



Upper Hudson River Habitat Reconstruction and Restoration

2023 Habitat Reconstruction Monitoring



- Habitat reconstruction/restoration is required as part of the remedy
- Riverine Fringing Wetland (RFW) and Submerged Aquatic Vegetation (SAV) habitats
 - RFW monitoring - plot-based measurements and plotless overall observations
 - SAV monitoring includes both plot-based, video transect, and sonar imagery
 - Assessments of planted and natural recolonization areas
- Overall – habitat is in the benchmark phase in which data from individual areas are compared to reference area values to confirm habitat progress toward success criteria
- Next steps – more restoration for areas under performing and continued monitoring (comparing restored areas to reference areas)



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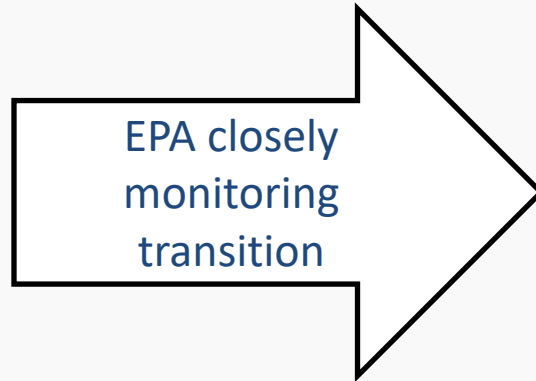


Benchmark v. Success Criteria Monitoring



Benchmark Monitoring

- Non-destructive, quantitative and qualitative monitoring of habitat reconstruction areas
- Ongoing (can last 5+ years for individual reconstruction areas)
- Percent cover and species composition compared to reference areas (data reported annually)
- Response actions based on monitoring results



Success Criteria Evaluation

- Certain areas beginning to transition to success criteria
- Additional years of quantitative and statistically-based evaluations needed
- May include destructive (harvest of biomass) survey methods
- Comparison to reference areas



2023 Habitat Reconstruction Response Actions



- Response actions implemented annually based on previous years monitoring results and the results of planting pilot and other studies
- 2023 RFW response actions included:
 - Installation of wave-break measures (coir logs),
 - Plantings in select RFW areas, and
 - Invasive species management
- 2023 SAV response actions include using American wild celery (*Vallisneria americana*) seed buoys (scheduled for November)

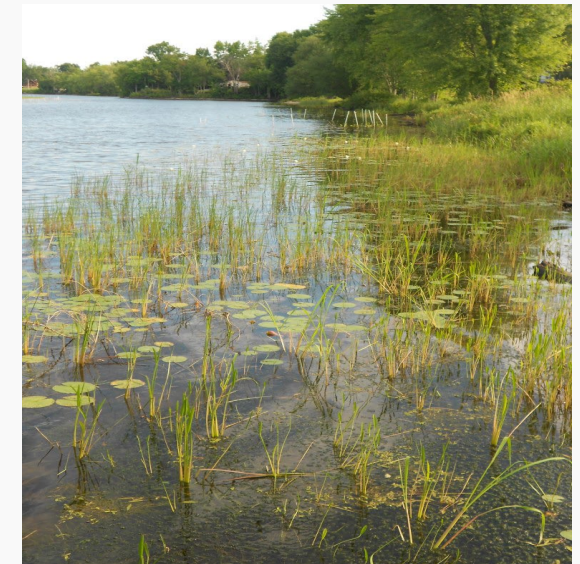


2023 RFW Response Actions



Examples of actions for this year:

- Certification Unit (CU) 68-70:
 - 4,600 plants (primarily water lily)
 - 12 coir logs installed to absorb wave energy
- CU64:
 - 1,600 plants (pickerelweed, bur-reed, bulrush, water lily)
 - 8 coir logs to slow down flows and prevent sedimentation
- Invasive species management (multiple areas)



2023 Habitat Reconstruction Response Actions



- More about wild celery seed pods
 - Seed pods are harvested from relatively dense SAV beds, placed into mesh bags, and attached to buoys to encourage re-vegetation - seeds fall in area around seed buoy



Seed Buoy Mesh Bag



Challenges to Habitat Reconstruction



- High flows
 - Higher than normal flows within a growing season can negatively impact submerged plants and emergent wetland plants
- Year-to-year variability (length of growing-season, temperature, water levels etc)
 - The overall approach to habitat reconstruction includes "designing with nature in mind"
 - Plant communities may benefit from consistent conditions
 - Since dredging, water levels have shown considerable variability year-to-year
- Herbivory – wild animals eating the plants can cause significant impacts
 - As was observed in CU68-69, some of the plants we installed were significantly impacted by waterfowl (aquatic birds) in 2021
 - EPA and GE/field crews are working to restore vegetation to this area with species that may not be as desirable by waterfowl

Summary of Considerations - Going Forward



- RFW and SAV habitat monitoring is still in the benchmark phase but transitioning to success criteria evaluation
 - Recent data suggest that certain RFW areas may be approaching the threshold for evaluation against the success criteria, but challenges presented by herbivory (plant eating animals) and fluctuating water levels are challenging
- EPA needs to further consider the scale at which to evaluate SAV results and the associated reference areas
- Invasive species are posing challenges in certain RFW and SAV areas; EPA is working with GE and NYSDEC to address these challenges
- Other challenges include wave impacts on plants – using more rigorous wave break approaches

