

Submerged Aquatic Vegetation Mapping

APNEP Ecosystem Symposium 2017

Don Field

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SAV Partnership

- Federal: ACE, FWS, NOAA, NPS, NRCS
- Combined: APNEP, NERR
- State: DCM, DMF, DWQ, DWR, EEP, WRC, DOT
- Academia, ECSU, ECU, NCSU, UNC-CSI, UNC-IMS, UNC-W, NC Seagrant, DUMML, CW&M-VIMS
- NGOs: NCCF, TNC

Environmental Parameters for Submerged Habitat Mapping

- Winds low – preferably 5 mph or less
- Sun Angle 20 – 45 degrees to reduce glint
- Low tide
- Turbidity low
- No clouds or haze
- Adequate biomass of target

Intergraph's Z/I Digital Mapping Camera (DMC)



2006 0.3 m vs. 2007 1 m DMC imagery

2007 1m Pixels
6.4 mi. long
3.6 mi. wide

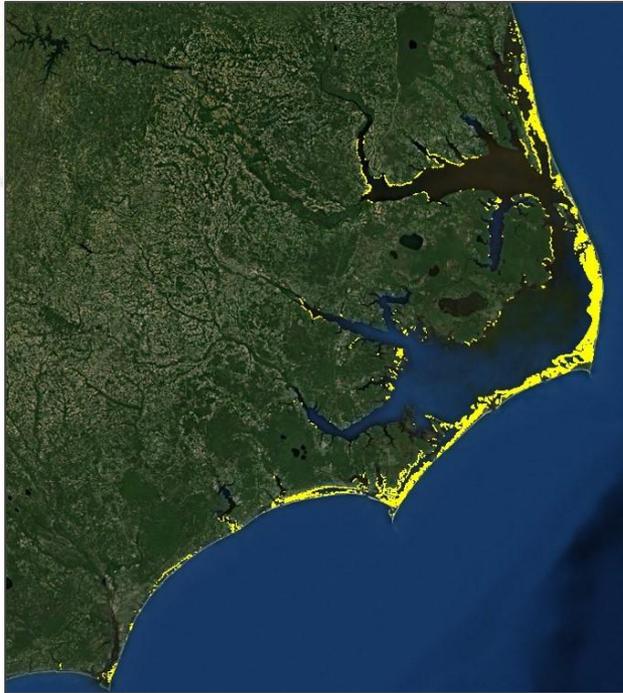


2006 0.3m Pixels
2.6 mi. long
1.4 mi. wide

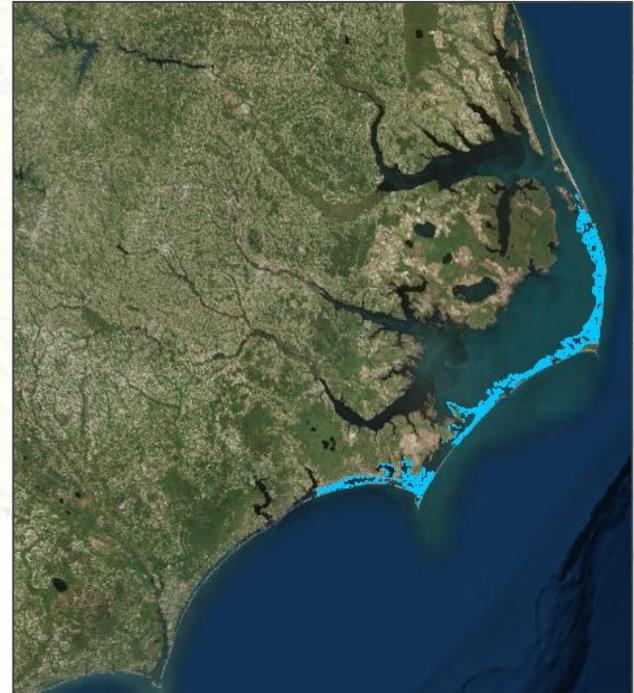


0.3 m image ~ 0.7 GB; 1.0 image ~ 0.25 GB

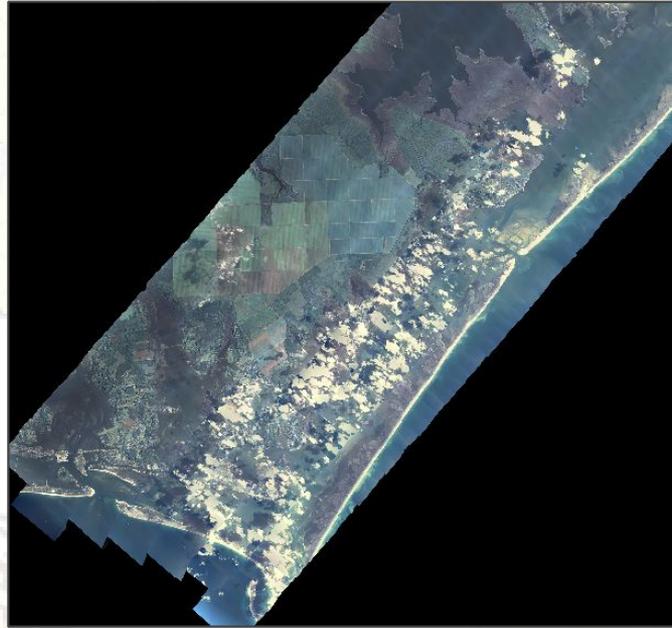
SAV in NC and Back Bay, VA 2006-2008



Seagrass in NC, 2013-2014



Issues with the 2013-2014 Imagery



Clouds in Core Sound

Study Areas

Study Area 1

- Northern extent: Highway 64 Bridge from Roanoke Island to Nags Head
- Southern extent: Oregon Inlet

Study Area 2

- Northern extent: Oregon Inlet
- Southern extent: Hatteras Inlet



Study Area 1 Change Detection Results

	2007	2013
Dense SAV Acres	2447	1354
Patchy SAV Acres	2753	3966
Total SAV Acres	5201	5320
119 acre difference (2.28%) between 2013 and 2007		

Vegetation Change Description	Acres
Dense SAV to Patchy SAV	1,160.02
Patchy SAV to NO SAV	633.04



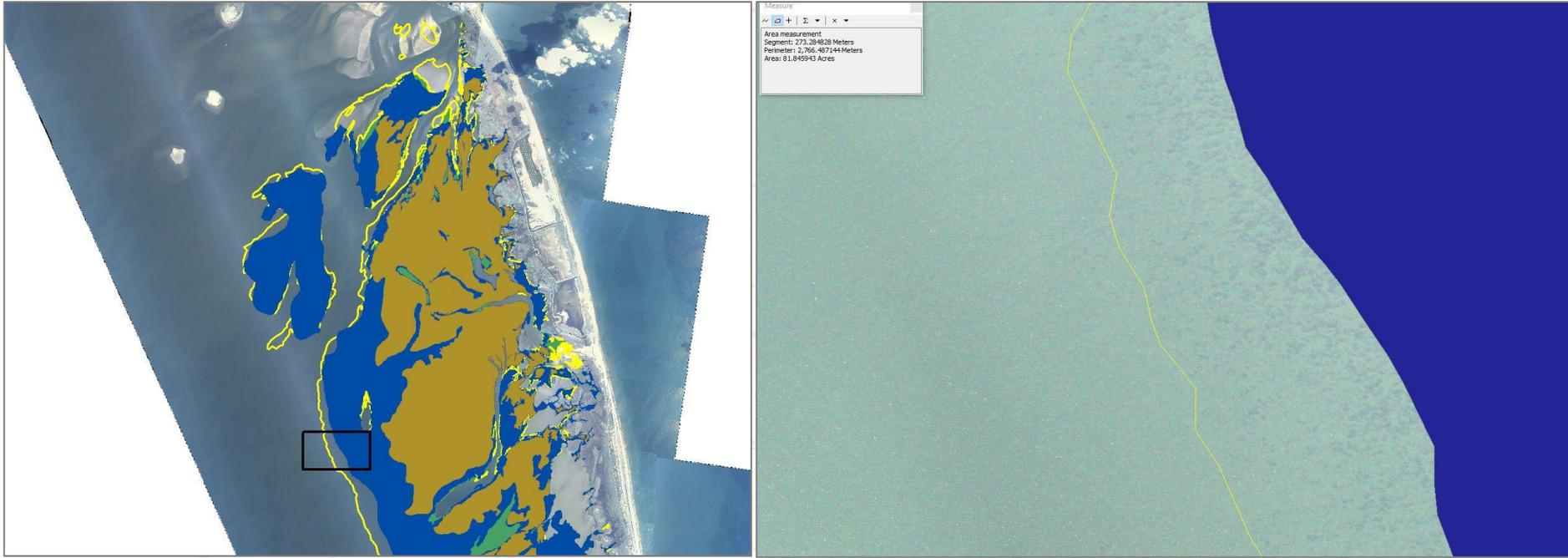
Study Area 2 Change Detection Results

	2007	2013
Dense SAV Acres	37,149	19,061
Patchy SAV Acres	28,581	42,447
Total SAV Acres	65,730	61,508
4,222 acre difference (6.4%) between 2007 and 2013		

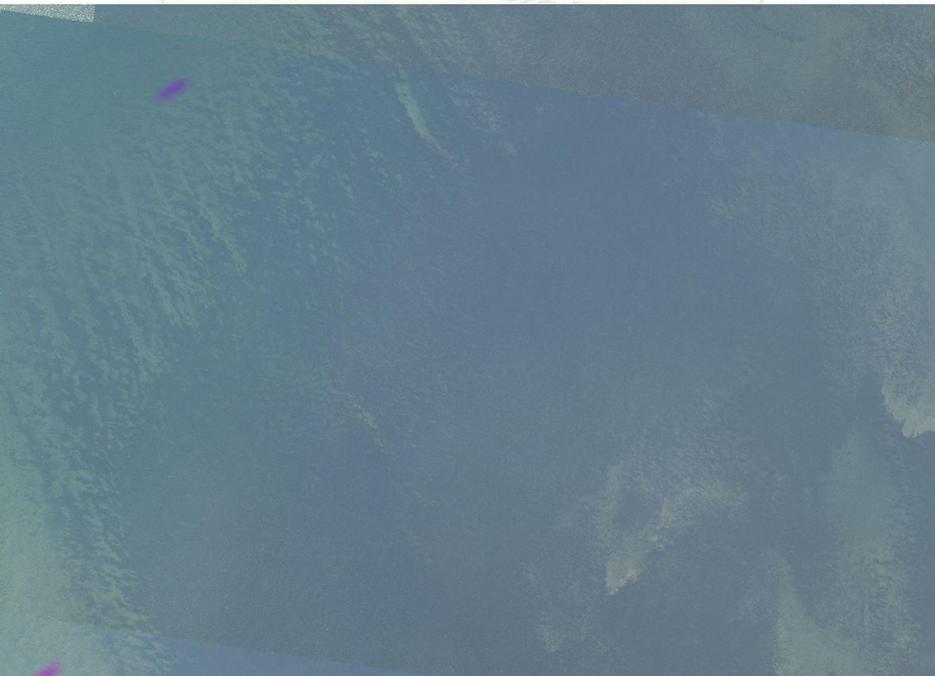
Vegetation Change Description	Acres
Dense SAV to Patchy SAV	18,055.09
Patchy SAV to NO SAV	6,236.75



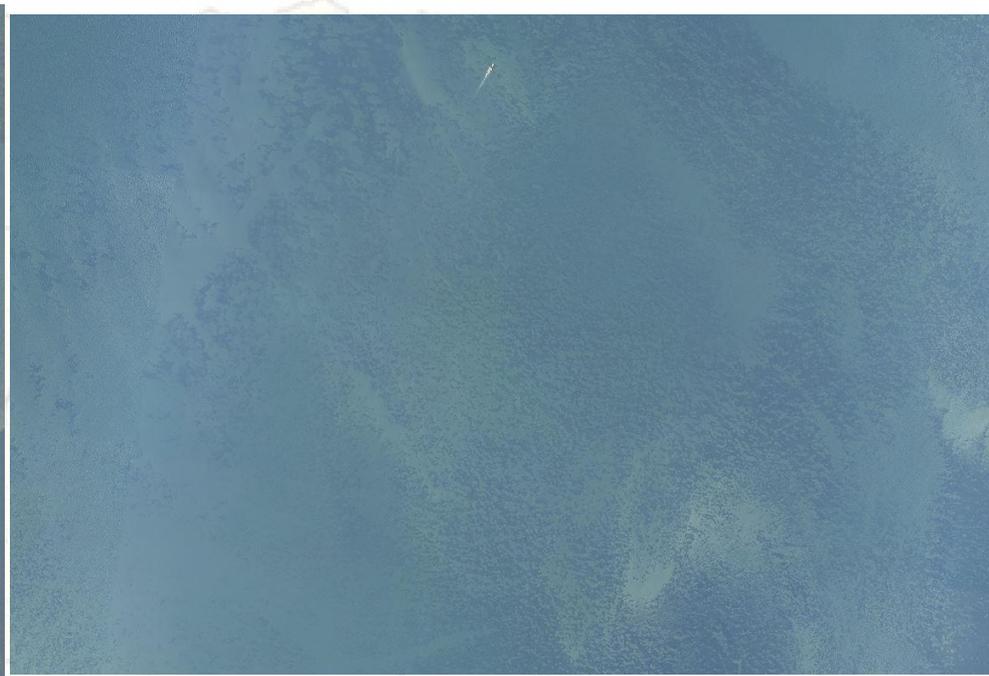
Deep Water Edge Difference 2007-13



Dense to Patchy Change 2007-13



2007

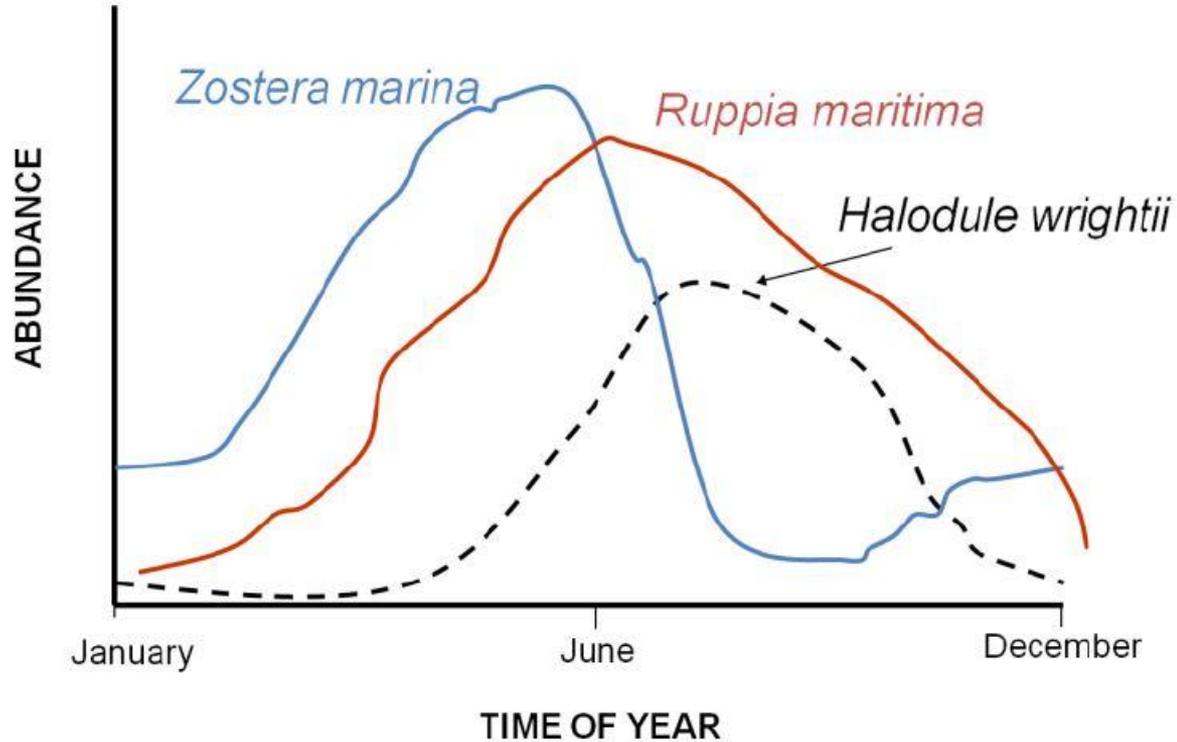


2013



Atlantic Ocean

NC Seagrass Abundance



“At each site, we classified seagrass meadows as declining or increasing if the areal extent changed by $>10\%$ or as no detectable change if the areal extent change by $\leq 10\%$ [which is typically within the error of assessment techniques (Kendrick et al. 1999)]. (Waycott et al. 2009)

Waycott, M., C. M. Duarte, T. J. B. Carruthers, R. J. Orth, W. C. Dennison, S. Olyarnik, A. Calladine, J. W. Fourqurean, K. L. Heck, Jr., A. R. Hughes, G. A. Kendrick, W. J. Kenworthy, F. T. Short, and S. L. Williams. 2009. Accelerating loss of seagrasses across the globe threatens coastal ecosystems, *Proceedings of the National Academy of Sciences*, 106(30): 12377-12381.

Kendrick G. A., J. Eckersley, and D.I. Walker. 1999. Landscape-scale changes in seagrass distribution over time: A case study from Success Bank, Western Australia. *Aquatic Botany* 65:293–309.