

**Development of a Comprehensive State Monitoring and
Assessment Program for Wetlands in Massachusetts**

Appendix Q
June 15, 2009

**Standard Operating Procedures: Mapping Anthropogenic Ditches
in Salt Marshes of Massachusetts**

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Standard Operating Procedures: Mapping Anthropogenic Ditches in Salt Marshes of Massachusetts

Purpose

Many, if not most, salt marshes in Massachusetts have had ditches cut into them, mainly in an attempt to control mosquito populations. There is no known data set that documents the extent and density of that ditching. This mapping project will provide those data by digitizing ditch locations on color orthophoto base maps.

Definition

The purpose of the project is to map anthropogenic ditches. Such ditches do not include naturally developed water channels such as creeks, rivers, etc. A ditch is defined as a narrow (generally 3 meters or less in width) channel, which has been cut into the salt marsh. Ditches are essentially straight and occasionally exhibit sharp (almost right angle) turns. On the source imagery, ditches appear as dark grey to black lines. A creek can be differentiated from a ditch in that the creek exhibits a sinuous flow path, including meanders, branching, and/or other features consistent with naturally flowing water. For the purposes of this mapping project, any narrow, straight, water feature will be mapped as a ditch. Portions of naturally occurring creeks which have been channelized and straightened will be mapped as ditches. Conversely, channels which are curved or contain meanders, etc. will not be mapped as ditches.

Delineation

The source imagery for mapping ditches will be the MassGIS 2005 color orthophotos (technical specifications and metadata available at MassGIS). Salt marsh polygons will be extracted from the MassDEP Wetlands Data layer (technical specifications and metadata available at MassGIS) and projected onto the source imagery. Photointerpreters will review each polygon for the presence of ditching. Ditches will be digitized using ArcMap 9.2. The output will be a linear shapefile. The name of the photointerpreter and the date of photointerpretation will be recorded in the attribute fields of the shapefile. The monitor will be a 15 inch LCD screen.

All photointerpretation will occur at a nominal scale of 1:3000. Only features that are visible at this scale on the source imagery will be mapped. Photointerpreters will not zoom in to more accurately place linework, nor will they zoom out to increase the work rate. Photointerpreters will attempt to digitize the centerline of the ditch. All line work that connects ditches to other ditches, or connects to the edge of the salt marsh feature, will be snapped (lines will connect via a shared vertex). Photointerpreters will not attempt to map ditches that appear to be less than 30 meters in length.

Due to the limitations of aerial photointerpretation, it is understood that not all ditches will be captured. In some cases vegetation obscures the ditch, thus it is not visible on the source imagery. In other cases the ditching is so dense and extensive that it cannot all be captured within a reasonable time frame. While the photointerpreters should attempt to capture all ditches and

delineate the centerline of the ditch, the project emphasis is on capturing the density of ditching in each salt marsh polygon, not capturing the specific features of each individual ditch.

Key Personnel

Michael Stroman, MassDEP. Coordinate all aspects of the project.

Bradley Compton, UMass. Review data for compliance with CAPS standards. Accept or reject final delivery of data.

Michael McHugh, MassDEP. Provide training and direct supervision of photointerpreters. Perform quality assurance checks to ensure compliance with these mapping standards.

Nathalie Regis, MassDEP (intern). Photointerpreter

Xuan Vu, MassDEP (intern). Photointerpreter.

Quality Assurance/Quality Control (QA/QC)

Photointerpretation and the digitization of ditches will be conducted by MassDEP interns trained by an experienced wetland photointerpreter (Michael McHugh). Mike McHugh will do preliminary QA/QC; Brad Compton will do secondary QA/QC. Quality Assurance/Quality Control will consist of comparing linework with imagery.

All linework will be reviewed and 10 percent will be carefully examined by Mike McHugh to determine whether it meets QA/QC objectives. Brad Compton will review linework after the first day of digitizing; throughout as requested, and at end of project to ensure its usability for CAPS metric development and modeling.

Data Quality Objectives

Parameter	Units	MDL	RDL	Expected Range	Accuracy (+/-)	Precision
Anthropogenic Ditches	m/ha	NA	30 m	0-500 m/ha	≥90% of ditches ≥30 m long will be mapped	95% of ditch linework will be within 15 m of ditch in image based on 10% QA/QC review