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BIOLOGICAL/ENVIRONMENTAL RELATIONSHIPS
IN DESERT ECOSYSTEMS OF THE NEVADA TEST SITE

Progress Report
for Period February 1, 1976 - April 30, 1977

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ABSTRACT - Technical Progress Report, February 1, 1976 - April 30, 1977

Activities covered by the report are: (1) The correction and putting on tape of all plant and rodent data collected on the Nevada Test Site, and the present status of all of the environmental and biological data; (2) accomplishments during the first part of the summer at the Nevada Test Site, and especially matters relating to its Endangered Plant Species, and the status of one of these species in particular; (3) herbarium curating activities; (4) gift of Test Site rodent skins and skulls to the U. S. National Museum; (5) manuscript and report in preparation; and (5) publications.

Technical Progress Report, February 1, 1976 - April 30, 1977

Because of a 3-month delay in the 1976 renewal of the contract, and consequent lack of funds for programmer's salary from February until May 1, 1976, the work projected for the winter quarter of 1976 (species diversity in desert plants and rodents) could not proceed after January; this required intensive programming and computer services, and the work was halted from February to June, at which time Dr. William Duggleby, who was the statistical collaborator, left the University of Cincinnati. Investigator taught a double load (Field Botany) the spring quarter 1976.

From shortly before Christmas 1975 and continuing through June 1976, all plant and rodent data (on 90,000 IBM cards) were put on tape in their final permanent form. This involved problems of card warpage (which had developed during the 6 to 8 years since most were punched and transported cross-country), and careful review of a total of three complete listings for errors and corrections, and changes in synonymy in about 1/3 of the cards in the 8 decks; all changes were made on the tape and new cards made to replace those on which changes had been made. All of this was done by Dr. Paul Herget, Director of the Cincinnati Observatory and Distinguished Service Professor of the University of Cincinnati, working with the investigator; this very large programming job was accomplished by Dr. Herget without any compensation, and represents a good many thousands of dollars worth of programming services and computer time. Between May and November 1976, the investigator's programmer recalculated the parameters for shrubs and herbaceous perennials from the corrected data on the Herget tape. The environmental data, in their final form, were put on tape by Stanley Zellmer at Nuclear Medicine in 1973, and hence all of the Test Site data collected on this program are now in a form usable for any purpose for which they are appropriate and by anyone who might have need for any part of them in the future.

In late June the investigator drove to Nevada, and from July 5 until early August the following were accomplished: (1) With Dr. James L. Reveal, a member of the Endangered Plant Species Committee of the Smithsonian Institution, most of the known sites of occurrence of the Endangered Plant Species on the Federal Register lists were visited and photographed, and the locations recorded on a large map of the Test Site, together with areas recommended by us to be "critical habitats"; this took 2½ days, and a representative of the Nevada Endangered Species Committee accompanied us. (2) For the next 3 to 4 weeks, a record of the species, location of collection, accession number, and collector, was made of every sheet (5,098 in total) in the herbarium at the Test Site; the herbarium was consolidated into 6 cabinets. (3) Investigator attended the Endangered Species hearings in El Segundo, Calif., where Dr. Reveal presented and put into the record the case for the central-southern Nevada species, as well as elsewhere in Nevada and Utah.

Investigator arrived back in Cincinnati on August 12. She subsequently prepared a report on the Endangered Species at the Test Site, including photographs taken earlier in the summer, reprints or copies of reprints of the publications in which the descriptions of these species appeared, and these, together with the map prepared by her and Dr. Reveal, were sent to Mr. Roger Ray, Nevada Operations Office, on August 30. This report will be put together as an official document, for distribution to others, by mid-February 1977.

In September, the collection of 79 rodent skins and skulls (and a number of skulls without their skins), prepared on the investigator's UCLA program in 1964, were offered to, and accepted by, the U. S. National Museum of the Smithsonian, as a gift from the Energy Research and Development Administration. These were mostly vouchers from the investigator's trapping grids (permanent study plots and vicinity) at the Test Site. They were subsequently accessioned, and when the Museum's accession record was received, copies were sent to Nuclear Medicine, and to Paul Dunaway of the Nevada Operations Office, for their information and records.

The fall quarter 1976 was devoted mostly to teaching (Plant Ecology). Thirty complimentary copies of the "Vascular Plants", supplied by the Technical Information Center of ERDA (along with mailers and franked labels), were sent out during the autumn, each accompanied by a note of appreciation, to botanists or others of the country who had contributed to the work through the years.

Following developments regarding the Endangered and Threatened Plant Species at the Test Site in April, a great deal of time and effort has been expended in defensive measures on behalf of the investigator's flora research and plant specimens housed at the Test Site. Matters pertaining to the publication of the "Vascular Plants", including proofreading of segments and finally the entire book, were accomplished in the winter and spring of 1976; this included two trips to Oak Ridge. In addition, the curating of the segment of the NTS herbarium currently housed at the University of Cincinnati -- from whence it will go to the U. S. National Herbarium of the Smithsonian -- has continued to be a significant activity with regard to shipping of specimens, record-keeping, and correspondence with taxonomists of the country. Two more herbarium cases were recently purchased by the University, and an additional one purchased by the investigator, to house these collections adequately; there is not cabinet space for the plot vouchers (in 12 cartons) shipped to Cincinnati this past summer.

The taxonomic status of one of the Endangered Species (Camissonia megalantha) has been questioned by the investigator for several years, and the problem of its relationship to C. heterochroma (also a regional endemic) has recently been turned over to her by the Camissonia authority and monographer (Dr. Peter H. Raven, Director, Missouri Botanical Garden) for the taxonomic judgments about this complex. These judgments will be based on (a) the 60 collections, recently reviewed and returned to Cincinnati by Dr. Raven, and (2) known collections of C. heterochroma in other herbaria. The complex has a history of interpretation since time of the first Cane Spring collection by Percy Train in the 1930's, and at the time of this writing, prior to critical review, it appears that either 2 or 3 taxa will be recognized by the investigator, and in doubt is the status of the large-flowered plants of the Cane Spring and French Peak populations on the Test Site. This review will be undertaken winter quarter 1977 (when the investigator is off-duty from teaching), so that the judgments can be available as soon as possible about the status of the Test Site and other populations in central-southern Nevada. Dr. James L. Reveal, University of Maryland and the Smithsonian Institution, will also be involved in this study before its completion, and the disposition of the taxa approved by Dr. Raven before the conclusions are published. In the meantime, C. megalantha remains a valid Endangered Species on the Nevada Test Site.

To the extent that time may permit during the winter quarter 1977, work will resume on the data analyses for the manuscript (or manuscripts) dealing with undisturbed and disturbed desert vegetation through time. This is a very large subject, considering the data base to be used, and it is anticipated that the most suitable manner of dealing with the data cannot be much more than additionally explored by the end of March. Because it is anticipated that the computer terminal will not be needed intensively for this, or for the duration of this year's contract, the rental of an IBM 2741 terminal was cancelled effective December 31, 1976 (for any unforeseen need, terminals are available at night in the departmental office).

The spring quarter will be devoted largely to teaching (Field Botany, i. e., Local Flora), and while collecting plants for class use, investigator will collect extensively in southwestern Ohio counties for the University of Cincinnati and Ohio State University herbaria (in which counties, surprisingly the vascular flora is quite inadequately documented). In addition, hopefully the investigator will complete a manuscript on the distribution of the Buckeyes in Ohio in relation to the physiographic and geologic regions (for which field work was completed in the spring of 1976) and submit it for publication by the spring of 1977; in any event, the essentials of the paper will be given at the April meetings of the Ohio Academy of Science in Columbus.

Investigator also will attend the "Stress Effects on Natural Ecosystems" presentation, February 4-5, at Battelle-Columbus, and the AAAS meetings in Denver, February 20-24.

PUBLICATIONS:

Beatley, Janice C. 1976. Environments of kangaroo rats (Dipodomys) and effects of environmental change on populations in southern Nevada. J. Mammal. 57: 67-93. (COO-2307-5)

Beatley, Janice C. 1976. Rainfall and fluctuating plant populations in relation to distributions and numbers of desert rodents in southern Nevada. Oecologia (Berl.) 24: 21-42. (COO-2307-6)

Beatley, Janice C. 1976. Vascular plants of the Nevada Test Site and central-southern Nevada: Ecologic and geographic distributions. TID 26881. Energy Research & Development Administration, Technical Information Center, Office of Technical Information. 316 p.

Beatley, Janice C. 1977. Endangered Plant Species of the Nevada Test Site. COO-2307-11 (to be submitted in February 1977). Ca 30 p.