



## Draft Compensatory Mitigation Guidelines

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### Introduction

Early failures with compensatory mitigation were the result of many factors, including inexperience. For many years we have been evaluating the mitigation efforts required through the Corps' regulatory program. This review has also been conducted by other Federal and State agencies and non-governmental organizations. Many of these studies have demonstrated that the following factors have to some extent contributed to the failure of many compensatory mitigation projects.

- Incorrect grading, excavation, or elevations
- Inadequate provisions for drainage
- Soil compaction
- Erosion
- Unplanned or uncontrolled human activity/impacts
- Noxious or invasive plant species
- Herbivory
- Changes in adjacent or upstream land use
- Lack of oversight during construction
- No or poor consideration of water budgets
- Inadequate soil conditions or testing
- Poorly written mitigation plans
- Lack of commitment on the part of the permittee
- Lack of communication between permittee and the regulatory agencies
- Financial problems of permittee

Any one or combination of the above factors can greatly compromise even the best plans and efforts. Compensatory mitigation can become an expansive and complicated undertaking. It is inherent that the public and regulatory agencies pay closer attention to compensatory mitigation proposals to insure continued and greater successes.



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### **I. Goals and Objectives.**

All successful compensatory mitigation proposals begin with the desired end-point in mind. As such, a mitigation proposal is more likely to be approved by the Corps and consequently more likely to be successful if it contains detailed descriptions of the environmental losses at the impact site(s) and the environmental gains at the mitigation site(s). The Philadelphia District does not utilize an officially approved methodology for assessing wetland and stream functions and values. Many methodologies have been developed in the past by various organizations and agencies. The most recent methodology known as “Hydrogeomorphic methodology” (HGM) is still under development. In the interim, the Philadelphia District relies on “best professional judgement” and established replacement ratios. This general policy is consistent with the Mitigation MOA and remains consistent with the more recent Regulatory Guidance Letter 02-2. These ratios, which should be used as a general rule, are as follows: 2 to 1 for forested wetlands (replacement acreage: impact acreage), 1.5 to 1 for scrub/shrub wetland habitat, and 1 to 1 for emergent wetland habitat.

### **II. Baseline Information**

#### **Impact Site**

The mitigation proposal should describe and quantify the aquatic resource type and functions that will be impacted at the proposed impact site. This should include any temporary and permanent physical impacts to the aquatic environment. This effort should characterize the wetland community from a vegetation perspective. Certain systems may be in various stages of community succession from previous disturbances. This should be noted since it will affect the condition of the impact site at some point in the future. Plants should be identified to the species level whenever possible. If a site is continuing to experience some type of disturbance (i.e., irregular stream flows from watershed mismanagement), it may not be fully characterize the structure of the community. However, this type of off-site disturbance may be valuable information for a mitigation proposal. The soils conditions at the impact should be characterized. For example, some wetlands are driven by ground water, while others are driven by overland flow. The can be evaluated by examining soil textures and permeability, soil fertility, pH, previous or historic soil disturbances, soil contaminants. One method of evaluation would be to apply the Cowardin classification system developed by the U.S. Fish and Wildlife Service. For example, forested wetlands can be described based upon such factors as seasonally flooded, intermittently flooded, seasonally saturated, etc.

The mitigation proposal should describe aquatic resource concerns in the watershed beyond the actual impact site, (i.e., flooding, water quality, habitat losses) and how the impact site contributes to overall watershed/regional functions. Identify watershed or other regional plans that describe aquatic resource concerns and objectives. The amount and nature of available information with respect to watershed will vary depending on local public and planning efforts.

#### **Mitigation Site**

The mitigation proposal should include information about the mitigation site that is similar to the information for the impact site. The proposal should describe and quantify the aquatic resource type and functions for which the mitigation project is intended to compensate. If the plan is proposing to emulate or replace the functions found at the impact site, then the nature and type of information for the mitigation site should already be available from the description of proposed impact site. If



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watershed studies have been conducted and are available, the plan should describe the contribution to overall watershed/regional functions that the mitigation site(s) is intended to provide.

The following is a more detailed description of the type of information and data that should be collected and evaluated for both the impact and mitigation sites. The specific nature and quantity of these various information requirements will vary from site to site, but they are included in this overall information description.

The compensatory mitigation proposal should include detailed information about the site location. This would include such items as Latitude and Longitude coordinates, Hydrologic Unit Code (HUC) number, a written property description including County, Township, Municipality, tax parcel number, lot and block description. The package should also include maps such as USGS Quadrangles, NWI maps, NRCS soil surveys, verified wetland delineations if available, street maps, local zoning maps, and tax maps. All of these maps should include an identification of the project site. Aerial or satellite imagery and photographs can also be a valuable tool to identify and describe the site.

The Philadelphia District does not utilize an officially approved wetland or stream assessment methodology. However, existing classification systems such as the U.S. Department of Interior Cowardin classification system or a Rosgen stream type classification could be useful assessment tools.

The mitigation proposal should quantify wetland resources (acreage) or stream resources (linear feet) by type(s). If an assessment methodology is going to be utilized, the methodology should be described. In the event that an applicant proposes to utilize a particular assessment methodology, it is recommended that the applicant contact the Corps of Engineers prior to the submission of an application or mitigation proposal to arrange for a pre-application meeting. This will assure that the assessment methodology and any subsequent results or findings are acceptable to the Corps. Further, any method that is proposed should be applied consistently at both the impact site and mitigation site.

The mitigation proposal should include a comprehensive study of site hydrology. In other words, the proposal should develop a water budget for the impact and mitigation sites. This should include water sources; such as precipitation, surface runoff, groundwater discharge or recharge, stream flows. The package should include a discussion of water budgets for both wet and dry years. The package should include a description of the “hydro period” such as depth and duration of inundation and/or soil saturation

The mitigation proposal should consider the historical hydrology of site and its associated watershed to determine whether there are any differences from the present conditions. This is particularly important in highly urbanized watersheds. The mitigation proposal should include water quality analyses for surface water and groundwater, tidal fluctuations in coastal areas, pH, nutrients, organic content, suspended matter, DO, heavy metals or other known possible contaminants.

The mitigation proposal should include an analysis of existing vegetation including a comprehensive listing of all species, indicating which are dominants. The plan should also characterize the vegetation including community cover maps, densities, succession, and community quality such as an analysis of non-native and or invasive plant species.



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The mitigation proposal should include an evaluation of existing soils such as soil profile descriptions, soil survey classification, results of standard soils analyses, including percent organic matter, structure, texture, permeability.

The mitigation proposal should include an evaluation of existing wildlife at the site, including an assessment of federally listed threatened and endangered species. Depending upon the site and geographic location, and assessment of State listed threatened and endangered species may be necessary. The evaluation should include historic wildlife usage at the site.

The mitigation proposal should include a discussion of land uses surrounding the project site and in the local watershed. This would include such uses as remaining forests, agricultural activities, industrial or commercial uses, and residential development. It should further describe how these land uses have changed with a discussion on the extent of wetland and/or other aquatic resource conversions that have occurred within the local landscape or watershed. This is an important discussion and consideration since it may help to identify the current functions at the project site and its potential to achieve any proposed functions and values.

### **III. Mitigation Site Selection**

Utilizing the baseline data obtained through evaluation of the impact site, the applicant should identify the preferred goals to achieve through the compensation plan. Once the objectives of a compensatory mitigation plan are identified, the applicant should evaluate the factors and data obtained from the proposed mitigation site to determine whether these goals can be reasonably achieved at the selected mitigation site.

The mitigation proposal should describe the selection process that lead to the preferred mitigation site. The proposal should include a discussion and comparison of off-site versus on-site, in-kind versus out-of-kind habitat replacement issues.

The proposal should also identify any local watershed initiatives or plans that have already identified needs or goals on a watershed basis. These goals may also play a role in the identification or even a modification of the proposed goals at the mitigation site.

If there is an existing watershed plan, the mitigation package should describe how the mitigation project would contribute to aquatic resource functions within the watershed or region.

The mitigation proposal should also discuss any known risk for the mitigation proposal. For example, a selected site may be shown to have substantial value for the aquatic resources of a particular region, however, there may be risks associated with technology, land acquisition, logistics or other social factors.

The selected mitigation site should be evaluated to determine whether there are any previous deed restrictions, easements or right-of ways that might encumber the mitigation proposal.

The mitigation proposal should also include any coordination efforts with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, State Historic Preservation Office or any other State agencies that may have an interest at the selected mitigation site.



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### **IV. Mitigation Work Plans**

The policies and guidance that have been developed and implemented in the Corps' Regulatory program have emphasized that compensation for aquatic resources should only be considered after the applicant has adequately addressed the issues of avoidance and minimization. Historically, this had lead to situations where compensatory mitigation is only addressed and considered as the final aspect in the regulatory review process. As a result, valuable information and insight has been gained posthumously. Over the years, the Corps of Engineers has been placing added emphasis on the pre-application process with potential applicants. The time and energy required by an applicant to investigate and develop a detailed compensatory mitigation proposal can be effectively realized if the application process is clearly understood. It is reiterated that the guidance described in this document does not alter the review process, but rather is intended to enhance the effectiveness of the compensatory mitigation proposals.

In summary, the mitigation work plan should describe the details about the following questions: who? what?, when?, where?, how?, and even why?.

The mitigation proposal should include detailed site maps with property boundaries, wetland boundaries, soil boundaries, or any other boundaries that are considered relevant. This data should include latitude and longitude information or any other location descriptions that commonly used in project region.

The mitigation work plan should describe what will be done and when. Certain work may be accomplished prior to the permitted work, or it may be performed concurrently with the permitted work. If a plan proposes mitigation work to occur after the permitted work, the plan should clearly explain why it couldn't be accomplished sooner.

The work plan should a detailed grading plan. If substantial soil movement is proposed, the plan must describe how the volumes of soil will be managed, stabilized, or stockpiled. Some soil treatments such as the development of micro topography within a site may be difficult to show on some project plans. However, this type of effort may be included as construction notes on a construction drawing or included as a contract specification in a contract document.

The plan should include a discussion of construction equipment. This is particularly important in those circumstances where large equipment may generate problems caused by soil compaction.

The plan should include a calendar schedule. If the work is going to involve dredging or soil disturbances that may generate turbidity concerns, appropriate time of year restrictions may be necessary for certain work. Also, certain timing efforts may be critical for planting schedules and other vegetative requirements for the site development.

The work plan should clearly outline the construction timetable from start to finish, much like traditional construction efforts. As-built drawings at project completion or at certain phases of construction should be included as a means to monitor and measure work progress.



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The construction work plans should describe in detail the hydrology of the mitigation site. It should include the proposed source or sources of water, expected heights and/or volumes of water, the depth, duration and timing of inundation and saturation, the connection or interconnection with adjacent waters or wetlands, the location and details about monitoring wells or gauges, any water control or diversion structures that may be temporary or permanent. If any structures are included in the work plan, the plan should include measures for maintenance where there is a concern or question about damage to these structures from such factors as ice flows, beaver activity or vandalism.

The work plan should include details about any planned vegetation. If the plan includes a planting program, it should describe the planting process such as balled or bare-root stock, fertilizing the planted stock, survival of the planted stock, the list of selected plants and their source particularly if only a local genotype is required, native versus non-native species, planting densities, and scheduling.

The work plan should measure to monitor the planting process and it should include the details of who will monitor the site after initial planting, how it will be monitored, when it will be monitored, what will be monitored,

The mitigation work plan should also discuss the planned soil conditions on the site. If the site is going to be excavated and regarded, the plan should describe the planned soil conditions and how that condition will be achieved. This is particularly important if a specific soil feature, such as a very permeability, is an important component of the plan. The plan should discuss soil fertility, particularly if the site is being treated with a topsoil component. This is important since certain soil factors such as pH or organic content may have an effect on the success of the site. The plan should also include details about soil erosion and sediment control. In certain municipalities, a local agency may have responsibility to erosion control, however, these issues should also be discussed in the overall mitigation work plan. The Corps permit document may subsequently delegate or defer to the local authority for erosion and sediment control compliance. If the plan proposes to augment soil conditions with wood chips or other woody debris, this should be described and detailed. If the mitigation site is going to be utilized as a public resource, it may require interpretive signs, trails and/or fences. The mitigation work plan should also include a description of property markers or other boundary markers. This should include some form of monuments such that the Corps or any party responsible for monitoring the site can effectively ascertain future compliance with the plan and permit document. Where the use of monuments is proposed, the plan should describe their proposed locations and types.

### **V. Performance Standards (Success Criteria).**

The mitigation proposal and permit document may establish target values or ranges for certain parameters such as vegetation densities, percent survival of planted stock, depth and duration of inundation or soil saturation or soil redox values.

Performance standards or success criteria must be relevant to the established goals and objectives, clearly defined, easily measurable and quantifiable external attributes that are established and approved prior to the development of a mitigation site. It must be established how the performance standards will be used to subsequently ascertain compliance with the mitigation goals and subsequent compliance with the permit document. The performance standards must be carefully developed to assure that they can adequately evaluate the stated goals and functions.



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It must be reiterated that any success criteria or performance standards must be as specific as possible, measurable, attainable, reasonable, and clearly understood by all parties. Independent of the mitigation plan, the permit document, whether it is an individual permit, nationwide permit or other general permit, will contain specific conditions that address performance standards, monitoring and eventual permit compliance at the completion of the project.

### **VI. Monitoring Plan**

The compensatory mitigation proposal should identify the party or parties responsible for accomplishing, maintaining and monitoring the mitigation project. To ensure that a project meets the prescribed success criteria, monitoring will be required for an adequate period of time, normally up to 5 years. However, this period could be as long as 10 years in certain circumstances. The permit document will normally include specific monitoring intervals such as once or twice a year. This issue should be included in the monitoring plan such that the responsible party can plan and budget their resources to comply with the plan and permit document.

The monitoring should include a schedule for the monitoring and a format for the eventual report to the Corps of Engineers. Simply stated, compliance monitoring entails sampling the structural elements of a mitigation project to determine if the specific success criteria have been met. If the success criteria have been met at the end of the prescribed monitoring period, then the permittee has satisfied his or her mitigation obligations under the subject permit. If the success criteria have not been met, then the permittee is out of compliance with their permit and corrective or enforcement action may be taken. If corrective work is considered necessary, the applicant will be able to refer to Adaptive Management or contingency plans that have been developed during the original mitigation development and approval process.

If a specific habitat assessment methodology is going to be utilized for subsequent monitoring efforts, it should be specifically identified in the plan. Since the Philadelphia District does not utilize an officially approved assessment methodology, any proposed use of an assessment method should be reviewed and approved by the Corps in advance. If a statistical analysis is going to be conducted, the format and parameters for that analysis should also be identified in the plan. To be useful, this type of monitoring must remain consistent in order to validate any future compliance determinations. This monitoring program should also include specific requirements to address such problems as invasive plants, invasive animals, unacceptable human intrusions or activities. This monitoring plan should also identify who and how these potential problems will be corrected and reported to the Corps of Engineers.

### **VII. Site Protection and Maintenance**

Compensatory mitigation proposals should include a written description of the legal means for protecting mitigation areas. The permit document, whether it is an individual permit, nationwide permit or other general permit will normally be conditioned to require some form of property protection. The wetland or other aquatic resources (including uplands when specifically approved) associated with a mitigation project should be protected in perpetuity with appropriate real estate arrangements. Such arrangements should effectively restrict harmful activities that might otherwise jeopardize the purpose and functioning of the mitigation project. These



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prohibitions include, but are not limited to, filling, grading, excavating, earth moving of any kind, construction of roads, walkways, buildings, signs, or any other structures; any activity that may alter the drainage patterns of the property; the destruction, mowing, or other alteration of vegetation on the property; disposal or storage of any garbage, trash, or other waste material; or any other activity which would result in the wetlands being adversely impacted or destroyed. Conservation easements with a third party are the preferred preservation mechanism. However, other mechanisms such as deed restrictions, transfer of property ownership, or other mechanisms may be approved on a case-by-case basis.

### **VIII. Adaptive Management Plan (Contingency Plan)**

Compensatory mitigation proposals should include contingency plans for unanticipated site conditions or changes. This is also referred to as adaptive management. Even with the best technology and applied sciences, it is not uncommon where proposed mitigation plans require unforeseen modifications. These circumstances may be the result of long term weather patterns such as extended periods of drought or flooding or other weather phenomena. The mitigation plan should address this issue. The need for adaptive management or contingency plans should be identified through the established performance standards and monitoring plans. This work should be coordinated with and normally approved by the Regulatory program project manager. This may also require coordination with other agencies and organizations depending upon the nature and scope of the required contingency work. Any subsequent decisions relating to the need for contingency plans or adaptive management should be based upon the goals of the overall mitigation project.

At a minimum, adaptive management or contingency plans should identify the following: (1) the party or parties responsible for the work, (2) the identification of potential challenges such as flooding, drought, known invasive plant or animal species, seriously degraded site, extensively developed landscape areas. These circumstances will vary from a regional perspective and with specific properties within a given region or municipality. The mitigation plan should discuss how the design accommodates these challenges. The plan should include a discussion of potential remedial measures in the event mitigation does not meet performance standards in a timely manner. The plan should include a description of procedures to allow for modifications of performance standards if mitigation projects are meeting mitigation goals, but in unanticipated ways.

### **IX. Financial Assurances**

Compensatory mitigation proposals should identify the party responsible for providing and managing any financial assurances to undertake and complete the mitigation plan. This should include financial considerations for any subsequent contingency or adaptive management plans if subsequent project monitoring identifies a problem requiring future work needs. Financial assurances should be commensurate with the level of impact and the level of compensatory mitigation required. In other words, greater emphasis should be placed on the issues relating to financial assurances in those circumstances where the permitted activity has a large impact and/or where the mitigation plan is a complex or large proposal. In addition, the Regulatory program may consider past experiences with a particular applicant, geographical region, or other aspects of a particular proposal where there is a concern for project failure.





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Specifically, the proposal should identify the following: (1) the party or parties responsible to establish and manage the financial assurance; (2) the specific type of financial instrument; (3) the method used to estimate assurance amount; (4) the date of establishment; and (5) the release and/or forfeiture of any financial assurances.

Further, the mitigation proposal should consider and address the provisions for financial assurances during all of the following construction and mitigation phases: (1) construction, (2) monitoring, (3) maintenance, (4) remedial or contingency measures, and (5) long term site protection

Financial assurances may be in the form of performance bonds, irrevocable trusts, escrow accounts, casualty insurance, letters of credit, legislatively enacted dedicated funds for government operated banks or other approved instruments. Such assurances may be phased out or reduced once the project has been demonstrated functionally mature and self-sustaining in accordance with the approved mitigation plan and performance standards.

### **X. Compensatory Mitigation Checklist**

See attached sheet