

Appendix J - Historic Mapping Methods

Methods for Processing and Photo-interpreting Historical Aerial Photographs

Historical aerial photographs from 1942 and 1943 were obtained from the National Archives and Records Administration in Washington D.C. Shapefiles of the Clearwater Harbor and St. Joseph Sound watershed boundaries were sent to the National Air Survey Center Corporation (NASCC), an approved vendor to the National Archives and Records Administration. NASCC selected the 30 black and white aerial photographs that covered the watershed boundaries. These photographs were scanned into TIFF images at 720 dpi and sent to Atkins for the purpose of digitizing historical land use and land cover.

All but four aerial photographs were taken on April 2nd, 1942. The other four, located in the northeast corner of the project area, were taken on January 31st, 1943. All images were taken from an altitude of 10,000 feet.

Historical aerial photographs were georeferenced in ArcInfo 9.3. Landmarks and roads from the 2008 SWFWMD aerial photographs were used to acquire a minimum of three reference points for each image. The root mean square error (RMSE) was calculated after each photograph was georeferenced. All RMSEs were less than half the image pixel length.

Several un-interpretable areas, such as those resulting from hotspots, or white overexposed areas, were found on the georeferenced, historical aerial photographs. Figure 1 shows an example of a hotspot.



Figure 1. Example of hotspot in St. Joseph Sound.

Most of the photographs over coastal waters contained hotspots. This made digitizing of land use and land cover impossible in those areas. As a result, additional aerial photographs that overlapped with the first set of aerial photographs were ordered and scanned from the National Archives and Records Administration. The additional aerial photographs provided sufficient coverage to make the areas more interpretable. Figure 2 shows the overlap of the additional aerial photographs in the same extent as is displayed in Figure 1.

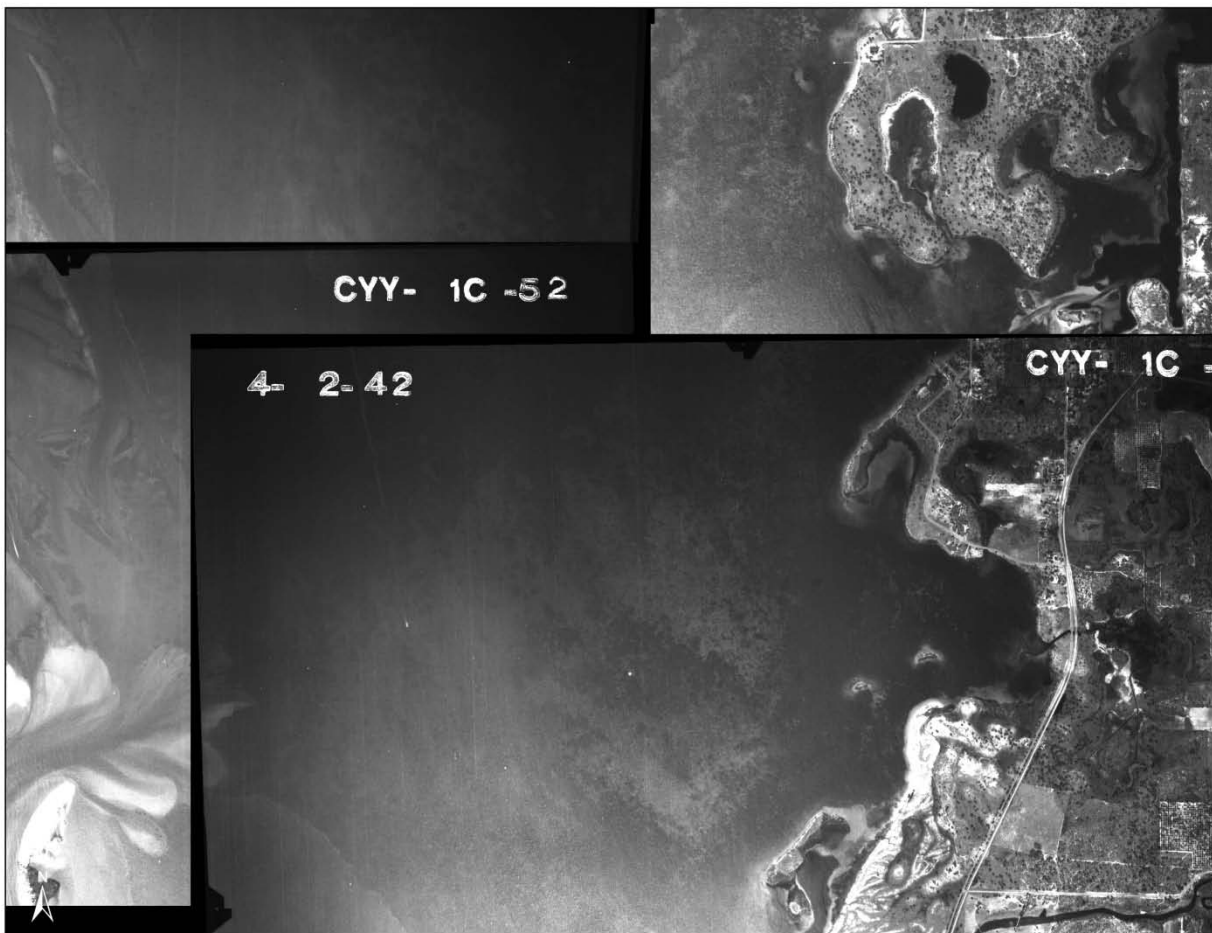


Figure 2. Overlap of additional aerial photographs in St. Joseph Sound.

Several parameters were defined and applied when digitizing and photo-interpreting historical aerial photographs. These guidelines included The study area was defined for the purposes of the historical land use and land cover mapping as well as the historical seagrass mapping. The study area separated into the watershed and estuary. The watershed was the landward extent of the watershed. The shoreline from the Southwest Florida Water Management District's 2004 seagrass coverage was used. The estuary extended from the shoreline to the westward edge of the barrier islands.

Polygons were digitized in ArcMap at a scale of 1:6000 with flexibility to examine areas at a finer scale. The minimum mapping unit (MMU), or smallest land cover feature delineated and characterized on the map, was two acres for seagrass, one acre for uplands and freshwater

wetlands, and 0.25 acres for saltwater wetlands (salt terns, salt marshes, and mangrove swamps). Figures 3, 4, and 5 show an example of the MMU for seagrass, freshwater wetlands, and saltwater wetlands, respectively.

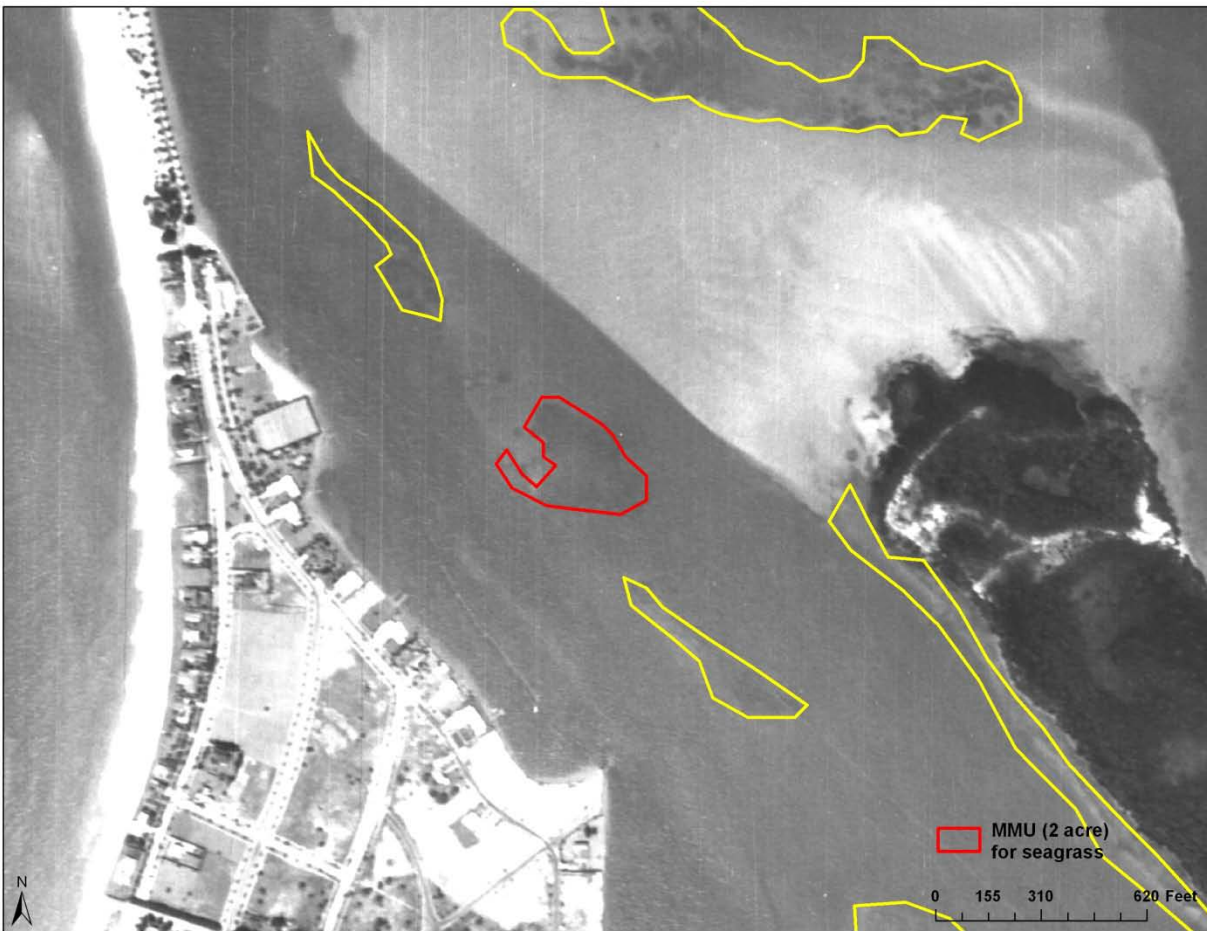


Figure 3. Minimum mapping unit (two acres) for seagrass.



Figure 4. Minimum mapping unit (one acre) for freshwater wetlands.

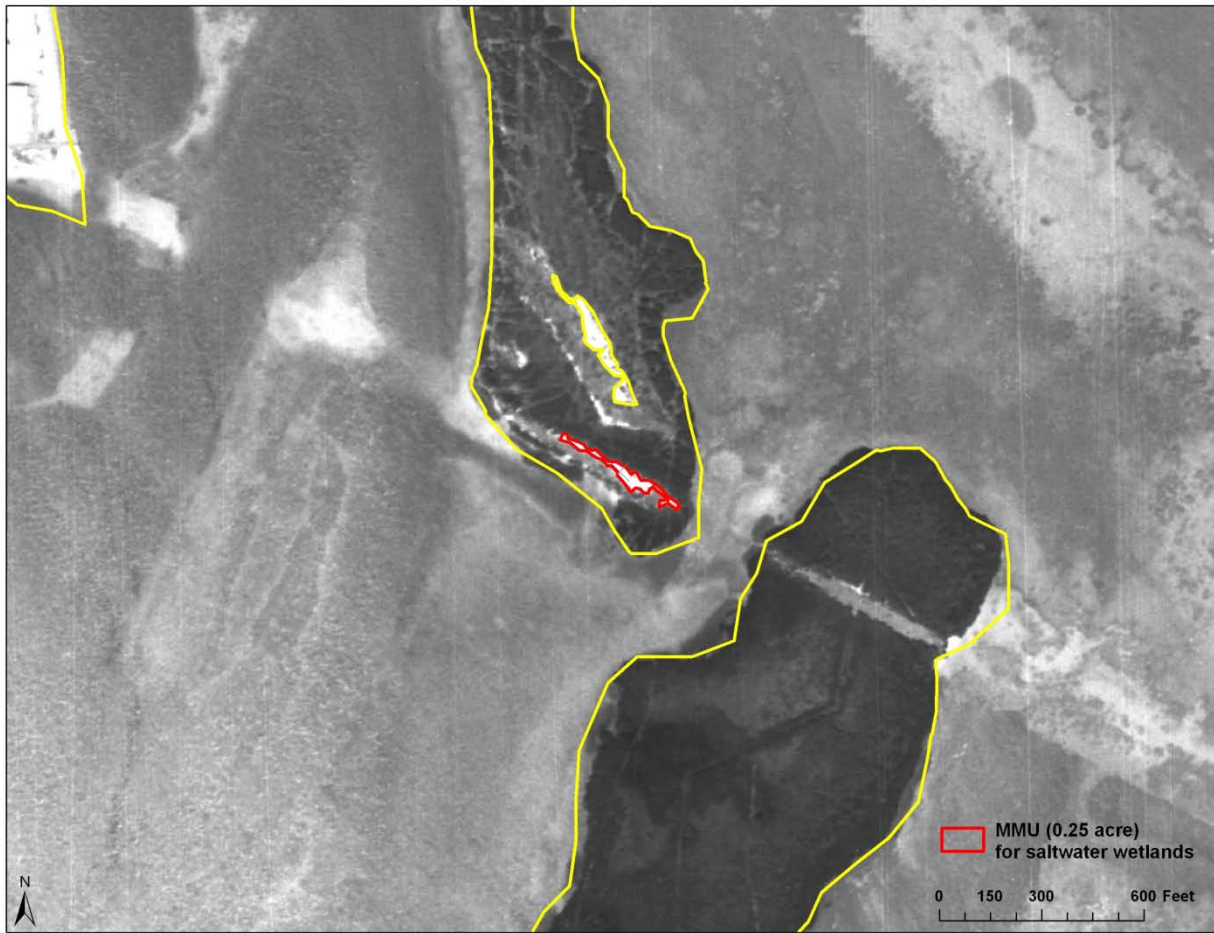


Figure 5. Minimum mapping unit (0.25 acre) for saltwater wetlands.

Historical land use and land cover were assigned FLUCFCS level 1 codes (e.g. 1000 - Urban and Built Up, 4000 – Upland Forested, etc.) with the exception of freshwater wetlands, which were assigned FLUCFCS level 2 codes (e.g. 6200 – Wetland Coniferous Forest, 6400 – Vegetated Non-Forested Wetland, etc.), and saltwater wetlands, which were assigned FLUCFCS level 3 codes (e.g. 6120 – Mangrove Swamp, 6420 – Saltwater Marsh, etc.) when interpretable. FLUCFCS codes for polygons with multiple small habitat components reflected the dominant habitat within the polygon.