INTERNAL REPORT 10

SMALL MAMMALS IN CONIFEROUS FOREST ECOSYSTEMS--REVIEW OF LITERATURE

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Oregon State University

A comprehensive outline for the review was completed in December 1970. These procedures were reviewed by Black, Taber, and Voth before systematic review of literature began in June 1971.

Initially, we planned a keysort system for organizing information but after consultation with personnel at the data bank of the University of Washington, we organized the abstracted data in a form suitable for computer analysis. Information was classified under four subject headings: (1) mammals by groups and species, (2) plants by groups and species, (3) research methods, and (4) population dynamics. Literature sources for comprehensive coverage were also listed. We originally planned to restrict our review to the role of mammals in the coastal Douglas-fir region, but later decided to include the entire Biome.

Abstracts were categorized for indexing by the coded marginal punch system. This classification system will also serve, with minor changes, as the key word list.

Twenty-three species of small mammals and eight species of large mammals, primarily consumers, which were rated of principal importance in the Coniferous Forest Biome, were identified. These species play an important role in controlling forest productivity or are important products of the forest ecosystem or both. Most of these species also are widely distributed and abundant in the Biome.

The main criteria for inclusion of an abstract were that it pertain to one of the selected species of mammals and that it pertain to the Coniferous Forest Biome. Abstracts of papers on related species were included, however, if the subject matter seemed pertinent to "our" species. For example, abstracts of papers on the feeding habits of the mountain pocket gopher were included, although this was not one of the species included on our list and the study was done outside the Biome. Abstracts of papers on research methods were restricted mainly to work done on "our" species in this Biome.

Efforts were concentrated on those journals that were judged the most likely sources of relevant papers. These journals were searched thoroughly with the expectation that their coverage would be complete and that a user needing more comprehensive coverage could concentrate on those sources partially searched or not included in the review.

We decided that all references included in the bibliography should be abstracted. Theses that are not available, but contain important subject matter, will be listed without abstracts. The author's abstract or abstracts available in abstracting journals, such as Wildlife Review, were included with only minor editing; lengthy reviews were condensed.

LITERATURE REVIEWED

Literature on small mammals was systematically reviewed in 26 journals. Complete reviews were made of these sources from initial date of publication through July 1971. An additional 18 publications were partially reviewed. (Reviews of two of these journals are to be completed in October.) Citations obtained from such sources as bibliographies, and reviews of current literature also were examined, adding numerous other publications to the list of serials searched for literature on small mammals. More than 1,500 papers were abstracted, but screening reduced this total to about 1,000. Papers on taxonomy and anatomy and on subjects not directly applicable to the role of mammals were eliminated. Papers relating to species selected for study and to the Biome, but trivial, were also omitted.

A systematic search of literature on the role of large mammals in the Coniferous Forest Biome in Wildlife Review, the single most valuable reference source, has been completed. Coverage of 14 additional journals is in progress. About 400 abstracts of papers on the selected species of large mammals have been compiled. Typing of these abstracts in a standardized format suitable for entry into the computer is in progress.

A review of unpublished information, such as that contained in Pittman-Robertson reports and other similar reports is impossible. Also, we did not attempt to assemble copies of the literature included in the bibliography.

PROGRAMMING

Dr. Bruce Bare, of the data bank at the University of Washington, has assumed the responsibility for preparing a program to permit compilation of the bibliography by computer. A programmer, employed at the data bank as of 1 September 1971, has been assigned to develop this program.

PUBLICATION

We plan to compile an annotated bibliography, similar in format to the "Annotated Bibliography of Mathematical Models in Ecology," compiled by John A. Kadled (1971), which will include a numerical list of references with abstracts and three indexes: (1) a keyword list, (2) an author index, and (3) a journal index. Examination of remaining references and typing of abstracts should be completed in October. We estimate that one or two months will be needed to complete the computer input, to check the listing of abstracts, and to complete the compilation of the bibliography in a form ready for publication.

The data bank and Biome office at the University of Washington will be responsible for printing the bibliography.

RELATION OF LITERATURE REVIEW TO IBP

A large number of data have been compiled on many aspects of mammalian fauna associated with coniferous forest ecosystems. This survey has identified and described those references of particular value to the consumer modeling group and to other groups in the Analysis of Ecosystems Program. These data will help with the planned survey of vertebrates at the two intensive sites. It will also have Particular relevance to thework of the consumer modeling group in the "Development of prototype producer-consumer interaction models." It should also be a useful tool in conduct of work planned later, relating to the effects of successional changes and perturbations of a stable ecosystem.

PREPARATION FOR BIOME II

We propose that this review of the literature be continued, to include the remaining species of mammals, and the birds, amphibians, and reptiles. That is, to compile a bibliography on the role of vertebrates in the Coniferous Forest Biome.

INTERNAL REPORT 11A

Foliage-Consuming Insects in Mixed Douglas-fir and Western Hemlock Forests
Annual Biomass Budget for Spruce Budworm

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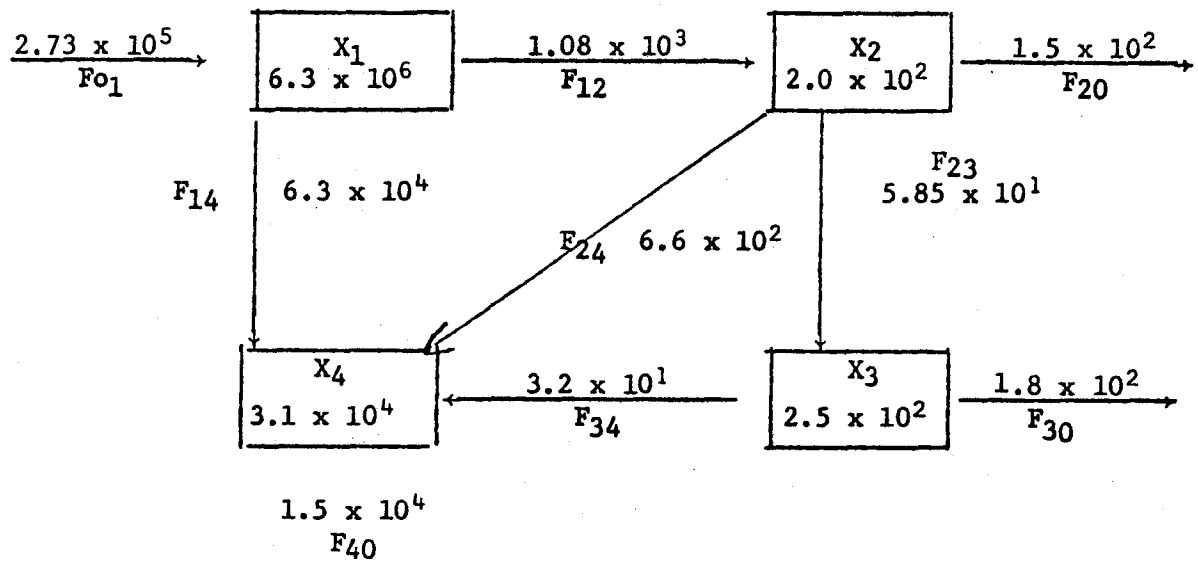
Oregon State University



values in boxes are mg/m^2
values on lines are $mg/m^2/yr$

X_1 = foliage
X_2 = spruce budworm
X_3 = predators of spruce budworm
X_4 = detritus

assuming linear donor control

equation	steady state soln.
$\dot{X}_1 = 27300 - .0117X_1$	$X_1 = 2.3 \times 10^7$ mg/m^2
$\dot{X}_2 = .0017X_1 - 4.34X_2$	$X_2 = 8.9 \times 10^3$ mg/m^2 = 80 insect/m^2
$\dot{X}_3 = .13X_2 - .73X_3$	$X_3 = 1.5 \times 10^3$ mg/m^2 = 30 pred/m^2
$\dot{X}_4 = .01X_1 + 3.46X_2 - .5X_4$	$X_4 = 5.0 \times 10^5$ mg/m^2

The year biomass budget for the spruce budworm population was undertaken to gather together estimates of the order of magnitude of the energy flowing through an herbivorous insect population in a forest system. The linear donor control model was used so a stable state would be generated for purposes of comparison.

From the stable state solutions, it can be seen that 2 larvae/m^2 is a low estimate for an endemic population. The model demonstrates that 80 insects/m^2 would provide a balanced endemic population.