TYPE I PROGRESS REPORT
For Period Ending
12/17/72

a. A study to explore the use of orbital remote sensing to determine native arid plant distribution. MMC#250.

b. UN 613

c. Initial ERTS-1 bulk 70 mm data products were characterized by newton rings, generally poor resolution, poor contrast toward the light end of the gray scale and extremely dark negatives, severely limiting the useful interpretive value of the data. More recent ERTS-1 data products were significantly improved in quality.

d. Species composition, cover, and phenological data have been obtained at sites in the study area on three dates when ERTS-1 overflights occurred. Nine individual study sites are dominated by the following perennial plant species:

1-2-3 Larrea tridentata (creosotebush); two sites varying in quality and quantity of annual plants present and in density of creosotebush

4 Prosopis juliflora (mesquite) - Bouteloua rothrockii (rothrock gramma), on floodplain

5 Prosopis juliflora, on floodplain

6 Prosopis juliflora, on alluvial slope

7 Prosopis juliflora, Bouteloua spp. (grama grass), on alluvial slope

8-9 Cercidium microphyllum (foothil paloverde) - cactus; two sites varying in parent material, i. e., granite and rhyolite

A complete set of matched 35 mm color and color infrared photographs was obtained for eight individual study sites at the time of the November 21, 1972 ERTS-1 overflight. The mesquite floodplain site was inaccessible because of recent rains. Photographs include vertical and oblique views from a portable 10-foot platform and oblique view from ground level. Other platform and groundlevel photography was obtained at some of the sites on two previous ERTS-1 overflight dates.

Light table analysis of ERTS-1 MSS 70 mm bulk transparencies for 22 August and 2 November in four spectral bands, indicates that it is difficult to distinguish some individual study sites from one another on these two dates. However, the floodplain mesquite site and similar areas could be distinguished because of their relatively low reflectivity and characteristic occurrence along drainageways. Similarly the two mesquite sites on alluvial slopes could be distinguished on the basis of reflectivity. Based on limited data, the low reflectivity site appears to be related to greater vegetative cover, primarily grasses or grass litter, and less soil erosion than on the highly reflective site.

The paloverde-cactus site on granitic-derived alluvium is slightly less reflective than the site on rhyolite-derived alluvium. The two sites differ somewhat in vegetative composition, soil surface color and surface rock composition. Additional ground truth data may indicate more precisely the relative importance of vegetative and soil signatures.

Preliminary analysis of ERTS-1 data for 22 August and 2 November with an I^2S color additive viewer, indicates little difference between individual study sites. However, most analyses thus far have been concentrated on enhancement of differences related to vegetational composition. The relatively low vegetative cover and low infrared reflectivity of many desert plants may be importantly related to the general lack of distinction between individual study sites. Fall rains have been significantly higher than normal, however, and the anticipated dense growth of desert annual plants may provide significant distinctions between sites in the next several months.

Plans during the next reporting period include the continued collection of observed and photographic ground truth and continued analysis and comparison of ground truth and ERTS-1 data. Data comparisons will follow a multi-stage approach and include NASA aircraft support photography and side looking radar imagery. Vegetative data will be correlated with topographic, geologic, and soil data in an effort to characterize study sites. Data collection from several new study sites will be initiated.

e. None

f. None

g. None

h. None

i. None

j. 10 October 1972
17 November 1972
7 December 1972

k. N.A.