

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
GEOLOGICAL AND LAND MANAGEMENT DIVISION**

TECHNICAL GUIDANCE FOR WETLAND MITIGATION

September 9, 2003

This document is intended to provide guidance to the Michigan Department of Environmental Quality's (MDEQ's) Geological and Land Management Division (GLMD) staff regarding wetland mitigation requirements associated with issuance of permits under Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. It is the goal of the GLMD that decisions made by staff regarding mitigation be consistent with the administrative rules for Part 303.

This document considers the following wetland mitigation requirements:

- Calculation of Mitigation Ratios
- Mitigation Plans
- Performance Standards
- Monitoring

The April 1, 2002 document "Frequently Asked Questions Regarding the Rules for Wetland Mitigation" was provided to staff to assist in the interpretation and application of the administrative rules for mitigation. This document is intended as interim guidance pending completion of a new GLMD Wetland Mitigation Manual.

Mitigation provisions associated with the issuance of a permit should consider the characteristics, functions, and values of the wetlands that are to be impacted by the permitted activity. The requirements described below should be considered the minimum requirements for most mitigation, but may be modified by staff when determined to be beneficial to the wetland resources of the state.

Calculation of Mitigation Ratios

As outlined in the administrative rules for Part 303, mitigation requirements should be calculated as follows:

1. The amount of permissible impact for each ecological type should be multiplied by the appropriate ratio.
 - 5:1 for creation or restoration of wetland types that are rare or imperiled.
 - 2:1 for creation or restoration of forested wetlands, coastal wetlands, and wetlands that border inland lakes.
 - 1.5:1 for creation or restoration of all other wetland types.
 - 10:1 for the preservation of existing wetlands which meet the criteria of Rule 5(4)(d).
2. If the mitigation will be a different ecological type than the impacted wetland, the ratio(s) may be increased.

3. If the mitigation is being required as part of an after-the-fact permit, the ratios must be doubled.
4. The acreage of mitigation required may be increased or decreased by up to 20 percent when beneficial to the wetland resources.

Example:

If the permissible wetland impact is:

1.0 acre forested (FO) impact
 0.5 acre scrub-shrub (SS) impact
1.0 acre emergent (EM) impact
 2.5 acres total impact

Then the mitigation required would be:

1.0 acre FO impact x 2 = 2.0 acres FO mitigation
 0.5 acre SS impact x 1.5 = 0.75 acre SS mitigation
 1.0 acre EM impact x 1.5 = 1.5 acres EM mitigation
 4.25 acres total mitigation

Variation 1: If the above 1 acre of emergent wetland to be impacted bordered on an inland lake, then the following mitigation would be required:

1.0 acre FO impact x 2 = 2.0 acres FO mitigation
 0.5 acre SS impact x 1.5 = 0.75 acre SS mitigation
 1.0 acre EM impact x 2 = 2.0 acres EM mitigation bordering a lake
 4.75 acres total mitigation

Variation 2: If 5 acres of forested wetland preservation that met the criteria in Rule 5(4)(d) were approved as mitigation, then the following mitigation would be required:

5.0 acres FO preservation ÷ 10 = replacement for 0.5 acre of FO impact, leaving 0.5 acre FO impact remaining to be mitigated.

0.5 acre FO impact x 2 = 1.0 acre FO mitigation
 0.5 acre SS impact x 1.5 = 0.75 acre SS mitigation
 1.0 acre EM impact x 2.0 = 2.0 acres EM mitigation bordering a lake
 3.75 acres of construction/restoration

Variation 3: An increase or decrease in the acreage of mitigation required may be allowed if it is beneficial to the wetland resources. For example, if the permit applicant will permanently protect remaining wetlands on site under a conservation easement to minimize impacts, a 20 percent decrease could be approved and the mitigation would be calculated as follows:

1.0 acre FO impact x 2 = 2.0 acres FO mitigation
 0.5 acre SS impact x 1.5 = 0.75 acre SS mitigation

$$1.0 \text{ acre EM impact} \times 1.5 = \frac{1.5 \text{ acres EM mitigation}}{4.25 \text{ acres} \times 0.80 = 3.4 \text{ acres total mitigation}}$$

Variation 4: If the forested and scrub-shrub mitigation is out-of-kind, then the ratio can be increased. In this example, the ratio for forested impact has been increased to 3:1 and the ratio for scrub-shrub has been increased to 2:1:

$$\begin{array}{ll} 1.0 \text{ acre FO impact} \times 3 = & 3.0 \text{ acres EM mitigation} \\ 0.5 \text{ acre SS impact} \times 2 = & 1.0 \text{ acre EM mitigation} \\ 1.0 \text{ acre EM impact} \times 1.5 = & \frac{1.5 \text{ acres EM mitigation}}{5.5 \text{ acres total mitigation}} \end{array}$$

Mitigation Plans

In accordance with the administrative rules for Part 303, a mitigation plan must be submitted by the permit applicant when mitigation is required by the GLMD. The following items must be submitted in the mitigation plan:

1. Mitigation Goals and Objectives: Goals and objectives, including:
 - a. The acreage to be restored, created, or preserved by ecological type.
 - b. A description of the ecological types, hydrology, soils, and vegetation of the wetlands to be impacted.
 - c. A description of the functions provided by the wetlands to be impacted and the proposed mitigation wetlands.
2. Map: A map showing the location of the mitigation site in relation to surrounding roads and other landmarks.
3. Baseline conditions: Characterization of the existing conditions at the proposed mitigation site including:
 - a. A description of the topography, soils, hydrology, and vegetation. Soil boring information and groundwater monitoring data should supplement this description.
 - b. A plan view that includes topographic information (1 or 2 foot contour intervals), roads, trails, structures, property lines, directional arrows, scale, and the exact size and boundaries of existing wetlands, streams and floodplain to the 100 year elevation.
 - c. Typical cross-sections.
 - d. An explanation of why the site was selected.
4. Site Development Plan: The proposed mitigation design including:
 - a. A description of the sources of hydrology, the source and type of soil amendments, wetland vegetation establishment, and wildlife structures.
 - b. A plan view showing all of the proposed conditions of the mitigation site including all contour elevations (at 1 foot contour intervals), structures, the

- type and size of all proposed wetland areas, property lines, directional arrows, scale, and the conservation easement area.
- c. Typical cross-sections.
 - d. A water budget of inputs and outputs to the proposed wetland (e.g., precipitation, groundwater, runoff, evapotranspiration).
 - e. A vegetative establishment plan which includes a plan view, methods, species list with scientific and common names, and source of any plant or seed stock.
5. Performance Standards: See section on performance standards below.
 6. Monitoring Plan: Monitoring methods are described below. Locations of vegetative sampling transects, photo points, monitoring wells, and staff gauges for monitoring should be shown on a plan view.
 7. Schedule and Construction Methods: A schedule for completion of the mitigation site must be provided (e.g., initiation, planting, completion). The site preparation and soil erosion/sedimentation control methods to be used during construction should be described.
 8. Long-term Protection: Information on current site ownership, the conservation easement, and other provisions for the long-term protection of the site must be provided. Methods to be used to prevent and control the establishment of invasive plant species, to prevent over-grazing of vegetation, to remove trash, etc., should be identified.
 9. Financial Assurances: Cost estimates for construction, planting, monitoring, and any necessary land acquisition should be provided by the applicant to allow the GLMD to determine the financial assurance amount necessary to be used to complete corrective action in the event of mitigation default or failure.

Performance Standards

The administrative rules for Part 303 require that performance standards be established for all wetland mitigation projects. These are the criteria by which the mitigation wetland will be evaluated to determine if the mitigation requirements of the permit have been met. If the mitigation wetland does not satisfactorily meet these standards by the end of the monitoring period, or is not satisfactorily progressing during the monitoring period, the permittee must be notified to take corrective actions. The following performance standards should be required by staff:

1. Construction has been completed in accordance with the GLMD approved plans and specifications referenced in the permit.
2. The mitigation wetland is characterized by the presence of water at a frequency and duration sufficient to support a predominance of wetland vegetation and the wetland types specified in the mitigation plan at the end of the monitoring period.

3. A layer of high-quality soil, from the A horizon of an organic or loamy surface texture soil, is placed over the entire created wetland area at a minimum thickness of 6 inches.¹

¹ The following alternate performance standard may be used for wetland restorations: A 6-inch layer of high-quality soil, from the A horizon of an organic or loamy surface texture soil, is present over the entire mitigation wetland area.

4. The mitigation wetland shall be free of oil, grease, debris, and all other contaminants.
5. A minimum of 6 habitat structures, consisting of at least 3 types, have been placed per acre of mitigation wetland.² At least 50 percent of each structure shall extend above the normal water level. The types of acceptable wildlife habitat structures are as follows:
 - a. Tree stumps laid horizontally within the wetland area. Acceptable stumps shall be a minimum of 6 feet long (log and root ball combined) and 12 inches in diameter.
 - b. Logs laid horizontally within the wetland area. Acceptable logs shall be a minimum of 10 feet long and 6 inches in diameter.
 - c. Whole trees laid horizontally within the wetland area. Acceptable whole trees shall have all of their fine structure left intact (i.e., not trimmed down to major branches for installation) and be a minimum of 20 feet long (tree and root ball) and a minimum of 12 inches in diameter at breast height (DBH).
 - d. Snags which include whole trees left standing that are dead or dying, or live trees that will be flooded and die, or whole trees installed upright into the wetland. A variety of tree species should be used for the creation of snag habitat. Acceptable snags shall be a minimum of 20 feet tall (above the ground surface) and a minimum of 12 inches DBH. Snags should be grouped together so as to provide mutual functional support as nesting, feeding, and perching sites.
 - e. Sand Mounds at least 18 inches in depth and placed so that they are surrounded by a minimum of 30 feet of water measuring at least 18 inches in depth. The sand mound shall have at least a 200 square foot area that is 18 inches above the projected high water level and oriented to receive maximum amounts of sunlight.

² The number of structures required per acre may be lowered by staff, if woodland or grassland habitat adjacent to the mitigation wetland is preserved under a conservation easement.

6. Mean percent cover of native wetland species in the herbaceous layer at the end of the monitoring period is not less than:
 - 80 percent for forested wetland.
 - 80 percent for scrub-shrub wetland.

- 60 percent for emergent wetland.
- 80 percent for wet meadow wetland.

Extensive open water and submergent vegetation areas having no emergent and/or floating vegetation shall not exceed 20 percent of the mitigation wetland area. Extensive areas of bare soil shall not exceed 5 percent of the mitigation wetland area. For the purposes of these performance standards, extensive refers to areas greater than 0.01 acre in size.

The total percent cover of wetland species in each plot shall be averaged for plots taken in the same wetland type to obtain a mean percent cover value for each wetland type. Plots within identified extensive open water and submergent areas, bare soil areas, and areas without a predominance of wetland vegetation shall not be included in this average. Wetland species refers to species listed as Facultative and wetter (FAC, FAC+, FACW-, FACW, FACW+, OBL) on the U.S. Fish and Wildlife Service's "National List of Plant Species That Occur in Wetlands" for Region 3.

7. The mitigation wetland supports a predominance of wetland vegetation (as defined in the "MDEQ Wetland Identification Manual") in each vegetative layer, represented by a minimum number of native wetland species, at the end of the monitoring period. The minimum number of native wetland species per wetland type shall not be less than:

- 15 species within the forested wetland.
- 15 species within the scrub-shrub wetland.
- 15 species within the emergent wetland.
- 20 species within the wet meadow wetland.

The total number of native wetland plant species shall be determined by a sum of all species identified in sample plots of the same wetland type.

8. At end of the monitoring period, the mitigation wetland supports a minimum of:

- 300 individual surviving, established, and free to grow trees per acre in the forested wetland that are classified as native wetland species and consisting of at least three different plant species.³
- 300 individual surviving, established, and free to grow shrubs per acre in the scrub-shrub wetland that are classified as native wetland species and consisting of at least four different plant species.⁴
- 8 native wetland species of grasses, sedges, or rushes in the wet meadow wetland.

³ Plant stock should be at least 12 to 18 inch seedling stock. Mortality for bare root seedlings can be high, so it is recommended that 600 to 800 seedlings per acre be planted unless dead seedlings will be replaced. For transplanted stock, 600 per acre may be sufficient. It is not recommended that less than 400 trees per acre be planted unless ball and burlap sapling stock is used.

⁴ Considering mortality, it is recommended that at least 400 shrubs per acre be planted.

9. The mean percent cover of invasive species including, but not limited to, *Phragmites australis* (Common Reed), *Lythrum salicaria* (Purple Loosestrife), and *Phalaris arundinacea* (Reed Canary Grass) shall in combination be limited to no more than 10 percent within each wetland type. Invasive species shall not dominate the vegetation in any extensive area of the mitigation wetland.⁵

If the mean percent cover of invasive species is more than 10 percent within any wetland type or if there are extensive areas of the mitigation wetland in which an invasive species is one of the dominant plant species, the permittee shall submit an evaluation of the problem to the MDEQ. If the permittee determines that it is infeasible to reduce the cover of invasive species to meet the above performance standard, the permittee must submit an assessment of the problem, a control plan, and the projected percent cover that can be achieved for review by the MDEQ. Based on this information, the MDEQ may approve an alternative invasive species standard. Any alternative invasive species standard must be approved in writing by the MDEQ.

⁵ Although this performance standard broadly covers invasive species, additional species of concern can be included by staff.

Additional performance standards specific to the goals and objectives of the mitigation may be developed and required by staff.

Monitoring

The administrative rules for Part 303 require that a monitoring plan be established for all wetland mitigation projects. Monitoring is necessary to determine if the mitigation wetland meets the performance standards. The permittee should be required to monitor the wetland mitigation for a minimum of 5 years (depending on the type of wetland) following the year that construction is completed, as follows:

1. Measure inundation and saturation at all staff gauges, monitoring wells, and other stationary points shown in the mitigation plan monthly during the growing season.⁶ Hydrology data shall be measured and provided at sufficient sample points to accurately depict the water regime of each wetland type.

⁶ The starting and ending dates of the growing season can be approximated by the last temperature of 28°F or lower in the spring and the first temperature of 28°F in the fall at a frequency of 5 years in 10. This information should be available for each county from the U.S. Department of Agriculture, Natural Resources Conservation Service.

2. Sample vegetation in plots located along transects shown in the mitigation plan once⁷ between July 15 and August 31⁸. The number of sample plots necessary within each wetland type shall be determined by use of a species-area curve or other approach approved by the MDEQ. The minimum number of sample plots for each wetland type shall be no fewer than five (5). Sample plots shall be located on the sample transect at evenly spaced intervals or by another

approach acceptable to the MDEQ. If additional or alternative sample transects are needed to sufficiently evaluate each wetland type, they must be approved in advance in writing by the MDEQ.

The herbaceous layer (all non-woody plants and woody plants less than 3.2 feet in height) shall be sampled using a 3.28 foot by 3.28 foot (one square meter) sample plot. The shrub and tree layer shall be sampled using a 30-foot radius sample plot. The data recorded for each herbaceous layer sample plot shall include a list of all living plant species, and an estimate of percent cover in 5 percent intervals for each species recorded, bare soil areas, and open water relative to the total area of the plot. The number and species of surviving, established, and free-to-grow trees and surviving, established, and free-to-grow shrubs shall be recorded for each 30-foot radius plot.

Provide plot data and a list of all the plant species identified in the plots and otherwise observed during monitoring. Data for each plant species must include common name, scientific name, wetland indicator category from the U.S. Fish and Wildlife Service's "National List of Plant Species That Occur in Wetlands" for Region 3, and whether the species is considered native according to the Michigan Floristic Quality Assessment (Michigan Department of Natural Resources, 2001). Nomenclature shall follow Voss (1972, 1985, and 1996) or Gleason and Cronquist (1991).

The locations of sample transects and plots shall be identified in the monitoring report on a plan view showing the location of wetland types. Sample transects shall be permanently staked at a frequency sufficient to locate the transect in the field.

⁷ The addition of a second vegetation sampling visit earlier in the growing season may provide valuable data to the GLMD and assist the permittee with providing data to show that the performance standards have been met.

⁸ These dates are meant to cover peak growing season and may need to be modified for northern regions of the state.

3. Delineate any extensive (greater than 0.01 acre in size) open water areas, bare soil areas, areas dominated by invasive species, and areas without a predominance of wetland vegetation, and provide their location on a plan view.
4. Document any sightings or evidence of wading birds, songbirds, waterfowl, amphibians, reptiles, and other animal use (lodges, nests, tracks, scat, etc.) within the wetland noted during monitoring. Note the number, type, date, and hour of the sightings and evidence.
5. Inspect the site, during all monitoring visits and inspections, for oil, grease, man-made debris, and all other contaminants and report findings. Rate (e.g., poor, fair, good, excellent) and describe the water clarity in the mitigation wetland.
6. Provide annual photographic documentation of the development of the mitigation wetland during vegetation sampling from permanent photo stations located within the mitigation wetland. At a minimum, photo stations shall be located at both

ends of each transect. Photos must be labeled with the location, date photographed, and direction.

7. Provide one-time photographic documentation during construction of the placement of at least six (6) inches of high quality soil, from the A horizon of an organic or loamy surface texture soil, across the site.
8. Provide the number and type of habitat structures placed and representative photographs of each structure type.
9. Provide a written summary of data from previous monitoring periods and a discussion of changes or trends based on all monitoring results including a calculation of the acres of each wetland type established.
10. Provide a written summary of all the problem areas that have been identified and potential corrective measures to address them.

The monitoring report, which compiles and summarizes all data collected during the monitoring period, shall be submitted annually by the permittee. Monitoring reports shall cover the period of January 1 through December 31 and be submitted to the MDEQ prior to January 31 of the following year.

Additional monitoring may be required by staff to document that performance standards are met.