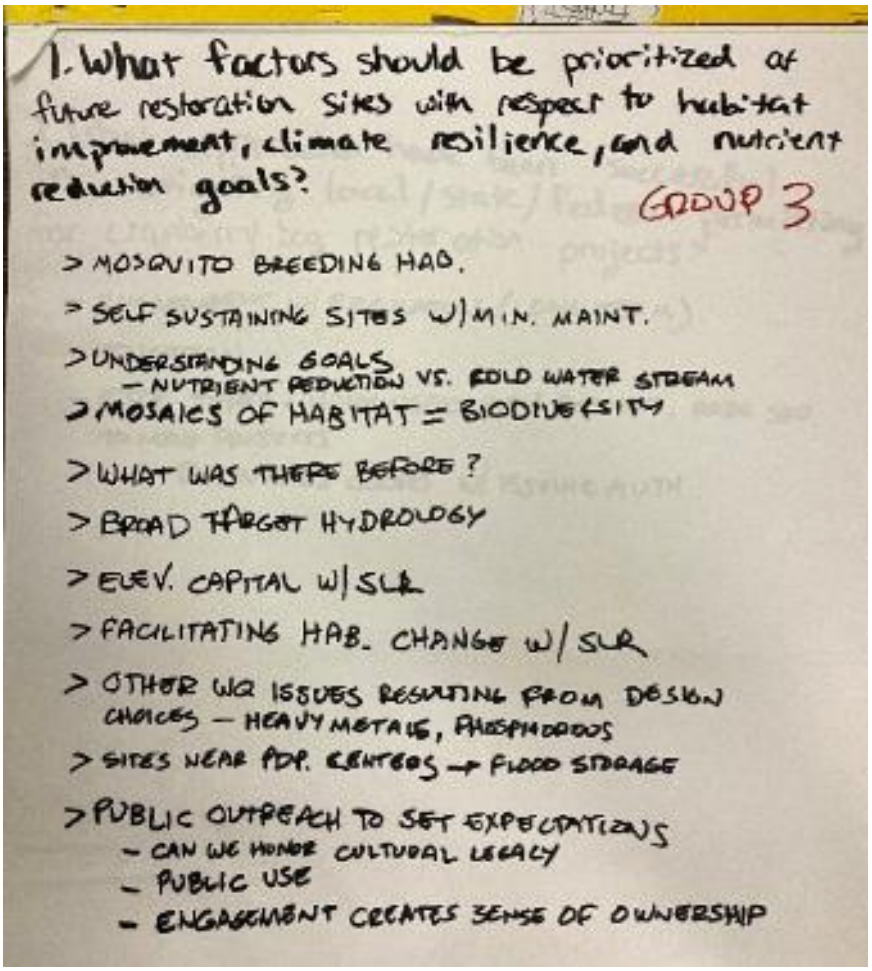
- May not be attainable

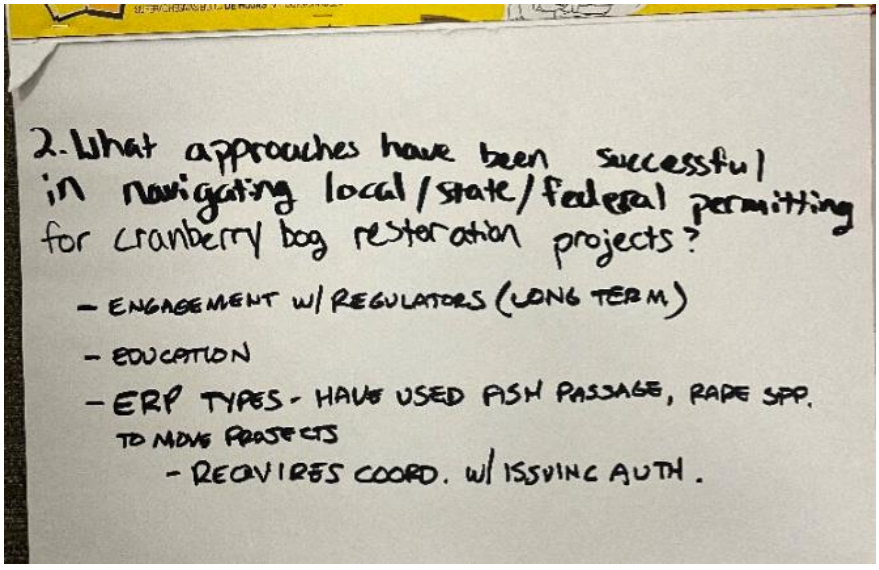
e. EJ communities

- Trigger longer timelines –may go down another pathway

f. ERP – Dam removal or fish passage

- Alternate pathways for getting cranberry bog restoration approved





Group 3 Discussion Notes

Group 4

Q3: What factors should be prioritized at future restoration sites with respect to habitat improvement, climate resilience, and nutrient reduction goals?

a. Habitat improvement
    - Connectivity
    - Stakeholder shared goals
    - Look at what habitat is provided
    - Study site to thoroughly understand it
    - Ask how the site fits into the landscape, and try to keep gradients
    - Ask: Do habitats and nutrient reduction conflict?

b. Non-coastal climate resilience
    - Carbon sequestration

c. Designing for a range of conditions and time
    - Set the environment up for success
    - Create a range of factors (such as topography) to anticipate future conditions
    - Process-based restoration
        - Work towards smooth transitions
        - Allow for habitat migration
    - Focus on water
    - Consider fast-moving issues (upper-end storm conditions, climate change, sea level rise, etc.) without getting rid of short-term goals
        - Choosing between climate change driven projects and other projects?
        - Limit the use of structures, when possible, in climate-resilience projects
    - Frontload your projects as much as possible whilst funding is available

Q4: What approaches have been successful in navigating local/state/federal permitting for cranberry bog restoration projects?

a. Assume that you're correct (a restoration project should be permitted as a restoration project)
    - Set a precedent that cranberry bog projects ARE restoration projects

b. Find language that works and continue to use it

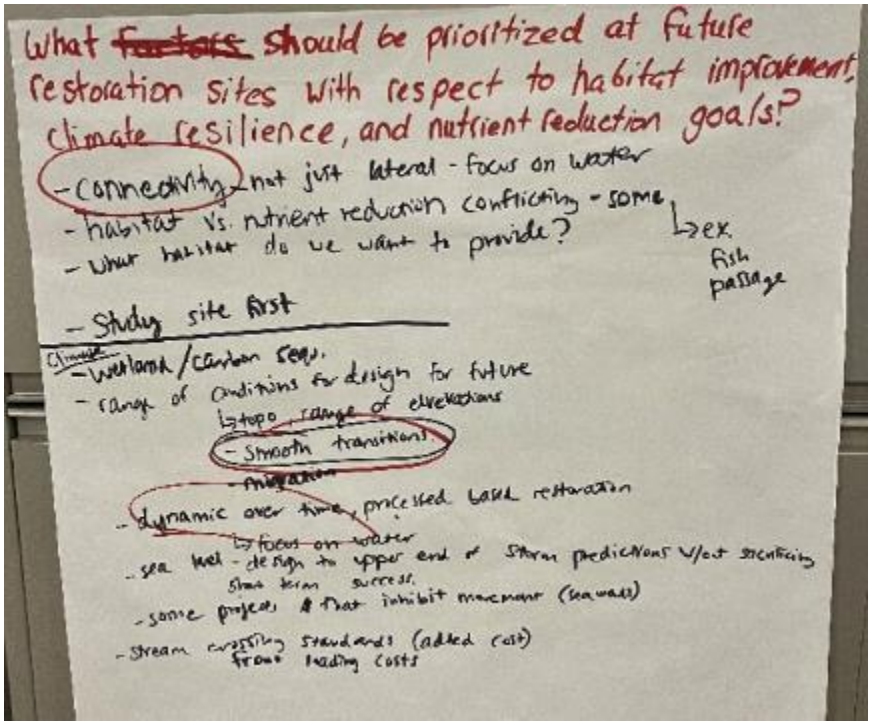
- Cranberry bogs don't fit into many permitting boxes. One tip brought up was "Daylighting"
- Find the loopholes

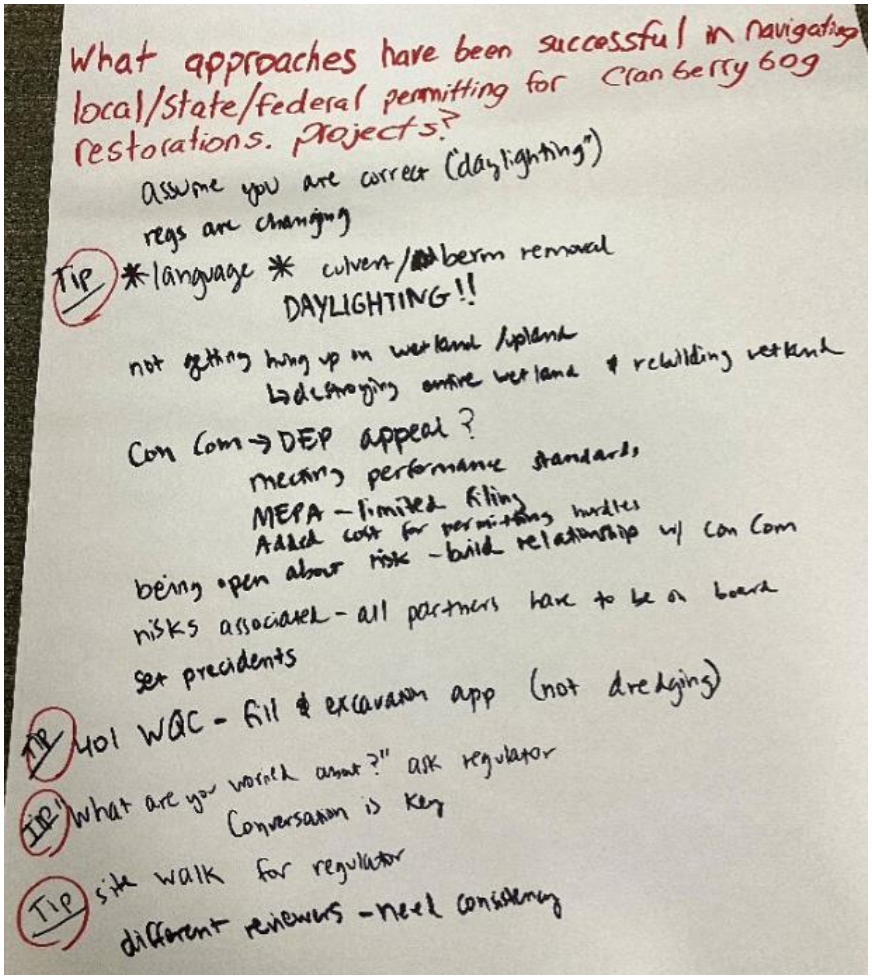
c. Look at the bigger picture. Be clear that the entire site is a wetland, don't get caught up on the microtopography or other small factors

d. Be open about the risks faced to partners

e. Working with permitting agencies
    - Show agencies and difficult individuals the sites (aka, take them on a site visit). This may help them ease up on challenges.
    - Finding helpful people at agencies who are more responsive to your projects may be helpful.
    - A large issue: regulation/government permitting should not take years to complete. More cranberry bog restoration projects could be done if it was faster.

f. Permitting
    - Projects can avoid MEPA
    - Within the 401 Water Quality Certification, do not consider "dredging"
    - Mass Audubon is proposing a 3-3 (9 month total) plan for MEPA.
        - Environmental Justice aspects of permitting was brought up as something that may slow this down.
    - One barrier project was appealed by the EPA.
    - An idea for streamlining the permitting process is starting the process while land is still owned by the farmers.





Group 4 Discussion Notes

Appendix 3:
SNEP Cranberry Bog Restoration Workshop - Evaluation Forms

Post-Meeting Evaluation

Attendees were asking to fill out a post-meeting evaluation answering the following questions:

- What did you take away from the workshop?
- What questions do you still have?
- Do you have any suggestions for how future workshops could be improved?

A total of 24 evaluations were collected. A summary of comments related to each question is below.

What did you take away from the workshop?	• The success and challenges of cranberry bog restoration (e.g., nutrient reduction challenges). Interesting/informative. • Tips and tricks for permitting. • There is an interest in cranberry bog restoration! Lots of great projects and research. • Goals can vary widely among different cranberry projects. • Organizations are researching and implementing new ways to ensure success of bog restoration. • Importance of pre- and post-project monitoring. • Collaboration is key to success. • Great opportunity to share knowledge, connect and collaborate (sidebar conversations was “best part”).
What questions do you still have?	• How best to achieve permit streamlining. • How can agencies best coordinate efforts for project implementation and long-term monitoring. • Local/State grant opportunities? What funding sources are available? • Do other compounds, such as phosphorous from fertilizer use, exhibit the same uptake into restored bogs as nitrogen seems to from the studies covered? How to sequester nitrates, arsenic, ammonia? • What are some best practices (e.g. microtopography)? How is research being implemented into on-the-ground practices? • How does mosquito use vary among restoration sites, particularly among different styles of micro-topography. • Where is the dormant native seed that revegetates the restored bogs? • There's a lot more to explore in terms of monitoring approaches and goals, as well as comparisons of monitoring data from different approaches. • Questions remain regarding phosphorus, microtopography, long-term site maintenance, public use statistics, $/acre of wetland restored/ROI, the fate and approach to project permitting, mosquitos, the idea of responsible agricultural decommissioning of farms before Ag permit closes.
Do you have any suggestions for how future workshops could be improved?	• Wish presenters had more than 15 minutes to speak. Longer, fewer presenters for the more technical presentations. • Breakout group sessions could be improved with less redundancy, better integration, more time. Intent was not clear. • More small group sessions. More time for a more emergent group discussion based on new learning during the workshop. • Include a broader range of stakeholders, including funders, NGO’s, and bog owners. • Add a field trip. Add skills-specific workshops (e.g., GIS tools, wetland vegetation ID, coordinating volunteer monitoring). • Focus on different types of restoration projects grouped by goals (e.g., fish passage, dam removal, N load reduction) • Annual workshop would be fantastic with case studies - what has worked, what has not. Overall, it was a fantastic workshop and would love to see this continue each year.

Would you be interested in attending another workshop on this topic?

Response	#	%
Yes	21	88%
No	0	0%
Maybe	3	12%
Undecided	0	0%

How would you rate the workshop overall?

Response	#	%
Excellent	11	46%
Good	13	54%
Adequate	0	0%
Poor	0	0%
N/A	0	0%

How would you rate the content structure of the workshop?

Response	#	%
Excellent	9	38%
Good	14	58%
Adequate	1	4%
Poor	0	0%
N/A	0	0%

How would you rate the stakeholder representation at the workshop?

Response	#	%
Excellent	12	50%
Good	11	46%
Adequate	1	4%
Poor	0	0%
N/A	0	0%

How would you rate Session 1 presentations? *Case Studies and Completed Projects*

Response	#	%
Excellent	18	75%
Good	6	25%

Adequate	0	0%
Poor	0	0%
N/A	0	0%

How would you rate Session 2 presentations? *Ongoing Work, Balancing Differing Goals and Site Prioritization*

Response	#	%
Excellent	16	67%
Good	7	29%
Adequate	1	4%
Poor	0	0%
N/A	0	0%

How would you rate the Session 3 Discussion? *Working Together: Identifying Gaps & Opportunities fro the Planning, Implementation and Monitoring of Cranberry Bog Restoration Projects*

Response	#	%
Excellent	6	25%
Good	11	46%
Adequate	7	29%
Poor	0	0%
N/A	0	0%

How relevant was the workshop to your work?

Response	#	%
Excellent	16	67%
Good	8	33%
Adequate	0	0%
Poor	0	0%

N/A	0	0%