

# Determining Changes in Wetland Abundance Within the Stony Brook Harbor / West Meadow Creek Estuary

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## Introduction

This project was conducted to see if the tools within ArcMap could be used to locate, quantify, and compare historic abundances of estuarine wetlands to the current abundance of estuarine wetlands for this study area. These types of analyses can be useful in providing Federal, State, local, and non-profit environmental groups a 'target acreage' when considering wetlands restoration projects. The information provided by these types of analyses is also useful in educating the public, reversing the 'shifting baseline syndrome', and preserving existing wetlands.



Figure 1. Study area



Figure 2. 1904 USGS Map

## Methods

A 1904 USGS map of the region was used for the historic analysis. For the current analyses, two separate data sources were used; the USFWS National Wetlands Inventory (NWI) dataset and 2010 high resolution orthoimagery from the NY GIS Clearinghouse. This project was divided into two parts; Part I: a comparison of 1904 wetlands to the NWI dataset, and Part II: a supervised image classification of the orthoimagery for comparison to the NWI dataset.

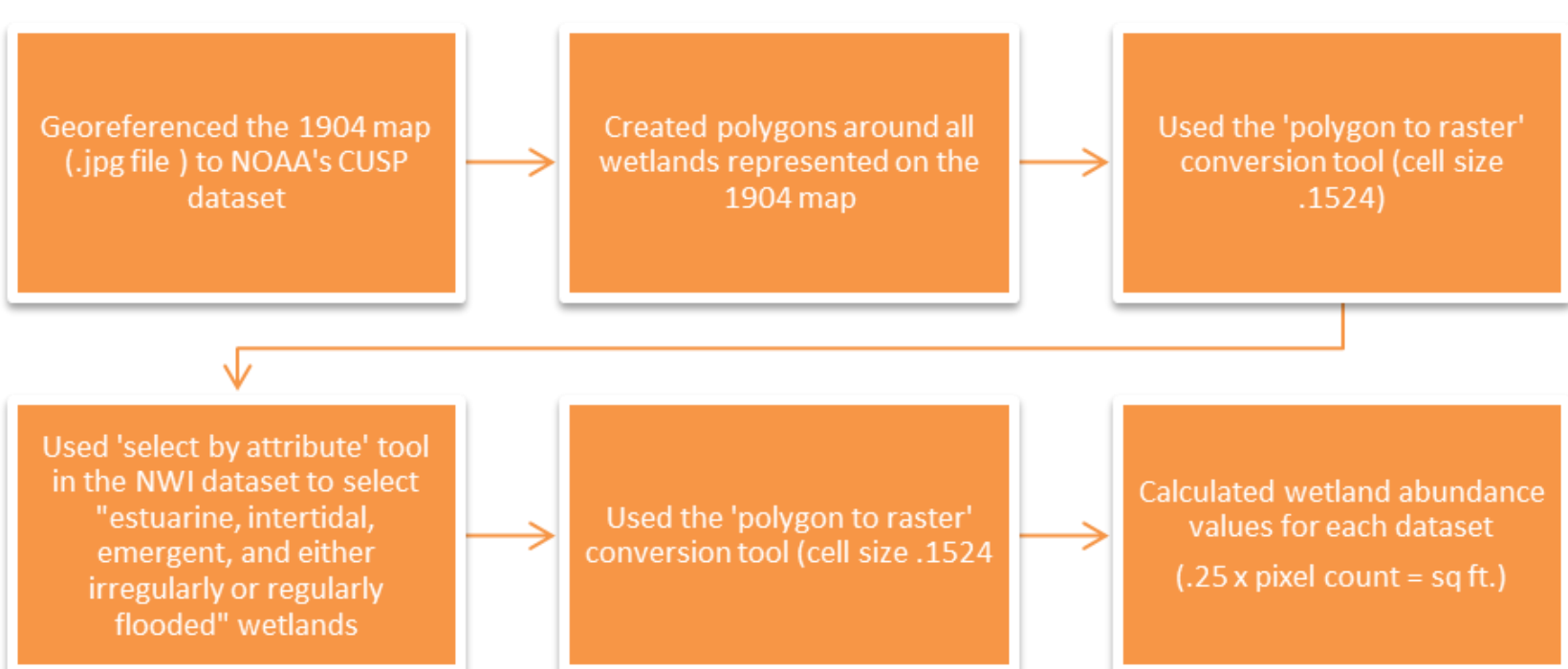


Figure 3. Workflow for Part I of the Study

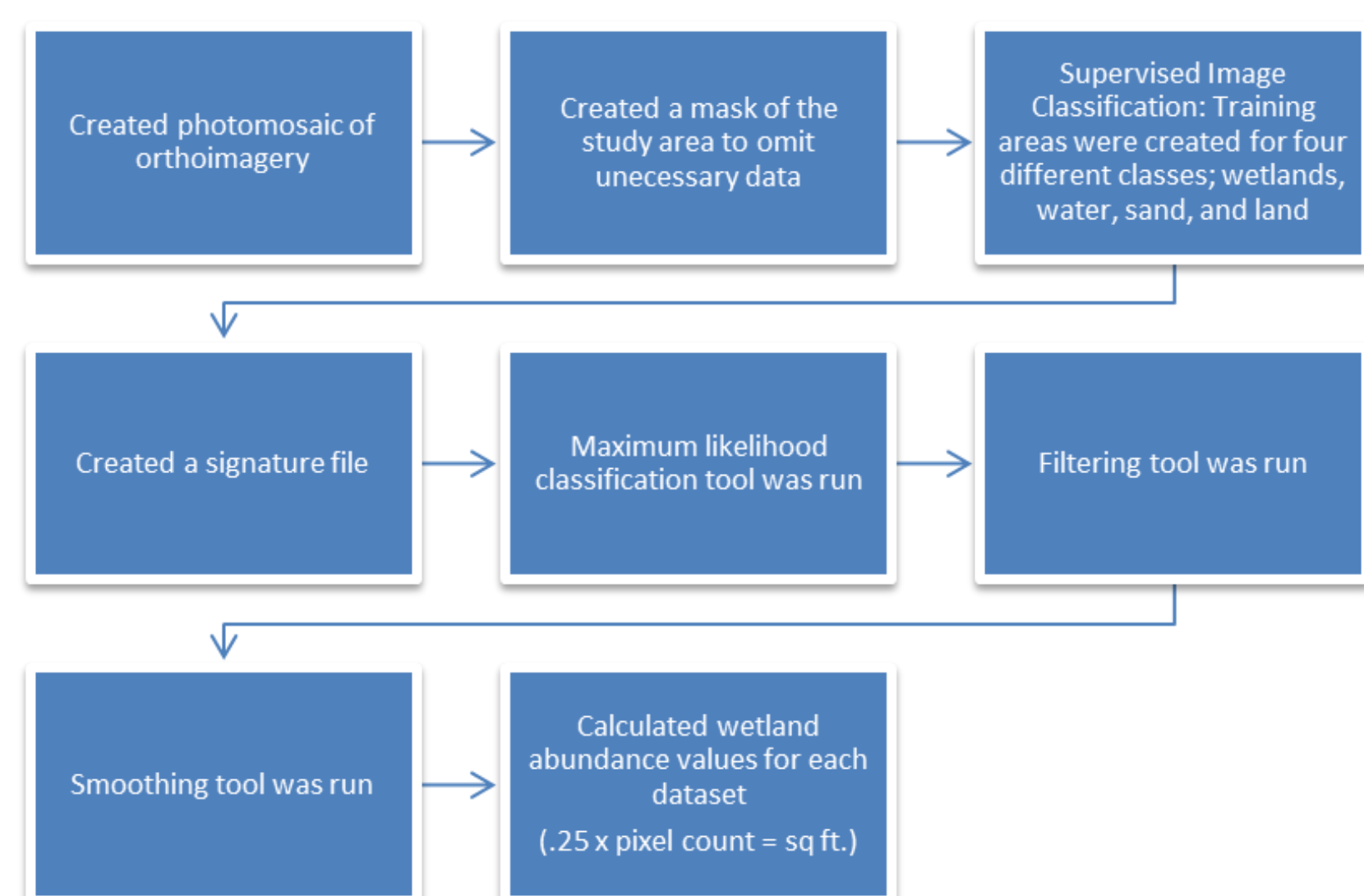


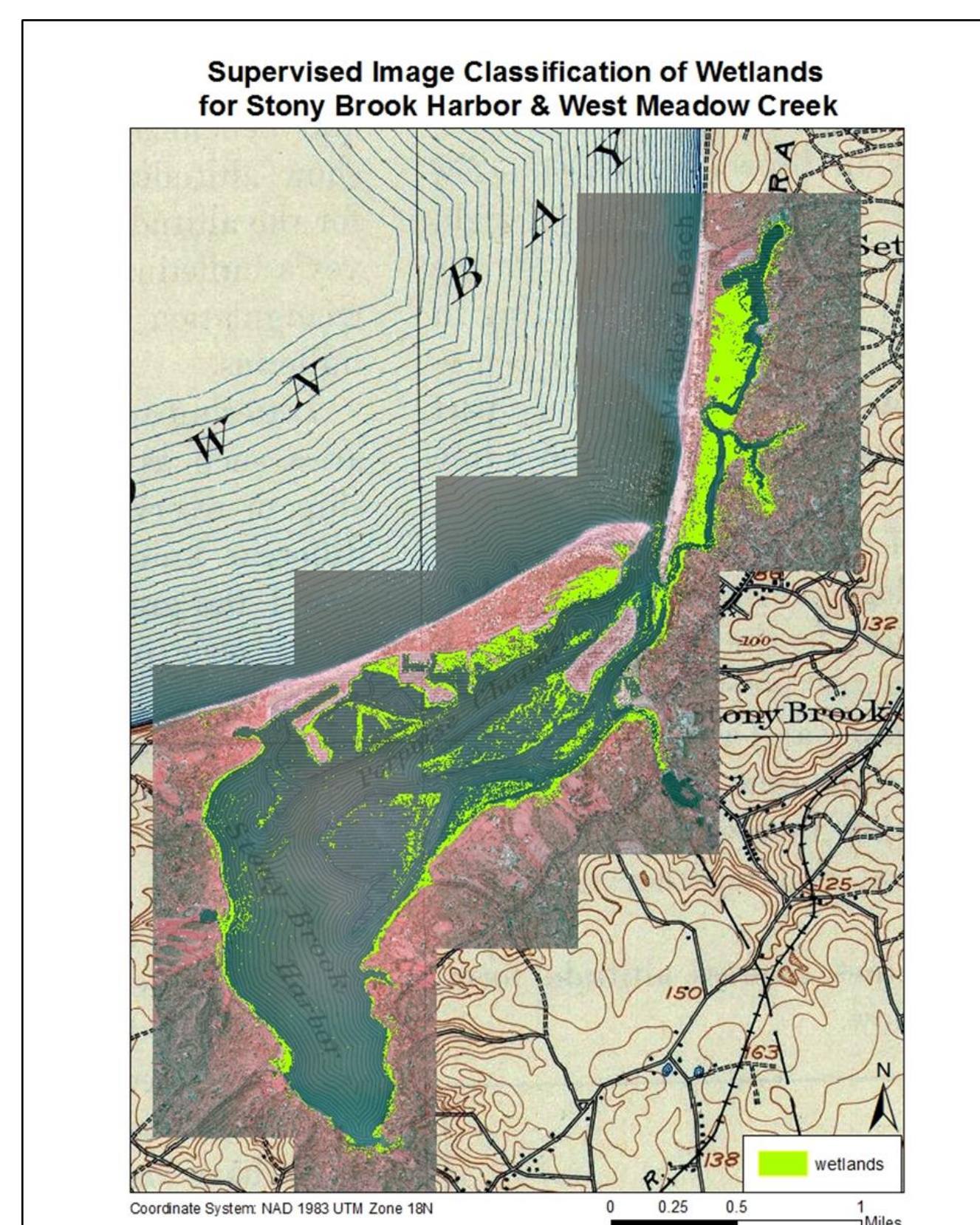
Figure 4. Workflow for Part II of the Study

## Results

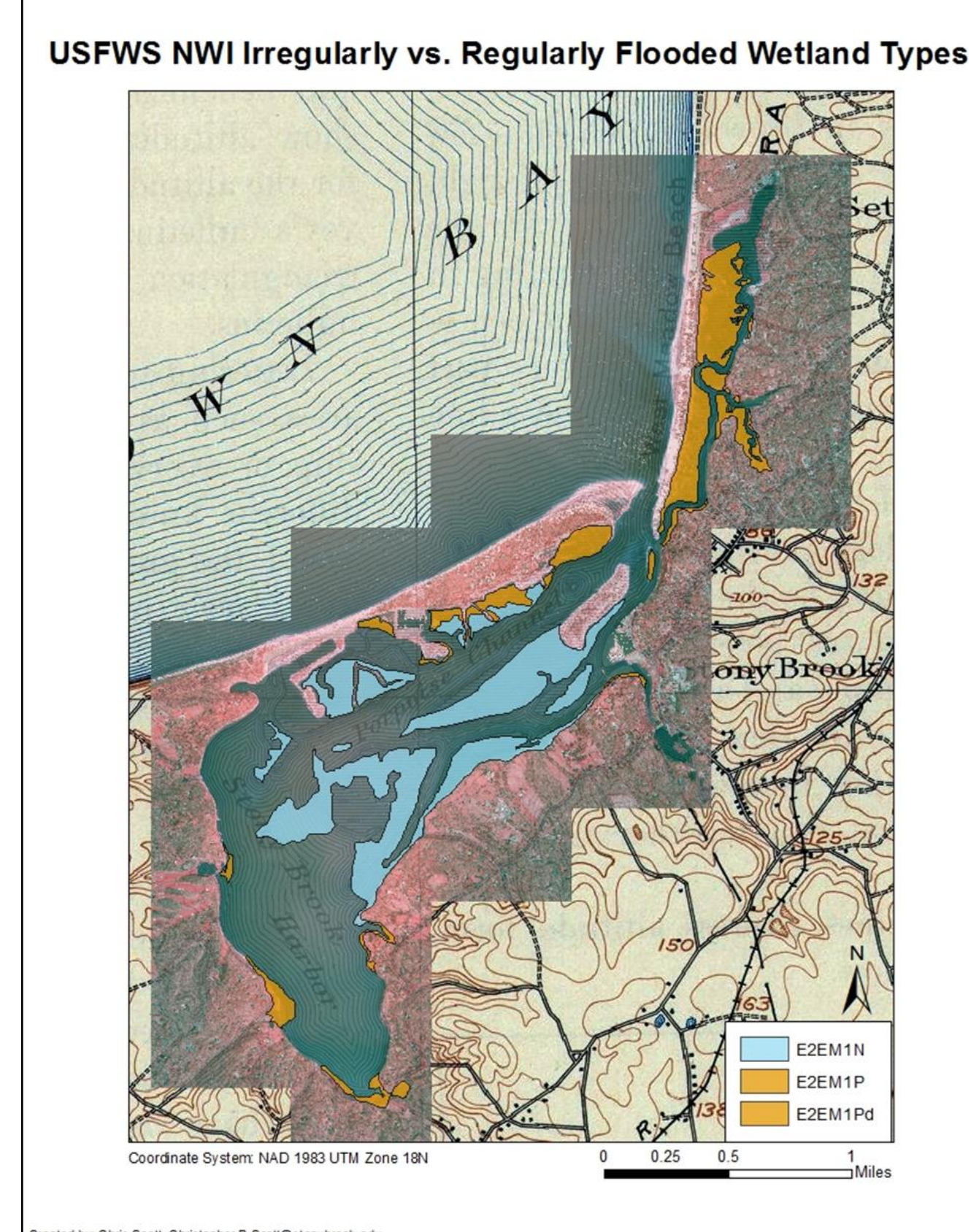
For Part I of the study, an 8.4 acre loss of wetlands is observed for the study area over the 100+ year period. It seems that the majority of the wetland change occurred in the more exposed Stony Brook Harbor.

1904 USGS Wetlands	Current USFWS NWI Wetlands
50.14 acres	41.70 acres

Table 1



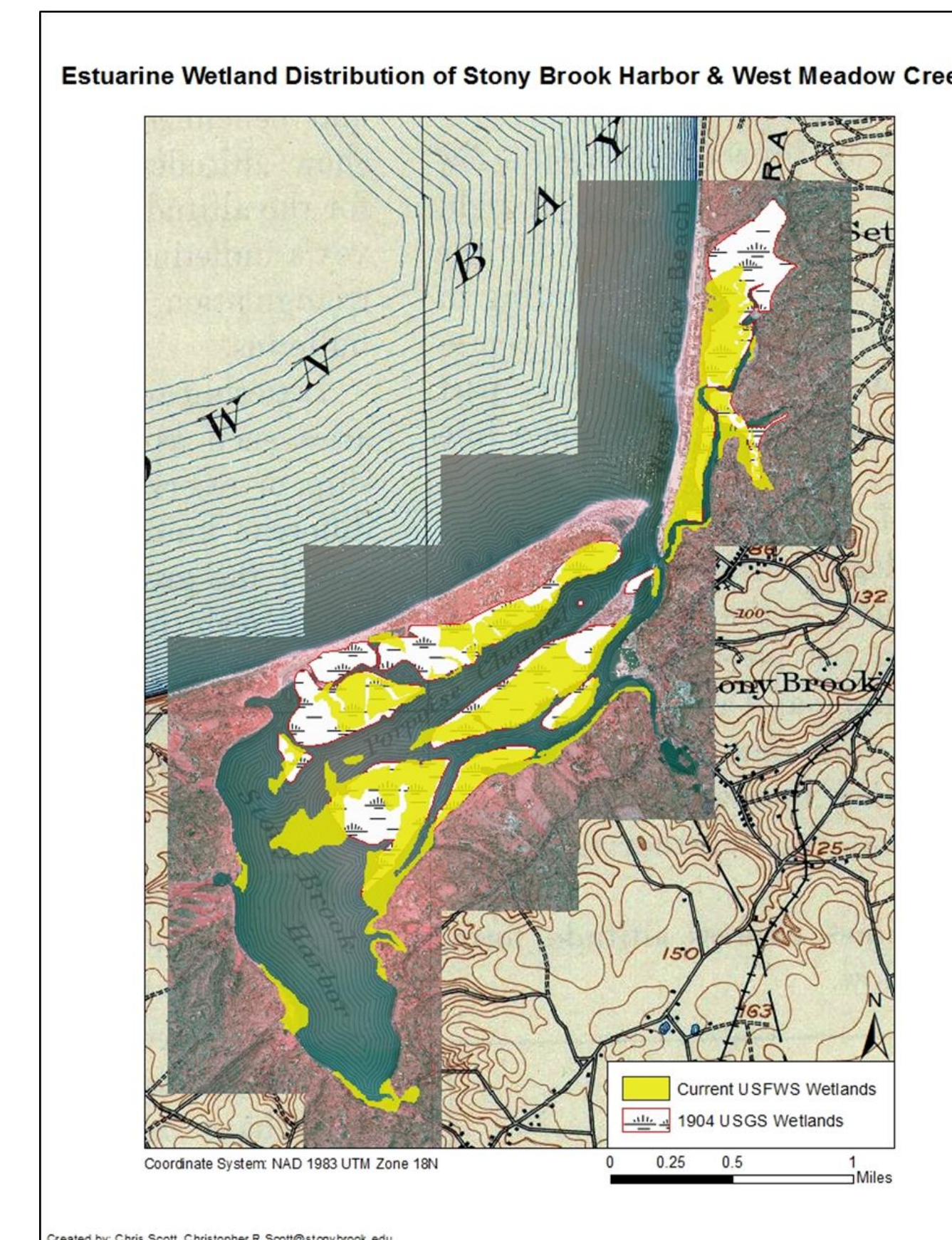
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Irregularly & Regularly Flooded	Irregularly Flooded Only	Supervised Image Classification
41.70 acres	15.93 acres	22.82 acres

Table 2

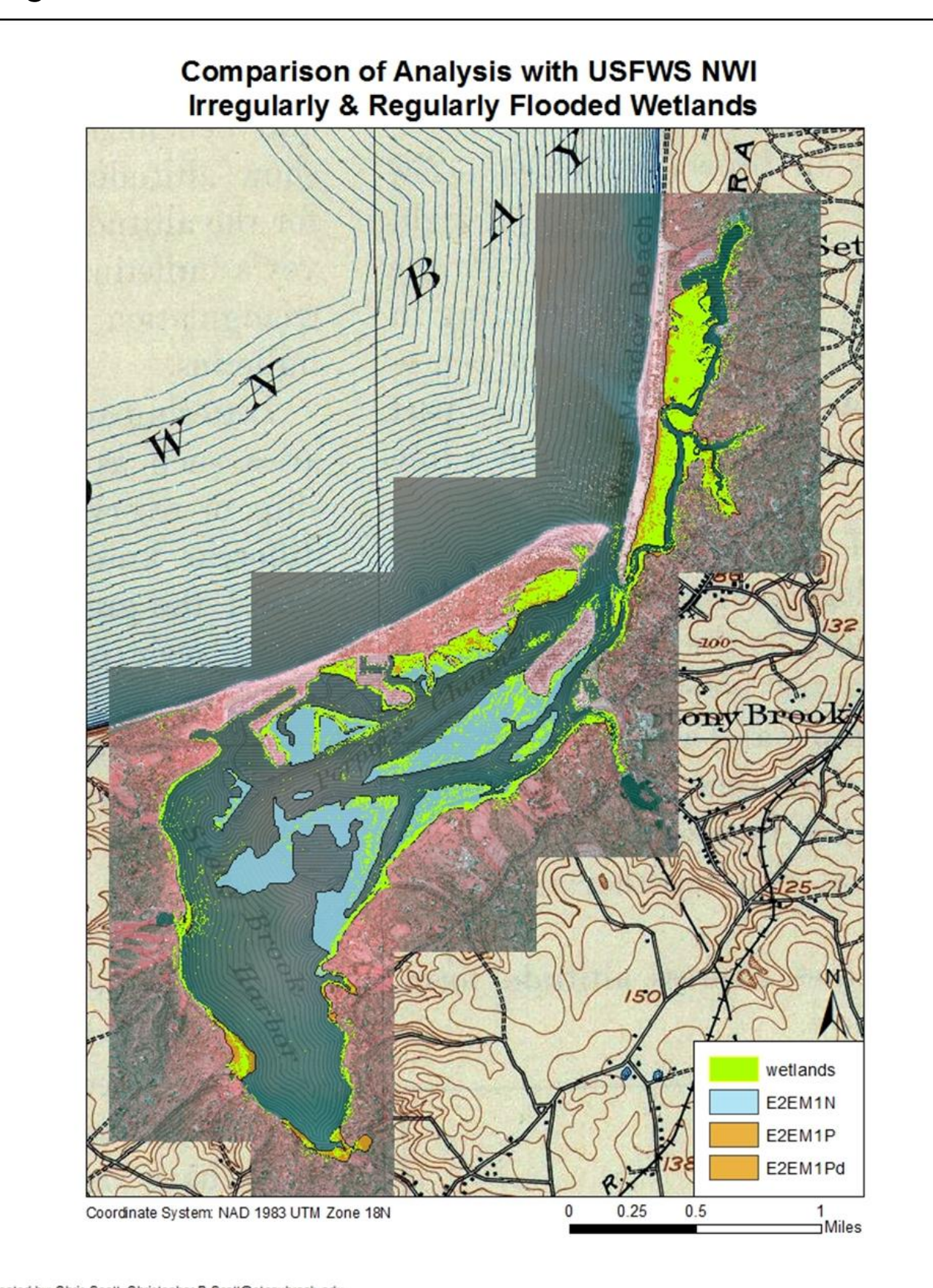


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Figure 5. Part I Results

For Part II of the Study, the supervised image classification was compared to both the NWI dataset that contained both regularly flooded (E2EM1N) and irregularly flooded (E2EM1P & E2EM1Pd) wetlands and to the NWI dataset that contained irregularly flooded wetlands only.

Figures 6.7.8. Part II Results



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## Conclusions

Part I: If we can assume that the 1904 wetland boundaries represent similar boundaries to the irregularly and regularly flooded wetland boundaries of the current USFWS data, then the analysis between the two is a useful method in determining the amount of wetland loss. This is also a helpful method in determining how much wetland needs to be restored to bring the system back to historic abundances and where these wetlands should be restored. Unfortunately the metadata for the 1904 maps was unable to be found during this analysis so there was some uncertainty in whether or not the comparison is accurate. With that being said this method of comparison would be more effective for an area in which the wetland type (i.e. irregularly, regularly flooding) of the historic map is known.

Part II: The supervised image classification was effective in locating and calculating wetland abundance and location. Though, this data should be groundtruthed to confirm the wetland type (i.e. irregularly vs. regularly flooding). This type of analysis could be a useful and accurate method in determining changes in wetland abundance over time if both the time of year and stage of tide are held constant for all of the photography being analyzed.

## Recommendations

ArcMap has many useful tools in determining wetland abundance and distribution. But as my analyses show, to achieve the most accurate results it is important to insure that all variables in data (i.e. time of year, stage of tide, wetland type, etc.) are held constant and that the correct data sets are being compared. To minimize error I would recommend that future studies compare supervised image classifications to supervised image classifications, not to polygon layers.

## References

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