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Section Two: Study D

REMOTE SENSING OF ENVIRONMENTAL DISTURBANCE*

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In October 1969 and November 1970, a NASA RB57 remote sensing aircraft at an altitude of 60,000 feet over the Boca Raton and Southeast Florida Earth Resources Test Site recorded simultaneously in Color, Color Infrared, and Minus-blue films nine different types of photographic images of the geographic patterns on the surface. The entire area can be overflown in less than four hours. Focal lengths varying from 40 to 250 millimeters were used on the nest of six Hasselblad cameras, 6 inch lens were used on two RC-8 cameras, and a 12 inch lens was used on the Zeiss mapping camera.

An analysis of the 1 to 60,000 scale color infrared imagery of the Miami area includes the Turkey Point shoreline of south Biscayne Bay. It shows cooling canal which runs southward toward its future warm rendezvous with the Bay. The synoptic view obtain also displays land use patterns which include the Homestead Air Force Base. The urban patterns of southeastern Miami, which include undeveloped bayfront lands currently proposed for an ambitious and disputed conversion to residential and recreational use, can be studied in this imagery. The strong red tones show the extent of mangrove fringe areas which many consider vital to the ecology of the Bay. But this synoptic view also indicates the nearness of this phenomena to the expanding population of south Miami. At somewhat smaller scale, one sees the Palm Beach environment with Peanut Island, the Port, and part of a proposed state recreation park on Singer Island - all current focal points of environmental change and pollution or land use disputes.

In Apollo 9 imagery, the recently re-aligned path of the Kissimmee River can be seen moving toward Lake Okeechobee in a now rather business-like manner. At 60,000 feet, the 40 millimeter lens of a Hasselblad camera demonstrates that the River is indeed now hard

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at work, with its increased velocity busily transporting a flow of natural and culturally-generated sediments into the Lake. The 80 millimeter lens provides a closer but less synoptic look. Some recent reports indicate that algae is being formed in the Lake from the excess amounts of fertilizer carried into the basin. However, a July 1970 interim report from a U.S. Geological Survey team assures us that massive eutrophication is not yet indicated. The view with a 250 millimeter lens should discourage complacency, as Figure A demonstrates.

Meanwhile, on the other side of the Lake, Belle Glade peacefully nestles amidst its reassuringly prosperous field patterns, as detected from 15,000 feet with Ektakrome imagery. It is noticeable that there is some discrepancy in the reflectance characteristics of the water in the two borrow pits that are side-by-side at the left center exit of the transverse canal. In a color infrared view, the second pit is more obvious and it is clear there is a considerable disturbance between it and the canal.

At 5,000 feet, a color view reinforces the previous impression that the second pit's waters do indeed seem different, and a same altitude but further enlarged color infrared image, as seen in Figure B, confirms a growing impression that all is not sweet in the land of sugar cane. The sewerage treatment plant is to the east, but more interesting is the unhealthy billious yellow mass floating on the water, and the reddish hook reaching into it.

But of course our "ground truth" team is under the aircraft, and provides firm, flag waving evidence of the nature of the colorful mass floating at the south end of the borrow pit. As Figure C demonstrates, radishes, squash, and other field crop debris look less attractive in Color infrared.

There is some evidence that this health store cocktail is finding its way into the nearby canal, and subsequently may reach the Hillsboro Canal, which enters the Atlantic Ocean via the lovely Boca Raton Inlet. From 1,000 feet, a low oblique color slide displays an informative pattern. But a recent experiment with the new Minus-blue film, does suggest that it's capacity for penetrating water surfaces may be particularly useful, and indications are that when used in the vertical axis a greater water penetration is achieved, as demonstrated in an image which provides some detail of the first underwater reef off the north Boca Raton Beach.

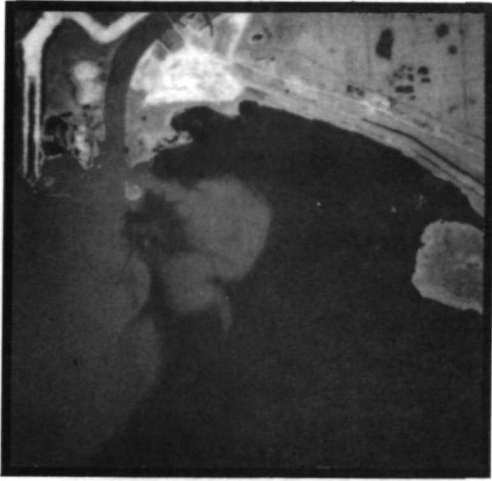


Figure A.

Black and White prints from
Color Infrared photographs
discussed in text.



Figure B.

Figure C.



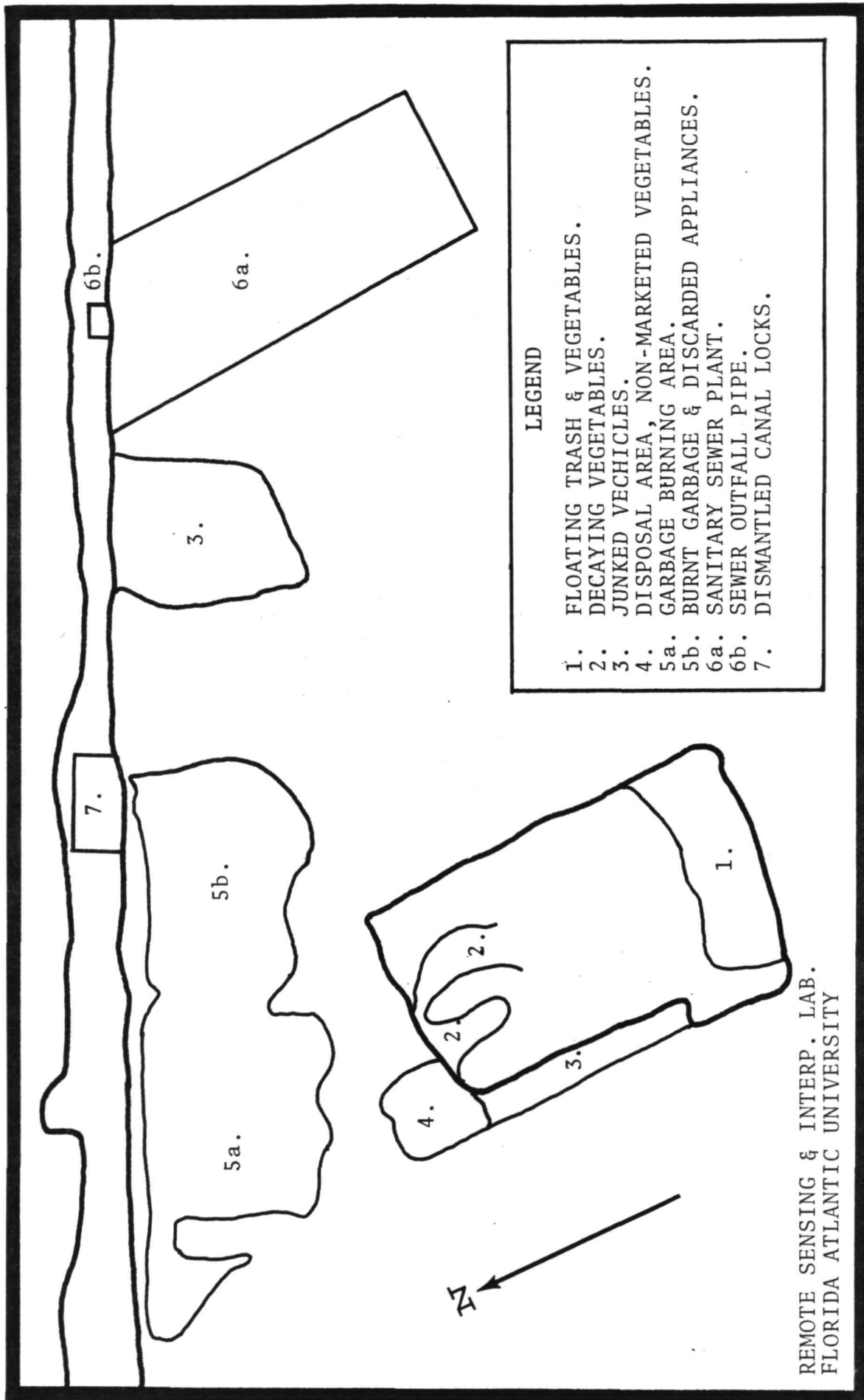


Figure D. Location map from imagery illustrating water pollution from agricultural waste.