E72-10207
CR-129189

N73-12330

(E72-10207) UTILIZATION OF ERTS-1 DATA TO MONITOR AND CLASSIFY EUTROPHICATION OF INLAND LAKES Bimonthly Progress Report, 1 Aug. - 1 Oct. 1972 P.E. Chase (Bendix Corp.) 1 Oct. 1972 3 p CSCL 08H G3/13

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Contract NAS 5-21810

Bi-Monthly Progress Report

Reporting Period

1 August to 1 October 1972

Prepared By: Bendix Aerospace Systems Division

Prepared For: NASA/Goddard Space Flight Center

FIRST TYPE 1 PROGRESS REPORT
(Period: Start to October 1 1972)

a. TITLE: Utilization of ERTS-1 Data to Monitor and Classify Eutrophication of Inland Lakes. GSFC PR 518, 598, Phillip E. Chase

b. Objectives:

The objectives of the study are to demonstrate the feasibility of ERTS in measuring the state of eutrophication of inland lakes as a broad survey monitor. Specific objectives are:

1. Determine the minimum size of inland lakes detected by ERTS when considering factors of color, size, shape, and shore definition.

2. Determine correlation of surface color to various indices of eutrophication for preparing charts of eutrophication versus surface color. Such indices are algal count, Secchi Disk transparency, leptopel content, macrophyte extent, phosphates, etc.

3. Determine if algal blooms are detectable by ERTS when they occur and color the surface of small inland lakes. Algal blooms are an indicator of enrichment.

4. Determine if changes in leptopel level are detectable by ERTS. This is another measure of eutrophication that can be related to ERTS.

5. Determine the feasibility of establishing classification of levels of inland lake eutrophication by either lake, pond, and swamp taxonomies or by individual indicators such as surface color, transparency, leptopel level, and appearance of algal blooms.

c. The only problem impeding the progress of the investigation is the lack of ERTS-1 data.

d. Accomplishments:

(1) Study of ERTS-1 imagery of lakes in the California/Nevada area have demonstrated that lakes of different colors present different spectral responses in the four MSS channels. Minimum size lakes readily detectable without enlargement are approximately 200 acres. Four of the test lakes should be detectable on the imagery. The one lake that might not be detectable in enlarged imagery is Forest Lake (40 acres).

(2) All of the lakes have been monitored in April 1972 by an aircraft carrying a thermal mapper, 70 mm color camera, a bank of 4 Hasselblad cameras, and an 8 channel multispectral scanner. Flights were performed at altitudes of 2000 and 10000 ft. Most of the lakes were monitored in September with a new eleven channel scanner and the bank of cameras. This scanner will replace the 8 channel for all subsequent aircraft data collection.

(3) Forel-Ule color comparator has been purchased and is used to determine water color subjectively.

(4) Four of the study lakes (Forest, Island, Lower Long and Angelus) have been tested on a routine basis previous to the contract for temperature, pH, dissolved oxygen, water transparency, nitrate phosphate and calcium concentrations.

(5) Activities planned for the next reporting period are:

1. Sample the study lakes as near in time to the next satellite pass as possible. The ground data collection will include subjective color determination, Secchi Disk transparency, algal extent and count, macrophyte type and extent, wet chemistry for phosphates, etc. Aircraft data might be collected if the weather merits it.

2. Screen the initial data received (none as yet) for determination of additional data requests. Begin development of the data analysis plan.

e. Activities to date have been directed towards being prepared for ERTS-1 data. Therefore, results significant for practical applications and cost-benefit analysis have not been obtained.

f. No release of information or requests for permission to release information have been made during the reporting period.

g. No changes in operation procedure required.

h. Attachment of ERTS image forms is not applicable as yet.

i. No retrospective Data Request Forms have been submitted.

k. Work to date conforms to schedule (Item C in paragraph 3.1 of Spec 5-250-P-1C)