Invasive Species Management Plan (ISMP):
Cup Plant (*Silphium perfoliatum)* at Mud Creek Conservation Area

Section 1: Project Summary

General Information	
Site Name: Mud Creek Conservation Area	**Property Owner Name, Title, and Contact:** Leanna O' Grady, Environmental Educator, leana.ogrady@ccswcd.org
Site Address (if different): 1024, NY, 66 Ghent 12075	
Latitude/Longitude: 42.2803882 N -73.7104736 W	**Project Leader Name, Title, and Contact:** Sam Schultz, Terrestrial Invasive Species Coordinator, ss986@cornell.edu
Total Parcel Size (acres): 35 Acres	**County:** Columbia
Worksite Size (acres): 0.8 Acres	**Permit(s)/Permission(s) Acquired?** Yes

*****Remember to obtain proper permissions before completing any response project. Please attach any permits/permissions completed for this project as an appendix.**

Conservation Goal:

☐ Delineate & assess a conservation value ☐ To prevent and protect a conservation value

☒ Local Eradication ☐ Post-Treatment Monitoring ☐ Containment

☐ Suppression ☐ Exclusion ☐ Restoration

Response Type:

☒ Initial Response ☒ Follow-up Monitoring ☐ Crew Assistance Program Project

☐ Research Action ☐ Restoration ☐ Volunteer Engagement

Site Description:

Mud Creek Environmental Learning Center (ELC) is located on the property of Columbia County Soil & Water Conservation District office. ELC consists of the nature trails behind the District building and an indoor classroom with the Hudson River Estuary exhibit room on the lower level of the District building. The Mud Creek ELC land contains a loop trail which covers a wetland area on which Leanna O' Grady, the Education Program Coordinator, hosts many educational programs.

This site has been designated for trail use by the public. The site has a plethora of different habitats including fields, forest, and wetlands. Many species take refuge there such as cedar waxwing (*Bombycilla cedrorum*), great blue heron *(Ardea herodias*), muskrats (*Ondatra zibethicus*), etc. Native plants such as shagbark hickories (*Carya ovata*), staghorn sumac (*Rhus typhina*), goldenrod (*Solidago spp.*) and green ash (*Fraxinus pennsylvanica*) have been found in the area. Some invasives have also been found such as oriental bittersweet (*Celastrus orbiculatus*) and autumn olive (*Elaeagnus umbellata*). Historically, cup plant was planted in a rain garden at the trailhead of Mud Creek Conservation Area and has since spread from the garden.

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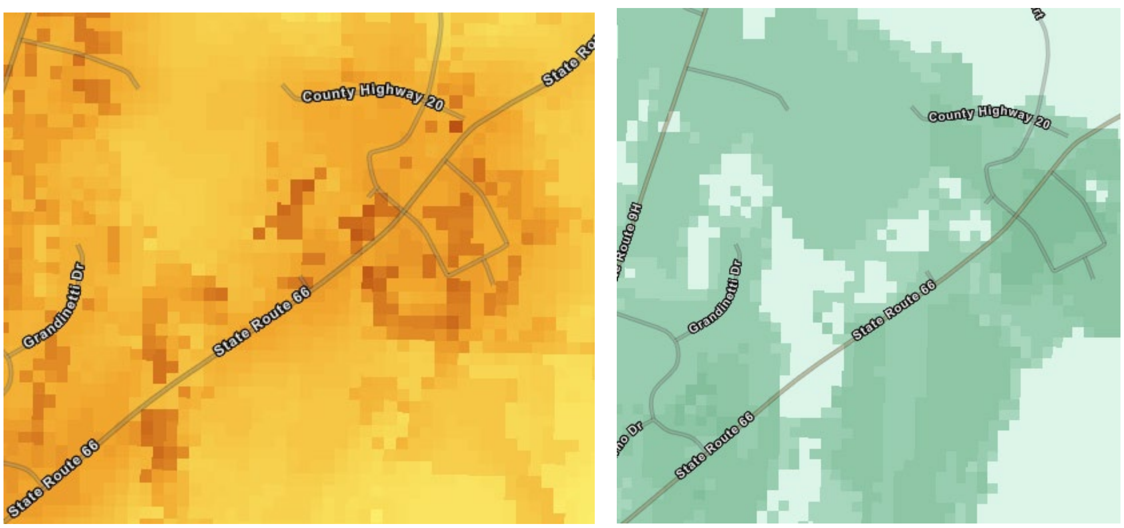
Project Description: The goal of this project is to locally eradicate cup plant, it is a high threat, prohibited Tier 2 species within the PRISM making it a high priority target. Manual and mechanical removals are the proposed approaches for this site. Brushcutters, spades, and grubbers (Top Dogs) are useful for this site. There is a variety of invasive species already at this site, however, within the work area there is staghorn sumac and a meadow of goldenrod species that will hopefully aid in native restoration at this site.

Project Significance:

The map on the left shows the comprehensive score of the ecological significance, risk of spread, and protected area status. This area is of low to moderate significance. The map on the right shows the ecological significance of the area, the creek itself is moderately significant but the land surrounding the creek is not ecologically significant. This site is prioritized solely due to the presence of the Tier 2 species. The site itself is of low significance within the context of the PRISM Framework of Response.



Figures 1 & 2: *Prioritization model and ecological significance maps of Mud Creek Conservation Area taken from the NYNHP Prioritization Mapper.*

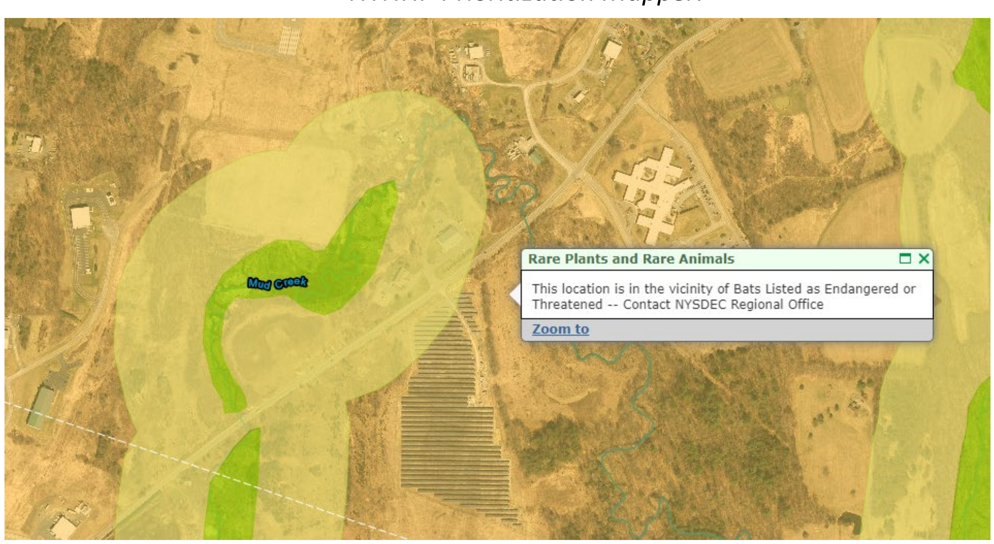


Figure 3*: Screenshot of Mud Creek taken from the NYSDEC Environmental Resource Mapper. Mud Creek is classified as a wetland, and the area is in the vicinity of bats listed as endangered or threatened.*

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Map: Develop a map of the response area that shows the geography and has the searched area, any iMapInvasives points, polygons and/or lines for presence or non-detection. Multiple maps may be added for multiple species or locations. All response actions should be uploaded to the CR-PRISM SharePoint Tracker and iMapInvasives.

***Figure 4:** Searched area and presence area for Cup-Plant at Mud Creek ELC, Year 1, 2023 June 1st.*

***Figure 5:** Searched area, presence area and treatment for Cup-Plant at Mud Creek ELC, Year 2, 2024 June 6th.*

***Figure 6:** Searched, presence, and treatment areas for Cup-Plant at Mud Creek ELC, Year 3, 2025 June 3rd*

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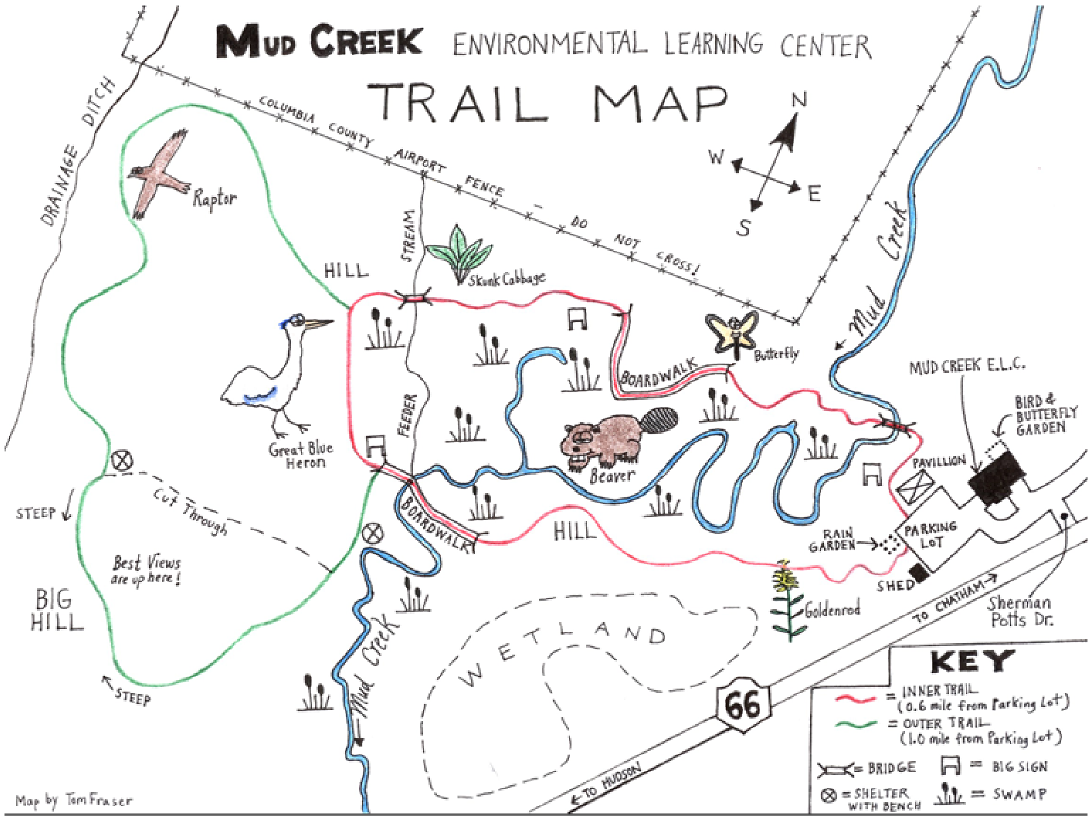

Figure 8: *Trail map of Mud Creek Conservation Area*

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Section 2: Implementation Summary

Response:

Manual and mechanical methods have been chosen for the Mud Creek Conservation Area work site. These methods were chosen because they were the most practical and effective options the CR-PRISM has to offer. Our target species for this area is Cup-Plant (Silphium perfoliatum). Cup-Plant is a Tier 2 species and has a high ecological threat ranking. Cup-Plant in Mud Creek is dense with a 60% estimated percent cover along with an infestation size of 0.085.

Management at this site consists of using brushcutters to reduce shoot biomass and root grubbing remaining stems. Post-treatment monitoring and continued evaluation will be conducted annually. Restoration will be considered for this site, likely using plants currently on site as the seed source.

Disposal and Disturbance: The first year of management, disposal consisted of creating brush piles due to the amount of biomass removed. Following years, disposal consists of leaving the roots to airdry by hanging them in trees and shrubs on site to prevent re-rooting. The level of anticipated disturbance is high due to using grubbing as the removal method. However, the soil is tamped down following removals, and restoration is being considered for this site.

Restoration: There is currently no planned active restoration for this site. There are native species on site, such as goldenrod that should fill in the disturbed area as it surrounds the entirety of this population.

Post-Monitoring: Monitoring will occur in the early summer to ensure action is taken prior to large amounts of biomass being produced. The PRISM Terrestrial Crew will monitor the site on an annual basis, early June is a great time to monitor. Each time the site is visited, the team should evaluate effectiveness of treatment the following year and make any necessary changes.

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Treatment, Post-Treatment (Monitoring), and Restoration Calendar: Briefly outline when response, post-treatment monitoring, restoration efforts, and possibly research efforts are anticipated to occur with a date range. When completed check the box next to the targeted date range with an initial.

	Year 1- 2023	**Year 2-** 2024	**Year 3-** 2025	**Year 4**	**Year 5**
Summer	☐ Initial Response (6/1/23, 7/20/23)	☐ Post Treatment Monitoring with Response (6/6/24)	☐Post Treatment Monitoring with Response (6/3/2025)	☐	☐
Early Autumn	☐ Post Treatment Monitoring with Response (8/3/23)			☐	☐
Late Autumn				☐	☐

Notes: Make notes as necessary and keep the documentation simple. Use plant phenology to determine ideal time for response actions and restoration efforts. Document anything that did not work with recommended adjustments in the post-season report.

Goal Progress: ☐ Goal Unlikely ☐ Regressing ☐ No Change ☒ Progressing ☐ Goal Met

Follow-up Plan: ☒ Further Treatment Planned ☒ Further Monitoring Planned ☐ Monitoring Phase Complete ☐ Further Management Not Planned ☐ Other: ____________

Native Species Recovery: ☐ Absent ☒ Sub-Dominant ☐ Dominant

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Section 3: Project Implementation - Year 1 (2023)

Treatment Schedule: Plan out when and how treatments will occur. Attach and reference separate spreadsheet if more space is needed for additional species. Include the Tier level & Threat ranking of each species.

Treatment Window (MM/DD/YY)	Target Species Common and Scientific Name	Tier & Threat Rank	Response Method	Size of Infestation (Acres)*	Percent Cover (%)	Species Abundance	Acreage Treated	Disposal Method
06/01/23	Cup-Plant (*Silphium perfoliatum*)	Tier 2, High	Manual	0.07 acres	75%	Dense	0.001 acres	Air Drying
7/20/23	Cup-Plant (*Silphium perfoliatum*)	Tier 2, High	Mechanical/ Manual	0.07 acres	75%	Dense	0.05 acres	Piled on site
08/03/23	Cup-Plant (*Silphium perfoliatum*)	Tier 2, High	Manual	0.07 acres	25%	Sparse	0.07 acres	Piled on site

*If infestation is linear, use miles to measure "size of infestation"

End-of-Year Summary:

Brush cutters and loppers proved to be effective towards removing the top growth of the cup-plant. Treatment started on June 1st, 2023; the crew met Leanna on site to discuss the history of the introduction of the plant. Most plants were removed during the second site visit, post-treatment monitoring occurred in August after some regrowth from the root balls.

Treatment method is to cut down plants to the crown with loppers and brush cutters. Then dig up root ball with a spade and grubbers. The main patch of the infestation was solarized by the Columbia Soil and Water Conservation District to minimize growth in that area.

Goal Progress: ☐ Goal Unlikely ☐ Regressing ☒ No Change ☐ Progressing ☐ Goal Met

Follow-up Plan: ☒ Further Treatment Planned ☒ Further Monitoring Planned ☐ Monitoring Phase Complete
☐ Further Management Not Planned ☐ Other: ____________

Native Species Recovery: ☐ Absent ☒ Sub-Dominant ☐ Dominant

Adjustments Needed:

Year 1 Notes:

Treatment should occur earlier in the season to prevent having to manage such a large amount of biomass that needed to be removed prior to the beginning of treatment of the root balls. Stems were found to have hairs that could irritate the skin of some people. Long sleeves are recommended for this site.

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Section 3: Project Implementation - Year 2 (2024)

Treatment Schedule: Plan out when and how treatments will occur. Attach and reference separate spreadsheet if more space is needed for additional species. Include the Tier level & Threat ranking of each species.

Treatment Window (MM/DD/YY)	Target Species Common and Scientific Name	Tier & Threat Rank	Response Method	Size of Infestation (Acres)*	Percent Cover (%)	Species Abundance	Acreage Treated	Disposal Method
06/06/24	Cup-Plant (*Silphium perfoliatum*)	Tier 2, High	Manual/ Mechanical	0.0294 acres	20%	Sparse	0.0294 acres	Left roots to air dry on site

*If infestation is linear, use miles to measure "size of infestation"

End-of-Year Summary:

Explain any successes, failures, or needed adjustments. Including restoration, missed treatments, not monitoring, etc.

Brush cutters were used to clear away other plants to be able to see and treat individual plants. Unfortunately, garlic mustard (*Alliaria petiolata*) filled in much of the area where the cup plant was treated last year. However, there was a significant reduction in cup plant density.

Tools used for removal included top dogs (similar to pick mattocks). Plants were much easier to manage, and removal went faster without needing to cut and pile above ground biomass. Continue treating in early summer, before the plants grow significantly.

Goal Progress: ☐ Goal Unlikely ☐ Regressing ☐ No Change ☒ Progressing ☐ Goal Met

Follow-up Plan: ☐ Further Treatment Planned ☒ Further Monitoring Planned ☐ Monitoring Phase Complete
☐ Further Management Not Planned ☐ Other: ____________

Native Species Recovery: ☐ Absent ☒ Sub-Dominant ☐ Dominant

Adjustments Needed:

Explain any changes to be made for future years and update treatment restoration and calendars.

*** Reminder:** if the project changes drastically (i.e., switch from manual control to chemical control) it may require a new SEQR review.

Year 2 Notes:

A variety of invasive species are prevalent on the property, so it is not a surprise that invasives filled in the disturbed area.

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Section 3: Project Implementation -Year 3 (2025)

Treatment Schedule: Plan out when and how treatments will occur. Attach and reference separate spreadsheet if more space is needed for additional species. Include the Tier level & Threat ranking of each species.

Treatment Window (MM/DD/YY)	Target Species Common and Scientific Name	Tier & Threat Rank	Response Method	Size of Infestation (Acres)*	Percent Cover (%)	Species Abundance	Acreage Treated	Disposal Method
06/03/2025	Cup-Plant (*Silphium perfoliatum)*	Tier 2, High	Manual/ Mechanical	0.085 acres	5%	Sparse	0.085 acres	Bag/ Trash

*If infestation is linear, use miles to measure "size of infestation"

End-of-Year Summary:

Explain any successes, failures, or needed adjustments. Including restoration, missed treatments, not monitoring, etc.
The primary method for removal of Cup-Plant was hand-grubbers and hand pulling in order to remove as much of the root as possible to prevent root sprouting. The abundance of cup-Plant has decreased from previous years' removal efforts.

Goal Progress: ☐ Goal Unlikely ☐ Regressing ☐ No Change ☒ Progressing ☐ Goal Met

Follow-up Plan:
☐ Further Treatment Planned ☒ Further Monitoring Planned ☐ Monitoring Phase Complete
☐ Further Management Not Planned ☐ Other: ____________

Native Species Recovery: ☐ Absent ☐ Sub-Dominant ☒ Dominant

Adjustments Needed:

Continue to manage this population via root grubbing.

Year 3 Notes:

A mix of invasive species present on the property, each with a low abundance, likely caused by the disturbance created through Cup-Plant removal efforts. Cup-Plant abundance lower than previous year but spread over a greater area.

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Section 3: Project Implementation -Year 4

Treatment Schedule: Plan out when and how treatments will occur. Attach and reference separate spreadsheet if more space is needed for additional species. Include the Tier level & Threat ranking of each species.

Treatment Window (MM/DD/YY)	Target Species Common and Scientific Name	Tier & Threat Rank	Response Method	Size of Infestation (Acres)*	Percent Cover (%)	Species Abundance	Acreage Treated	Disposal Method

*If infestation is linear, use miles to measure "size of infestation"

Integrated Pest Management Methods Deployed:

- **Manual**- the use of physical means to eliminate or reduce pest populations
  Cut, Girdle/Frill, Mow, Dig, Plow, Pull, Smother/Cover, Stump cut, Other (Describe)
- **Mechanical**- the use of mechanical means to eliminate or reduce pest populations
  Cut, Girdle/Frill, Mow, Dig, Plow, Pull, Excavate, Brush hog, Controlled burn, Weed torch, Other (Describe)
- **Chemical***- the use of pesticides to eradicate or limit the prevalence of unwanted pests.
  *Please include Chemical name(s) below
  Foliar spray, Stem injection, Cut-stump treatment, Wiper application, Basal bark application, Frill, Tree injection method, Soil Drench, Other (Describe)
- **Cultural****- the practice of modifying the growing environment to reduce the prevalence of unwanted pests.
  Mulching, Solarization, Thermal weed control, Prescribed burning, Water manipulation, Rotational grazing, Prevention programming, Reseeding/cover crop
- **Biological control*****- the use of a natural enemy or predator to control a pest.
  Please include the scientific name of the biological control released, number released, and the life stage released.

Percent Cover:
iMapInvasives Percent Cover Ranges: <5%, 5%-25%, 26%-50%, 51%-75%, 76%-100% or use a specific percentage

Distribution/Abundance:
Trace (single plant/clump), Sparse (scattered plants/clumps), Dense plants/clumps, Monoculture, Linearly scattered

End-of-Year Summary:

Explain any successes, failures, or needed adjustments. Including restoration, missed treatments, not monitoring, etc.

Goal Progress: ☐ Goal Unlikely ☐ Regressing ☐ No Change ☐ Progressing ☐ Goal Met

Follow-up Plan: ☐ Further Treatment Planned ☐ Further Monitoring Planned ☐ Monitoring Phase Complete ☐ Further Management Not Planned ☐ Other: ____________

Native Species Recovery: ☐ Absent ☐ Sub-Dominant ☐ Dominant

Adjustments Needed:

Explain any changes to be made for future years and update treatment restoration and calendars.

*** Reminder:** if the project changes drastically (i.e., switch from manual control to chemical control) it may require a new SEQR review.

Year 4 Notes:

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Section 3: Project Implementation -Year 5

Treatment Schedule: Plan out when and how treatments will occur. Attach and reference separate spreadsheet if more space is needed for additional species. Include the Tier level & Threat ranking of each species.

Treatment Window (MM/DD/YY)	Target Species Common and Scientific Name	Tier & Threat Rank	Response Method	Size of Infestation (Acres)*	Percent Cover (%)	Species Abundance	Acreage Treated	Disposal Method

*If infestation is linear, use miles to measure "size of infestation"

Integrated Pest Management Methods Deployed:

- **Manual**- the use of physical means to eliminate or reduce pest populations
  Cut, Girdle/Frill, Mow, Dig, Plow, Pull, Smother/Cover, Stump cut, Other (Describe)
- **Mechanical**- the use of mechanical means to eliminate or reduce pest populations
  Cut, Girdle/Frill, Mow, Dig, Plow, Pull, Excavate, Brush hog, Controlled burn, Weed torch, Other (Describe)
- **Chemical***- the use of pesticides to eradicate or limit the prevalence of unwanted pests.
  *Please include Chemical name(s) below
  Foliar spray, Stem injection, Cut-stump treatment, Wiper application, Basal bark application, Frill, Tree injection method, Soil Drench, Other (Describe)
- **Cultural****- the practice of modifying the growing environment to reduce the prevalence of unwanted pests.
  Mulching, Solarization, Thermal weed control, Prescribed burning, Water manipulation, Rotational grazing, Prevention programming, Reseeding/cover crop
- **Biological control*****- the use of a natural enemy or predator to control a pest.
  Please include the scientific name of the biological control released, number released, and the life stage released.

Percent Cover:
iMapInvasives Percent Cover Ranges: <5%, 5%-25%, 26%-50%, 51%-75%, 76%-100% or use a specific percentage

Distribution/Abundance:
Trace (single plant/clump), Sparse (scattered plants/clumps), Dense plants/clumps, Monoculture, Linearly scattered

End-of-Year Summary:

Explain any successes, failures, or needed adjustments. Including restoration, missed treatments, not monitoring, etc.

Goal Progress: ☐ Goal Unlikely ☐ Regressing ☐ No Change ☐ Progressing ☐ Goal Met

Follow-up Plan: ☐ Further Treatment Planned ☐ Further Monitoring Planned ☐ Monitoring Phase Complete ☐ Further Management Not Planned ☐ Other: ____________

Native Species Recovery: ☐ Absent ☐ Sub-Dominant ☐ Dominant

Adjustments Needed:

Explain any changes to be made for future years and update treatment restoration and calendars.

* **Reminder:** if the project changes drastically (i.e., switch from manual control to chemical control) it may require a new SEQR review.

Year 5 Notes:

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