Maine Natural Resource Conservation Program (MNRCP)

Restoration/Enhancement Work Plan Guidance

*April 2022*

**Introduction**

This document provides a detailed overview of the information that must be included in a Work Plan for Restoration and Enhancement projects under the Maine Natural Resource Conservation Program (MNRCP). Work Plans are required for all MNRCP-funded projects with a restoration or enhancement component. The guidance in this document is based on the U.S. Army Corps of Engineers 2020 New England District Compensatory Mitigation Standard Operating Procedures (a full copy of which can be found [online](https://www.nae.usace.army.mil/Missions/Regulatory/Mitigation/)). All sections (A-R) described below should be addressed in the Restoration/Enhancement Work Plan, or an explanation included as to why the section is not applicable.

Restoration and enhancement are the most common types of active mitigation carried out in MNRCP projects. Creation is another type of compensatory mitigation but is much less common and is generally less preferred than restoration. These guidelines specifically refer to restoration and enhancement projects, but they may be used for all three types of projects. Additional information may be necessary for creation projects.

**Restoration**, **enhancement, rehabilitation,** and **creation** as used by MNRCP are specifically defined regulatory terms. Restoration involves returning natural/historical conditions to a former aquatic habitat that has been degraded and no longer functions as an aquatic habitat. A typical example of wetland restoration is removing material (soil, rock, pavement, etc.) from a former wetland area and returning it to a natural condition that meets the jurisdictional parameters to be considered a wetland. Examples of stream restoration are dam removal, daylighting a piped stream, and removal of a concrete channel. Restoration results in a gain in resource acreage or linear feet. Restoration is the preferred form of compensatory mitigation funded through MNRCP, as it generally has the greatest likelihood of successfully replacing impacted aquatic resource extent and functions.

Enhancement/Rehabilitation is defined as restoring degraded functions of an existing aquatic resource. Degradation may result from partial filling that does not create upland, deliberate removal of woody species (natural changes such as flooding and subsequent demise of trees as a result of beaver activity is not degradation), partial draining, etc. Enhancement typically refers to improving one or two functions, while rehabilitation is intended to result in a general improvement in the suite of functions typically performed by the resource. Neither enhancement nor rehabilitation result in a gain in aquatic resource area (acreage or linear feet). Throughout this guidance document, the term “enhancement” is meant to encompass both “enhancement” and “rehabilitation.” Creation involves the transformation of upland to an aquatic resource such as wetland at a site where there is no evidence that it was previously aquatic habitat.

See the Additional References in Appendix C for further information.

**Resources covered by MNRCP** include freshwater wetlands, rivers, streams and brooks, lakes and ponds, inland and coastal waterfowl and wading bird habitats, vernal pools, vernal pool critical terrestrial habitat, intertidal/coastal wetlands, and marine/subtidal habitats (e.g., eelgrass).

Some sections of the Restoration/Enhancement Work Plan listed below may not be pertinent for a specific project. This should be stated in that section and the rationale for it not being applicable explained. For example, grading plans and information on topsoil may not be applicable for an enhancement project with no grading proposed.

Please provide MNRCP with a draft of the Work Plan as a MS Word document for review prior to finalizing the plan as a PDF. Review using Word and track changes is significantly easier for MNRCP reviewers. If necessary, maps and other appendices can be provided as a separate PDF file for the purposes of review.

Note that MNRCP Restoration Work Plans require review and approval by the Maine Department of Environmental Protection, the U.S. Army Corps of Engineers, and the MNRCP Interagency Review Team (IRT) prior to the implementation of restoration or enhancement work. By rule, the IRT requires a minimum 35-day review period to provide comments on proposed work plans. Please plan accordingly when drafting work plans and preparing for project implementation.

MNRCP ID \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| ***Maine Natural Resource Conservation Program******Restoration or Enhancement* Plan****for*****Fill in Project Name*** |
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|  |
| **Organization** |
| **Author and title** |
| Date |

**A. General Project Information**

|  |  |
| --- | --- |
| MNRCP Project Name: |  |
| MNRCP ID  | *Provided by MNRCP* |
| Location:  |  |
| MNRCP Project Summary: | *Provide a very brief overview of the MNRCP Project, including the goals of the restoration or enhancement project.* |
| Restoration Work Plan Title:  |  |
| Plan Preparer:  |  |
| Plan Date:  |  |
| Permit Number(s), *if applicable*\* |  |

**\* NOTE**: MNRCP projects may require a permit from the Maine Department of Environmental Protection, the U.S. Army Corps of Engineers, and/or your local municipality. Your Work Plan cannot be carried out without required permits. Please note that MNRCP restrictions may be more stringent than what is allowed by permit. It is highly recommended that applicants consult with MNRCP representatives prior to seeking permits for their work to assure that the proposed work meets both regulatory permit conditions and MNRCP requirements.

**B. Current (Baseline) Condition:** Please describe the original habitat types and the current habitat conditions of the MNRCP Project site as a whole, with particular attention to the following.

1. Site selection: Please include the following text in this section, then add a brief description of the attributes of this site that were considered during the review process: *MNRCP projects are selected based on a competitive grant application process wherein applicants must demonstrate that projects meet standard review criteria. Each project is reviewed and assessed by the MNRCP Interagency Review Team (IRT) based on its ability to meet mitigation program goals such as the practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.* Add a brief description of the project here.
2. Impacted resource(s): Describe the impacted resource(s) on the MNRCP Project site that will be restored or enhanced through this work, including the type of impact and acreage impacted. Label each area clearly and include a map showing the location of these areas.

If the impacted resource is a wetland, describe the wetland class(es) at the impact site(s) using the Cowardin, et al. (1979), wetland classification system (as is used in the National Wetlands Inventory (NWI) <http://www.fws.gov/wetlands/> ) and/or the hydrogeomorphic classification systems outlined by the US Army Corps of Engineers (<https://wetlands.el.erdc.dren.mil/pdfs/wrpde4.pdf>). *For example: The project site is an area within a scrub-shrub wetland (PSS1E) where gravel fill and debris have been dumped. The impacted area covers approximately 20,000 square feet*.

If the impacted resource is a river, stream or brook, provide linear feet impacted and average stream width. Describe the current conditions on site using the [USDA NRCS Stream Visual Assessment Protocol Version 2](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1043252.pdf) (SVAP2). A qualified aquatic/wetland scientist may be needed to document conditions. Describe the current impacts to the stream including impact type, impact on flow, gradient, sinuosity, fish or invertebrate populations, etc. *For example: stream was ditched along a 300’ foot length with an average width of 25’and riparian vegetation was removed, resulting in straightening and widening of the stream bed, decreased flow rate, disconnection from its floodplain, removal of riffles and pools, and warming of the stream.*

If the impacted resource is a vernal pool, describe the vernal pool(s) origin (natural or man-made), size, vegetation, type of impact, size of impact area, hydroperiod (the timing and duration of seasonal inundation and drying in a typical year, which influences species composition and abundance), and any available information on pool productivity (e.g., egg mass count or other information on species use). Although the pool depression may contain limited or no woody vegetation, a surrounding intact forested canopy cover provides shading, leaf litter for nutrients, and woody debris for protection and egg attachment sites within the pool. Removal of the shade of the tree canopy can heat up the air, soil, and water in the pool, change the period of time that water remains in the pool, and influence which species can survive there.

1. Current wetland/resource functions and values on site: Wetland functions and values may be curtailed by the current impact(s) or altered because of changes caused by the impact(s), such as tidal or stream flow restriction. When performing functions and values assessments, include additional information to support the rationale for how this resource is providing the stated functions and values. Simply stating “wildlife habitat” or “fishery habitat” is inadequate. Provide indicator species for the habitat type such as forest-dwelling migratory birds or spotted salamanders and/or wood frogs for a vernal pool. Wetland functions and values should be assessed using the U.S. Army Corps of Engineers’ Highway Methodology Workbook Supplement. It may be necessary to work with a qualified professional to accurately assess the functions and values. The Highway Methodology Workbook Supplement is available online at:

<https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/HighwaySupplement6Apr2015.pdf> Note, if an MNAP ecologist visited the site, the current wetland functions and values are likely included in the MNAP report.

1. Reference site(s): It is necessary to identify an unimpaired or minimally impaired resource of similar type within the same landscape setting (HGM type) to use as a comparison. The project should seek to duplicate the features of the reference resources. Restored areas should have variability (elevation and size) similar to the reference area. When practicable, they should take into account the expected stages of aquatic resource development. At least one reference site adjacent to or near each restoration/enhancement site shall be described and measured for characters important for the performance standards, so that it can be compared to the restoration/enhancement site (i.e., what is the percent cover or stem density of the reference site?). Multiple reference sites may be needed as each type of resource restored or enhanced (i.e., forested wetland, emergent wetland) should have its own reference site. Reference sites should be shown on a locus map.
2. Existing wildlife use: Include information on any probable state and federal endangered species and/or indicator species for the habitat type such as wood frogs, Blandings turtles, bird species, etc. found on the site, as well any information on other wildlife use of the site.
3. Existing soil conditions: Describe soil types present on the site, degree of compaction, etc. NRCS has soil survey data online: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>.
A list of the availability of the Maine soil surveys online can be found at : <http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=ME>
4. Existing vegetation in impacted area(s): Describe the existing vegetation on the site including a list of species, dominant species, density, community types, and community structure. Specifically note the presence and extent of any invasive species.

**C. Restoration Area(s):** Provide the following for each area where restoration and/or enhancement will take place.

1. Restoration and/or Enhancement Activities: Describe the type of activities, method, purpose and acreage proposed at each site. Include Latitude/Longitude of restoration/enhancement area(s) and a detailed map of each area.
	1. Wetland Classes: If wetland restoration/enhancement is planned, describe the wetland classes (e.g., Cowardin and/or hydrogeomorphic classification) that are intended/expected at each site when work is complete.
	2. Stream Characteristics: If stream restoration/enhancement is planned, describe the nature of the restoration/enhancement including length and width of stream included in the work, nature of banks, normal seasonal flows, gradient, sinuosity, bed load, lengths of riffles and pools, and adjacent landscape. Describe the stream condition that is expected (as determined using SVAP2) at the site when the work is complete.
	3. Description of any other MNRCP resources to be included in restoration/enhancement work.
2. Functions and Values: Describe how functions and values are expected to be improved at each site as a result of the restoration or enhancement activities. Compare this to the current wetland functions and values at the site (from section B.2 above). Wetland functions and values should be assessed using the [U.S. Army Corps of Engineers’ Highway Methodology Workbook Supplement](https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/HighwaySupplement6Apr2015.pdf). For stream projects, proposed improvements in stream condition should be explained using the [USDA NRCS Stream Visual Assessment Protocol Version 2](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1043252.pdf) (SVAP2). It may be necessary to work with a qualified professional to accurately assess/forecast the proposed improvements in functions and values/conditions.
3. Target fish and/or wildlife species: Describe species of particular interest in this plan. This is of particular importance if the work involves vernal pools or streams; however, there may be other state and federal endangered species and/or indicator species for the proposed habitat type such as wood frogs, Blandings turtles, bird species, etc.
4. Design Constraints: Frequently, restoration/enhancement designs are constrained by landscape features or public issues that control or otherwise influence the design and/or monitoring and remediation of the mitigation area. Such constraints need to be explained in detail. If there are no constraints (rare), that should be stated in the plan. *For example, use of herbicides and/or biological controls may require a state permit or encountering ledge may require plan changes.*
5. Construction oversight: To ensure that someone with expertise in the specific aquatic resource(s) being restored/enhanced provides construction oversight for the project, **the following language should be included in the narrative portion of the restoration plan:**

“*A wetland scientist/coastal habitat scientist/stream scientist/professional engineer* ***[choose appropriate for project]*** *shall be on-site to monitor construction of the aquatic resource restoration area(s) for compliance with the Restoration Work Plan and to make adjustments when appropriate to meet restoration goals.”*

1. Project construction timing: Timing may be influenced by the growing season, availability of equipment or materials, requirements of any permits, etc.
2. Responsible parties for all aspects of project: Identify all parties responsible and their roles for the implementation, performance, and long-term management if permanent preservation is not part of the overall MNRCP project.
3. Threat to Aircraft: Is there any potential to attract waterfowl and other bird species that might pose a threat to aircraft? Restoration/enhancement sites near airports are of concern to the Federal Aviation Administration. Indicate how far the nearest airport is from the site.
4. Permitting: Will local, state, or federal permits be required to carry out the restoration plan? If you are unsure whether permits will be required for the work, contact the Maine DEP, U.S. Army Corps of Engineers, and your local Code Enforcement Officer. Please also coordinate your permitting effort with MNRCP as MNRCP project requirements may differ from the standards allowed by permit.

**D. Hydrology**

1. Adequate hydrology: Supply evidence of adequate hydrology to support the desired resource. Reestablishment of natural hydrology is encouraged; active engineered devices or structures are discouraged. When natural hydrology is not feasible, consider passive structures to sustain the desired hydroperiod over the long term. Avoid designing a system that depends on water-control structures or other infrastructure that must be maintained in perpetuity in order to provide the necessary hydrology. Emphasis should be on establishing naturally variable hydrology. This includes fluctuations in water flow, depth, duration, and/or frequency. Hydrology within the project site should be comparable to a reference aquatic resource within the same landscape setting (HGM type).
2. Water source(s): Indicate in the plan if the water source is groundwater, surface runoff, precipitation, lake and/or stream overflow, tidal, and/or springs and seeps. Provide substantiation (e.g., well data, adjacent wetland conditions, stream gauge data, precipitation data).
3. Vernal pools: Hydrology is a critical component of vernal pool restoration. Too little water and the pool will dry to quickly not allowing vernal pool species to complete their life cycles, too much water and the pool may hold standing water year-round which provides habitat for wildlife species that prey on obligate vernal pool species. It is recommended to engage a qualified professional if attempting vernal pool restoration or creation.

**E. Grading Plan**

1. Plan View: Please provide plans for the restoration/enhancement areas that meet the following specifications.

* 1. Existing grade elevations and proposed grading plans.
	2. Microtopography. Natural wetland systems, particularly those with trees and/or shrubs, typically have an intricate pattern of topographic relief. Where microtopographic variation is planned (such as in a forested wetland), the proposed maximum differences in elevation should be specified. The plan does not need to show the locations of each pit and mound as long as a typical cross-section and approximate number of pits and mounds is given for each zone. Restored areas should have variability (elevational and size) similar to that found in a similar natural area or a suitable reference area. For streams, some of the relevant information includes planform geometry, channel form, watershed size, design discharge, length, sinuosity, riffles/pools, and floodplain.
	3. Scale is in the range of 1”=20’ to 1”=100’.
	4. All items on the plan are legible. Electronic documents of suitable quality are encouraged.
	5. Plans have a bar scale.
	6. The drawings show the access for maintenance and monitoring.
1. Cross Sections: Include representative cross-sections showing the existing and proposed grading plan, expected range of shallow groundwater table elevations or surface water level consistently expected. Cross-sections should include key features such as upland islands and pools. They should extend beyond the restoration/enhancement site into adjacent wetlands and uplands.
2. Soil Compaction: Soil compaction by heavy machinery may adversely affect plantings and/or may result in perching of water. Therefore, efforts should be made to minimize soil compaction area during grading of the restoration/enhancement site. If use of heavy machinery cannot be avoided, compaction must be addressed by disking or some other treatment to loosen the soil surface. Finer grained soils are more susceptible to compaction than more coarsely grained soils, so clayey soils should not be worked at all except in extremely dry condition. Similar consideration should be given while spreading the topsoil.
3. Professional Assistance – It is recommended to engage a contractor and/or consultant in the planning phase of your project to make sure your project is designed appropriately.

**F. Topsoil or Substrate**

1. Proposed source of topsoil or substrate material: Topsoil and substrate material for restoration/enhancement sites can be a source of invasive species seeds. Provide information on the source and the likelihood that such seeds could be in the material.
2. Depth: Twelve or more inches of natural or manmade topsoil should be present in all freshwater wetland restoration and some enhancement areas. Exceptions might be permanently or semi-permanently inundated or saturated areas and turtle nesting areas. Rationale for less than 12 inches should be provided. Manmade topsoil shall consist of a mixture of equal volumes of organic and mineral materials. Well-decomposed clean leaf compost is the preferred soil amendment to achieve these standards. Note that “clean” refers both to a negligible amount of physical contaminants such as plastic and to the lack of chemical contaminants that might pose a hazard to plants or animals. If other soil amendments are more readily available than clean leaf compost, they can be used to meet the requirement for the appropriate percent organic carbon content. Note, however, that compost or other organic matter should be clean and free of weed seeds, specifically the seeds of any invasive species. Commercial peat is not recommended for soil amendments as its harvesting methods are generally destructive to wetlands. Caution should be used when using non-commercial peat salvaged from project impact sites as the chemical composition of that material may not be adequately buffered against phytotoxic levels of pH. Note that the term “loam” that is frequently used for the material spread on a project site after subsoil grading is a landscaping term. In soil science, the term refers to a specific texture of soil comprised of specific amounts of sand, silt, and clay particles. The landscaping term is not a scientific term and should be avoided.
3. Appropriate organic content of topsoil: Natural topsoil proposed to be used for the restoration/ enhancement of wetlands should consist of at least 4-12% organic carbon content (by weight) (or 9-21% organic matter content), **with the percentage specified**. Manmade topsoil used for the restoration/enhancement of wetlands should consist of a mixture of equal volumes of organic and mineral materials. This may be accomplished by adding a specific depth of organic material and disking it in to twice that depth. The actual measured organic content of the topsoil used should be provided in the as-built plan submitted with the first monitoring report. Manufactured soil may also have to be tested for contaminants.
4. Storage of soil/substrate materials: All materials stockpiled on site must be maintained in such a way as to avoid erosion and sedimentation. Measures should be taken to maintain moisture in the soil. Avoid stockpiling compost organics in piles over 4 feet in height.
5. Tidal Wetlands: There is no recommended standard for substrate organic content in tidal wetlands, but it is recommended to match that of a nearby reference tidal wetland.
6. Vernal Pools: Appropriate amounts of leaf litter and other decaying organic materials are needed to provide adequate habitat in the pool(s). Source and location should be specified.

**G. Erosion Controls**

1. Erosion controls such as silt fence or hay bales may be appropriate around work areas.
2. Stockpiles should be covered with a material that prevents erosion (tarps, erosion control mat, straw and temporary seed, depending on size and duration of storage)
3. The protection measures listed above should be inspected and repaired regularly (weekly), as well as prior to (to the extent possible) and after storm events.
4. The erosion control removal deadline should be specified in plan. Removal should be as soon as the site is stable but before the end of the monitoring period.

**H. Planting Plan**

Planting and/or seeding are generally appropriate for a restoration/enhancement site, as determined through consultation with the MNRCP. When planting is proposed as part of the plan, the guidelines below should be followed.

1. Scientific Names: All plans and supporting documents should use scientific names. The use of scientific names ensures that all involved have the correct understanding of the species of plants proposed to be planted or seeded.
2. Native Plant Materials: Proposed plant materials should be native and indigenous to the area of the site(s). Invasive species, non-native species, and/or cultivars should be avoided. Although the use of non-native species is typically discouraged, there are situations where such use may be appropriate such as using *Secale cereale* (Annual Rye) to quickly stabilize a site. The species should be noted and the reason for their use explained. No cultivars shall be used. Beware of stock identified as a native species which is actually a cultivar or non-native species (e.g., there have been numerous instances around New England of *Alnus incana* or *Alnus rugosa* labels appearing on seedlings of non-native *Alnus glutinosa*). Non-native or otherwise unacceptable species are included in the Corps’ 2016 Mitigation Guidance and are not to be included as seed or planting stock in the overall project.

The following stipulation must be included in the Restoration Work Plan, either in the plan view or in the narrative portion of the plan:

*To reduce the immediate threat and minimize the long-term potential of degradation, the species included in the U.S. Army Corps of Engineers “Invasive and Other Unacceptable Plant Species” list in the 2016 Mitigation Guidance, as well as the species listed on the Maine Department of Agriculture, Conservation, and Forestry’s list of Invasive Terrestrial Plants, shall not be included as planting stock in the overall project. Only plant materials native and indigenous to the region shall be used (with the exception of* ***[specify]****). Species not specified in the plan shall not be used without prior written approval from MNRCP.*

1. Community classification: Vegetation community types or zones should be classified in accordance with Cowardin, et al. (1979) or other similar classification system. If another classification system is used, an explanation of terms should be included.
2. Plan view drawings: A plan view drawing should show where the various species are proposed to be planted. Since showing each individual plant is neither practical nor realistic, this may be illustrated with areas of uniform species composition and the number of plants or rate of seeding within the polygon. The scale should be in the range of 1”=20’ to 1”=100’, depending on the size of the site
3. Cross-section plans: Cross-sectional drawings should include identification of vegetative community zones (e.g., forested, shrub swamp, etc.). This can be combined with the plans required for grading if they are not too complex.
4. Wetland zones: More than 50% of the plantings proposed in each zone should be structural determinants for the community type designated for that zone. Although the prevailing hydrology will ultimately influence the type of wetland that will develop, plantings “jump start” the project. When determining species to plant, considerations should include the tendency of some species to volunteer promptly whereas others may take years to move into a site. Determine whether it is preferable to include rapidly establishing species to help prevent invasive species problems or to emphasize planting species unlikely to “volunteer” during the monitoring period.
5. Woody stock: Any woody stock proposed should be planted in densities not less than 600 trees and shrubs per acre, including at least 400 trees per acre in forested cover types. Woody planting densities may require adjustment depending upon the goals of the Restoration Work Plan and the ‘reference wetland’ used to develop the habitat goals. For example, if the primary goal for a particular creation site is flood storage and there is minimal need for wildlife habitat but there is interest in developing a woody component in the flood storage area, the density may be reduced. Also, if the wetland type desired is a dense thicket, the density may need to be increased.
6. Herbaceous stock: Where uniform coverage is anticipated, herbaceous stock should be proposed to be planted in densities not less than the equivalent of 3 feet on center for species which spread with underground rhizomes; 2 feet on center for species which form clumps.
7. Seed mix: The list of species proposed in seed mixes should not include any invasive or unacceptable species. Similarly, non-native genotypes and cultivars should not be used.
8. Relocation of plantings: Plantings may be relocated when appropriate. The following stipulation shall be included in the Restoration Work Plan, either in the drawings or in the narrative portion of the plan:

*During planting, a qualified wetland professional may relocate up to 50 percent of the plants in each community type if as-built site conditions would pose an unreasonable threat to the survival of plantings installed according to the Restoration Work Plan. The plantings shall be relocated to locations with suitable hydrology and soils and where appropriate structural context with other plantings can be maintained.*

1. Irrigation: Irrigation is solely a temporary measure to enhance the success of vegetation establishment, not to provide hydrology. The use of irrigation for woody plantings should be considered for the first one or two growing seasons after planting due to the unpredictability of short-term local hydrologic conditions and the need for additional care to establish new plantings. For small sites, hand watering may be possible over a short period of time to help planted woody species become established. Irrigation equipment (e.g., pipes, pumps, sprinklers) is not recommended. However, if approved, equipment must be removed and irrigation discontinued no later than the end of the second growing season unless the MNRCP concurs with extended irrigation. In this situation, the monitoring period shall be extended an equivalent time period.
2. Use of Mulch: The use of mulch around woody plantings is strongly encouraged, and may be required, to reduce the need for irrigation and to keep down herbaceous vegetation in the immediate vicinity of each plant for a couple of years. There are at least two methods available: biodegradable plastic or fiber (which should be stapled or staked to the ground) or organic mulch. Note that organic mulch is not considered to be part of the organic content of the topsoil and it should not be used in locations that will be inundated as it may float away. Suggested specifications for organic mulching are as follows:
3. Mulch balled and burlaped or container-grown trees and shrubs in a 3' diameter circle approximately 2" deep.
4. Mulch bare-root woody planting in an 18" diameter circle approximately 2" deep.
5. Tidal Wetlands: Planting zones should be based on species requirements and a tidal datum. Each species must be planted at the appropriate elevation for that species and at the proper depth. Following grading, a survey shall be conducted to determine if supplemental backfill materials need to be placed to achieve required elevations for planting. If necessary, supplemental backfill shall be applied and then allowed to settle for a minimum of six tidal cycles prior to planting.

The elevation of low marsh should be identified and considered in the design and should be provided in the plan. Low marsh plants should be planted between mean tide level and mean high water. High marsh plants should be planted between mean high water and spring high water. Salt hardened plants are most likely to survive. Plant storage on site should be kept short (less than 2 weeks). Planting densely (i.e., on 12 inch centers) will encourage the site to provide habitat and some water quality functions more quickly. A nitrogen-rich slow-release fertilizer may be added to each planting hole prior to closing. Salt marsh cordgrass (*Spartina alterniflora*) is shade intolerant, so it should not be planted in shady areas or, if a Restoration Work Plan involves planting a riparian buffer, trees should not be planted within 20 feet of a salt marsh restoration area. Additionally, salt marsh cordgrass is recommended to be planted on 18-inch centers, 2 culms per hole. Also, in areas with geese, a goose exclusion system is very important during the plant establishment period.

If planting of eelgrass is proposed, contact MNRCP for additional guidelines.

1. Vernal pools: Adequate shade is essential for vernal pool habitat. Describe existing shade species and specify if plantings will be needed to provide the necessary shade to the pool. There also should be adequate places for attachment of egg masses for vernal pool species. Typically, these are the woody stems of shrubs or woody debris. Explain and describe proposed attachment provisions.
2. Stream banks: Adequate shade and streambank stabilization are essential for stream habitats. Describe plans to ensure vigorous vegetative cover in any streamside environments. Fast growing, native woody vegetation should be used in any streamside plantings.
3. **Coarse Woody Debris and Other Features**

Coarse woody debris includes such materials as logs (ideally, a mix of hardwoods for longevity and softwoods), stumps, smaller branches, and standing snags but not woodchips or mulch made from wood. Placement of this material is generally inappropriate in tidal or frequently flooded environments, and may not be appropriate for some herbaceous systems. As much as possible, these materials will be in various stages of decomposition. Where floodwaters are a factor, it may be practical to anchor or partially bury snags and other larger components of woody debris.

When restoration/enhancement includes a component of forested or scrub-shrub habitat, the design should include plans for a continuum of coarse woody debris, including snags (standing dead trees). This continuum should include a full range of sizes, including small twigs and brush, not merely larger logs, stumps, and snags. Woody debris also plays an important role in vernal pool habitat by providing egg mass attachment sites in the pool basin and terrestrial refuges in the adjacent terrestrial habitat.

Frequently the inclusion of scattered various sized boulders, as well as woody debris, is an appropriate method of increasing structure and habitat in a site. NOTE: if not properly screened by a wetland scientist, such debris can be a source of invasive species.

Where appropriate, the following language should be included in the Restoration Work Plan, either in the drawings or in the narrative portion of the plan:

*A supply of dead and dying woody debris shall cover at least 4% of the ground throughout the project site after the completion of construction of the project site. These materials should not include invasive species.*

**J. Invasive and Noxious Species**

Soils disturbed by projects are susceptible to colonization by invasive species. Invasion on exposed mineral soils may result from excavation or filling. In addition, construction equipment can be a source of contamination and should be thoroughly cleaned prior to arrival on the project site.

Because of the pervasiveness of invasive species in New England and the damage they do to aquatic resources, the Restoration Work Plan must include an Invasive Species Control Plan (ISCP). More information on ISCPs is available on New England District’s Regulatory webpage - <http://www.nae.usace.army.mil/Portals/74/docs/regulatory/InvasiveSpecies/ISCPGuidance.pdf>.

The ISCP should include:

1. Risks: Discuss the risk of colonization by invasive species (plant and/or animal). The discussion of risk should include an assessment of the potential for invasion of the wetland by the species listed below or other identified problematic species specific to this project or site. The assessment of risk should consider the local and regional backdrop of invasive species, the potential mechanisms for the spread of invasives (e.g., contaminated equipment and machinery), the potential virulence and responsiveness to control of the species.
2. Constraints: Identify regulatory and ecological constraints that influence the design of any plan to control invasive plants and animals by biological, mechanical, or chemical measures. For example, if a state requires a permit for use of herbicide, this will be a factor in developing a plan to control an invasive plant species. If there are no constraints, this should be stated.
3. Controls: Describe the strategies to prevent the introduction of invasives and to recognize and eradicate or control the degradation of the project site by invasive or non-native plant species. See the Corps website for information on controlling these species. <http://www.nae.usace.army.mil/Missions/Regulatory/InvasiveSpecies.aspx>

The ISCP should address a full range of practicable measures to minimize threats to wetlands as well as all associated buffers or other habitats. The ISCP should consider traditional control methods including: mechanical (pulling, mowing, or excavating on-site), chemical (herbicides), and biological (planting fast-growing trees and shrubs for shading or releasing herbivorous insects). None of the species included in the U.S. Army Corps of Engineers’ list of “Invasive and Other Unacceptable Plant Species” (Appendix K of the [2020 Compensatory Mitigation Standard Operating Procedures](https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Mitigation/Compensatory-Mitigation-SOP-2020.pdf?ver=EWhCrK70ZfmPr--8x0K5Jg%3d%3d)) or Maine DACF’s Advisory List of Invasive Plants should be planted anywhere on the project site. <https://www.maine.gov/dacf/mnap/features/invasive_plants/invsheets.htm>

Tidal Wetlands: Along salt marshes, be especially alert to the project's influence on freshwater runoff. The potential for establishment of *Phragmites australis* is an important consideration in the design of tidal wetlands. Selected backfill material should be free of seed and vegetative propagules of *Phragmites*. Frequently, *Phragmites australis* invasion is an unanticipated consequence of freshwater intrusion into the salt marsh. It should also be noted that, although relatively rare, there are populations of native *Phragmites australis* (*P.a.* ssp. *Americanus* or *P. americanus* per some botanists) throughout New England and these plants should be conserved, rather than controlled (<https://gobotany.nativeplanttrust.org/species/phragmites/americanus/>).

Eelgrass habitat: In the case of eelgrass (*Zostera marina*) habitat, non-native species can negatively impact the establishment and persistence of restoration beds through herbivory, encrusting growth on shoots, physical disturbance, etc. Common invasive species in these habitats include green crabs, mute swans, colonial tunicates, and bryozoans (Williams 2007).

**K. Off-Road Vehicle Use**

1. Current off-road vehicle use: Describe any off-road vehicle use in immediate vicinity
2. Control plan: If off-road vehicle use is affecting the project site, describe control measures that will be taken.

**L. Notification of Construction Completion**

The following language, shown in italics, shall be included in the Restoration Work Plan. See Appendix A for a Work Completion Form Template. This template may be attached to the Work Plan as appropriate.

*Within 60 days of completing a project that includes restoration, enhancement or creation, the project sponsor will submit to the MNRCP a report specifying the date of completion of the restoration/enhancement work. The report shall include a description of the work done, when it was completed, and photographs of the site before, during and after completion.*

*If restoration or enhancement is initiated in, or continues throughout the year, but is not completed by December 31 of any given year, the project sponsor will provide the MNRCP with a letter outlining the date mitigation work began, the progress as of December 31, and the timeframe for completion. The letter will be sent no later than January 31 of the next year.*

**M. Performance Standards**

Specific performance standards must be included in the Restoration Work Plan. The performance standards are ecologically based standards that will be used to assess whether the project is achieving its goals and objectives. Performance standards should be based on attributes that are objective and verifiable. They must be clear, concise, specific, measurable, achievable, relevant, and time specific. The goal is for the mitigation site to trend toward the reference site, therefore, performance standards should compare at least some aspects of the project site to the identified reference site(s). MNRCP suggests providing specific metrics for at least two of the five years of monitoring, e.g., metrics to reach at Year 3 and Year 5, although yearly metrics can also be listed for each performance standard, if desired.

Below are EXAMPLES of specific performance standards. Performance standards included in your plan ***should be modified as appropriate for the project***.

Not all example performance standards listed below will be appropriate to every project. Similarly, additional performance standards not listed below may be appropriate for the project and may be added. MNRCP generally recommends between 4-7 performance standards.

***Performance Standard Examples***
*(Note, suggested monitoring ideas included below are NOT to be included in actual performance standards – rather, they are provided for reference and could/should be moved to the Monitoring section of the work plan.)*

1. No erosion is observed on slopes, soils, substrates, and constructed features within and adjacent to the restoration/enhancement site(s).

 [Monitoring idea: photo documentation including after storm events if possible.]

1. (#s based on reference site) Percent cover of non-invasive plants exceeds 50% by Year 3, and 80% in Year 5, in each designed/target vegetation zone and for the site overall, excluding any planned open water areas. (Alternatively, a similar standard could use stem density -*based on reference site*- instead of percent cover: e.g., Stem density in wetland restoration areas exceeds 500 stems/acre, of which at least 350 stems/acre are hydrophytic species. Only stems greater than 18” in height will be counted toward this standard.)

[Monitoring idea: establish transects through each vegetation zone area, estimating percent cover class of each species forming more than 5% cover within evenly spaced meter-square plots, and overall total percent cover of non-invasive plants.]

1. The restoration area(s) contain at least 60% cover by plant species *consistent with the target wetland type(s)*, by Year 3. I.e., tree species are growing in target forested areas, shrub species are growing in target scrub-shrub areas, etc.

[Monitoring idea: use sampling (transects or quadrats) to measure average percent cover, or perform field delineation and detailed description of vegetative zones (e.g., listing top 10 species and their % cover class within separate zones spatially mapped over the target areas), depending upon the size and complexity of the site. Larger sites may require a sampling approach whereas it may be possible to completely survey smaller areas.]

1. Invasive plants do not exceed 10% cover across the site and no monotypic stands greater than 500 SF in size are present. Percent cover of invasive plants is decreasing over time. If invasive plants exist at Year 5, a long-term plan and resources are in place to address them.
2. The site has the necessary hydrologic performance/hydroperiod to support the designed wetland type when compared to the reference wetland(s). [Add specifics, e.g., Wetland restoration areas exhibit at least one primary indicator of wetland hydrology, or two secondary indicators, as defined in the Army Corps of Engineers Regional Supplement to the Wetland Delineation Manual. Or, no areas of permanent standing water are observed on the site.]

[Monitoring ideas: data to support this standard could include wetland delineation results, well data measured regularly during the growing season, continuous data logger data upstream/downstream, or other substantial dataset appropriate for the site. Areas that are too wet or too dry should be identified each year and suggested corrective measures implemented.]

1. The soils within the wetland restoration area(s) exhibit at least one indicator of hydric soil as defined by the Army Corps of Engineers Regional Supplement to the Wetland Delineation Manual by Year 5. (Alternatively: Soil in the wetland restoration areas has documented evidence of redoxymorphic features developing by the third year (Year 3) after construction.)
2. Channel dimensions and grade in the restored stream reach will be comparable to the reference reach by Year 3, as measured by topographic cross sections and a longitudinal profile. (Include specific measurements from the reference reach as quantifiable targets.)
3. There will be an increase in average salinity upstream of the restoration site: salinity levels will increase compared to pre-construction measurements and be within 20% of the reference site salinity levels starting at Year 2 and continuing through the monitoring period. (Include specific measurements from the reference reach as quantifiable targets.)
4. The existing dam impoundment currently classified as PUB will transition to at least XX% (XX acres) riverine systems and at least XX acres total of PFO, PSS and PEM within the restoration area by Year 3, as defined by the Cowardin classification.

[Monitoring idea: This could be measured via annual vegetation transects and a wetland delineation in Year 3.]

1. By Year 3, site will have documented use by breeding populations of target species: spotted salamanders and wood frogs.

**N. Long-Term Monitoring Plan**

***Monitoring Methods***

Describe the methods that will be used to monitor the site(s) after implementation of the restoration or enhancement work. Monitoring visits should include a meander survey to perform an overall, qualitative assessment of the site and should include photographs of the site. Photos are required, including of the reference site; permanent photo stations are highly recommended so that annual changes in site conditions can be observed. Quantitative monitoring methods are also highly recommended and should address the performance standards of the project (e.g., stem counts, transects, quadrats, egg mass counts, water salinity measurements, bankfull width measurements, fish surveys, etc.). Specific monitoring methods should be designed to address the performance standards developed and approved for your site. For example, for a performance standard of 80% areal cover by non-invasive hydrophytes, monitoring methods should be proposed that will allow for the assessment of that standard (e.g., transects with equally spaced m2 vegetation point-intercept plots). A wetland delineation may also be required to determine if the site is on track to meet the performance standards, as well as in Year 5 to document areas that have effectively been restored to wetland condition.

The following language, shown in italics below (and edited to fit the project), should be included in this section. If the applicant has concerns with any of the requirements included below, please contact MNRCP to discuss potential deviations from these standards. Additional language on the specific monitoring methods should also be included.

*For each of the first five**full growing seasons following construction of the restoration/enhancement site(s), the site(s) will be monitored and annual monitoring reports submitted. Observations will occur at least two times during the growing season – in late spring/early summer and again in late summer/early fall. The first year of monitoring will be during the first full growing season after completion of construction and planting. For this requirement, a growing season starts no later than May 31. However, if there are problems that need to be addressed and if the measures to correct them require prior approval from the MNRCP, the project sponsor will contact the MNRCP as soon as the need for corrective action is discovered.*

***Monitoring Reports***

Annual monitoring reports should be concise and effectively provide the information necessary to assess the status of the restoration/enhancement project. Reports should provide information necessary to describe the site conditions and whether the project is meeting the performance standards. The information required should be provided in the Monitoring Report Form in Appendix A of this guidance, based on the US Army Corps of Engineers Regulatory Guidance Letter 08-03. If the applicant has concerns with any of the requirements included below, please contact MNRCP to discuss potential deviations from these standards. The following language, shown in italics, should be included in the Restoration Work Plan.

*Each annual monitoring report, in the format provided in the Maine Natural Resource Conservation Program Restoration Work Plan Guidance, will be submitted to MNRCP, no later than December 31 of the year being monitored. The reports will address the following performance standards in the summary data section and will address the additional items noted in the monitoring report requirements, in the appropriate section. The reports will also include the monitoring-report appendices. Failure to perform the monitoring and submit monitoring reports may jeopardize funding of future projects from MNRCP.*

**O. Adaptive Management Plan (Contingency)**

Provide a management strategy to address unforeseen changes in site conditions or other components of the project, including the party or parties responsible for implementing adaptive management. The Adaptive Management Plan will guide decisions for revising this work plan and implementing measures to address both foreseeable and unforeseen circumstances that adversely affect project success.

Describe the procedures to be followed should unforeseen site conditions or circumstances prevent the site from meeting the performance standards described above. The plan should include specific measures that will be taken if one or more of the performances standards is not being met. Examples of such situations include, but are not limited to, poor seed catch, poor plant survival, no hydric soil development, no documented use by target species, etc. Additional situations that are often beyond the applicant’s control, include unanticipated beaver activity, disruption of the groundwater by nearby blasting or other construction in the vicinity, unexpected subgrade texture, unearthing an unexpected archaeological site, and encountering hazardous waste.

The following language should be included in this section, along with the specific adaptive management strategies:

*Remedial measures will be implemented at least two years prior to the completion of the monitoring period in order to attain the performance standards described below within the five-year* ***[adjust this number as appropriate]*** *monitoring period. Should measures be required within two years of the end of the original monitoring period, the monitoring period may be extended to ensure two years of monitoring after the remedial work is completed. Measures requiring earth movement or changes in hydrology will not be implemented without written approval from the MNRCP.*

**P. Final Assessment Plan:**

The following language, shown in italics, should be included in the narrative portion of the Restoration Work Plan. Details can be adjusted to fit the specifics of the project:

*A final assessment of the condition of the restoration/enhancement site(s) shall be performed following the fifth growing season (Year 5) after completion of the restoration/enhancement site(s) construction, or by the end of the monitoring period, whichever is later. “Growing season” in this context begins no later than May 31st. The assessment report shall be submitted to MNRCP by December 15 of the year the assessment is conducted; this will coincide with the year of the final monitoring report, so it is acceptable to include both the final monitoring report and assessment in the same document.*

*The final assessment shall include the four assessment appendices listed below and shall:*

* *Summarize the original or modified restoration/enhancement goals and discuss the level of attainment of these goals at each restoration/enhancement site.*
* *Describe significant problems and solutions during construction and maintenance (monitoring) of the restoration/enhancement site(s).*
* *Recommend measures to improve the efficiency, reduce the cost, or improve the effectiveness of similar projects in the future.*

*FINAL ASSESSMENT APPENDICES:*

*Appendix A -- Summary of the results of a functions and values assessment of the restoration/enhancement site(s). This assessment should compare the functions and values of the site(s) at the end of the monitoring period to the functions and values prior to the restoration/enhancement work. Note improvements and/or changes in functions and values. Functions and values should be described using the same methodology used in the original work plan (e.g., the Highway Methodology). For stream restoration/enhancement projects, the SVAP2 assessment should be used to to compare the condition of the site at the end of the monitoring period to the condition prior to the restoration/enhancement work.*

*Appendix B -- Calculation of the area by type (e.g., wetlands, vernal pools) of aquatic resources in each restoration/enhancement site. Wetlands should be identified and delineated using the most current versions of the Corps Wetlands Delineation Manual and approved regional supplement. Supporting documents shall include (1) a scaled drawing showing the aquatic resource boundaries and representative data plots and (2) datasheets for the corresponding data plots.*

*Appendix C -- Comparison of the area of* ***actual*** *delineated restored/enhanced aquatic resources (from Appendix B) with the area of* ***proposed*** *restored/enhanced aquatic resources from the Restoration Work Plan. Also provide a comparison of the different community types present as compared to what was proposed in the Work Plan. In other words, how does the site compare to what was planned? These comparisons may be made on a scaled drawing(s) or as an overlay on the as-built plan.*

*Appendix D -- Photos of each restoration/enhancement site taken from the same locations as the monitoring photos. Include a map showing photo point locations (required).*

**Completion of Monitoring Requirements.** Monitoring requirements will not be considered fulfilled until the awardee has received written concurrence from the Maine Natural Resource Conservation Program that the project has met its objectives and no additional monitoring reports are required. A final field visit may be conducted to verify that onsite conditions are consistent with information documented in the monitoring reports.

**Q. Long-Term Management Plan**

Provide a description of how the site(s) will be managed after the completion of post-construction monitoring and after the performance standards have been achieved to ensure the long-term sustainability of the natural resources. The owner of the site or the holder of a conservation easement will be responsible for ensuring the site is in compliance with the goals of this work plan, as well as all applicable permits. If the site is located on protected land that is already governed by a long-term management plan, include information on where this plan is located and who is responsible for maintenance and updates to the plan.

**R. Payment Schedule:**

The payment schedule can usually be copied from the MNRCP Project Agreement. Payments for restoration projects are typically broken out as show below but may be modified as appropriate.

$X upon submission and approval of the finalized MNRCP Restoration Work Plan

$X after completion of the restoration work and upon submission and approval of the Restoration Completion Report, described above.

Applicants may be asked to submit receipts, invoices, or other documentation of project expenses to justify project costs and payment. MNRCP may request a final project cost after work is complete for help in award allocations for future projects.

**Appendices to Guidance Document**

*(Provided for reference only; these appendices* ***do not*** *need to be attached to the work plan.)*

**Appendix A: Work Completion Report Template**

**Appendix B: Monitoring Report Form**

**Appendix C: Additional References**

**Appendix A**

**MNRCP Work Completion Report**

|  |  |
| --- | --- |
| Report Date |  |
| MNRCP Project NameMNRCP Project ID |  |
| Project Location  |  |
| Project Sponsor  | *Name of person filling out the report, and the sponsoring organization and any partners* |
| Contractor and/or Consultant | *Name(s) of contractor performing the work and consultant, if applicable* |
| Start and Completion Dates | *Dates restoration/enhancement work commenced and was completed.* |
| Corps and DEP Permit Numbers (if applicable) |  |

**Summary of Work Completed:**

Describe the work that was done for the project:

1. Summarize how the work was completed. Include a description of the major steps in the process.
2. Discuss the status of the project as of the date of the report, including status of earthwork, planting, seeding, erosion controls, etc.
3. Describe any places where the project deviated from the approved work plan. Include documentation of MNRCP approval of any changes, if applicable.
4. Discuss any difficulties or unanticipated constraints. Also include any lessons learned that may inform future projects.
5. Please include the final total cost of the project. This number may or may not be the same as your original budget. Please also include an estimate of staff and/or volunteer time spent on the project if that is not included in your final cost. This information will be especially helpful as we review and assess future restoration/enhancement projects.

 **Photographs and Maps:**

Please attach photographs of the work, with a description of each photograph, taken before (if possible), during and after completion with photo locations shown on a map of the site. If the work deviated from the approved work plan, please provide an updated “as-built” plan.

**Appendix B**

**Maine Natural Resource Conservation Program**

**Monitoring Report Form**

Report Date:

Report Number: *(Monitoring Report 1 of 5, for example)*

1. **MNRCP Project Overview** *(Most of this information will be the same for each monitoring report)*

|  |  |
| --- | --- |
| MNRCP Project Name |  |
| MNRCP ID |  |
| Project Location  | *Location of and directions to the restoration/enhancement site. Directions and any identifiable landmarks of the compensatory mitigation project including information to locate the site boundaries.*  |
| Project Sponsor  | *Name and contact information of project sponsor* |
| Contractor and/or Consultant | *Name(s) of contractor who performed the work and project consultant, if applicable* |
| Start and Completion Dates | *Dates restoration/enhancement work commenced and was completed.* |
| Corps and DEP Permit Numbers (if applicable) |  |

**Project Summary:**A summary paragraph defining the goals of the approved project, nature of the impact being restored/enhanced, restoration/enhancement acreages and types of aquatic resources.

1. **Requirements**

List performance standards from the approved MNRCP Restoration/Enhancement Work Plan. In addition, list any other restoration/enhancement-related requirements as specified in the plan.

1. **Monitoring Information**

Describe the monitoring inspections that occurred since the last report. Include dates that inspections were conducted and the name of party conducting the monitoring. Photo documentation is required (See Appendix A below for further information).

Describe the current conditions on the site, specifically with respect to each performance standard. Provide data to substantiate the success and/or potential challenges associated with each standard. Concisely describe actions taken during the monitoring year to meet the performance standard – actions such as removing debris, replanting, controlling invasive plant species (with biological, herbicidal, or mechanical methods), re-grading the site to achieve desired hydrology, applying additional topsoil or soil amendments, etc. Include dates that any remedial work was done. Address all requirements that apply from section 2 above.

A table is one option for comparing the performance standards to the conditions and status of the developing restoration/enhancement site. A table can also be helpful to compare the status of performance standards over multiple monitoring years. See attached “Table 4” for a sample table for comparing performance standards over time.

Additional Monitoring Considerations: If the questions below have not been addressed as part of the assessment of performance standards, please provide brief answers.

* + - What fish and wildlife have been observed using the site(s) and what do they use it for (nesting, feeding, shelter, etc.)?
		- Report the status of any erosion control measures on the restoration/enhancement site(s). Are they in place and functioning? What is the overall level of stability across the site(s)? If temporary measures are no longer needed, have they been removed? (NOTE: Non-biodegradable erosion control materials MUST be removed prior to the end of the monitoring period.)
		- Has there been any unauthorized ATV or off-road vehicle use on the site? If so, describe any damage to the site and any actions being taken to prevent future damage (installing signs or boulders, outreach to local landowners or ATV clubs, etc.).
		- Describe any other issues of concern for the site (e.g., beaver influence, vandalism, trash dumping, surrounding land use changes, etc.).
1. **Summary and Conclusions**
	1. Include a general statement describing the status and conditions on the project site. If multiple years of monitoring have been performed, describe how the site has progressed over time. Has the site progressed as expected?
	2. Summarize the overall status of the site relative to the performance standards. Is the site meeting the performance standards? If performance standards are not being met or other issues have been identified, include a brief discussion of the difficulties encountered, probable causes, and potential remedial actions. Specific recommendations for any additional corrective or remedial actions, including a timetable, must be provided.
2. **Monitoring Report Appendices**
* **Appendix A – Maps (required)**

A map or maps should be attached to each monitoring report showing the boundaries of the restoration/enhancement area(s) relative to other landscape features on the site, habitat types, locations of photographic reference points, transects, sampling data points, and/or other features pertinent to the restoration/enhancement plan and monitoring events. Geographic coordinates are helpful in locating the site(s) for inspection purposes.

* **Appendix B – Photographs (required)**Representative photos are required to support the findings and recommendations, for each restoration/enhancement site. Photos should be taken from the same locations for each monitoring event and must be dated and clearly labeled. A map, or maps, showing photo locations must be included and clearly labeled with the direction from which the photo was taken. Photos may be included in this appendix or in the body of the report.
* **Appendix C – Plans**

If alterations were made to the approved restoration/enhancement plan due to conditions found in the field, as-built plans showing appropriate topography for type of restoration, structures including any inlet/outlet structures, grading, etc. must be submitted. These need only be submitted once and may be included in future monitoring reports by reference. If plantings were part of the plan, location and extent of the designed plant community types (e.g., shrub swamp) should be included. Within each community type the plan shall show the species planted—but it is not necessary to illustrate the precise location of each individual plant. There should also be a soil profile description and the actual measured organic content of the topsoil. This should be included in the first monitoring report unless there is grading or soil modifications or additional plantings of different species in subsequent years.

* **Appendix D – Plant List**

If applicable, a plant species list for each plant community type/wetland type. The plant species list need not be exhaustive, e.g., it could exclude species not exceeding 5% cover in their plant community/wetland type.

1. **Final Assessment Plan (Year 5 Only)**

Note that in Year 5, additional evaluation is required – refer to the approved Restoration Work Plan for details.

**Appendix C**

ADDITIONAL REFERENCES

*(Note, please do not include these in the final Work Plan unless it specifically references them – these are provided as resources only.)*

Ashby, Steven. “Approaches for the Mitigation of Water Quality Functions of Impacted Wetlands – A Review,” ERDC TN-WRAP-02-03 <http://el.erdc.usace.army.mil/elpubs/pdf/tnwrap02-3.pdf> U.S. Army Research and Development Center, Vicksburg, MS.

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Federal Aviation Administration Advisory Circular AC No: 150/5200-33B Hazardous Wildlife Attractants on or Near Airports, 8/28/2007 [http://www.airweb.faa.gov/Regulatory\_and\_Guidance\_Library/rgAdvisoryCircular.nsf/0/532dcafa8349a872862573540068c023/$FILE/150\_5200\_33b.pdf](http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/532dcafa8349a872862573540068c023/%24FILE/150_5200_33b.pdf)

Fonseca, M. S., W. J. Kenworthy and G. W. Thayer. 1998. Guidelines for the conservation and restoration of seagrasses in the U. S. and adjacent waters. NOAA Coastal Ocean Program. Decision Analysis Series No. 12. <http://www.seagrassrestorationnow.com/docs/Fonseca%20et%20al%201998.pdf>

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