E7.4-1 0.1 3.2.

CR-136177

MAPPING COASTAL VEGETATION, LAND USE
AND ENVIRONMENTAL IMPACT FROM ERTS-1

V. Klemas
College of Marine Studies
University of Delaware
UN 362   SR 9654

December 13, 1973
Report on Significant Results

Prepared for
GODDARD SPACE FLIGHT CENTER
GREENBELT, MD   20771

SIGNIFICANT RESULTS

Digital analysis of ERTS-1 imagery was used in an attempt to map and inventory the significant ecological communities of Delaware's coastal zone. Eight vegetation and land use discrimination classes were selected as follows:

1. Phragmites communis (Giant Reed grass)
2. Spartina alterniflora (Salt marsh cord grass)
3. Spartina patens (Salt marsh hay)
4. Shallow water and exposed mud
5. Deep water ($>$ 2 meters)
6. Forest
7. Agriculture
8. Exposed sand and concrete

Canonical analysis showed that classification accuracy was quite good with Spartina alterniflora, exposed sand — concrete, and forested land — all discriminated with between 94% and 100% accuracy. The shallow water-mud and deep water categories were classified with accuracies of 88% and 93% respectively with all errors in classification occurring as one water category being classed as the other, a condition which is neither surprising nor bothersome with the overlap which these two classes exhibit no matter what the measurement technique used. Phragmites communis showed a classification accuracy of 83% with all confusion occurring with Spartina patens which may be due to use of mixed stands of these species as training sets. Discrimination of Spartina patens was very poor (accuracy = 52%) due to difficulties in locating large, pure stands of S. patens for use as training sets. Classification accuracy for agriculture was also very poor (51%). Limitations of time and available class-memory space resulted in limiting the analysis of agriculture to very gross identification of a class which actually consists of many varied signature classes. If crop inventory had been the primary objective of the study, substantially better results could have been achieved in discriminating agricultural land categories.

Abundant ground truth was available in the form of vegetation maps compiled from NASA-RB-57 color and color infrared photographs. Blow-ups of portions of the thematic maps digitally derived from ERTS data showed very good correlation with known sites. Cal-comp plots of thematic data at scales up to 1:24,000 showed good cartographic precision when overlayed onto existing maps. It is believed that with further refinement of training set selection, sufficiently accurate results can be obtained for all categories producing a useful planning and management tool.