Oyster Integrated Mapping and Monitoring Program

Suwannee Sound Oyster Reef Mapping 2019

Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

100 8th Ave SE

St. Petersburg, FL 33701

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Overview

The Oyster Integrated Mapping and Monitoring Program (OIMMP) (https://myfwc.com/research/habitat/coastal-wetlands/projects/oimmp/), based at the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute in St. Petersburg, Florida, compiled oyster mapping and monitoring data across Florida. As a part of this process, the Big Bend of Florida was identified as a region in need of additional or updated mapping efforts. One of the objectives of OIMMP was to fill selected mapping or monitoring gaps, thus this mapping effort focused on previously unmapped intertidal oyster reefs located in tidal creeks and near-shore waters located to the north and south of the Suwannee River (Fig. 1). The newly mapped oyster reefs in this effort supplemented previous aerial photointerpretation of oyster reefs conducted by AGRA Baymont, Inc. for the Suwannee River Water Management District (SRWMD) in 2001 (SRWMD 2001).

Methods and Results

Imagery used for photointerpretation of oyster reefs included Landsat imagery (USGS/NASA) and Florida Department of Transport mosaics (FDOT 2011-2014). Previously unmapped oyster reefs (those not identified by SRWMD 2001; example in Fig. 2) were identified with the assistance of the photointerpretation key (Patterson et al. 2002) developed by AGRA Baymont, Inc. for the 2001 SRWMD mapping effort with improved oyster identification descriptions. Delineation of oyster reefs was conducted in ArcMap Version 10.5 with no specified minimum mapping unit. Oyster reefs were classified following the 6540 (Oyster Bars) code from the Florida Land Use, Cover and Forms Classification System (FLUCCS), originally developed by the Florida Department of Transportation (FDOT 1999).

Patterson et al. (2002) identified oyster reefs (FLUCCS 6540) according to the following characteristics:

1. *Linear and or oval shape with some having branching arms.*
2. *Typically have a bright white signature due to the "hash" (dead oyster shells) that have been bleached due to exposure to the sun. The hash area typically occurs directly adjacent to living oyster bars. During photointerpretation the hash areas are included as part of the oyster bar.*
3. *Parallel ridges formed by remnant oyster shells deposited by waves washing over the bar.*
4. *Oysters typically occur in association with* Spartina *sp. emergent vegetation.* Spartina *is often the only cover type visible on the photography and thus is used to delineate oyster habitat particularly on narrow strand type islands.* Juncus *sp., when visible on the photography, is not included as oyster habitat.*
5. *Code 6541: A cotton-ball like appearance when submerged.*

After analyzing updated imagery from 2011-2014, an additional characteristic useful for identifying oyster reefs from aerial imagery was identified:

6. Presence of bright white signatures indicative of patch oyster reefs in high-flow areas of tidal creeks. These high-flow, deeper areas are typically on the outside bends of the creeks and would scour lighter, less consolidated sediment such as sand or mud deposits.

A total of 1,126 oyster reefs were identified that had not been included in the 2001 project. Of these newly identified reefs, 10-20 % were randomly selected to be groundtruthed for accuracy. The groundtruthing effort, conducted by OIMMP personnel in June 2019, visited 12 % (137 reefs; Fig. 3) of the total newly-identified reefs over 1.5 days. Only one location was misidentified as containing oysters (Fig. 4), resulting in an accuracy of 99 % for oyster reef photointerpretation. The misidentified area conformed to all the key characteristics above and may have contained an oyster reef at the time the aerial imagery was collected but was possibly smothered by fine sediment at the time of ground truthing and was not easily detectable. Groundtruthing included additional descriptors such as whether the oysters were exposed or submerged at the time of ground truthing (Fig. 5) or exhibited characteristics of a string, patch, fringe, and shell reef. It should be noted that this mapping effort did not separate between live and dead patches of oyster reef. During the groundtruthing work in June 2019, the tidal level was recorded as 0.3 m above the forecast high, hindering identification of living oysters versus shells.

Acknowledgements

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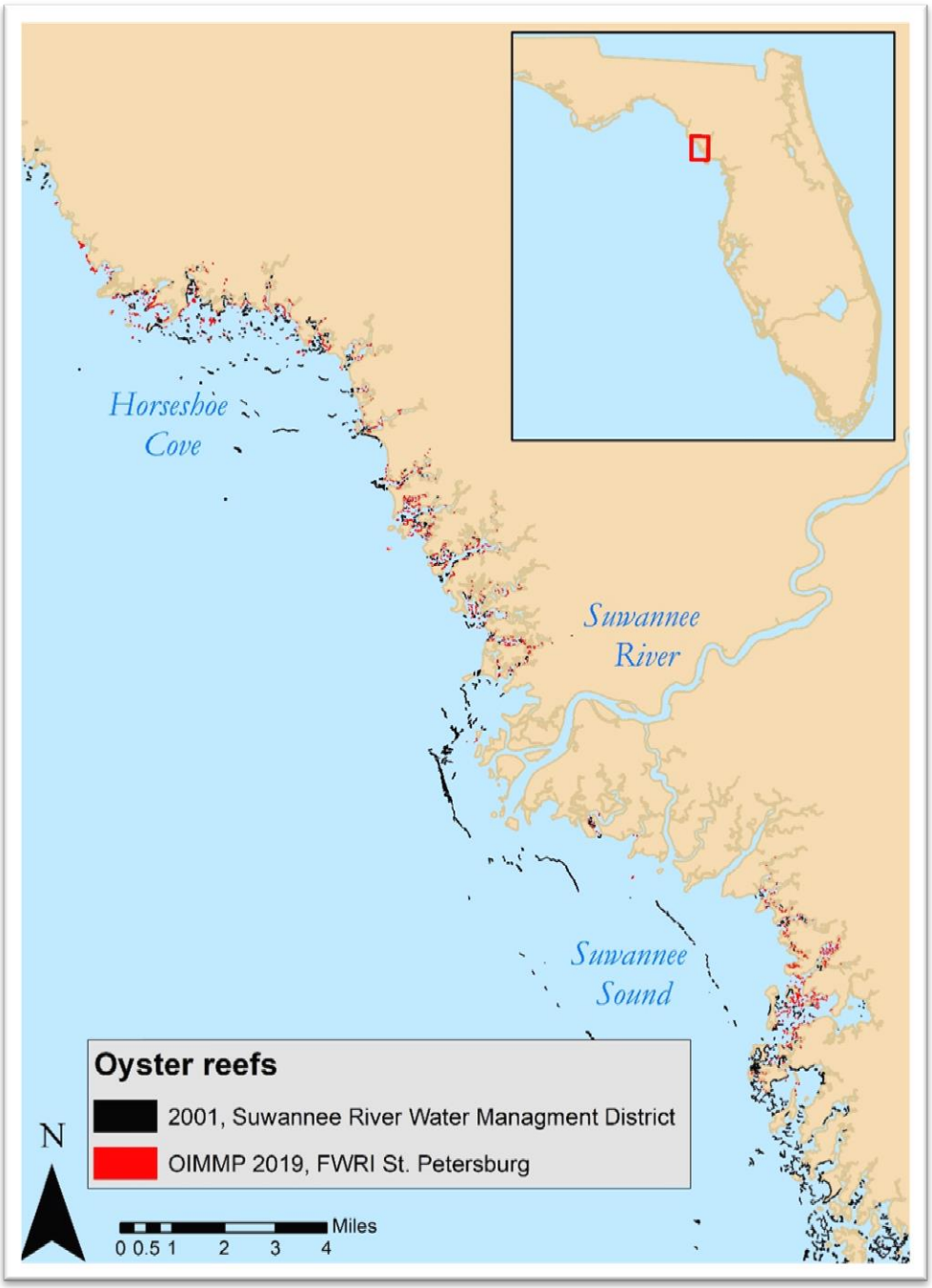

Figure 1. Overview of Horseshoe Cove and Suwannee Sound. Oyster reefs delineated by this mapping effort (FWRI 2019) are depicted in red; black outlines indicate those reefs identified by AGRA Baymont in 2001 for SRWMD (SRWMD 2001).

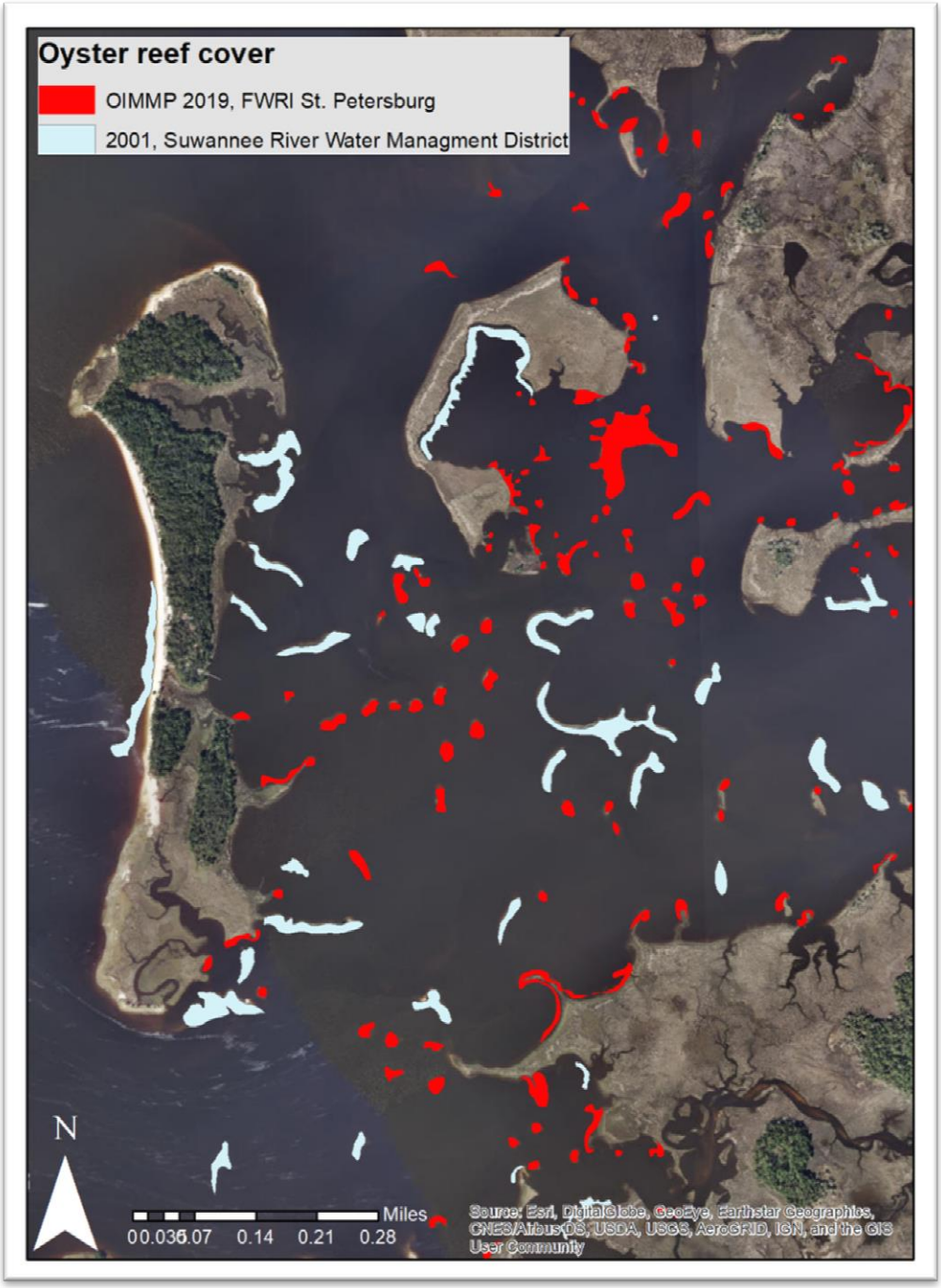

Figure 2. Oyster reef identification for a section of the springs coast near Suwannee Florida. Red polygons represent the 2019 effort by FWRI; blue polygons are reefs identified by AGRA Baymont in 2001 for SRWMD (SRWMD 2001). Basemap imagery provided by Esri through ArcMap.

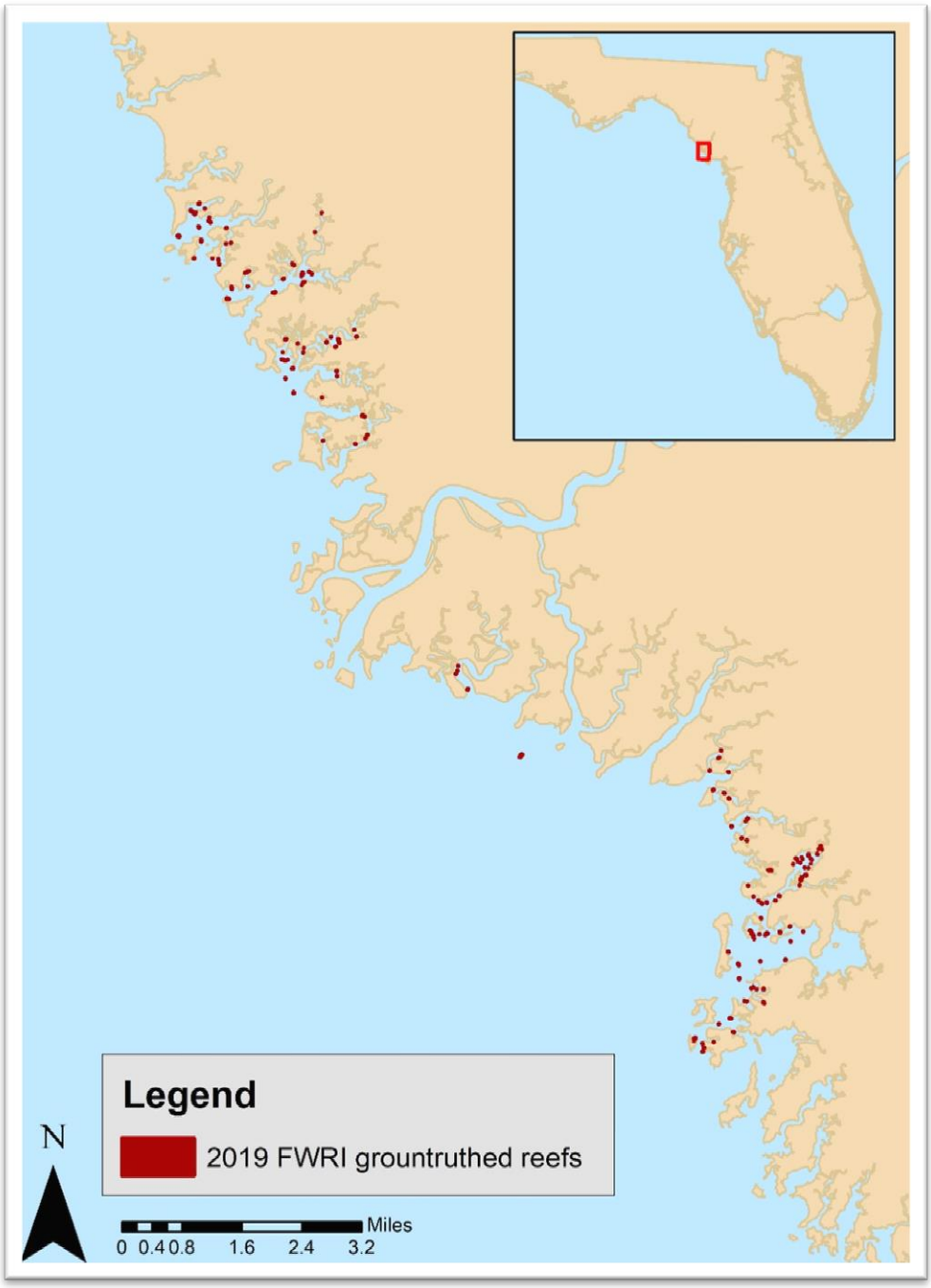

Figure 3. Groundtruthed reefs (2019) north and south of the Suwannee River are indicated by dark red outlines and comprised 12 % of the total reefs identified.

Figure 4. Single misidentified area (red) that did not contain oysters in 2019.

Figure 5. Photo of a visible, intertidal oyster reef north of the Suwannee River.