

Historic Aerial Photography of the Greater Everglades - Archive and Geodatabase Development

A digital archive of historical aerial photographs for the Greater Everglades is an essential tool for building a scientific understanding of the evolution of the south Florida landscape. It provides the framework needed to develop a geodatabase - a relational database that can store geographic data. The geodatabase has the advantages of a database management system in that all the data, regardless of format (e.g. tabular, vector, raster, etc.), can be stored in the same database. These data can function together as one integrated system governed by a set of topological rules and logical relationships that can be accessed by scientists and managers working in the Greater Everglades Ecosystem.

A project to develop an Everglades Historic Aerial Photography (EHAP) Archive was initiated by the USGS Florida Integrated Science Center in 2001, when the Center began compiling some of the 25,000 known historical aerial photographs of the Greater Everglades into a comprehensive archive of rectified, high-resolution, digital aerial photography. Aerial photography from the archives of several federal and state agencies were scanned at high resolution (800dpi) and stored as .tiff format images. Extensive metadata about the photography and the digital imagery was also collected and stored in a relational database structure. After scanning the photographs, unreferenced mosaics of flight lines were constructed to indicate the general locations of the photography. Each mosaic was then georeferenced, and approximate flight lines and center points of each photograph were digitized. The entire set of imagery from 1940 has now been rectified. Small samples of the sets from 1953, 1964, 1987 and 1992 have also been rectified (fig. 1). In addition, U. S. Coast & Geodetic Survey topographic sheets (T-sheets) based on 1927 aerial photography of the coastal area have been georeferenced.

The EHAP Archives database stores information about the historic photography at several levels. At its most basic, it functions as a catalog of individual photographs, recording where

each is stored and details about the flight, the camera, and quality of the photography. More comprehensively, the database functions as a storehouse of metadata for the digital imagery; images of the photographs are cataloged and information about the scanning process and resultant imagery is recorded. Any further processing of the imagery is also detailed, along with by-product spatial information from the process. For example, if a digital image is rectified, metadata about the projection parameters, resolution, spatial coordinates and rectification error are recorded. By including geographically referenced information, the database functions as a rudimentary geodatabase in the context of a geographical information system. As of November 2005, the EHAP Archives database listed 119 sets of photography, 8,502 photographic records, and 6,695 scanned image records, approximately 1,800 of which have been rectified.

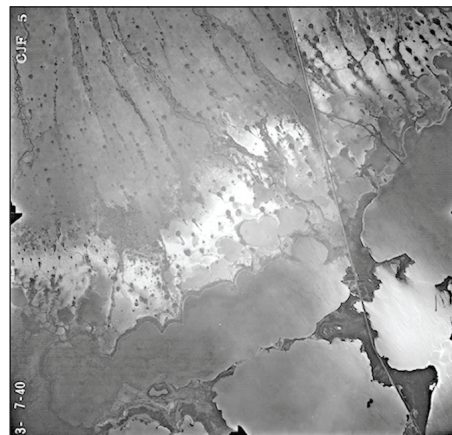
The EHAP Archives are now being used in a pilot project to develop and test a geodatabase in South Florida. One subset region of the Greater Everglades, the Southern Inland and Coastal System (SICS), was selected for the pilot project. Data sets were chosen to span the scope of the EHAP Archives, including image layers from 1927, 1940, 1953, 1964, 1987 and 1995. The SICS geodatabase is a scientific data resource intended to contribute to ongoing and future scientific studies in the region, including studies related to climate and vegetation change over time. The geodatabase provides a graphic, geographically-referenced interface by which the raster imagery can be linked to relevant metadata tables of the EHAP Archives, for query and analysis.

For more information about the geodatabase concept, go to <http://www.esri.com/software/arcgis/about/geodatabase.html>.

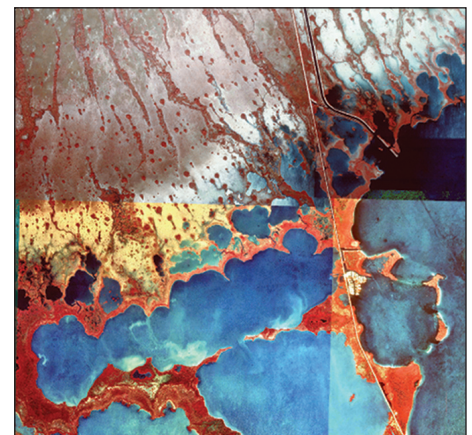
Archived photography collected during this study can be found on the South Florida Information Access (SOFIA) web page at <http://sofia.er.usgs.gov>.



Early map.



1940 image.



1995 image.

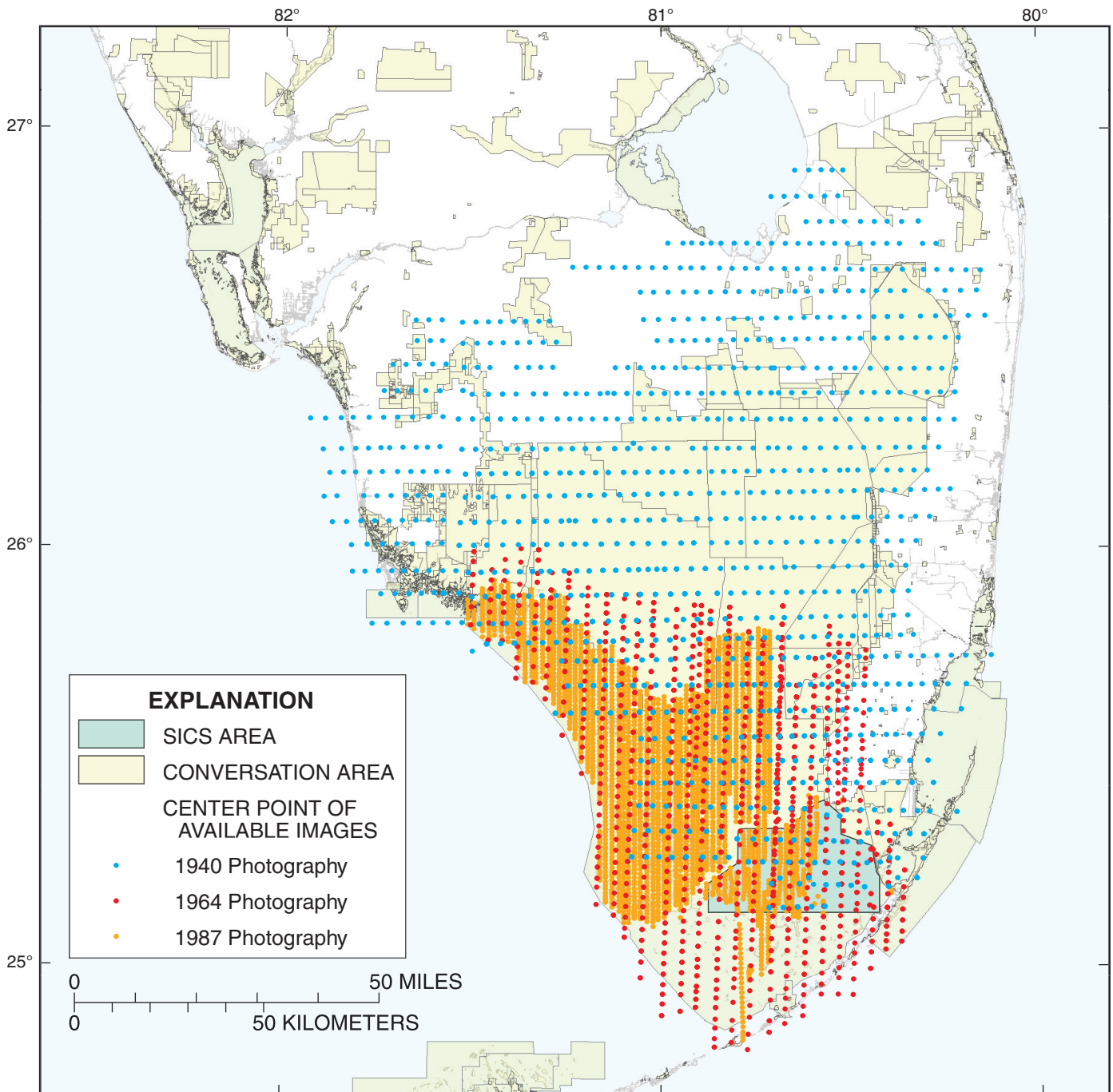


Figure 1. Map showing approximate locations of selected EHAP Archives photography and the SICS study area.

Three products of this study include:

Foster, A.M., A.W. Coffin, K.M. Capobianco, and T.J. Smith III. 2004. Creation of a Geospatially Rectified Digital Archive of the 1940 Aerial Photography Photoset: South Florida and the Everglades. Report to the U.S. Army Corps of Engineers, October 2004. DVD.

Smith, T.J. III, A.M. Foster, P.R. Briere, J.W. Jones & C. Van Arsdall. 2002. Conversion of historical topographic sheets (T-sheets) to digital form: Florida Everglades and vicinity. USGS, Open-File Report 02-204. CD-ROM, and

Smith, T.J., III, A.M. Foster, P.R. Briere, A.W. Coffin, J.W. Jones & C. Van Arsdall. 2003. Historical aerial photography for the Greater Everglades of south Florida: The 1940, 1:40,000 photoset. USGS, Open-File Report 02-327. DVD.

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