

INTERNAL REPORT 31

COORDINATION OF THE DECOMPOSER STUDIES  
IN THE WESTERN CONIFEROUS BIOME

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The objective of coordinating the decomposer research was accomplished by organizing a steering committee and a working group. The ultimate steering committee consisted of Drs. Taub, Chairman, Denison, Driver, Gilmour, and Lighthart. This committee advised on the research direction, evaluated proposals, and organized the working committee meetings (Appendix 1). Several interim committees were organized, which included broader representation of geographical areas and included agencies, but these groups were too unwieldy to function. A working group was formed of all the principal investigators of proposals listed in the formal Year 2 Grant Proposal (Appendix 2). Because these individuals were to be working directly in the BIOME, they constituted the group whose work was to be coordinated, both among themselves and with the other BIOME researchers. Their travel expenses to coordination meetings therefore were paid from this grant. No committees of "disinterested" microbiologists, that is, those not directly working with proposals, were formed. Although such a group might better be able to evaluate proposals free of self-interest, no microbiologists not involved in the program seemed to be knowledgeable enough about the BIOME objectives. We thought that to ask outside researchers to keep up with the rapidly developing BIOME working plans would be an imposition.

The steering committee (1) held three meetings of the working committee and has plans for 2 or 3 in the near future (Appendix 3), (2) represented the BIOME at five IBP-related microbiological meetings (Appendix 1) and did much of the necessary work in organizing the Year 2 Grant Proposal. Incidentally, the committee was instrumental in originating a seminar series at OSU and a course at the University of Washington.

By means of the meetings held at Seattle, Washington, the various members of a working committee had an opportunity to become acquainted and to learn from one another's research approaches. The first major meeting was for the purpose of showing where the decomposition work was to relate the other aspects of the BIOME studies. The second meeting was held to discuss the units of measurement among the decomposers in an attempt to resolve a problem of relating species enumeration and chemical transformation data. A third meeting was held on the occasion of Dr. Borje Noren's visit in which we were able to present our own series of proposals and learn of the proposed Swedish BIOME study (programs and attendance, Appendix 3).

The steering committee met both in August and in February to evaluate proposals. Because of the spread of workers, much of the work was done by mail and the telephone.

## Recommendations

The function of this grant should be taken over by the Central Administration of the BIOME as all of the year 2 research gets under way. Probably, the organization of the Aquatic and Terrestrial Decomposers will be split into two groups so that each component can be better integrated with the primary productivity and mineral cycling of that aspect. We hope that the past record of communication between the Aquatic and Terrestrial groups will continue.

Appendix I

Activities of the Decomposition Coordination Project

Working Group Meetings Held (Program and attendance list appended)

Decomposer Organization Meeting, November 20-21, 1970

Units of Measurement, April 23-24, 1971

Visit of Dr. Borje Noren of Sweden, Exchange of Programs, Aug. 6, 1971

Meetings Planned for during Interim (Sept. 15 - Dec. 31, 1971)

Carbon Flow Workshop - Demonstration by George Saunders of his C<sup>14</sup> techniques to assess pool size and turnover rate. November 5-8, 1971 at University of Washington.

Nitrogen Fixation and Multiple Sampling Handling (both Drs. Trappe and Lighthart have published on such techniques). December at Corvallis.

Meetings attended

IBP-AOE Meeting on Aquatic Microbiology, August 1969, ABS meeting Vermont. (Dr. Taub attended)

IBP Microbiological Methods in Aquatic Ecology, June 15-17, 1970, Pittsburgh, Penn. (Dr. Lighthart attended)

US/IBP Desert BIOME, Microbiological Specialists' Meeting, April 3-4, 1971, Las Cruces, New Mexico. (Dr. Taub attended)

Eastern Deciduous Forest BIOME, Aquatic and Terrestrial Decomposition.

February 19, 20, 1971, Raleigh, North Carolina. (Dr. Denison attended)

Microbiological Contribution to Terrestrial Ecosystem. Energy Flow and Nutrient Cycling. May 2-7, 1971, Minneapolis, Minnesota. (Dr. Taub attended)

Course initiated: "Energy and Material Transfers in Ecosystems" was planned and is currently being offered for 3 credits under both Fisheries (507) and Forestry (490) sponsorship. Course leaders are Drs. Hatheway and Taub, but other faculty and IBP staff will be cooperating.

Seminar: A Decomposer-Modeling seminar has been meeting at OSU under the direction of Drs. Denison and Overton.

January 29, 1971

Appendix 2

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CHAIRMAN

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\*Indicates campus number only.

DECOMPOSER SECTION (AQUATIC - TERRESTRIAL)

January 29, 1971

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### Appendix 3

#### CONIFEROUS BIOME DECOMPOSER MEETING

##### AGENDA

November 20 - 21, 1970

##### Friday, November 20

10:00 A.M.	Dr. Frieda B. Taub	Open Meeting
	Dr. Stanley P. Gessel Biome Director	Status of Western Coniferous Biome
10:15 A.M.	Dr. Dale W. Cole Site Director, Cedar River Watershed	Intensive site description
10:45 A.M.	Dr. Hans Riekerk (Administrative Assistant)	Coniferous Biome organization
11:00 A.M.	Open discussion of Decomposer Program	
12:00-1:30 P.M.	Lunch - Child Development Center, University of Washington (Rm 188)	
1:30 P.M.	Discussion of Decomposer programs in the other Biomes	
2:30-5:00 P.M.	Discussion of our 1971-72 Decomposition proposal for Coniferous Biome	

##### Saturday, November 21

9:00 A.M.	First draft of "position paper" and outline of proposal	
12:00-1:30 P.M.	Lunch - Village Square Beef and Brew	
1:30-4:00 P.M.	Outline of composite draft of 1971-72 proposal	

Appendix 3 (continued)

IBP - CONIFEROUS BIOME DECOMPOSERS MEETING, NOVEMBER 20, 1970

University of Washington

ATTENDANCE

Dr. Frieda B. Taub	University of Washington
Dr. Hans Rickerk	Biome Central Office, Univ. of Washington
Dr. Patrick Flanagan	University of Alaska, Biological Sciences - Inst. of Arctic Biology
Dr. Mario M. Pamatmat	Oceanography, University of Washington
Dr. Julia Vidal	Oceanography, University of Washington
Dr. C. M. Gilmour	University of Idaho
Dr. George Carroll	University of Oregon
Dr. Robert J. Barsdate	University of Alaska
Dr. Bruce Lighthart	Western Washington State College, Institute for Freshwater Studies
Dr. Lawrence Pike	Biology, University of Oregon
Dr. Larry Male	University of Washington, CQS
Dr. Sigurd M. Olsen	University of Washington
Dr. D. Knutsen	Forestry Sciences Laboratory, U.S.F.S. Corvallis, Oregon
Dr. Fred Rhoades	Botany Department Oregon State University
Dr. John Hobbie	University of North Carolina

Appendix 3 (continued)

DECOMPOSER WORKSHOP  
for the  
Western Coniferous Biome

April 23-24, 1971

AGENDA

Room 280

Fisheries Research Institute Seminar Room  
University of Washington  
Seattle Washington 98105  
(New Fisheries Wing)

UNITS OF MEASUREMENT

9:00-12:00

1:30-5:00 P.M.

AQUATIC

Fri. Apr. 23

Chemical  
Transformations

Organism Distribution  
and Occurrence

TERRESTRIAL

Sat. Apr. 24

Chemical  
Transformations

Organism Distribution  
and Occurrence

Representatives from the Modeling Group will serve  
as advisors to assure that our units of measurement,  
and the proposed models will be compatible.

For more information contact:

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Appendix 3 (continued)

IBP Decomposer Workshop Meeting Held April 23-24, 1971

College of Fisheries, University of Washington, Seattle, Wash.

ATTENDANCE

Dr. George Carroll	University of Oregon
Dr. Francis E. Clark	Fort Collins, Colorado
Dr. William C. Denison	Oregon State University
Dr. Charles Driver	University of Washington
Dr. Harold J. Jensen	Oregon State University
Dr. C. M. Gilmour	University of Idaho
Dr. John Kadlec	University of Michigan
Dr. Donald A. Klein	Colorado State University
Dr. Bruce Lighthart	Western Washington State College
Dr. Gerald W. Krantz	Forestry Sci Lab., Moscow, Idaho
Dr. J. Matches	University of Washington
Dr. Mario M. Pamatmat	University of Washington
Dr. Eugene Staffeldt	New Mexico State University
Dr. Frieda B. Taub	University of Washington
Dr. James Trappe	Oregon State University
Dr. Howard C. Whisler	University of Washington
Mr. Kent Brakken	University of Washington (College of Fisheries)
Dr. Robert Edmonds	University of Washington (College of Fisheries)
Mr. Jonathan Heller	University of Washington (College of Fisheries)
Dr. Larry Male	University of Washington Center for Quantative Sciences
Mr. Daniel McKenzie	University of Washington (College of Fisheries)
Dr. David McIntire	Oregon State University
Mr. Patrick Minyard	University of Washington College of Forestry
Dr. Eugene Welch	University of Washington Civil Engineering
Dr. Demetrious Spyridakis	University of Washington Civil Engineering

Appendix 3 (continued)

presented IBP Decomposer Workshop  
April 23-27, 1971

MODELING

Notes (Robert Edmonds)

Associational Model: Empirical equation describing a relation observed to exist between two or more quantities, say a, b, and c. Does not incorporate the causes of the observed relation between a, b, and c, but simply provides a rule for calculating one, given the other two.

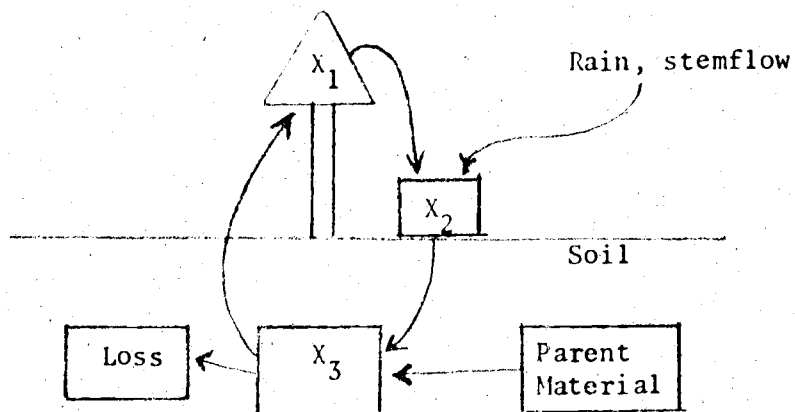
Causal Model: In formulating the equations the modeler draws upon his general knowledge of the behavior of the system components and derives expressions he believes incorporate the mechanism causing changes in this component.

Incorrect reasoning will lead to faulty prediction. Construction of the model is slow. Such a model often incorporates empirical equations.

Compartment Model: Elements are storage containers or compartments. Natural form for a system model to take if the variable input is energy or a nutrient. The relations among the elements are transfer functions that are modeled as differential or difference equations.

Formulation of Model: e. g., potassium cycling on the terrestrial system.

1. Picture Model:



## 2. Word Model:

$\frac{\text{Change in K in tree}}{\text{Change in time}} = \text{addition from soil (uptake)} - \text{loss in litter fall}$

$\frac{\text{Change in K in litter}}{\text{Change in time}} = \text{addition from litter} - \text{loss from decomposition}$

$\frac{\text{Change in K in soil}}{\text{Change in time}} = \text{addition from decomposition} + \text{addition from rain stem flow} + \text{addition from parent material} - \text{loss from uptake} - \text{loss from subsurface flow}$

## 3. Mathematical Model:

$$\frac{dX_1}{dt} = k_u - k_1$$

$$\frac{dX_2}{dt} = k_1 - k_d$$

$$\frac{dX_3}{dt} = k_d + k_r + k_{pm} - k_u - k_1$$

Each of the components are functions of other variables.

Litter Submodel:

$$\frac{dX_2}{dt} = k_1 - AY$$

$$k_d = AY$$

A = fractional loss

Y = amount K in litter.