USAE Waterways Experiment Station
20 December 1972

Progress Report on ERTS Project 281

a. Title of Investigation

Sediment Pattern Correlation with Inflow and Tidal Action, Proposal No. MMC 281.

b. Principal Investigator

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c. Problems

Satellite imagery received to date consists of three MSS frames taken on 23 September that cover the entire Chesapeake Bay Study Area (CBSA), three frames taken on 10 October that cover the entire study area, and one frame taken on 11 October that covers only a portion of the CBSA. Computer-compatible tapes (CCT's) for these frames have not been received; therefore, automatic processing of data has not been possible.

Inclement weather in the CBSA prevented getting satellite imagery on 28 October as planned to coincide with collection of ground truth data.

d. Work Accomplished 1 October - 30 November 1972

ERTS overpasses of the CBSA on 10 and 28 October were supported by collection of ground truth data. Data were collected in the C&D Canal and the Rappahannock, York, Choptank, and Wicomico Rivers with the assistance of personnel and boats from the U. S. Army Engineer District, Norfolk, Chesapeake Biological Laboratory, Chesapeake Bay Institute, and National Marine Fisheries Service. The data were collected at 72 stations on 10 October and 63 stations on 28 October. Weather conditions precluded collection of data on the Choptank River on 28 October, but data were collected at 11 stations on the river on 29 October when the satellite again passed over this area.

A data collection platform (DCP) connected to a water quality analyzer for monitoring temperature, conductivity, pH, and dissolved oxygen and a multichannel recorder connected to sensors for monitoring water temperature and solar radiation were used to collect data at a station in the Choptank River and one in the Rappahannock River.

The locations of field data collection stations have been pinpointed on the 10 October ERTS imagery, and water patterns that may be related to suspended sediments are being identified and delineated. This work is confined to use of photo interpretation techniques since CCT's have yet to be received.

Data collected in the field are being reduced for subsequent correlations with water patterns.

A computer program for separating interleaved ERTS data on CCT's into a separate tape for each MSS channel has been formulated and tested using a CCT containing 25 July 1972 coverage of the Lake Tahoe area. This program facilitates separation of data for an entire scene or for small portions of a scene to permit data processing on a computer with a limited memory.

Sensitivity tests on the atmospheric transmittance model failed to isolate atmospheric parameters that must be monitored for radiometric analysis of ERTS imagery. However, it was found that zenith angle has an overwhelming effect on transmittance of radiation in the 0.5- to 1.1-micrometer band. By increasing the zenith angle from 0° to 50° the transmittance was reduced approximately 40%. Short wave-length radiation appears to be affected somewhat more by an increase in zenith angle than does long wave-length radiation.

Work Contemplated 1 December 1972 - 31 January 1973

Analysis of ERTS imagery to determine correlation between water patterns and ground truth data will be continued.

Computer compatible tapes of CBSA will be processed and the results will be analyzed.

Arrangements will be made to obtain spectrophotometer measurements on a representative number of water samples from the CBSA.

e. Significant Results

None.

f. Published Articles, Papers, Reports, Talks

None.

g. Recommendations

Computer compatible tapes contain data from each of the four MSS channels interleaved in a manner such that the first two bytes are data from MSS 4, the second two bytes are from MSS 5, etc. These data can be easily separated according to MSS channel on ADP equipment that operates on 8-bit bytes. However, on machines such as the Honeywell G-437 which operates on a 24-bit word, substantial computer time is required to shift, unpack, and separate the data. It is therefore recommended that consideration be given by NASA to furnishing a set of CCT's for each scene with each tape in a set containing data for only a single MSS channel.

h. Changes in Standing Order Forms

None.

i. ERTS Image Descriptor Forms Submitted

None.

j. Data Request Forms Submitted

None.

k. Other Information

None.