COASTAL RECREATIONAL FISHING LICENSE

FINAL PERFORMANCE REPORT

Recipient: Anne Deaton

Grant Award #: 2014-H-025

Grant Title: Submerged Aquatic Vegetation Mapping along the Southern North Carolina Coast

Grant Award Period: July 2014- June 2015 + extension to December 2016

Performance Reporting Period: Jan 2016 – August 30 2016

Project Costs: $23,500 total, $16,500 for Year 1, $7000 for Year 2.

Expenditures for the Period, Jan 2016-Aug 2016:

Category	Expenditures
Personnel	0
Fringe	0
Travel	0
Equipment	0
Supplies	0
Construction	0
Contractual	$6,426.13
Other	0
Total Direct	0
Indirect	0
TOTAL	$6,426.13

Beginning Grant Award	$23,500.00
Additional Funding Awarded	$ 9,500.00
Total Grant Funds	$33,000.00
Beginning Balance Jan 2016	$26,658.40
Jan-Aug Expenditures:	$ 6,426.13
Total Project Expenditures:	$12,767.73
Total Remaining Balance:	$20,232.27

Description of Work**:**

1) Year 1 - Obtain high resolution aerial imagery of SAV in the southern region of NC, from Bogue Inlet in Onslow County to Mason's Inlet in New Hanover County. Collect field data to groundtruth aerial photographs.

2) Year 2- Digitize an SAV layer to determine quantity and location of SAV in the southern region and, when combined with the efforts of APNEP, have an updated map of high salinity SAV in NC that can be used to monitor change.

Project Status/Work Accomplished:

Submerged aquatic vegetation, or seagrass, provides vital nursery and foraging habitat for many recreational fish species, including red drum, speckled trout, blue crab, bay scallop, hard clam, and penaeid shrimp. Quantifying change in habitat extent and distribution over time provides fishery scientists with information critical for managing fisheries holistically.

Aerial photography of SAV was done south of Bogue Sound for the first time in 2008. Other areas of the state within the Albemarle-Pamlico National Estuary Program, where greater quantities of SAV occur have been mapped irregularly since the 1980s and 1990s. In 2008, an interagency effort mapped SAV along the entire coast using similar aerial photographs and delineation criteria. That effort identified 414.73 acres of SAV within the same waters as this CRFL project. This represents only 0.3% of the estimated 150,000 acres identified coastwide. However, for species dependent on SAV, the presence of even small patches of grass can enhance survival and growth of juveniles, enhancing fish populations and strengthening ecosystem resiliency.

The purpose of this project was to remap the area south of Bogue Sound to determine if SAV habitat was increasing or decreasing. Given that SAV in this area is at its southern limit in North Carolina, the habitat may be more vulnerable to changes in environmental conditions. Monitoring at habitat distribution edges allows for early detection of change in a system.

For this project, NC Department of Transportation (DOT) was contracted to obtain the imagery and conduct the photo-interpretation. The project was delayed one year due to the timing of the grant, the peak growing season of SAV when imagery should be taken, and the time to secure a contract with DOT. In 2015, the DOT flew over the project area and successfully collected imagery from Bear Inlet to Mason's Inlet in May 2015. Prior to the flights, DMF and DOT decided to omit the small area between Bear Inlet and Bogue Inlet since an APNEP project covered that area in 2013. Although the 2008 imagery extended to the Cape Fear River, only an extremely sparse amount of SAV was found south of the Mason's Inlet area, and so the southern end of the mapping ended near Mason's Inlet. Following the flights, the

DOT rectified and mosaicked the images. DMF received the individual and mosaicked images in color and infra-red color in July 2015.

DMF staff were responsible for collecting groundtruthing data for verification of the delineated results. Within one month of the flights, staff collected bottom habitat data from 171 locations that were selected using ArcGIS software and a random point generator, stratified by past bottom type. The data were sent to DOT to assist with photo-interpretation.

In 2016, DOT completed photo-interpretation and delivered the delineated shape files. DMF reviewed the shape files and field verified some questionable areas. DMF staff met with DOT to review the imagery together at two separate visits. Based on the field visits and further review of the imagery with DOT, some changes were made to the delineated SAV polygons. Changes primarily consisted of deleting some polygons labeled as patchy SAV that, after field visits and further examination of the aerials, actually appeared to be areas of submerged scattered oysters, shell, algae, or a darker muddy bottom. These habitat types had similar color signatures in the imagery as scattered SAV. In contrast to areas north of Bogue Sound, this southern area has a greater abundance of intertidal oyster reefs, with small areas of subtidal oysters and other biogenic organisms in close proximity and intermixed with SAV, making their identification more difficult.

Once the photo-interpretation was completed, a total of 2,271.28 acres of SAV habitat were identified. Of this, 549.17 acres were classified as dense, and 1,722.11 acres were classified as patchy (Figures 1). An example of the imagery obtained depicting SAV and the delineated boundaries is shown in Figure 2. The larger acreage compared to the 2008 data indicates that SAV habitat may have increased over the past seven years in the southern end of its NC range. However further analysis is needed to determine how much of this apparent change in SAV abundance is accurate or attributed to small differences in methodology.

Deviations:
There were no deviations to the goals, objectives, or scope of work during the reporting period.

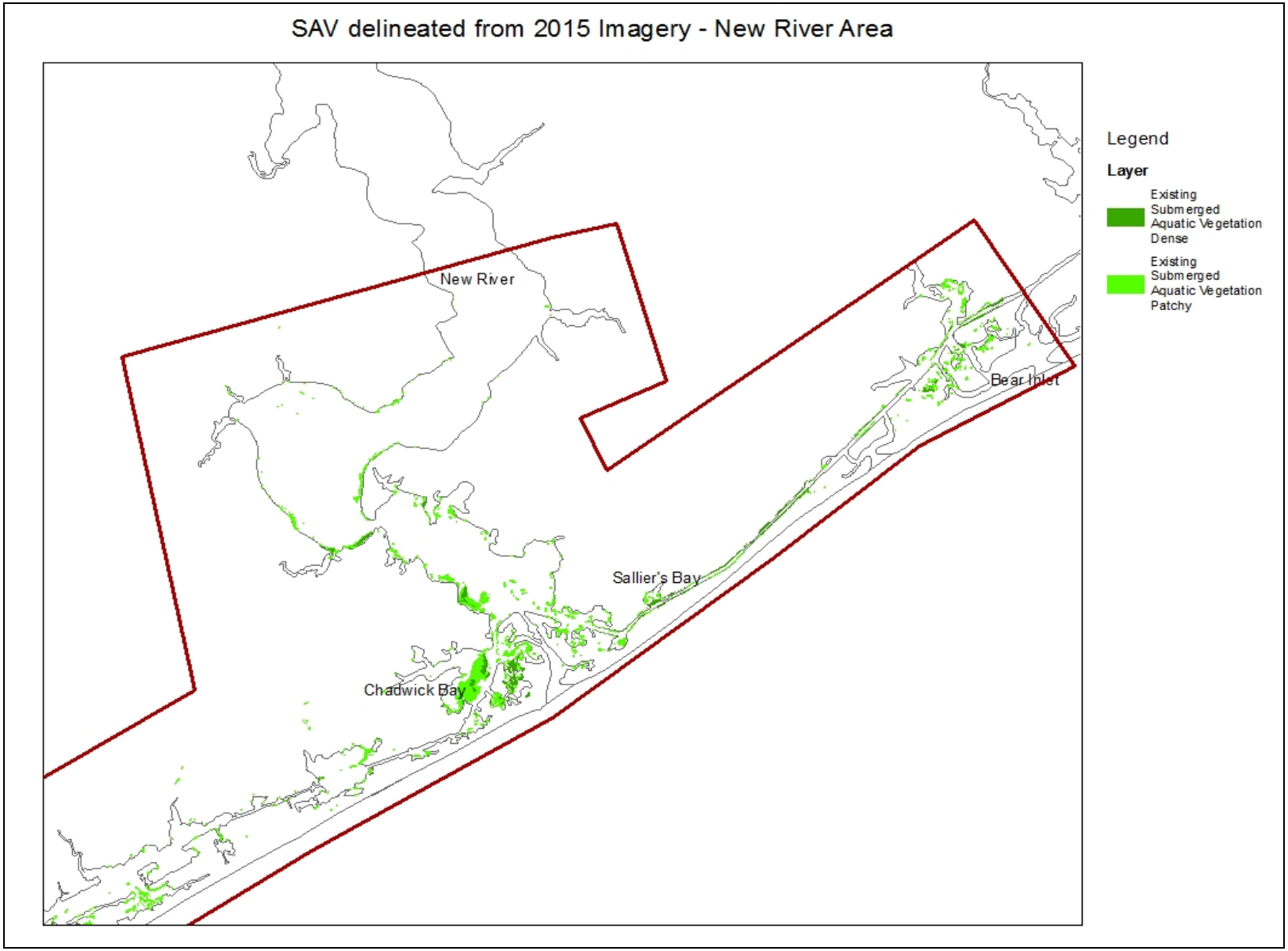

Figure 1a. Dense and patchy SAV identified from aerial imagery.

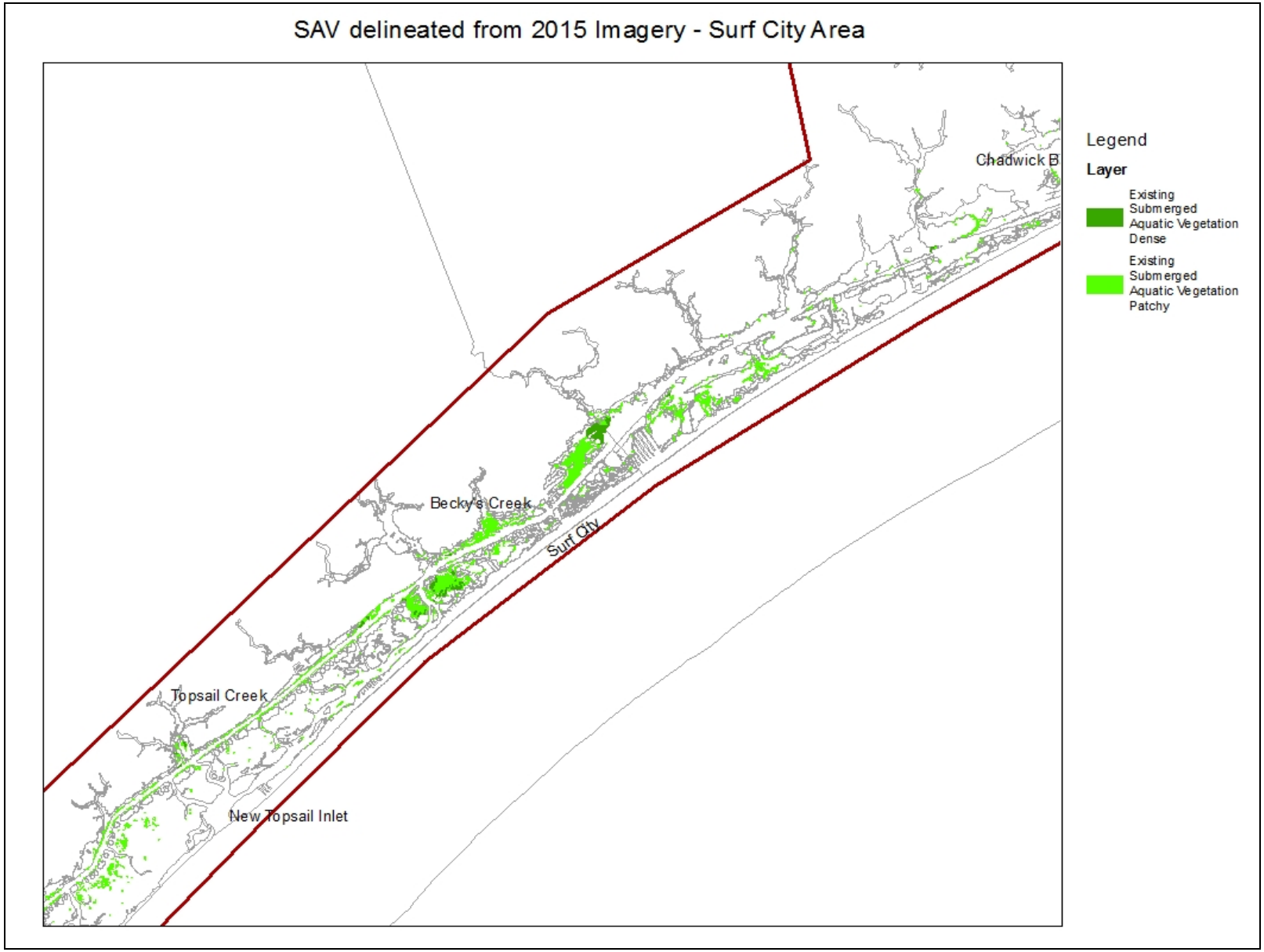

Figure 1b. Dense and patchy SAV identified from aerial imagery.

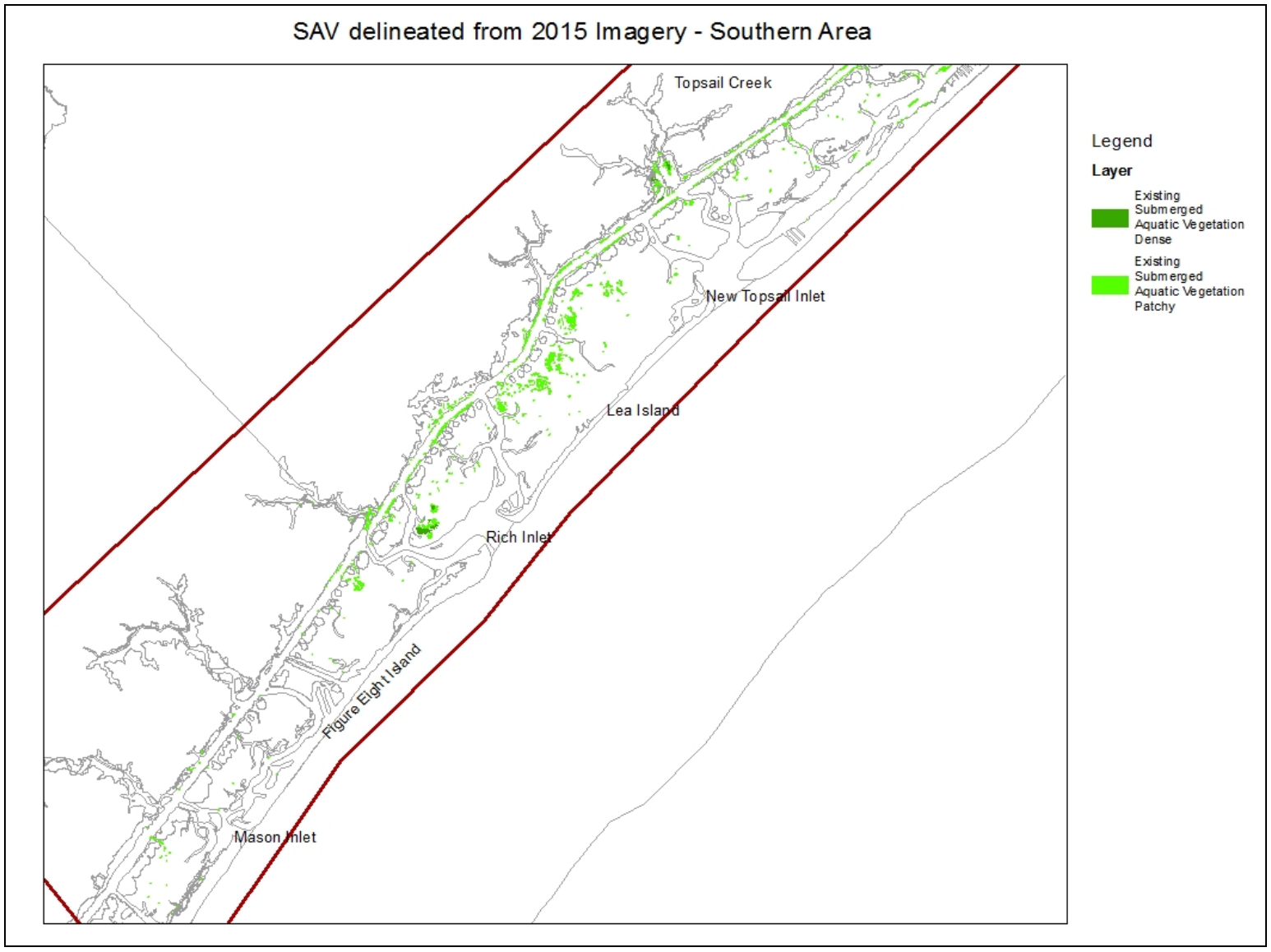

Figure 1c. Dense and patchy SAV identified from aerial imagery.

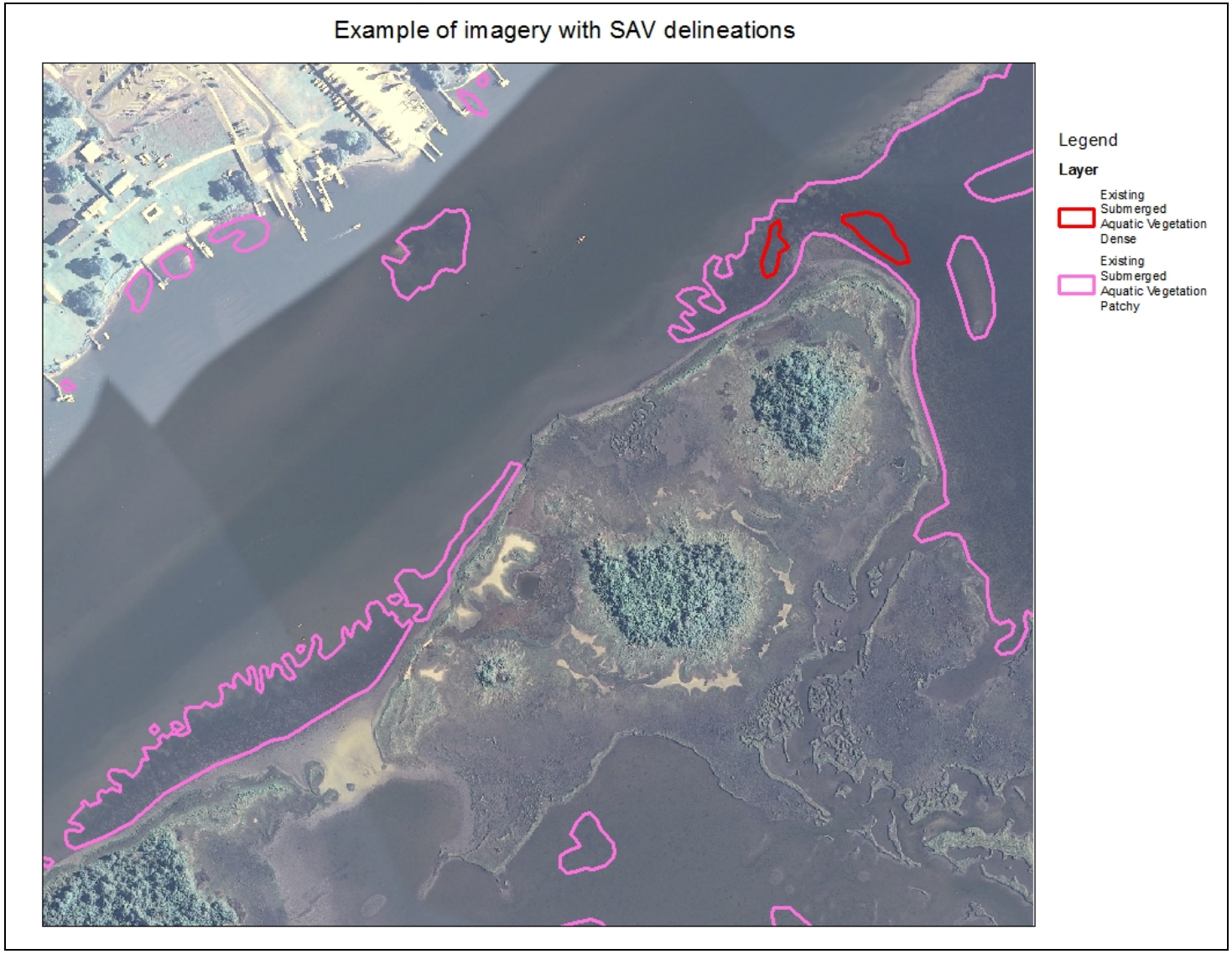

Figure 2. Aerial photograph and delineated SAV polygons on the Intracoastal Waterway and Moore's Bay, in the Hampstead area.