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US Coast and Geodetic Survey Aerial Photos from 1927, 1928, 1932, 1935, 1952 and 1954 Covering South Florida

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US Coast and Geodetic Survey Aerial Photos from 1927, 1928, 1932, 1935, 1952 and 1954 Covering South Florida

Summary of the Dr. Harold R. Wanless collection of film copies and scanning project

Peter W. Harlem

12/18/2014

HISTORY

In the 1970s the US Coast and Geodetic Survey (USCGS) was maintaining an air photo collection including images of the coastline and coastal areas of the US (including Florida) and stored as hard copy prints at the NOAA office in Silver Spring, Maryland. The images were originally made in order for the correction of existing shoreline maps made by traditional survey techniques and while the original aerial negatives were not kept the agency did keep the prints as they included hand written notes on many of them and were therefore considered "field notes.". By law they were required to keep field notes on hand but not the original film. The author of this document discovered these in 1977 and traveled to Silver Spring to make copies of some of the set from 1928 and 1932. NOAA staff at that time reported that there were missing images so the original viewed collection was not fully complete.

Images which covered Biscayne Bay in 1928 were copied onto 35mm film and using limited funds provided by Florida Sea Grant a small number of 1:1 contact prints were also purchased. Included in this latter step were images from northern Biscayne Bay taken in 1932. These contact prints are currently located in the MIUS room in a drawer reserved for the author. The scanned versions have been used to supplement the Wanless collection.

Dr. Hal Wanless, sedimentology professor at the University of Miami's Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) was able to secure funds to revisit the NOAA office and copy many of the images covering South Florida. He spent about a week with student help copying them onto either 35mm film or 2.25x3 in. film. In a few cases images were copied on to both film sizes and a small amount of duplication resulted. Additionally, some areas with geological interest were copied as zooms showing only a portion of the original image, but at much better resolution. Representatives of USGS recently inquired of NOAA to find out if the images were available for copying into digital format and was told that they had been sent to National Archives. Inquiry at National Archives has not turned up any images from the USCGS set so USGS came to the conclusion that the only set available for digitization were the film copies made by Dr. Wanless.

Dr. Wanless maintains the collection at UM in ring binders with negatives stored in archival pages and additional albums of contact prints are included. In mid-2014, Dr. Mike Ross of Florida International University (FIU) discussed borrowing those portions of the collection covering the Florida Keys and brought one of the albums to the FIU GIS-RS Center to see about getting them scanned digitally. The author discussed the possibility of scanning the full Wanless collection with him and was told that USGS staff in Gainesville, Florida had already approached him about doing just that. We opened a discussion with USGS and the local NOAA Librarian which led to USGS providing funding for the images to be scanned by GIS personnel at FIU. The project was initiated with a deadline of mid-December to get the scans finished which was achieved.

Dr. Wanless provided a paper inventory and crude maps showing image locations but in order to better describe the collection and understand the nature of the scanning load an inventory was conducted by the author. The resulting Excel file which accompanies this report lists all the images and contains IDs, and film type, date, and location notes. Numerous errors in the original information were corrected and updated during this process. Location index sheets on paper were digitized in ArcMap after georeferencing and shapefiles of the flight lines were created with one shapefile made for each accession number (flight line). These were combined into a single shapefile showing the full collection after the scanning efforts were completed and this is available for users. A Google Earth KML file was also created showing the full set.

IMAGE INFORMATION

Two types of images were in the Wanless film collection. The majority are a multi-lens camera output made with a trimetragon camera. The 1953 and 1954 dated images (ACC 1772) are standard 9x9 aerial images and taken with cameras common since WWII timeframe and following normal industry practices. Images covered by the Wanless collection are listed in Table 1. This includes several accession numbers (flight lines) which are not shown in the new index maps but were shown in the original documents provided, these being ACC 684 (1927) covering the Ten Thousand Islands area, and ACC 694 (1928). Many of the flight lines represented have missing photos which are noted in the table but are not shown on the index maps except as a gap in the flight line. It is unknown if the missing images were in the original NOAA collection and not copied or missing from the full collection they had.

Table 1: List of aerial photos covered in Wanless collection and/or associated documentation				
Accession No.	Image Date	Image Nos.	Location	Notes
682	1927	21-35	S. East Coast of Florida	#21, 23, 30 in collection.
684	1927	75-108	West Coast/Ten Thousand Islands	No images in collection
685	1927	108-189	Ten Thousand Islands	#161-177, 179-189 in collection
686	1927	2-?	Broward County	#2 in collection.
687	1928	99-131	Key Biscayne to Miami Beach	#99-100, 117-131 in collection
688	1928	1-26	Cape Sable to Whitewater Bay	#1-19, 21-26 in collection
689	1928	27-48	Shark River to Cape Sable	All in collection.
690	1928	49-89	Shark River – Ten Thousand Islands	All in collection.
691	1928	89-160A	Cape Sable to Ten Thousand Islands	All in collection.
692	1928	161-182	Cape Sable to North Florida Bay	All in collection.
693	1928	183-263	Cape Sable to Ten Thousand Islands	All in collection
694	1928	264-309	North Florida Bay	No images in collection
695	1928	310-365	NE Florida Bay to Ragged Keys	#310 not in collection
696	1928	366-469	Key Largo to Coral Gables	#366-368, 370-372, 374-378, 380, 382, 384, 444, 446-448, 450, 460, 462, 464, 466, and 468 not in collection. Additions from PWH collection.
697	1928	398-471	North Biscayne Bay	#470 in collection.
806	1/1932	11-113	Broward County coastline to Ragged Keys	#12-50, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77-83, 85, 91, 90, 93, 95, 97, 100-103, 105-107, and 109-111 not in collection. Additions from PWH collection.
807	1/1932	114-194	Black Point to Miami	#114-116, 118, 120-131, 133-137, 140, 142, 144-148, 151-153, 155-157, 159-161, 163-169, 171-

				173, 175-177, 179-181, 183-185, 187-189, and 191-193 not in collection.
610	1/1935	197-263	Central Florida Bay	All in collection.
613	1/1935	339-390	Manatee Bay to Monroe Lake	All in collection.
614	1/1935	391-434	Seven Palm Lake to Cape Sable	#392, and 397-398 not in collection
615	1/1935	435-482	N. West Florida Bay	All in collection.
616	1/1935	483-519	Key Largo to Marathon?	#503, 513-515 and 518 in collection.
1772	2/9/1953	25-156	North Florida Bay-Ten Thousand Islands	#26-42, 46-47, 50-123, 127-134, and 138-152 not in collection.
	2/14/1953	87-217		#90, 93-176, 180-181, 190-213 not in collection.
	2/16/1953	53-130		#62-73, 83-94, 98-102, 106-114, and 122-123 not in collection.
	2/18/1953	18-82		#24-52, 60-61, 64-71, and 81-82 not in collection.
	3/9/1953	140-217		#150-163, 168-169, and 176-212 not in collection.
	11/28/1953	54-67		#60-62 not in collection.
	2/5/1954	147-150		All in collection.
PWH = Peter Harlem whose collection was used to fill in missing images where possible.				

Individual photos or photo sets can be of several types (indicated in the Excel file) based on the number of image panels included. Single lens panels are single air photos as commonly used in modern times while multi-lens photos (trimetragon camera) can have three or more panels (See Figure 1). The combinations are:

1. 1-lens = air photo taken with single lens camera. This is the modern standard method. Only the 1953-1954 dated images (ACC 1772) are of this type.
2. 3-lens = trimetragon camera image comprised of a single center vertical panel (B or M) and two oblique wing panels (A and C) which were rectified during printing by USCGS. The wing panels show the side views from the aircraft centerline.
3. 4-lens = as above with additional panel showing oblique rear view (E) from aircraft.
4. 5-lens = as above with wing panel showing oblique view in front of aircraft.

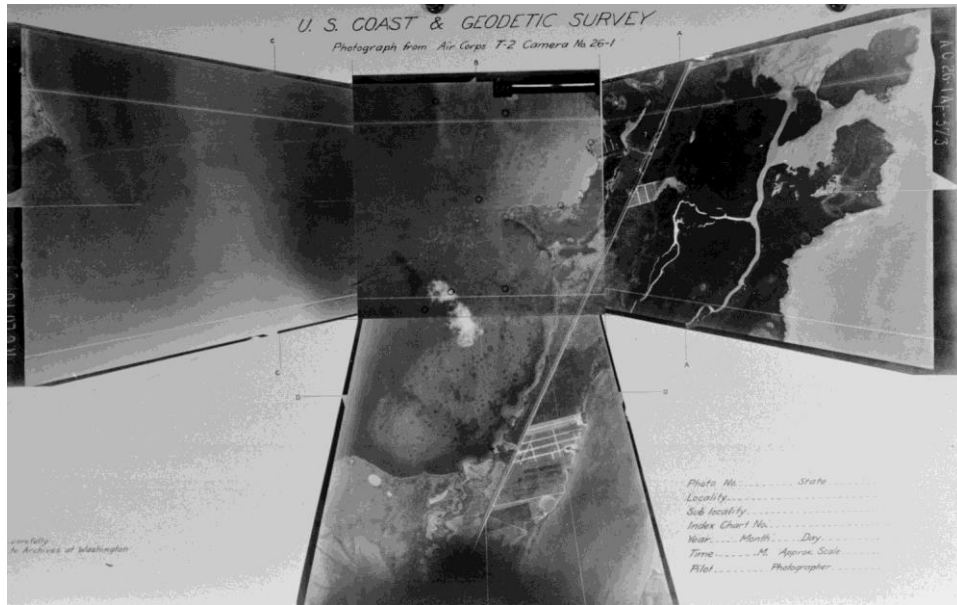


Figure 1: Image ACC 696-373, an example of a 4-lens trimetragon image showing a portion of Key Largo. This type was normally copied by Wanless in three negatives, Left, Right, and Bottom (B), all with the central square included for overlap merging. (Harlem collection: scan of 1:1 contact print showing full image as found in NOAA archive.)

A code system is used in the data file for the wing panels on the multi-lens images (Figure 2 and Figure 3). These can be used to determine if the full image set is available for each photo number. The 1927 and 1928 images were shot either as a left and right view providing the full center panel to allow merge after scanning or have an additional view showing the aft panel, usually with the center panel (see Figure 4). The 1935 air photos were not preassembled at NOAA at the time of copying and each panel is normally shot individually. The panel codes in the data file should be used to figure out which panels are available.

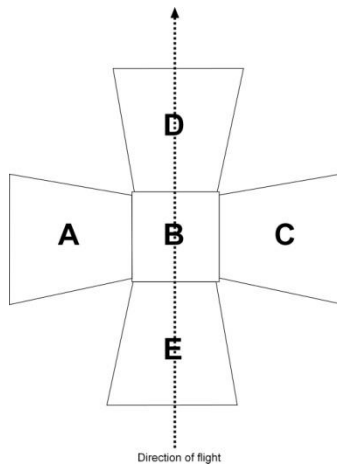


Figure 2: Wing panel codes used to identify which portion of a multi-lens image is included in each negative in the Wanless collection. The arrow shows the relation to the direction of flight. Panel D sometimes has the

landing gear of the airplane visible in the uppermost portion of the image. Note that this original pattern was not followed in the labeling of the 1927-28 images (see Figure 4) however the panel codes can be seen on the image components if one zooms in to the margine

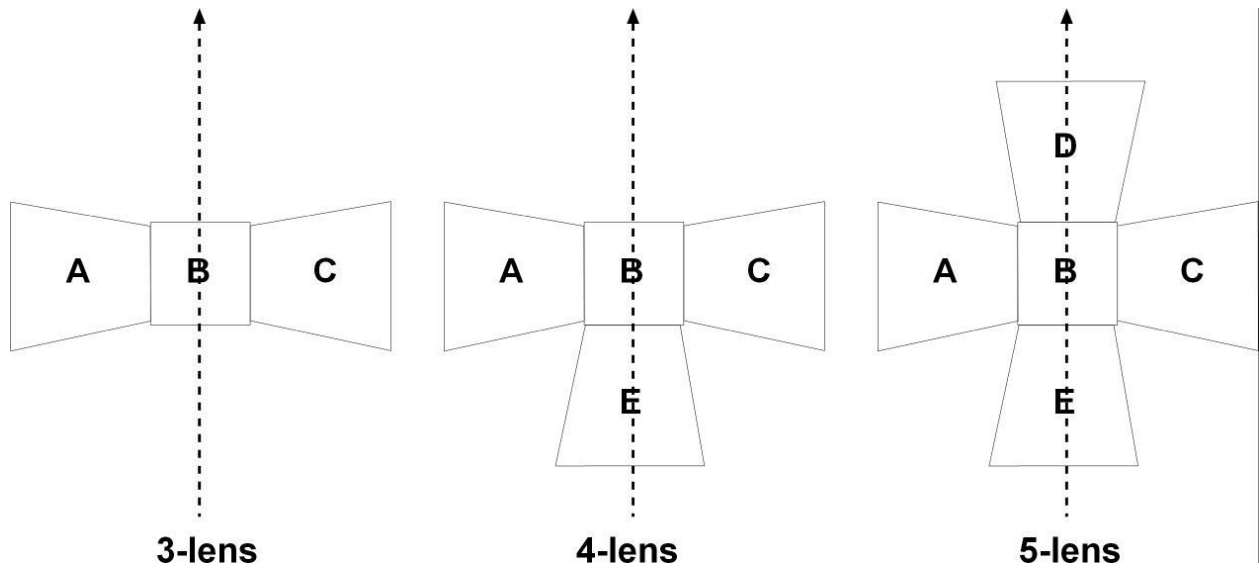


Figure 3: Wing panel code arrangement for the three types of multi-lens originals in the USCGS set. Arrow shows flight direction. This pattern from the originals was not followed by Wanless when labeling the 1928 image negatives (see Figure 4).

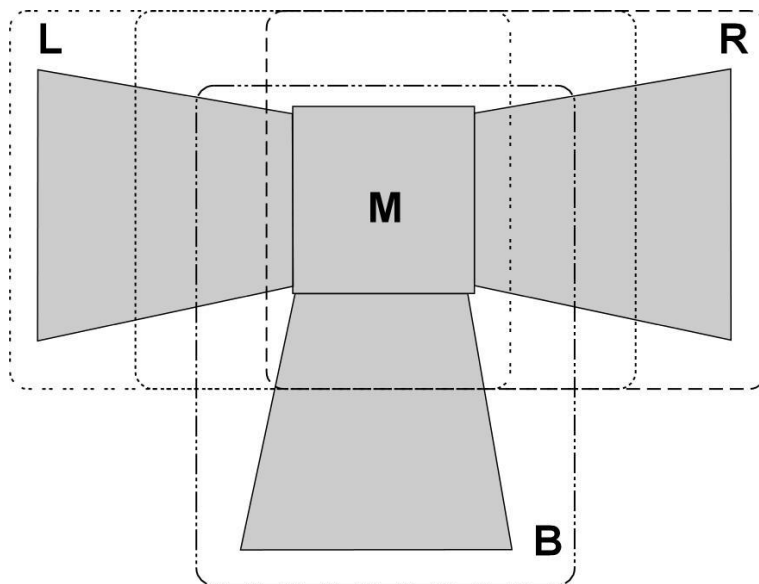


Figure 4: Wanless copied the 1927 and 1928 images using these patterns: a left (L) view, a right (R) view, and sometimes a bottom (B) view which includes the central “B” panel (see Figure 2 above). In a few cases only the middle “B” portion was copied and labeled M to avoid confusion with the other naming convention. This does not apply to the 1932, 1935 or 1952-54 images.

Table 2 shows the number of images (panels) vs. the number of actual air photo numbers represented. Because some images have 3-5 panels for each photo number or the images were done in halves (L and R) and there might be zoomed versions, the image number is much higher than the number of photo locations represented. However there are 2,575 scanned images representing 871 air photos in the collection.

Table 2: Wanless film collection summary (includes images contributed by PWH).				
ACC Number	Year	No of Images	No of Photos	Type
610	1935	335	67	5-lens
613		260	52	
614		191	41	
615		240	48	
616		5	5	
682	1927	3	3	3-lens
685		59	28	4-lens
686		1	1	3-lens
687	1928	25	17	5-lens
688		75	25	4-lens
689		73	22	
690		136	39	
691		195	72	
692		43	22	
693		243	81	
695		129	57	
696		179	76	
697		1	1	
806	1932	70	34	5-lens
807		42	30	
1772	1953-1954	268	150	1-lens
TOTAL		2,575	871	

SCANNING

FIU GIS personnel scanned one image to test optimal resolution for the full image set. The image was scanned at 2000, 2400, and 3200 dpi. We chose 2400 dpi as the best choice for the 2.25x3 inch negatives as it provides sufficient resolution for further GIS manipulation and data extraction by automated means while not producing too large a file to be opened in common software. Lower resolution copies of these scans can be produced later for wider dissemination if needed. Figure 5 shows the 2000 dpi test image.



Figure 5: Scanned test image (USCGS1928_613_375_E) from southern Everglade's shoreline north of Little Madiera Bay. This is the 2000 dpi version which was rejected for 2400 dpi.

A significant number of collection images were copied on 35mm black and white film, particularly the set from 1953 (ACC 1772). These were scanned at 2400 dpi with a dedicated film scanner which could do six frames at one time. Users can find the type of film listed in the accompanying Excel file (**Wanless USCGS photo log.xlsx**). In addition, the author of this document has a partial collection of 1928 and 1932 photos in both hard copy (contact prints) and/or 35mm film copies and these were used to add 106 additional images to the collection. Those may be fully assembled (in some cases) and resolutions vary depending on source and method used to scan them in the past. They are included in the collection for completeness and the notes column in the Excel file show which images come from this source.

FINAL PREPARATION

Because of the time involved and the short deadline of Dec 2014, we did not do any extensive improvement of the digital scans. Images were oriented alike and the side nearest north was rotated to the top for most images. For the FIU set, which will be put online in the future, we expect to crop the negative frame out of the images and straighten out crooked scans where that is a problem. This has been started and the 1927 images have been so treated as of the date of this report.

GIS-RS Center staff discussed georeferencing the images but because of the size of the collection it was decided not to do so at this time and the funding agency was not requiring this effort. Georeferencing or other manipulation of the images will be done on a case by case basis for funded projects or as needed in the GIS Center. As images become georeferenced we expect to create GIS shapefiles (polygons) to better show the area of coverage of each photo set. The department would entertain the idea of doing georeferencing of the whole set if funding were to become available. A small number of the 1928 images covering Coral Gables coastline have been georeferenced successfully for another project by this author as a test of concept and shown here (Figure 6). The oblique wing panels did not produce any significant problems as they were apparently photo-corrected at the time of printing by USCGS prior to use for coastal map making. However in doing this it was discovered trimming the wing panels (A, C, D, E) to remove adjacent panel overlap using Photoshop improved the resulting photomosaic effort considerably.

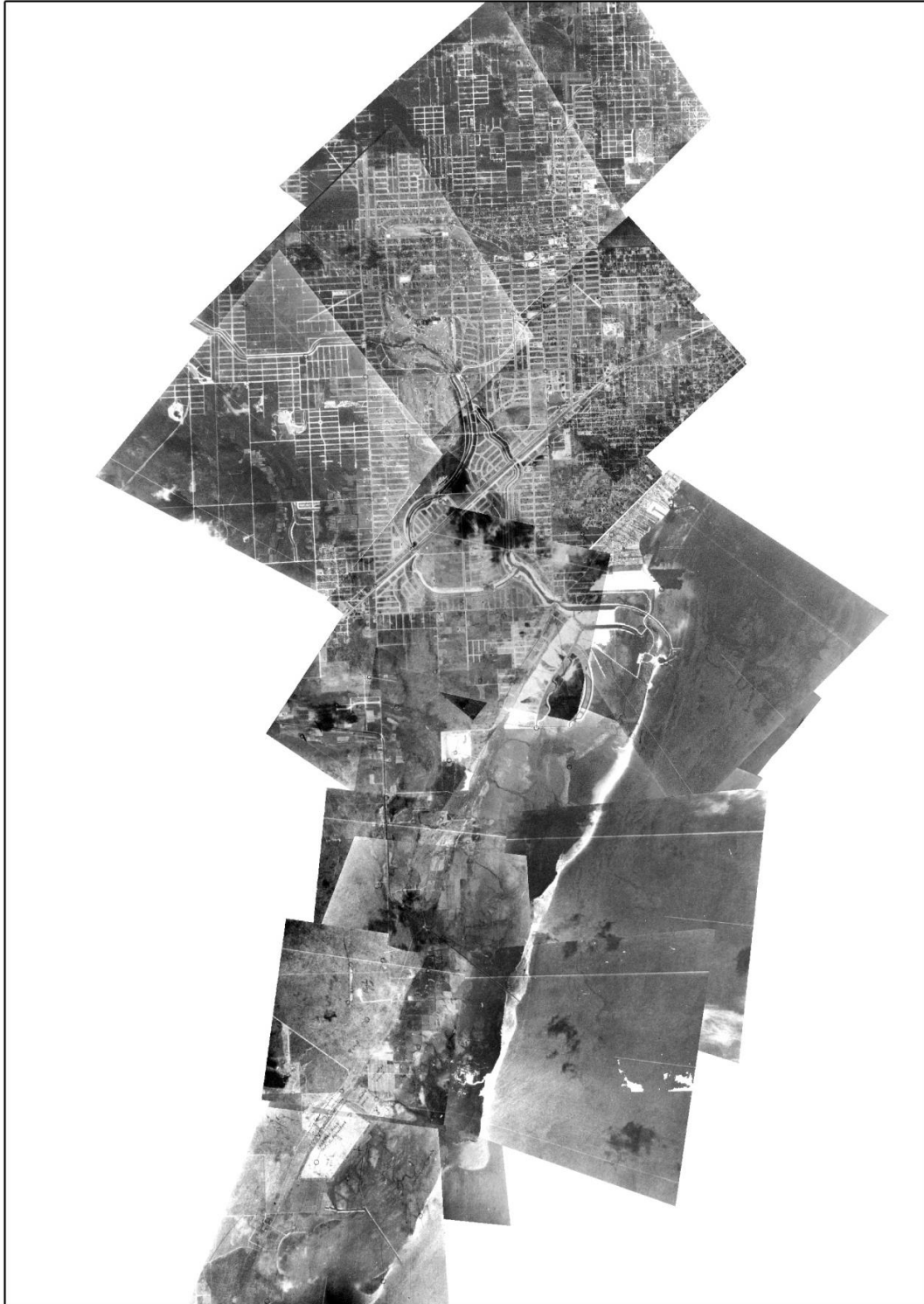


Figure 6: Example of 1928 4-lens images which overlap the City of Coral Gables. Note that some wing panels outside the city limits are not shown but are in the collection. At this point in history the majority of the coastal marshes were not yet developed but the street grid for the City of Coral Gables was built as was the Coral Gables Waterway. Cloud shadows are rare in collection photos but can be seen in this location in this particular ACC run. (FIU GIS-RS Center image – georeferencing by author)

IMAGE LOCATIONS

A single GIS point type feature class (layer) has been created to show the image locations for those air photos actually in the collection. Other photos which are known to have existed at the time of photography but were not copied and therefore not in the collection are not shown but are mentioned in Table 1 as “not in collection”. To produce the GIS file the Image location was determined by examination of the central portion (the B component) of each multi-lens set and a point created in the GIS layer at the appropriate map location. This was a “calibrated eyeball” method and the location on the GIS layer should be considered as close but not exact. Index maps were prepared to show the location of collection images by year group and ACC flight line and are presented below.

1927 Images:

The images from 1927 (month and day unknown) are from 3 of four known accession numbers (ACC) each representing a single flight run (Figure 7). All were taken by USCGS. These are ACC 682, 685, and 686. ACC 684 was included on Wanless’s original map document but no images from this set were found in the albums however it covered the northern portion of the Ten Thousand Islands area. Each flight set is described and can be found in the following map figures:

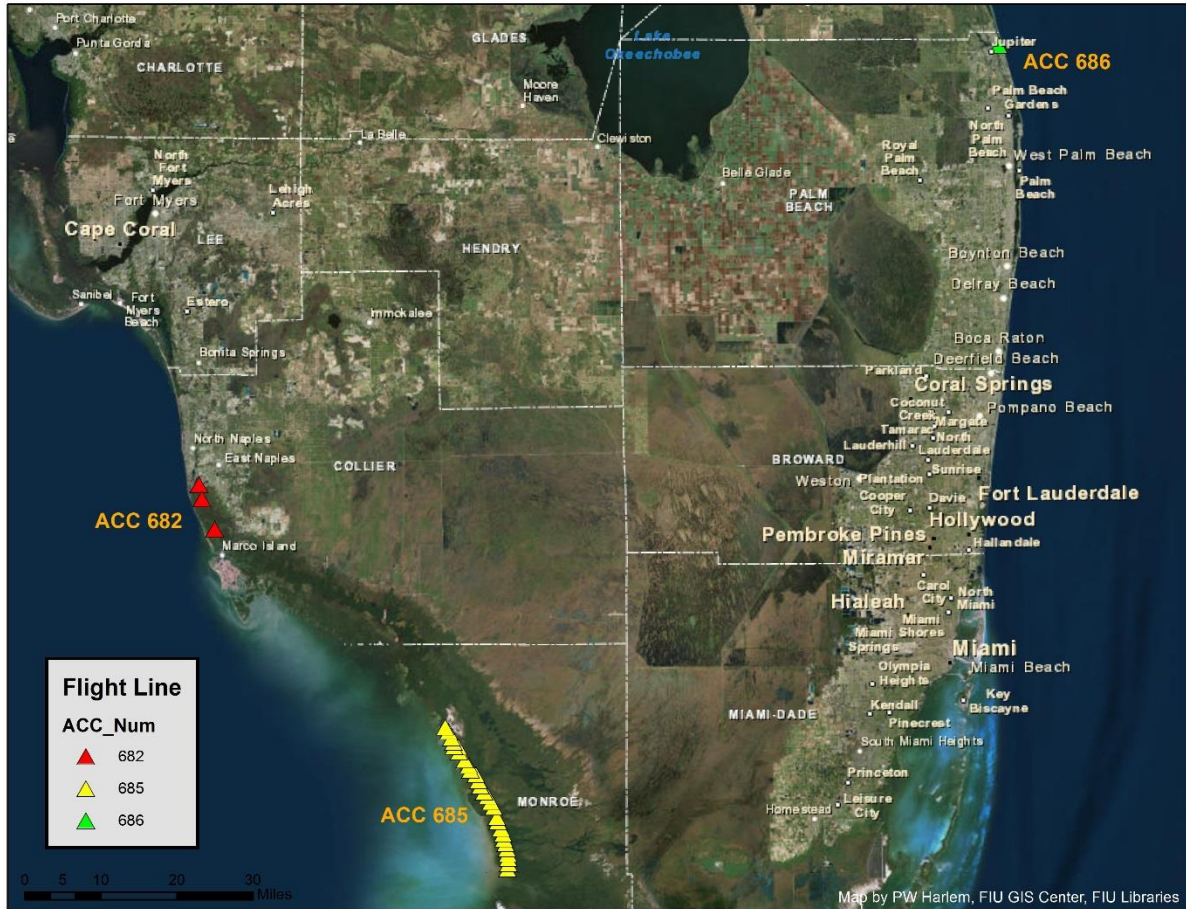


Figure 7: Map of 1927 multi-lens photo locations. Center of triangle shows approximate center of the B or M portion of the photo set. Known missing photo locations from each flight are not shown.

- ACC 682, 3 images from Collier County representing 3 multi-lens photos (Figure 8). Only single component for each. Taken from the area immediately north of Marco Island and centered interior to the coastline proper.
- ACC 685, 59 images from Monroe County representing 28 multi-lens photos (Figure 9). Taken from North Cape Sable to the middle reach of the Ten Thousand Islands. Images taken just inside the outer coastline.
- ACC 686, 1 image representing 1 multi-lens photo, taken over Jupiter Inlet (Figure 10). No others from this set are in the collection which probably covered portions of the Broward and Palm Beach County coastlines.

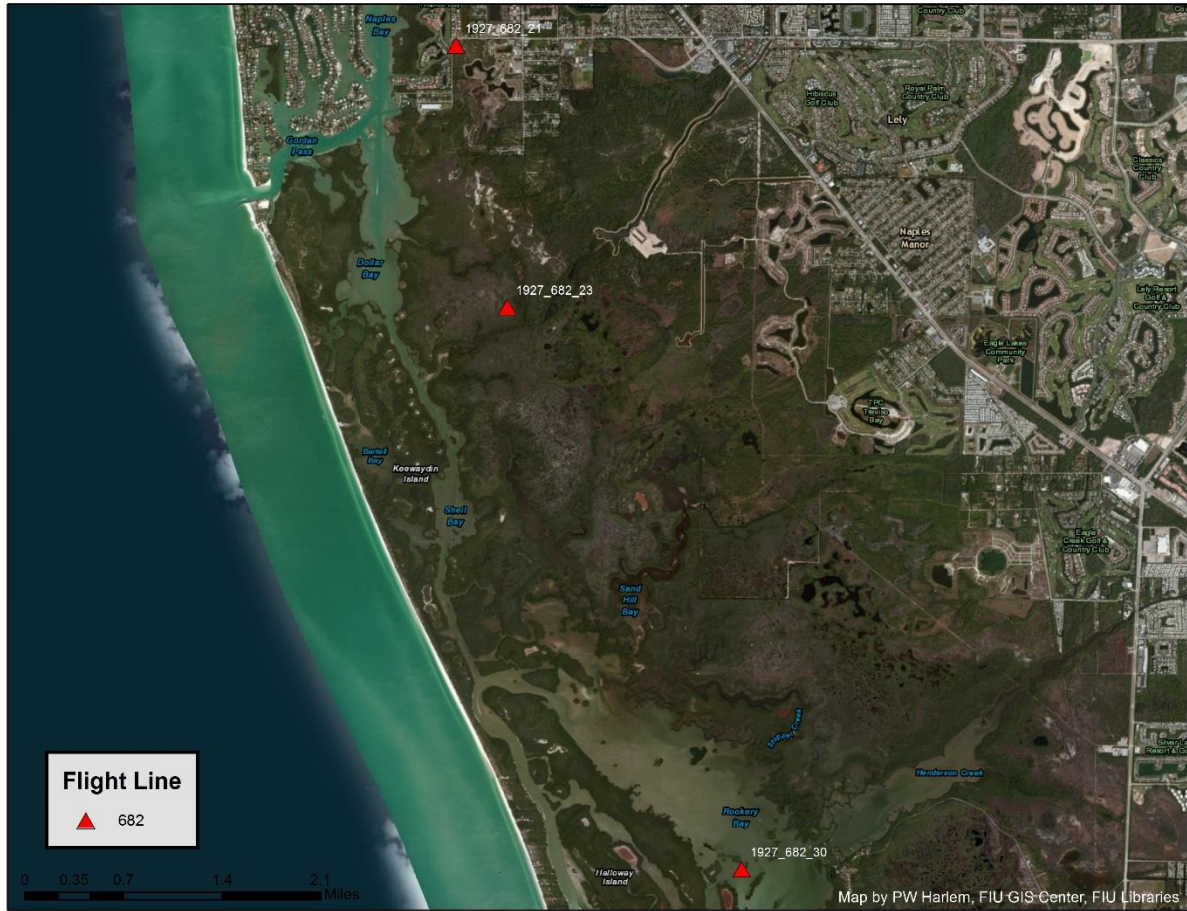


Figure 8: Map of 1927 ACC 682 multi-lens photo locations for the three photos in the collection.



Figure 9: Map of 1927 ACC 685 multi-lens photo locations. Missing images not shown.

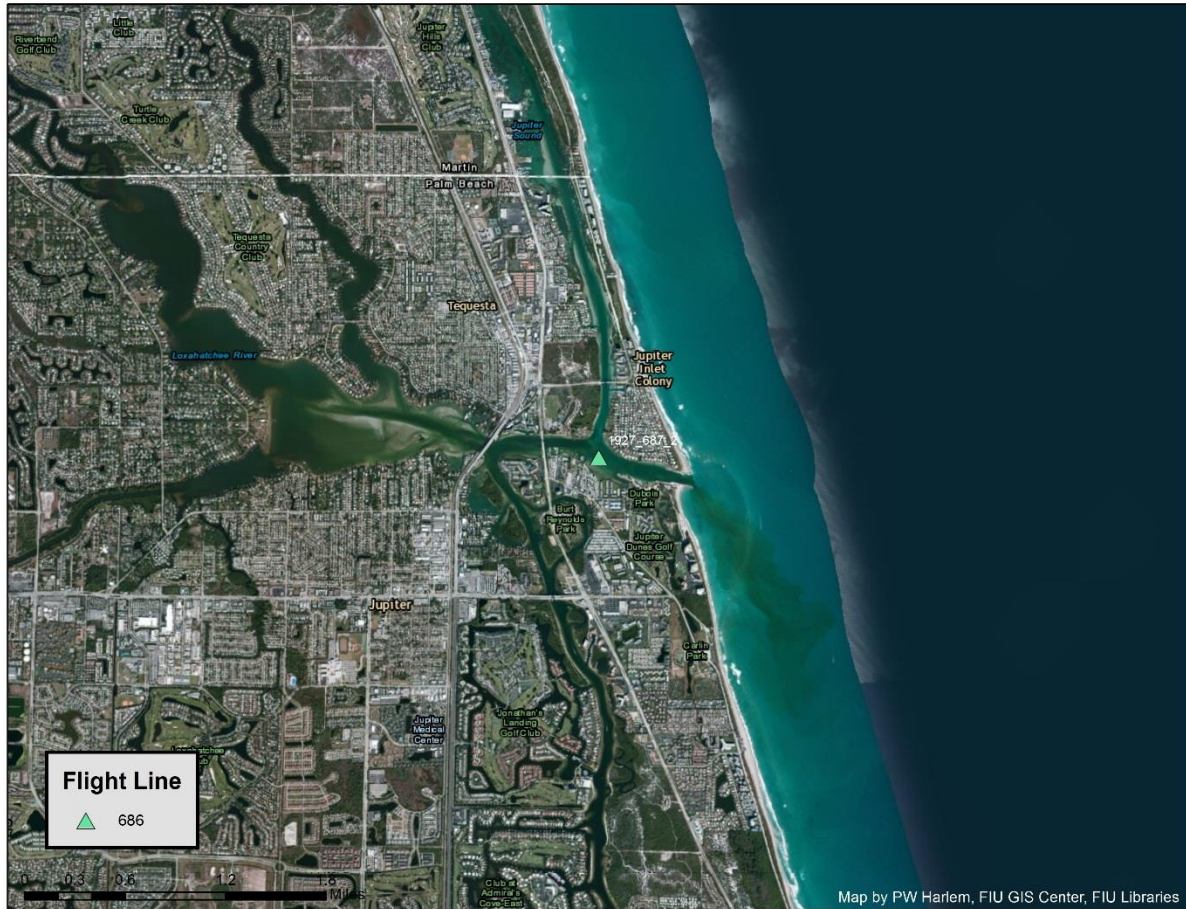


Figure 10: Map of 1927 ACC 686 multi-lens photo location centered on Jupiter Inlet. Missing images not shown.

1928 Images:

The images from 1928 (month and day unknown) are from 10 of 11 known accession numbers (ACC) each representing a single flight run (Figure 11). These are ACC 687-693, and 695-697. ACC 694 was also included on Wanless's original map document but no images from this set were found in the albums, however it covered the northern coastline of Florida Bay. A layer showing the approximate location of the ACC 684 set is available from FIU GIS-RS Center upon request. Each set is described and can be found in the following map figures:

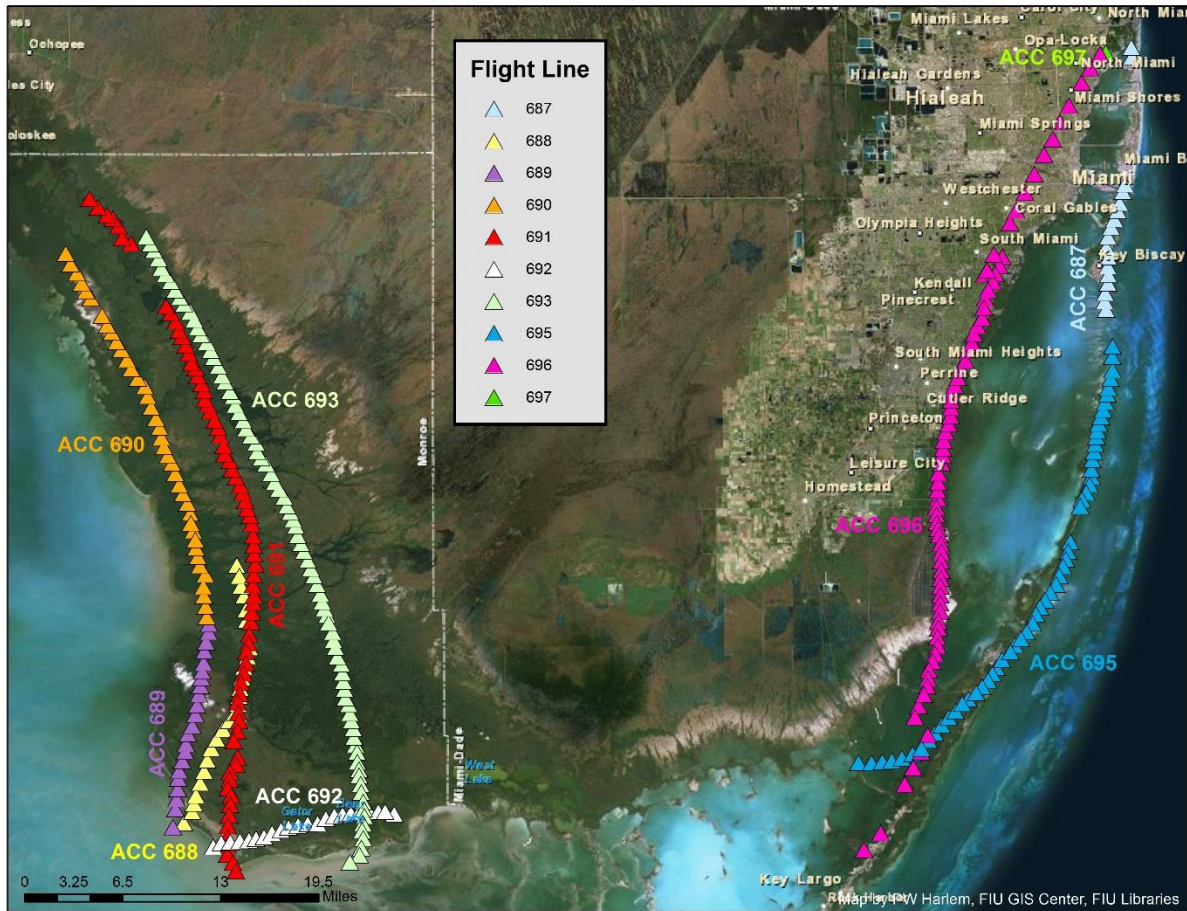


Figure 11: Map of 1928 multi-lens photo locations. Center of triangle shows approximate center of the B or M portion of the photo set. Known missing photo locations from each flight are not shown.

- ACC 687, 25 images from Miami-Dade County representing 17 multi-lens photos (Figure 12). Taken from Baker’s Haulover Beach to just below Cape Florida located just inland from the beach line.
- ACC 688, 75 images from Monroe County representing 25 multi-lens photos (Figure 13). Taken from Cape Sable to mid Ten Thousand Islands centered several kilometers inland from the coast.
- ACC 689, 73 images from Monroe County representing 21 multi-lens photos taken from Cape Sable to just north of the outlets to Shark River (Figure 14). Images taken just inland from the outer coastline.
- ACC 690, 136 images from Monroe County representing 40 multi-lens photos taken from Shark River outlet to north Ten Thousand Islands (Figure 15). Images taken just inland from the outer coastline.
- ACC 691, 195 images from Monroe County representing 73 multi-lens photos taken from Cape Sable to north Ten Thousand Islands (Figure 16). Images take several kilometers inland from the coast.

- ACC 692, 43 images from Monroe County representing 22 multi-lens photos (Figure 17). Taken from Flamingo to Cape Sable taken just inside the outer coastline.
- ACC 693, 243 images from Monroe County representing 71 multi-lens photos taken from East Cape Sable to north Ten Thousand Islands (Figure 18). Taken well inland along the east edge of the coastal mangrove areas.
- ACC 695, 128 images from Miami-Dade and Monroe Counties representing 56 multi-lens photos taken from Northeast Florida Bay to Soldier Key following the trend of the upper Keys (Figure 19). Additional photos were included in this set contributed by this document's author from his thesis collection to fill in missing images.
- ACC 696, 179 images from Miami-Dade and Monroe Counties representing 66 multi-lens photos taken from Tavernier to North Miami (Figure 20). On mainland section these are taken just inland from the coastline. Additional photos were included in this set contributed by this document's author from his thesis collection to fill in missing images.
- ACC 697, 1 image from North Miami-Dade County representing a single multi-lens photo taken over Arch Creek area (Figure 21). Missing images from this flight are thought to run north of Arch Creek into Broward County.

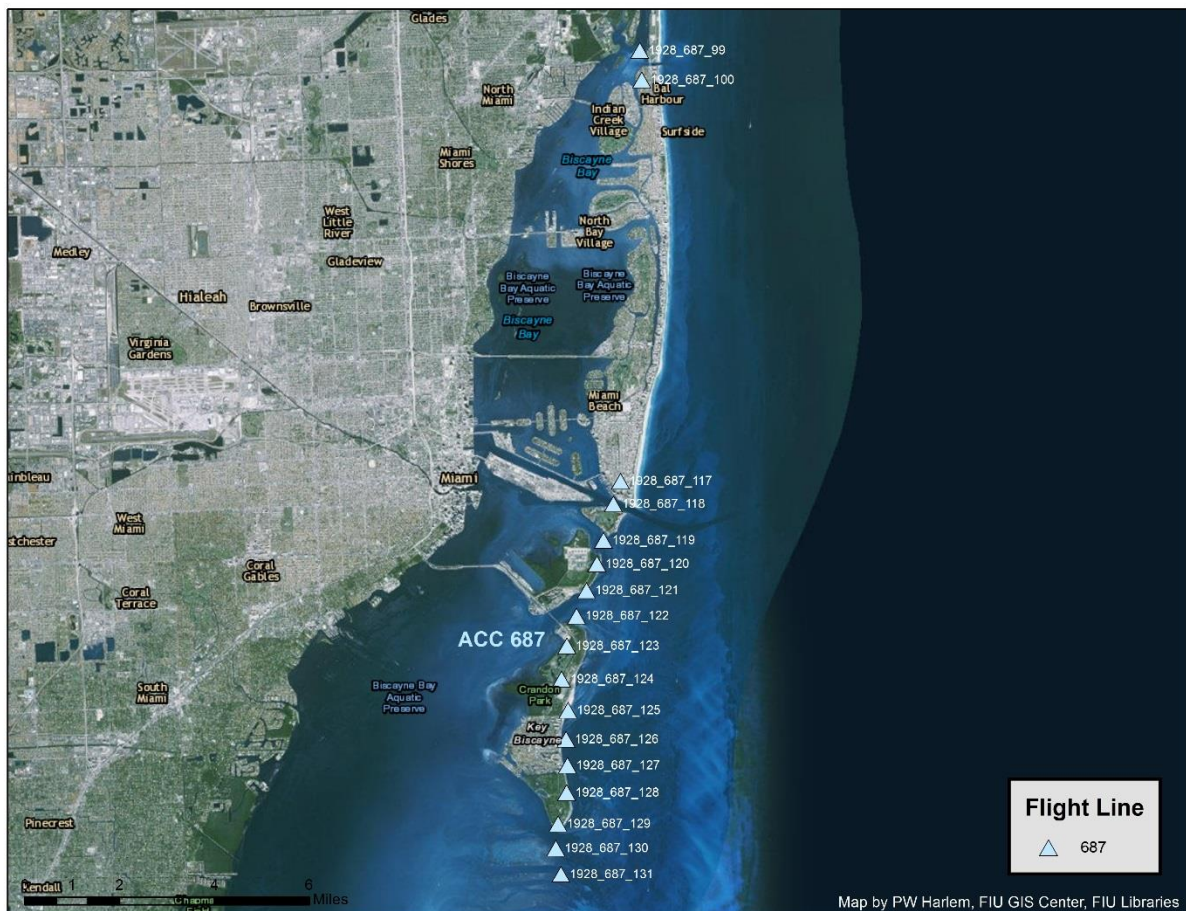


Figure 12: Map of 1928 ACC 687 multi-lens photo locations. Missing images not shown.

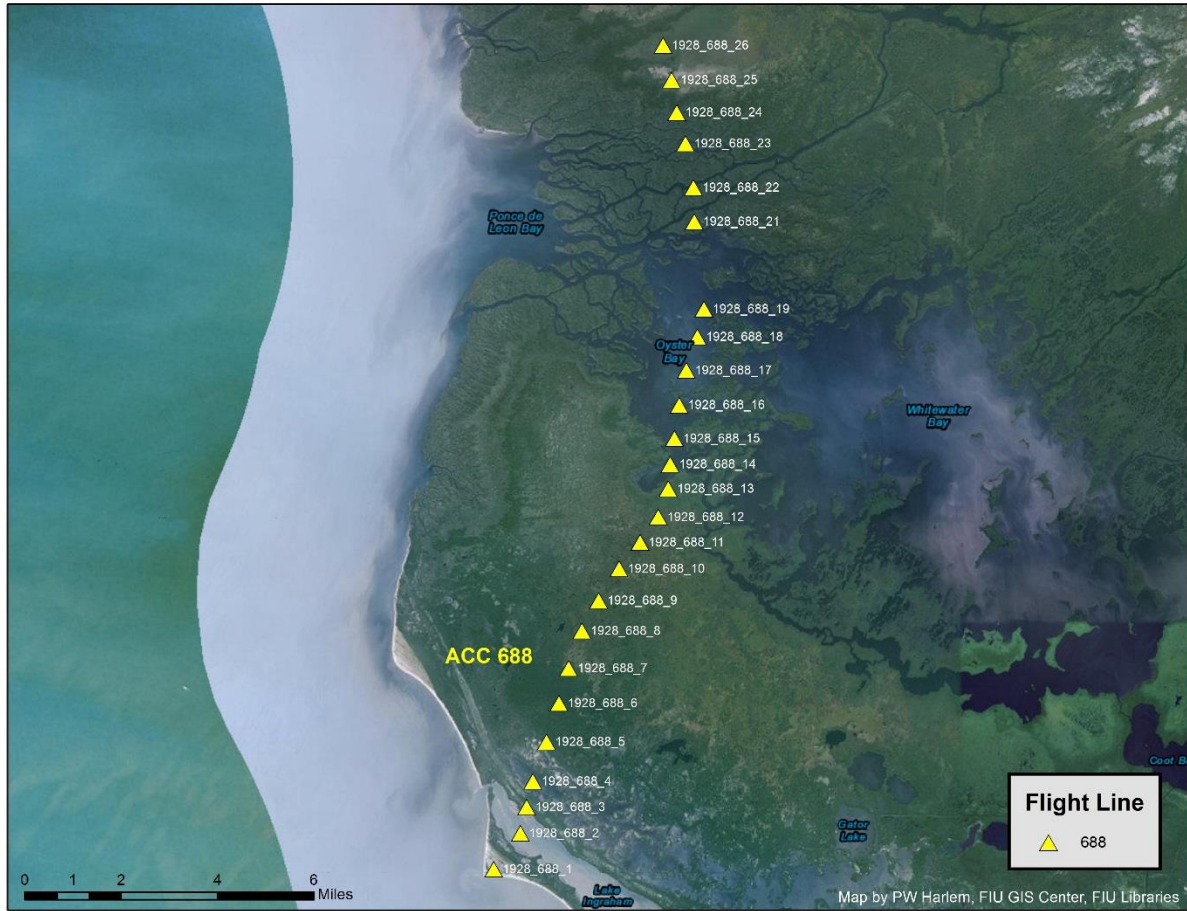


Figure 13: Map of 1928 ACC 688 multi-lens photo locations. Missing images not shown.



Figure 14: Map of 1928 ACC 689 multi-lens photo locations. Missing images not shown.



Figure 15: Map of 1928 ACC 690 multi-lens photo locations. Missing images not shown.



Figure 16: Map of 1928 ACC 691 multi-lens photo locations. Missing images not shown.

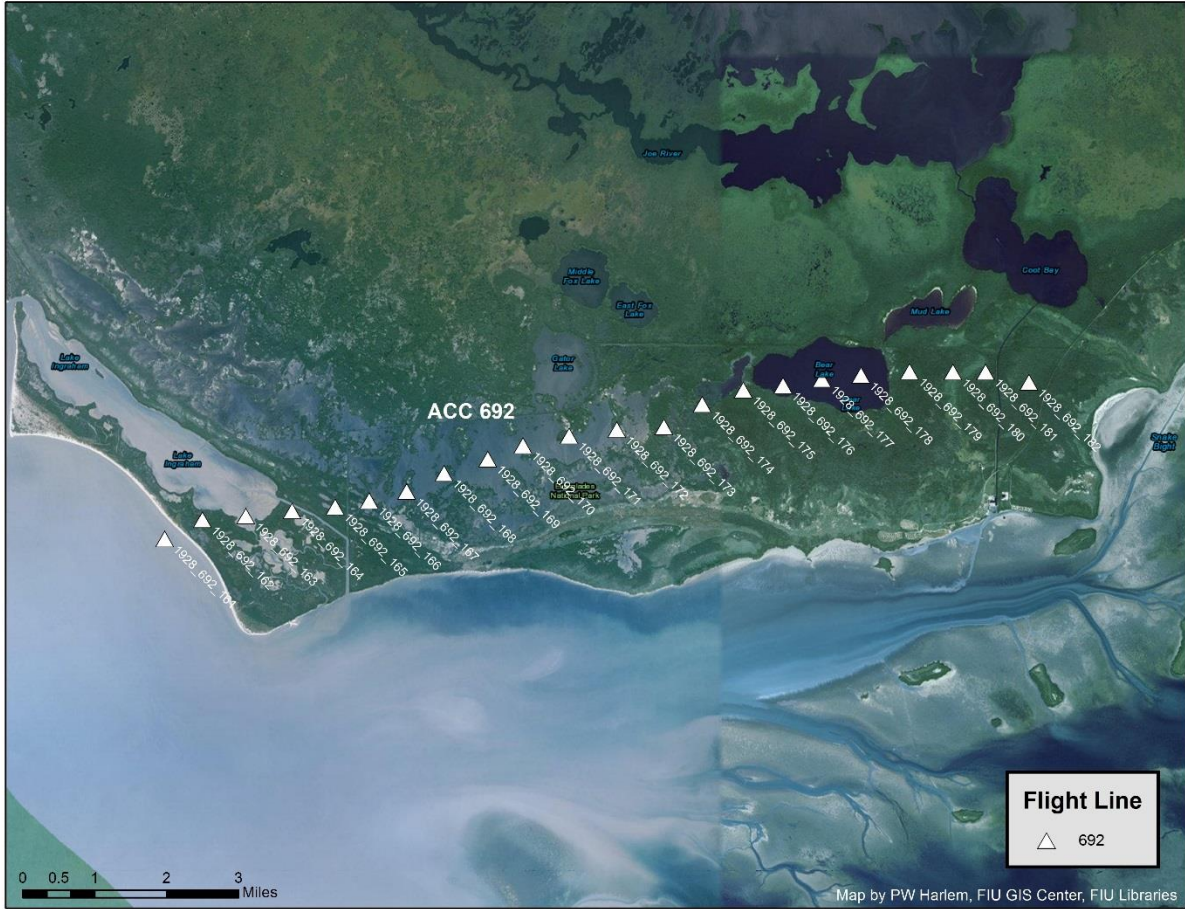


Figure 17: Map of 1928 ACC 692 multi-lens photo locations. Missing images not shown.

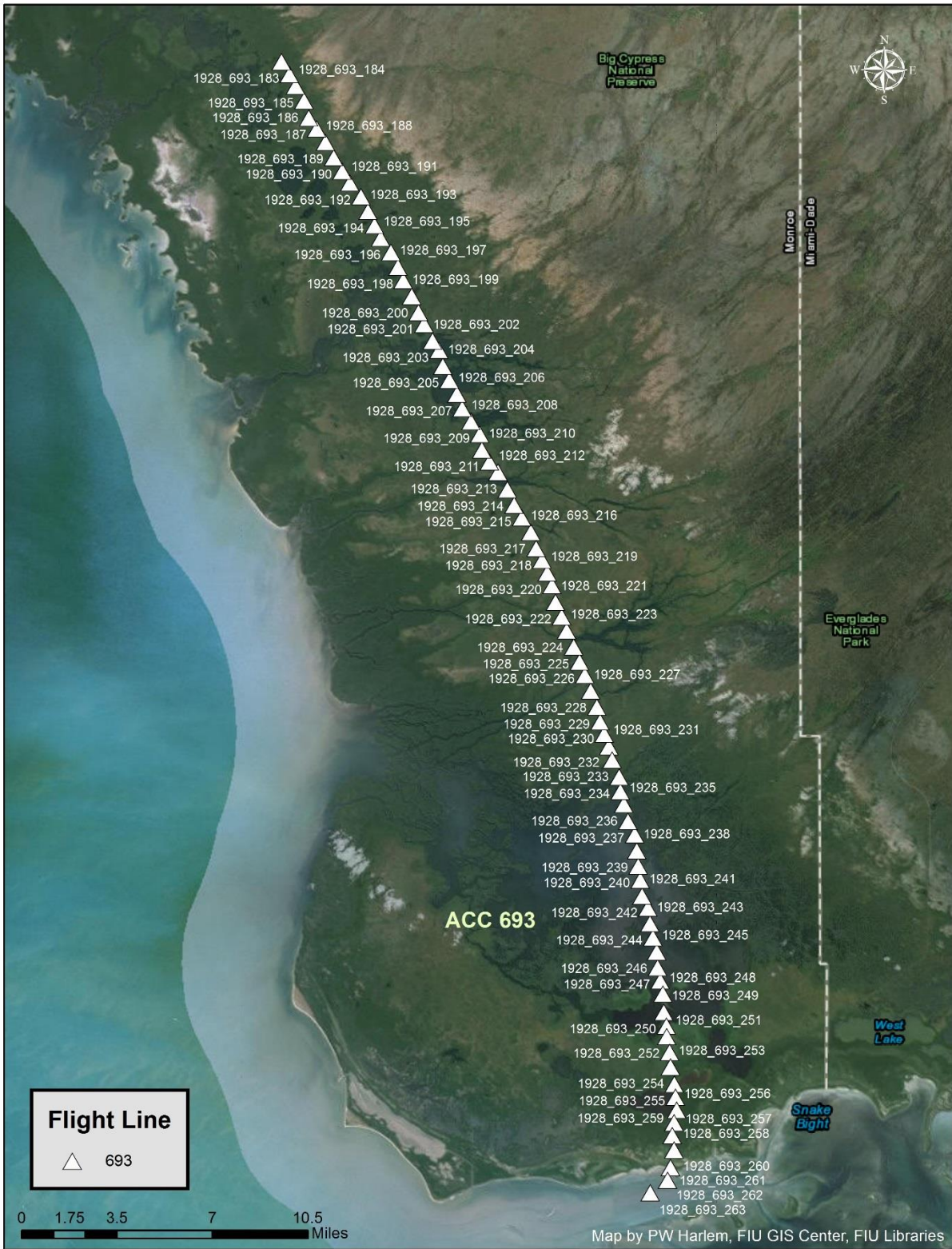


Figure 18: Map of 1928 ACC 693 multi-lens photo locations. Missing images not shown.

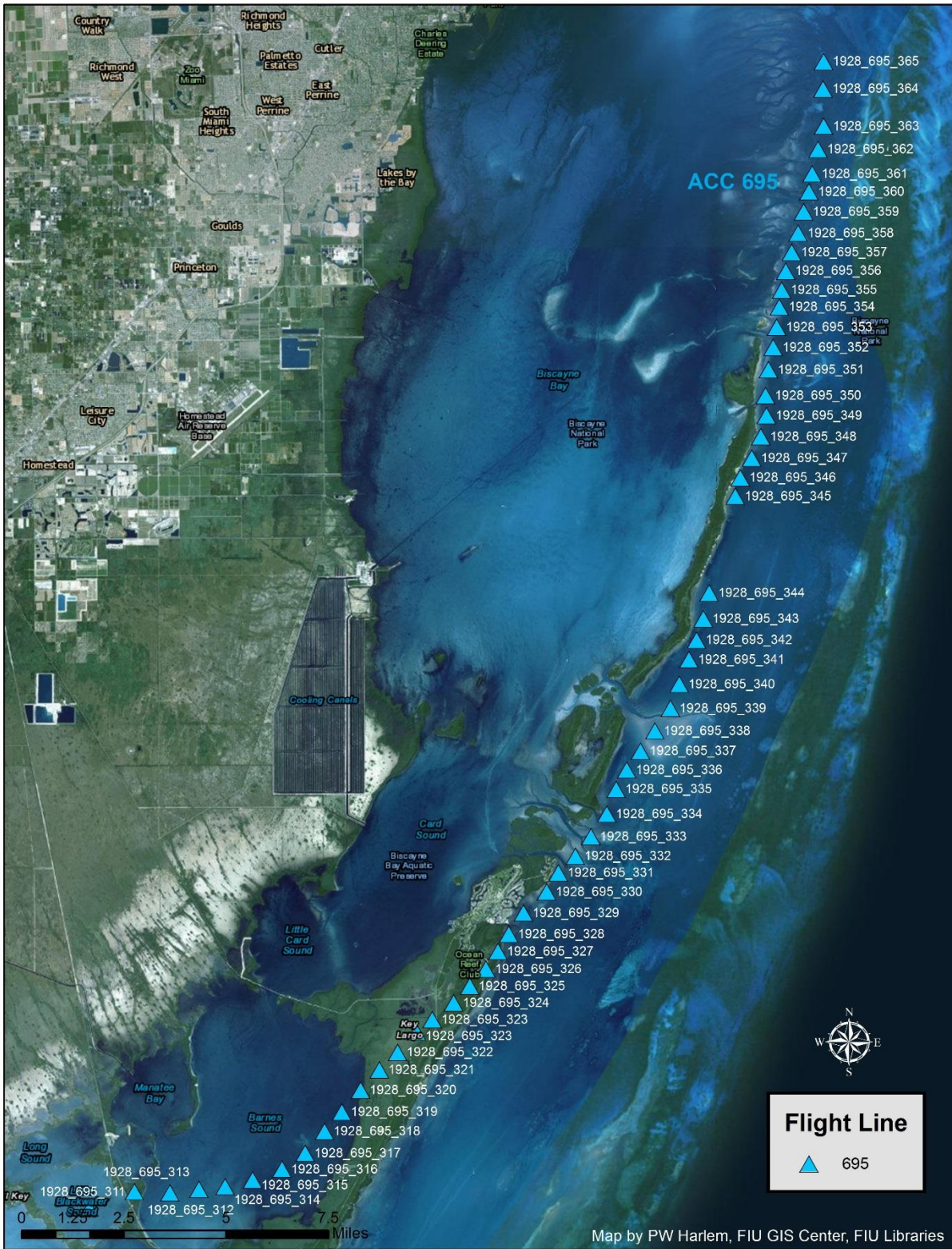


Figure 19: Map of 1928 ACC 695 multi-lens photo locations. Missing images not shown.

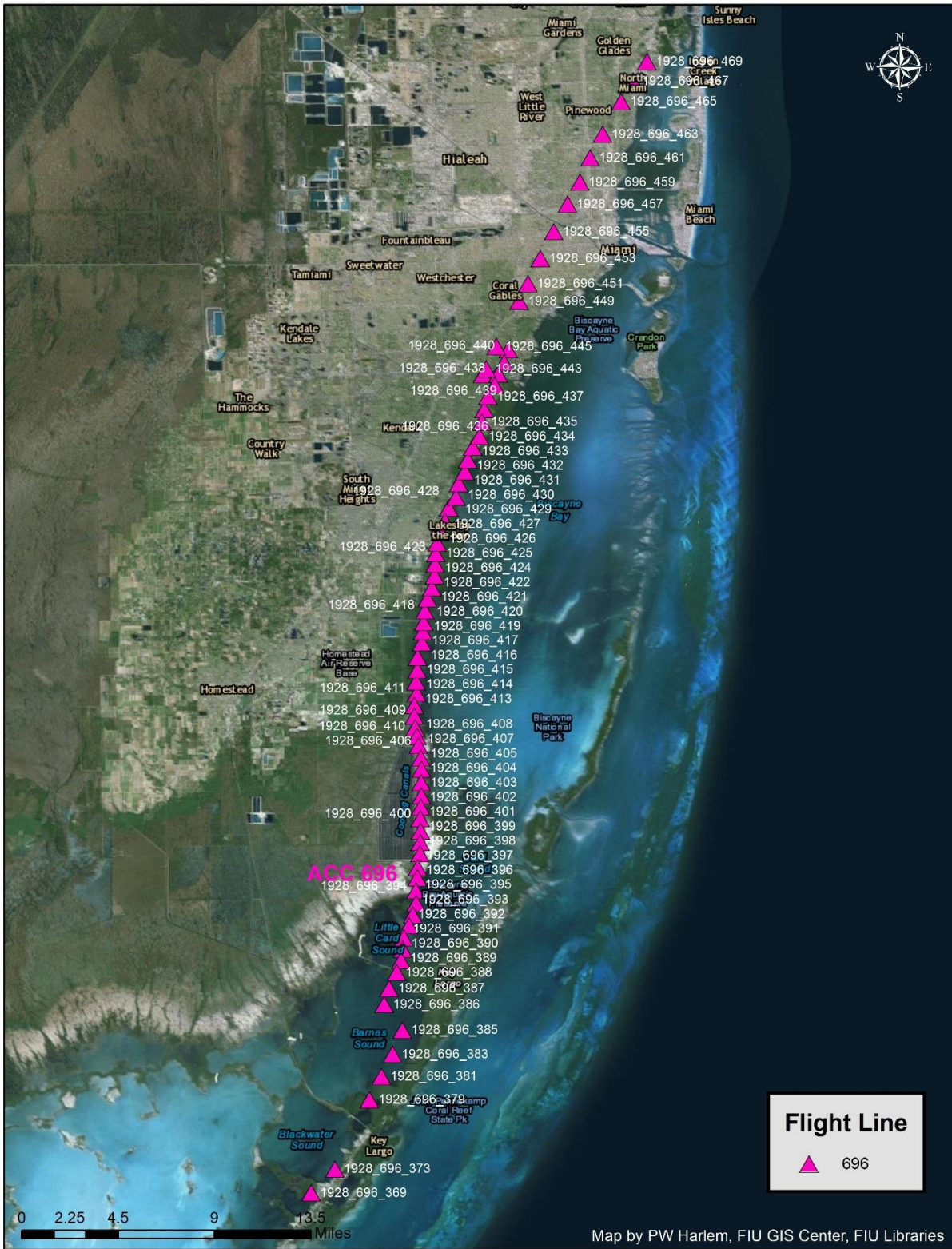


Figure 20: Map of 1928 ACC 696 multi-lens photo locations. Missing images not shown.

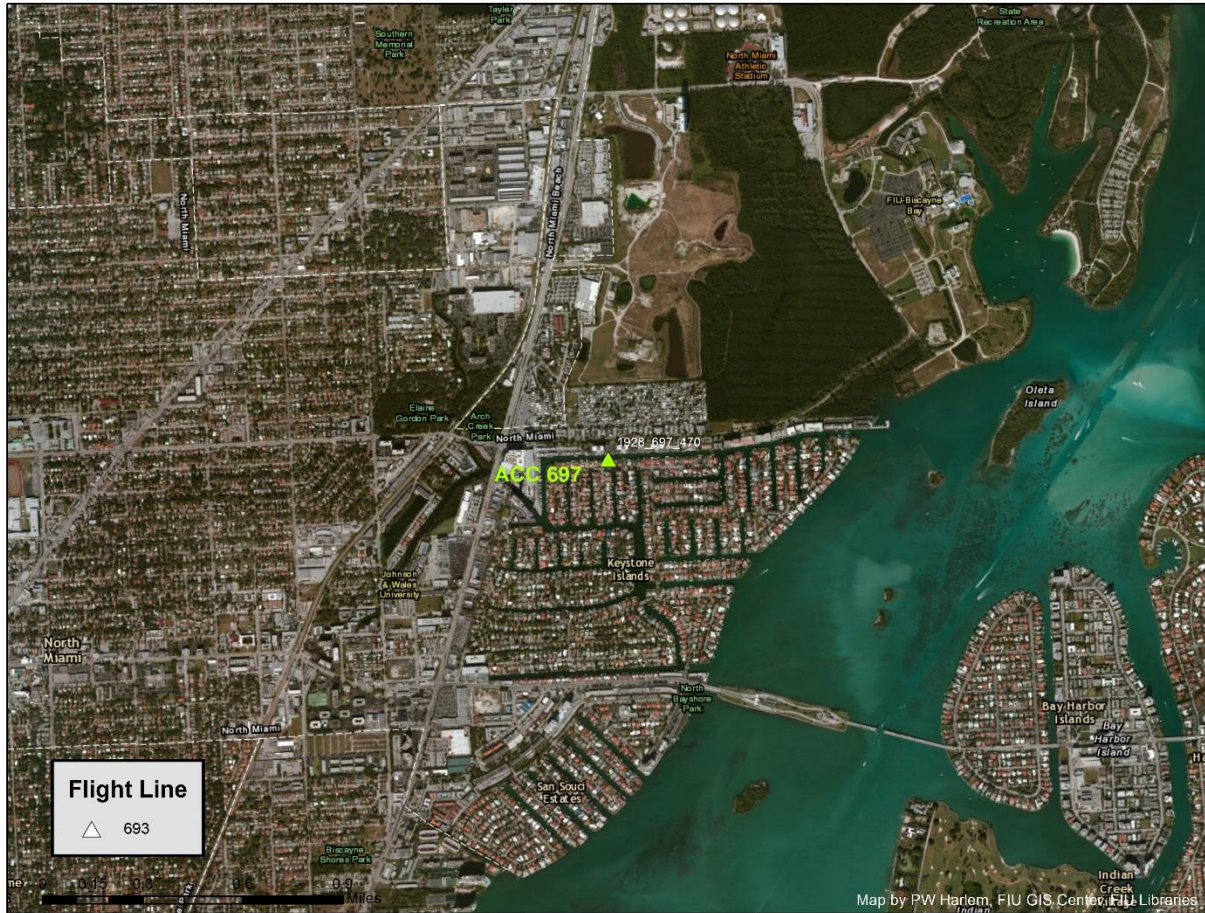


Figure 21: Map of 1928 ACC 697 multi-lens photo location. Missing images assumed to be in the original set not shown.

1932 Images:

Two flight lines flown in January of 1932 are included in the collection (Figure 22). These are ACC 806 and ACC 807 and all were taken by USCGS using a trimetragon camera. The Wanless collection only included a few images from these lines, most just having a single panel from the photo number, however a majority of the included images are contributions by the author from his personal collection and added to make the collection more complete. Each set is described and can be found in the following map figures:

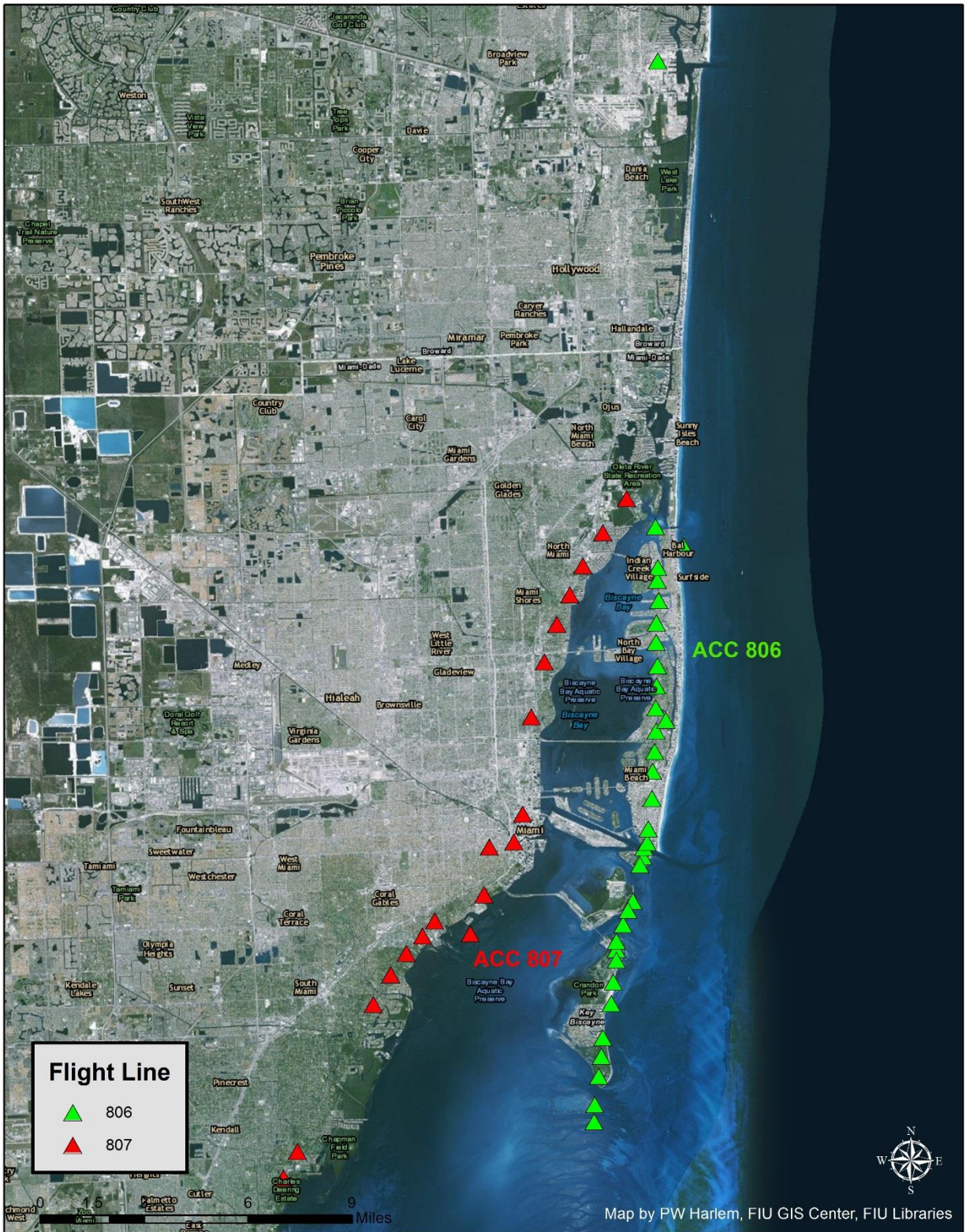


Figure 22: Map of 1932 multi-lens photo locations. Center of triangle shows approximate center of the B or M portion of the photo set. Known missing photo locations from each flight are not shown.

- ACC 806, 70 images covering the barrier island chain of Miami-Dade and Broward Counties representing 30 multi-lens photos (Figure 23). The collection only has those in Miami-Dade and a single image of Port Everglades inlet opposite Fort Lauderdale. PWH Collection provided many of the images in this set.
- ACC 807, 42 images of Miami-Dade County representing 19 photos covering the mainland coastline from North Miami to Cutler Bay (Figure 24). PWH Collection provided many of the images in this set.

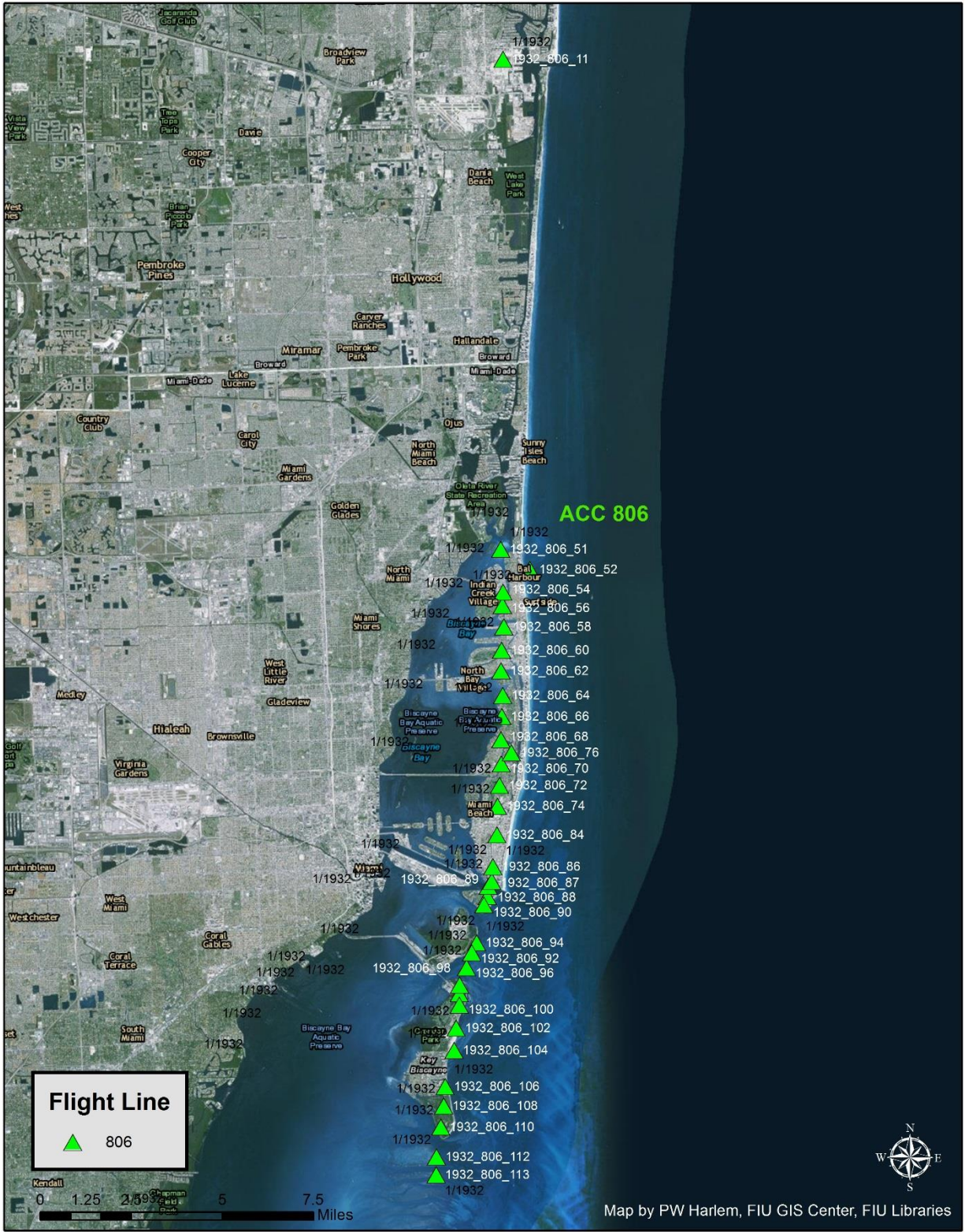


Figure 23: Map of 1932 ACC 806 multi-lens photo locations. Known missing photo locations are not shown.

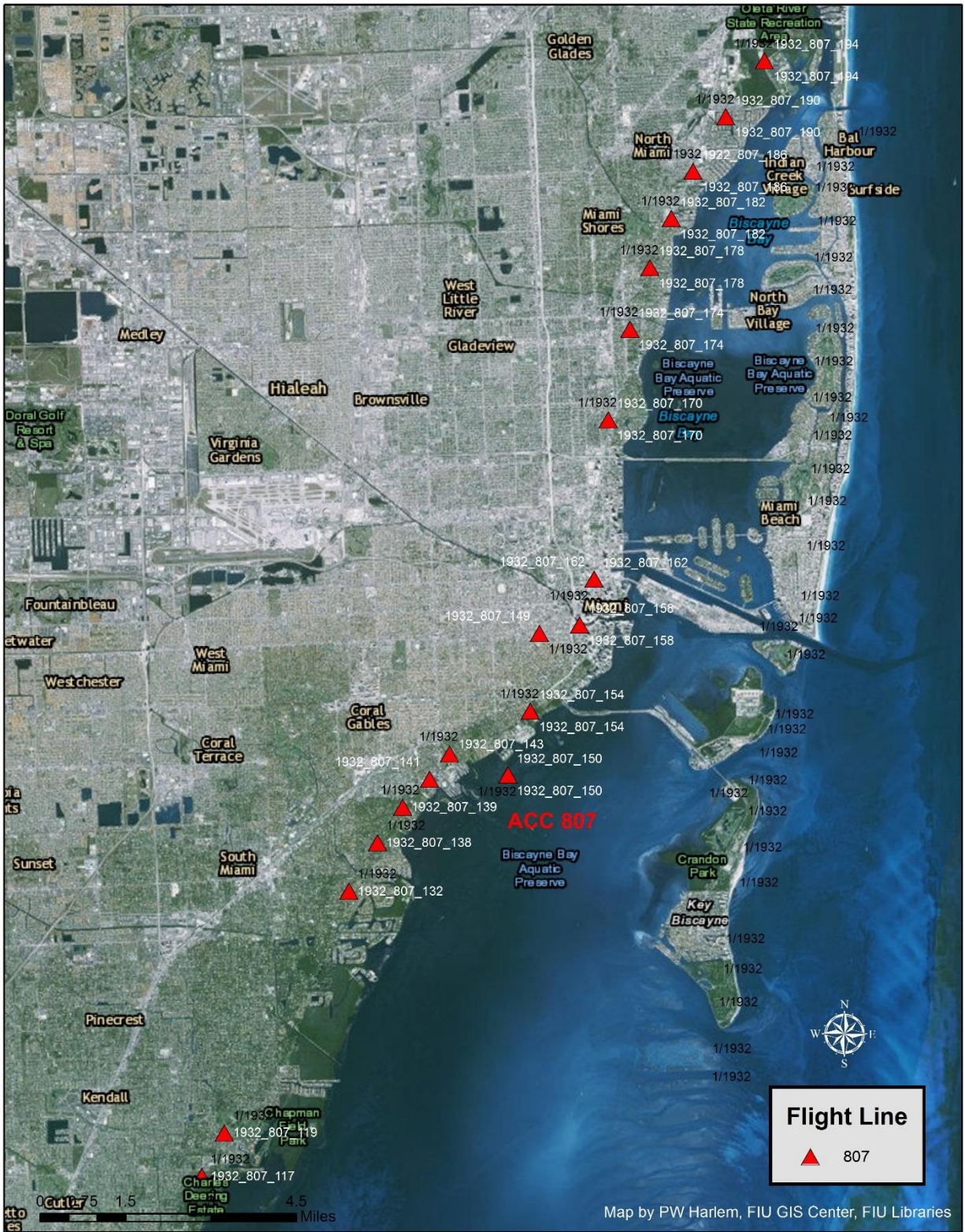


Figure 24: Map of 1932 ACC 807 multi-lens photo locations. Known missing photo locations are not shown.

1935 Images:

The images from 1935 (taken in January) are from 5 accession numbers each representing a single flight run (Figure 25). All were taken by USCGS. These are ACC 610, 613, 614, 615 and 616. Each set is described and can be found in the following map figures:

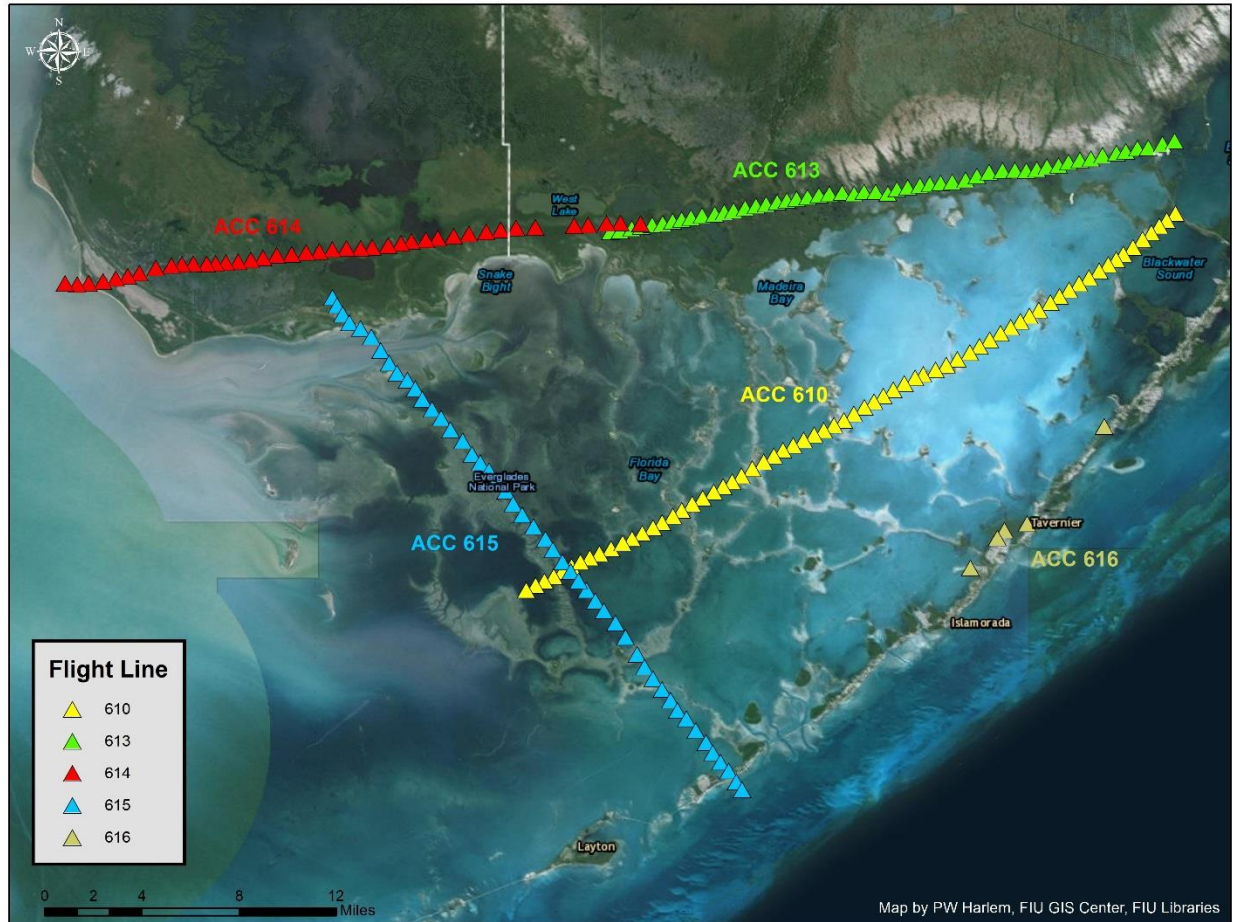


Figure 25: Map of 1935 multi-lens photo locations. Known missing photo locations are not shown.

- ACC 610, 335 images taken 1935 over the middle of Florida Bay in Monroe County representing 67 multi-lens photos (Figure 26).
- ACC 613, 260 images taken over the NE coastline of Florida Bay, mostly in Monroe County with a few over Miami-Dade County representing 52 multi-lens photos (Figure 27). The flightline was located a short distance inland from the coastline.
- ACC 614, 191 images taken over the NW coastline of Florida Bay in Monroe County representing 41 multi-lens photos (Figure 28). Images taken a short distance inland from the coastline.
- ACC 615, 240 images taken over Florida Bay in Monroe County representing 48 multi-lens photos (Figure 29). This flightline crosses Florida Bay from Lower Matecumbe Key to the mainland just west of Flamingo.

- ACC 616, 5 images taken over the lower Florida Keys in Monroe County representing 5 multi-lens photos (Figure 30). The collection only has a single panel for each of these locations except for image #518 which has the B panel and a zoomed portion of the D panel.

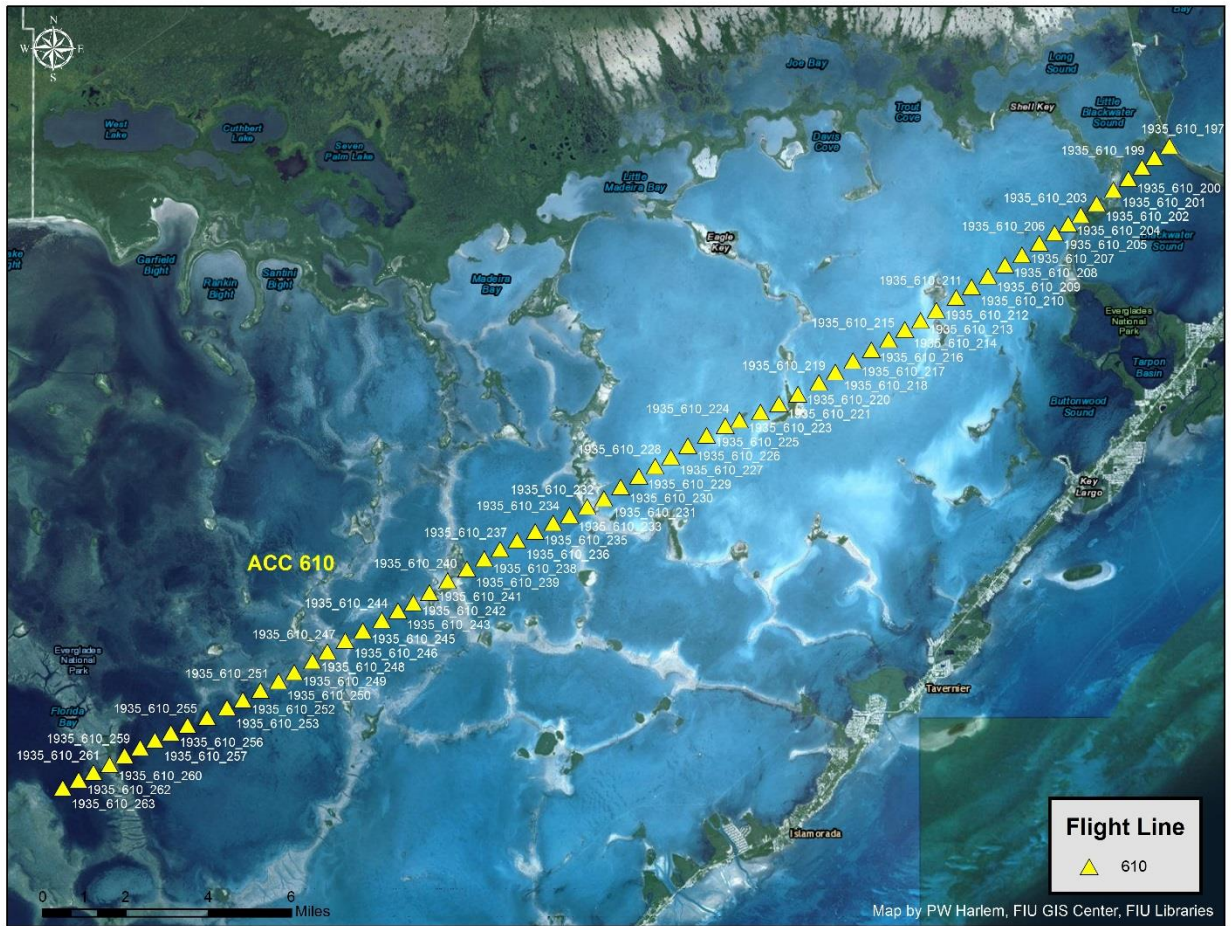


Figure 26: Map of 1935 ACC 610 multi-lens photo locations. Known missing photo locations are not shown.



Figure 27: Map of 1935 ACC 613 multi-lens photo locations. Known missing photo locations are not shown.



Figure 28: Map of 1935 ACC 614 multi-lens photo locations. Known missing photo locations are not shown.

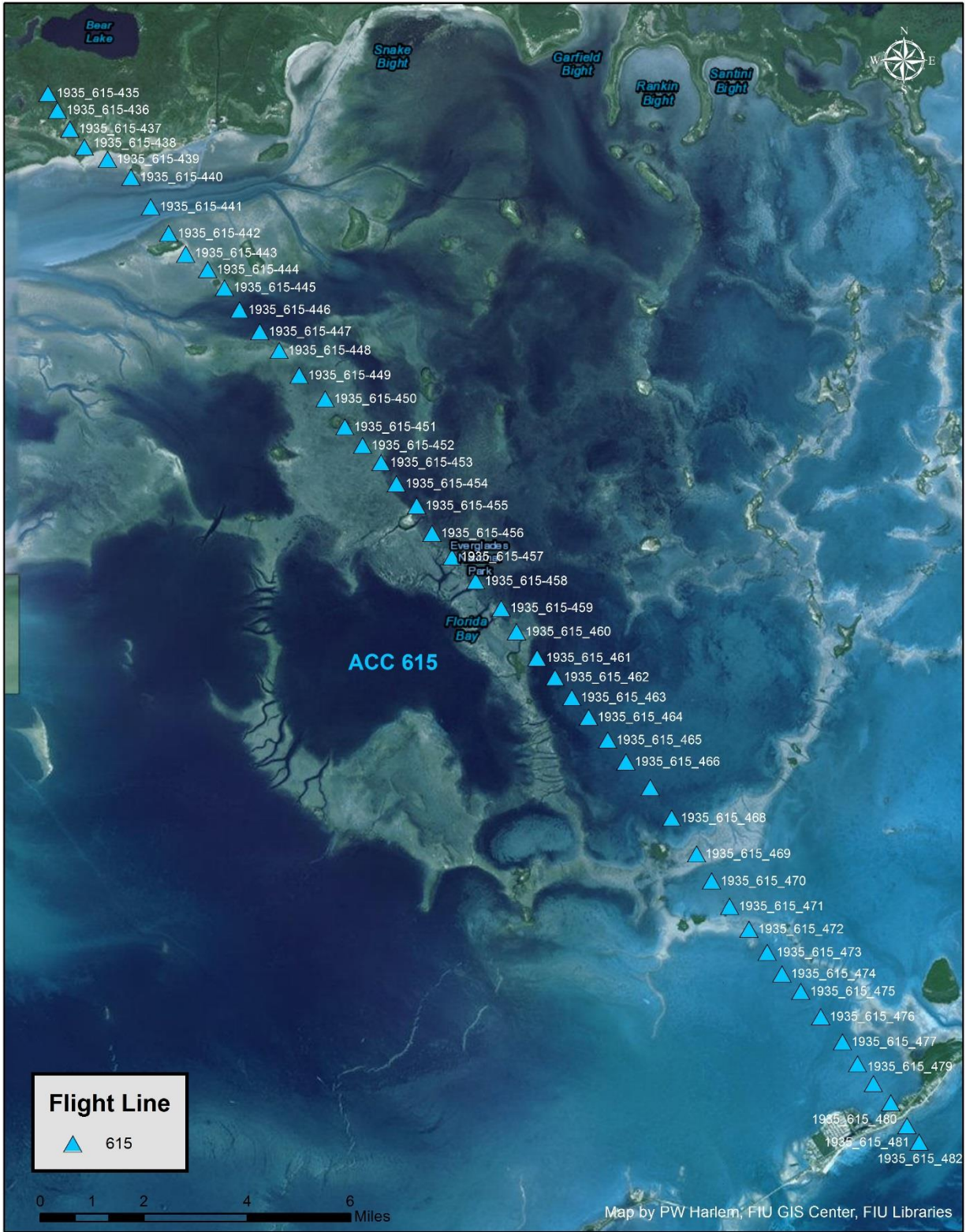


Figure 29: Map of 1935 ACC 615 multi-lens photo locations. Lower Matecumbe Key is at lower right. Known missing photo locations are not shown.



Figure 30: Map of 1935 ACC 616 multi-lens photo locations. Known missing photo locations are not shown.

1953-1954 Images:

The air photos taken in 1953 and 1954 by the Soil Conservation Service of the US Department of Agriculture (USDA) were taken at various dates. Two projects were included coded DSN (1953) and BUP (1953 and 54, Figure 31). These are modern single lens images with one panel per image (called 1-lens in the data tables). As per modern practice each project had individual flight lines representing each day's flying effort so the data table includes flight numbers. Each project set is described and can be found in the following map figures. Dates are listed in table 3 and note that some images are duplicates or zoomed into specific features:

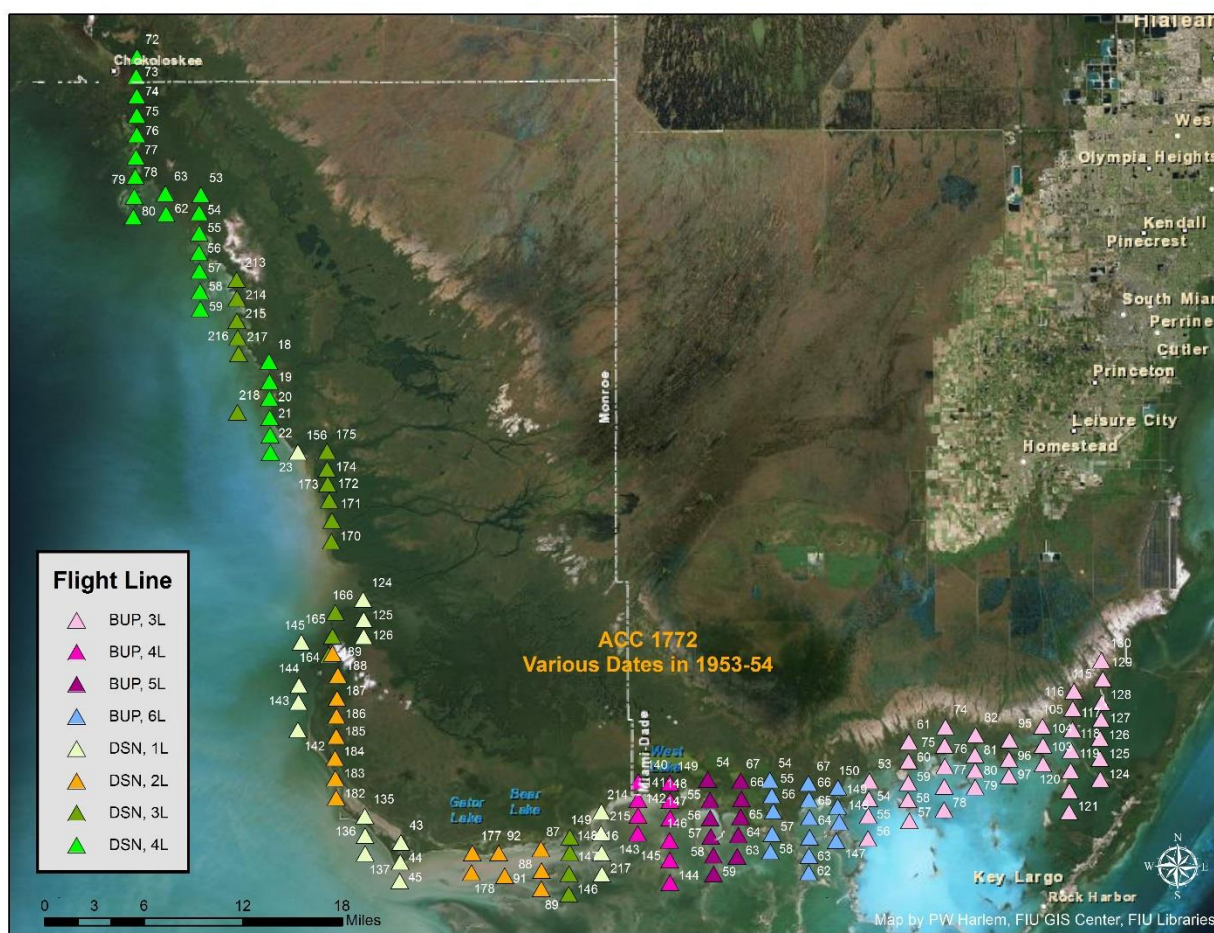


Figure 31: Map of 1953 ACC 1772 multi-lens photo locations. Known missing photo locations are not shown.

Table 3: Flight info for ACC 1773 images taken in 1953 or 1954.				
Date	Project Code	Flight No.	No. of images	No. of photos
2/9/1953	DSN	1L	36	16
2/14/1953	DSN	1L/2L	36	19
2/16/1953	BUP	3L	77	38
2/18/1953	DSN	4L	29	24
3/9/1953	DSN	1L/3L	46	24
	BUP	4L	18	10
11/28/1953	BUP	5L	11	11
12/16/1953	BUP	6L	11	11
2/5/1954	BUP	6L	4	4

- ACC 1772 DSN, 147 images taken in 1953 over the southwest coast of Florida representing 97 single lens photos (Figure 32). Set includes duplicate copies and zooms.
- ACC 1772 BUP, 121 images taken in 1953 and 1954 over the north coast of Florida Bay in eastern Monroe or Miami-Dade Counties representing 74 single lens photos (Figure 33). Set includes duplicates and zooms.

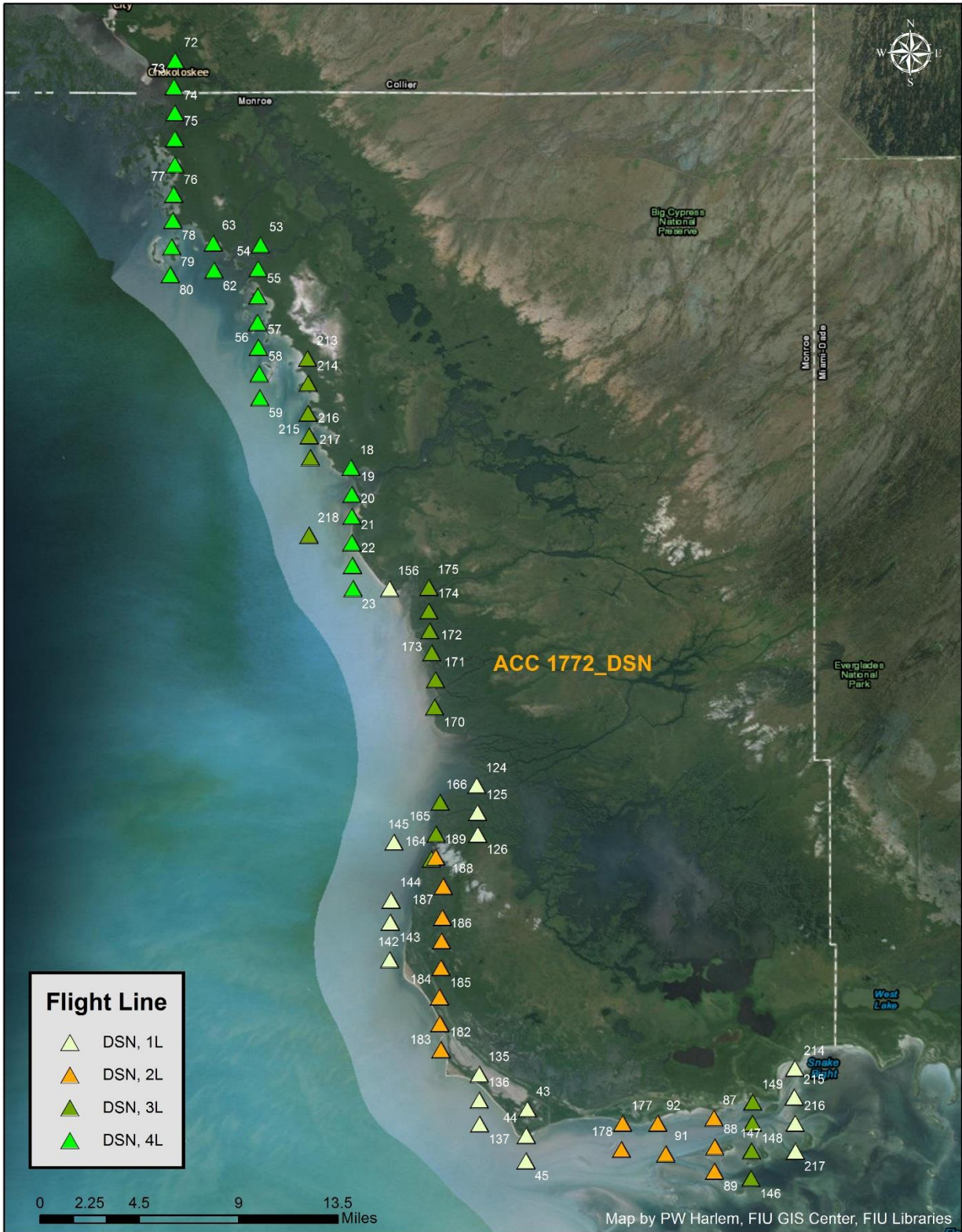


Figure 32: Map of 1953 ACC 1772 DSN multi-lens photo locations. Known missing photo locations are not shown.

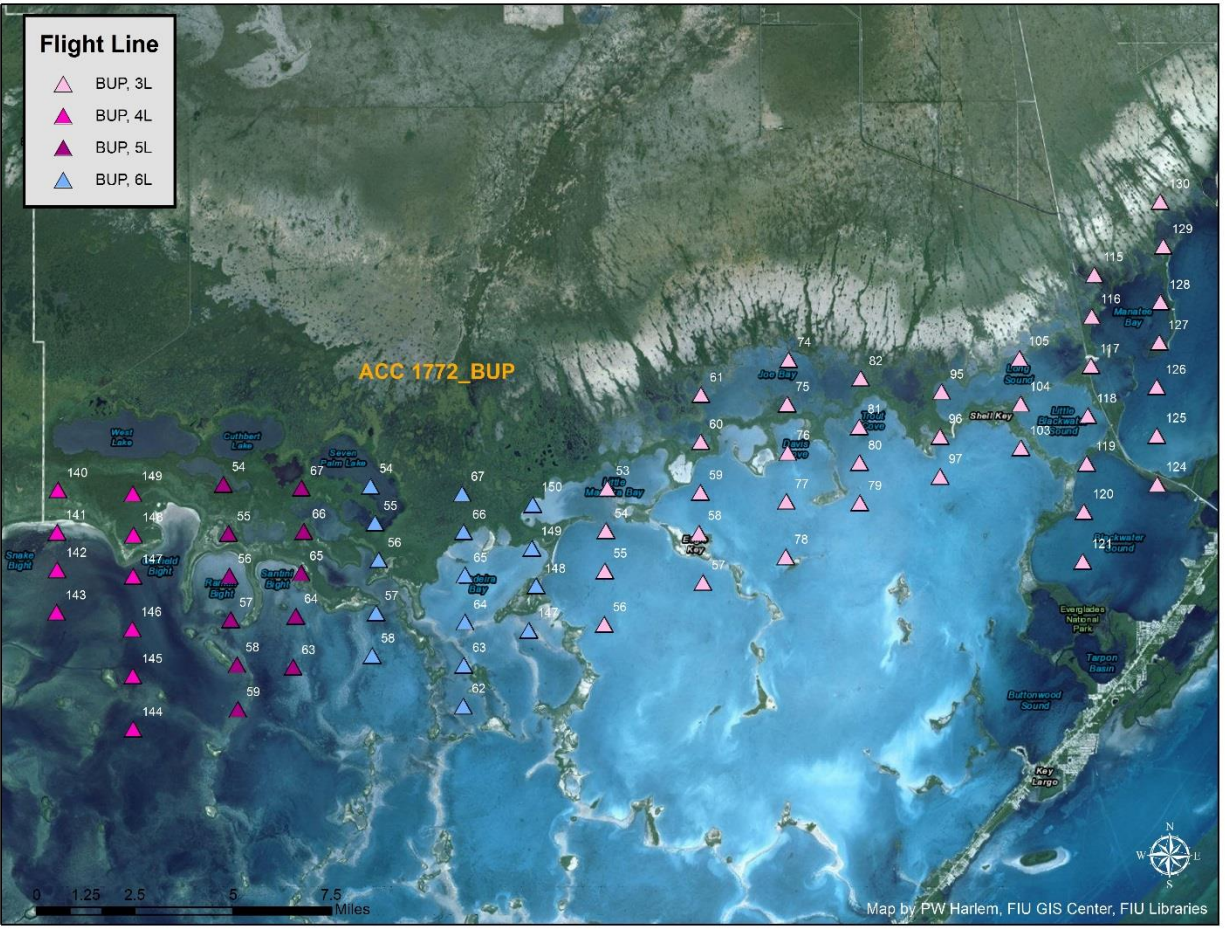


Figure 33: Map of 1953 ACC 1772 BUP multi-lens photo locations. Known missing photo locations are not shown.

ADDITIONAL INFORMATION

The images will be placed online at a future date to provide access to researchers needing historical data. Additional digital copies of the full set have been created for USGS and Dr. Wanless at UM. The FIU interface will be map based to aid easy location of the images and will allow downloading for other users. Questions about the images or other information requests should be referred to the FIU GIS Center at the following address:

FIU GIS-RS Center
 11200 SW 8th ST.
 Miami, FL 33199
 (305-348-6443)