QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR

A Regional Guidebook for Applying the Hydrogeomorphic (HGM) Approach to Flats in the Mid-Atlantic Coastal Plain

Submitted by:
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EPA Project

Management Approvals:

Signature indicates that this QAPP is approved and will be implemented in conducting the research of the Assessment Phase of this project.

Project QA Manager:

Name	Title	Signature	Date
Dr. Kirk Havens	Asst. Director, CCRM		06/01/2009

EPA Project Officer:

Name	Title	Signature	Date
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Name	Title	Signature	Date
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Project Management

A Regional Guidebook for Applying the Hydrogeomorphic (HGM) Approach to Flats in the Mid-Atlantic Coastal Plain

Objectives

The objective of this project is to develop a finalized HGM guidebook for coastal plain flats in the Mid-Atlantic. The Mid-Atlantic flats guidebook will provide guidance in determining functions associated with flats for use in the regional regulatory programs.

The project will involve the combining and analysis of both the Delaware and Virginia flats protocol. An initial workshop will be conducted to evaluate the variables from both procedures in order to determine compatibility of methods and identify protocol gaps, if any. The initial workshop of experts in HGM development will also be used to determine whether additional field sampling of certain agreed upon variables is necessary to obtain pertinent reference data.

Consolidation of methods and analysis of additional field variables will be conducted prior to a second workshop. The second workshop will evaluate the final methodology and variables. In addition, input from the Army Corps of Engineers Waterways Experiment Station will be sought regarding final dispensation of the guidebook.This project will result in the development and implementation of HGM model for the Mid-Atlantic flats wetlands that can:

- provide a periodic characterization of regional wetland conditions
- diagnose the dominant stressors that are effecting wetland conditions that can inform managers about how to proceed with remediation and restoration
- generate an assessment of wetland conditions suitable to inform regulatory decisions and support non-regulatory wetland protection programs
- inform the setting of restoration and creation goals

Over the course of the one-year project period, we will:

- Conduct expert workshops;
- Develop a comprehensive HGM flats model for the Mid-Atlantic region

Project/Task Organization

The Regional Guidebook for Applying the Hydrogeomorphic (HGM) Approach to Flats in the Mid-Atlantic Coastal Plain consists of two distinct parts: (1) expert workshops to review the Delaware and Virginia draft models and (2) additional variable collection if gaps are identified. The overall responsibility for the project, including quality control and quality assurance, rests with Principal Investigator, K. Havens. The four project Co-Investigators (Havens, Jacobs, Whigham and Rhodes) comprise the core management team. The core management team will hold periodic conference calls and frequent email exchanges to administer and coordinate the project.

Assessment/Oversight

The management team (Havens, Jacobs, Whigham, and Rhodes) will be coordinated by K. Havens. A. Jacobs, is responsible for assuring that quality assurance procedures are followed in the field portion of the assessment, should it be necessary, and for ensuring that appropriate communication between the field team and the management occurs in a timely and complete fashion.

Project/Task Organization

HGM Model Comparison

The Model Comparison will have one specific goal; to consolidate the Virginia and Delaware HGM flats models for the Mid-Atlantic region. Experts at the Virginia Institute of Marine Science's Center for Coastal Resources Management (CCRM), the Smithsonian Estuarine Research Center (SERC), Delaware Department of Natural Resouces, and EPA with carry out the function.

Task One. Virginia and Delaware HGM flats model comparison

In order to conduct the analysis, both draft models and their supporting data, will be reviewed by the co-investigators and conclusions independently confirmed by an expert workshop. Gaps and model redundancies will be noted for Task two.

Task Two: Field Studies to Capture Variable Data Gaps

The second step is to gather additional data if necessary to bring the two methods into compliance. Field data collection will follow the accepted EPA approved protocols for "Protocols for Scoring Variables for the Flat Subclass in the Coastal Plain Region of Delaware Version 2.0" (Quality Assurance Project Plan for State of Delaware's Wetland Monitoring and Assessment Program, 2007) and "A Draft Regional Guidebook for Applying the Hydrogeomorphic Approach to Wet Hardwood Flats on Mineral Soils in the Coastal Plain of Virginia" (Quality Assurance Project Plan Hydrogeomorphic Regional Guidebook for Hardwood Mineral Flats (HMF), 2000). A. Jacobs will serve as Project Manager for any additional field data collection utilizing the previously approved quality assurance plans from these projects.

Data Generation and Acquisition

This project uses data only from the two projects that were conducted under existing EPA QAPs. No data will be acquired that has not been subject to one of the previous project's quality assurance protocols.

Data Management

Full backups of all network drives are done every Friday beginning at 8:00 PM. This weekly backup copies full content of all drive to backup tapes. Backups generally last 28 to 36 hours. Incremental backups are done nightly Monday through Thursday. These incremental backups target only those files that have been modified since the last full backup. Successful completion of backup jobs is verified every morning Monday through Friday and failed jobs are rescheduled if they occur. Tapes containing the most recent full backup are removed from the Qualstar Backup Library and stored in a fire proof safe in CCRM administration building. Full copies are kept for at least the previous month. CCRM procedures are consistent within the guidelines outlined in Little and Chapa (2003).

Quality Objectives and Criteria

The data quality objectives of the project are to (1) review and consolidate previously quality assured data and, if necessary, (2) collect accurate and precise data across the Mid-Atlantic Region to supplement consolidation of the methods. This will be achieved by establishing quality assurance checks throughout the data handling process from reviewing existing project data, to checking data sheets in the field prior to leaving a site. If collection of additional field data is

necessary field briefings will be done prior to field sampling to ensure consistency with the previously approved project QAPs.

Special Training/ Certification

If collection of additional field data is required, the field team will be trained in the previously approved data collection methods. Training in each method will be provided by the appropriate developers/authors of the method A. Jacobs is the field team Project Manager.

Analytical Methods Requirements

The selection and use of appropriate statistical methods is a critical component of the present study. The following section outlines the procedure for processing field data. We will analyze the data to determine what statistically significant differences or conclusions can be reached. Our approach to data analysis will be developed once data comparison is complete as there is currently no defined method for integrating individual HGM assessment methods into one for regional use.

Statistical Programs

Minitab and Primer will be the main statistical packages used to analyze data collected in this study. These are powerful, flexible, and comprehensive programs that will perform most of the tests discussed below, as well as a wide variety of multivariate exploratory techniques.

Descriptive and Graphical Methods

Descriptive and graphical methods will provide a sound starting point for subsequent analyses. For example, "notched box and whisker" plots of variable scores by model may illustrate differences in model performance. Scatter plots of one model versus another will indicate comparability of models.

Simple/multiple regressions and residual analysis

Useful simple and multiple linear regression models may be able to be developed from the data collected from the previous projects. In particular, models that use biological measures may be helpful in determining the relationship between assessment information. The relationship between individual assessment metrics will also be compared.

Analysis of Variance

Analysis of variance (ANOVA) is a commonly employed statistical technique that determines whether means of two or more sampling distributions are significantly different from the expected value using an F-distribution. This can be used to compare the mean scores for each method in each region. Tukey's multiple comparison test is typically used after obtaining a significant result from an ANOVA test to determine which means are significantly different from each other. If certain data sets depart seriously from the assumption of normality, nonparametric equivalents to the ANOVA and Tukey's multiple comparison test will be used, e.g. Kruskal-Wallis Distribution-free Test for General Alternatives and the Critchlow-Fligner Multiple Comparison.

References

Little, David B., and Chapa, David A, 2003. Implementing Backup and Recovery: The Readiness Guide for the Enterprise, Wiley Publishing, Inc, Indianapolis, IN, pp.340.