

***A checklist and distributional analysis of marine algal species  
collected as vouchers during the CHIA-EVOS studies.  
(submitted under BAA)***

Project Number:  
Restoration Category: Research and publication preparation  
Proposer: Gayle I. Hansen (Oregon State University, HMSC)  
Lead Trustee Agency:  
Cooperating Agencies:  
Alaska SeaLife Center: No  
Duration: 1<sup>st</sup> year of a 1-year project  
Cost FY 01: \$65,734  
Geographic Area: No field work will be carried out, but specimens from the entire oil spill area will be utilized for the study.  
Injured Resource/Service: Intertidal communities: macrobenthic marine algae or seaweeds.

***ABSTRACT***

During the CHIA-EVOS studies, intense investigations were carried out on the intertidal algal communities of Prince William Sound, Kenai, Kodiak, and the Alaska Peninsula. As a byproduct of these studies, thorough voucher collections were made of the algal species present in more than 100 transect areas used for the study. The 7,300 voucher specimens were identified to species, curated, and cataloged, but no money was available at the time for publishing the wealth of information on algal biodiversity and distribution they provided. For this study, we will use these data to prepare regional checklists and biogeographic analyses of the species discovered and finally make available these critical habitat data for restoration and conservation efforts in Alaska.

## ***INTRODUCTION***

Macro-benthic marine algae or seaweeds form the base of the food chain in nearly all rocky intertidal and shallow subtidal communities. In areas where they flourish, they also benefit both the structural and chemical environment. Nearshore marine animals are all at least partially dependent on algae for survival, and the environmental stresses that impact the algae also impact these members of the higher trophic levels.

Even so, comparatively few environmental impact studies have been done on the macro-benthic marine algae. One reason for this appears to be that many of these plants are difficult to identify. They often require sectioning and microscopic examination for species determination, a time-consuming procedure prohibitive in most studies. Therefore, when algal investigations are done, identifications are often limited to genera and/or complexes that can be easily identified in the field, a short-cut that frequently leads to problems in data interpretation. In Alaska, other factors compound the difficulties. There are no illustrated keys to the marine algae of this region. During the CHIA studies, we were able to use two somewhat helpful identification guides: (1) the unillustrated keys of Gabrielson *et al.* (1989) covering the algae from Oregon to southeast Alaska and (2) the illustrated but out-of-date flora of Abbott and Hollenberg (1976) on the *Marine Algae of California*. These guides were useful, but they only covered a portion of the algae in the oil spill area. Therefore numerous individual taxonomic papers on the algae of other areas (Japan, Russia, Eastern Canada, Europe) had to be used to adequately cover the species encountered, and species identifications had to be made primarily by experts.

There have been a number of floristic studies that have included marine algae from Alaska, but most of these have been historical. In 1840, Postels and Ruprecht published a richly illustrated text on the algae collected during the 1826-29 Luetke expedition from Russia to southeastern Alaska. Later, Saunders (1901) described and illustrated many of the species encountered during the Harriman Alaska Expedition. Perhaps the most comprehensive of these early accounts were those of Setchell and Gardner who included many Alaskan species in their monumental books on the marine algae of the Pacific Coast of North America (1903, 1919-1925). The most important recent account of the marine algae of Alaska was by Lindstrom (1977). It was the first complete checklist of the marine algae of the entire state. This checklist, compiled primarily from the literature, was used as a baseline for Alaskan marine algal studies for many years. Calvin and Lindstrom went on to produce checklists of the algae of Berner's Bay (1977), Port Valdez (1980), and Juneau (1986), and a number of environmental impact studies have relied on these lists as starting points for their investigations. Perhaps the best known of these are the RCAC-funded studies of Port Valdez by Weigers *et al.* (1997) and Hines *et al.* (1999). Most recently, O'Clair and Lindstrom (2000) have produced an illustrated account of southeastern Alaska's algae entitled *North Pacific Seaweeds*. This volume will be of great value to all algal researchers working in that area.

During the EVOS investigations in Alaska, the importance of macro-benthic marine algae was finally recognized. Numerous researchers took part in algal studies that were well-funded by both EXXON and the Trustees. Volumes of data resulted from these studies, but little of this information has been made readily available to the public. Although there were numerous technical reports produced, few peer-reviewed articles or books have appeared on the data. Most of it remains on government or university shelves waiting for the opportune moment for publication. Many years have gone by since the spill, and it has become more and more imperative that this information is published now before it is forgotten.

## **NEED FOR THE PROJECT**

### **A -- Statement of Problem.**

During the EVOS studies by the University of Alaska, support was generously provided for the CHIA studies, but, due to its litigation sensitivity, no support was given for publishing the data. This left a huge amount of information unavailable to the scientific community and to the public. This proposal is for financial support for the preparation and publication of a peer-reviewed journal article on the occurrence and distribution of marine macroalgae in the oil spill area based on data derived from the CHIA algal voucher collection. In addition, it will provide the funding necessary to correct and update the taxonomy and nomenclature used for these specimens and their corresponding database, thus vastly improving the usefulness of this resource for environmental studies in Alaska.

Because so little was known about the marine algae of south-central Alaska during the EVOS studies, the CHIA algal teams (including the proposed PI) carefully collected and pressed voucher specimens for later identification from more than 100 sites visited during the study. At each site, at least one of every species present was collected, amounting eventually to many thousands of specimens. These were then sent to the proposed PI in Newport, Oregon, where they were identified, curated, cataloged and labeled. With the help of 2 part-time assistants and many volunteers, she was able to finish the entire collection by the 1994 deadline, but then the funding ended. There was no support for editing the database or for publishing the results. Now, before this wealth of information on the occurrence and distribution of marine algae in Alaska is lost, it is important to revive and edit the data and analyze the results for publication in a peer-reviewed journal that will be available to all that are interested.

### **B -- Rational/Link to Restoration.**

The proposed paper will provide information on the algal biodiversity occurring in each of the areas studied by the CHIA teams. Without knowledge of the diversity of species present in an area, it is often difficult to accurately assess environmental impacts such as those encountered during the CHIA studies. Part of the problem appears to be that interactions between species frequently occur. For example, the death of one species might cause the death of another -- or allow it to flourish through a lack of competition. Algal species also vary greatly in their ability to withstand exposure to oil, hot water washes, and trampling. Damage to one species will not necessarily reflect damage to others. Some species (e.g., annuals like *Ulva fenestrata*) rebound quickly from perturbation while others (e.g., perennials like *Fucus gardneri*) may take several years to recover. Much of this variation in response is influenced by the life history and method of growth of the individual species and by their vegetative and reproductive seasonality, fecundity, and ability to disperse and recruit. If restoration procedures are used to expedite recovery of any algal species, it is imperative that these features and the environmental factors that trigger them are well understood--not just for the restored species but for all of those species impacting its fate. Otherwise time and money may be wasted.

### ***C -- Location.***

The project will be carried out at the CHIA collection herbaria located at JCSFOS in Auke Bay (AK) and at the Hatfield Marine Science Center in Newport (OR). One study trip will be made to the herbarium of the University of California at Berkeley to examine Alaskan type material, use the library, and discuss problematic species with the experts there. The project will include all 7,300 specimens collected as site vouchers by the CHIA algal teams. The resulting paper will be an essential resource for scientists monitoring and restoring the oil spill area. It will provide valuable information for marine biologists, teachers, and environmental managers working in Alaska, and it will be useful to those in the general public that use algae for food.

### ***COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE***

Since this project involves mainly laboratory (herbarium) work, literature research, and writing, there will be no community involvement. However, the final paper will be of interest to native groups harvesting algae and/or herring roe-on-algae for food. To facilitate this more general use of the publication, common names will be included with the scientific names in this paper whenever possible.

### ***PROJECT DESIGN***

#### ***A -- Objectives.***

The proposed publication will provide: checklists of the marine algae found in the Prince William Sound, Kenai Peninsula, and Kodiak/Cook Inlet regions studied by the CHIA teams. In addition, it will provide an analysis of the species distributions as they relate to geographic area, substratum type, wave exposure, and salinity and, when the data are available, to oil exposure and beach cleaning.

#### ***B -- Methods.***

The project will involve the following stages of preparation: a preliminary library and herbarium study of the difficult species, corrections and additions to the voucher database, voucher specimen annotations, checklist preparation, data analyses, and manuscript preparation.

1. Preliminary library and herbarium study of the difficult species. Although I am familiar with most of the Alaskan algal species and the type specimens that represent them, there are a number of species complexes that I find particularly confusing. These will need to be researched at the University of California at Berkeley herbarium which houses the most complete set of Alaskan type specimens and the most complete algal library within the United States. Some of the more difficult complexes include species in the genera *Alaria*, *Mazzaella*, *Mastocarpus*, *Porphyra*, *Ceramium*, *Neorhodomela*, and *Polysiphonia*. Within the past 5 years, monographs have been written on several of these making identifications much easier. On others, I have projects in progress that will assist me in my final determinations. Some nomenclatural problems exist with the species, but by the summer of 2001 these should be resolved through discussions with S. Lindstrom for our NSF project on the *Marine Flora of Alaska*. The complexes that cannot be resolved

during the time-frame allowed will remain listed as species or generic complexes in the paper. During the EVOS studies, I did discover several new species. These will not be included in this paper, but it is hoped that the Trustee Council or GEM project will support the descriptive work necessary to describe these species by 2002.

2. Voucher database corrections and additions. The voucher database was designed and programmed by myself and a volunteer during the early CHIA studies in order to mainly produce specimen labels. It was initially written (from scratch!) in BASIC, and it was a wonderfully useful program. But, after entering the first few thousand specimens, I soon realized that the sorting procedure was way too slow. Therefore, I transferred the data into Fox Pro II, a program that my lab used for data entry until the close of the project in 1994. Recently, I imported the data into Access 2000, a database that is much easier to work with and that I have become an expert in during the past few years. Over the EVOS study years, a number of people in my lab were involved in data entry of the voucher specimens and numerous typographic errors were made. Before queries and analyses even begin to be possible, it is imperative that corrections are made. I will spend at least one month at this task and at incorporating the taxonomic and nomenclatural decisions described in #1 into the database. In addition, the known information on habitat types will be entered.
3. Voucher collection annotation. Except for a small reference set of specimens held by me in Newport, the CHIA voucher collection is currently held entirely at the herbarium in Juneau. It is a valuable resource for those studying algae in Alaska and only recently was examined by R. O'Clair for her book with S. Lindstrom on *North Pacific Seaweeds*. Since it is in active use, it is important that I go through the specimens to cross-check my earlier identifications and annotate the specimens for taxonomic and nomenclatural changes and for typographic mistakes. Since the data for these changes will be maintained in my Access database, it will be an easy matter to query the database for these changes and to generate Annotation Labels for all of the specimens. However, it will be a time-consuming task to attach these labels to all of the specimens concerned so that others will be aware of the changes. Therefore, in order to stick within the time-frame established for the project, an assistant will be employed to help with this task.
4. Checklist preparation. I will query the database for lists of species from the entire spill area and then from each of the geographic areas. As in our first preliminary CHIA project report (1991), I will indicate which species were new records to the area at the time of the study.
5. Data analyses. This will be performed with the assistance of M. Stekoll, my coauthor. Although we are still in the process of determining which analyses to use, some of the species group characteristics and preferences that we will try to reveal are:
  - i. widespread vs. narrow distributions.
  - ii. substratum preference (bedrock, boulder or cobble).
  - iii. exposure preference (exposed or sheltered, and aspect).
  - iv. low salinity tolerance (if salinity data is available)
  - v. oil exposure and cleanup tolerance and/or quick recovery.Most of these preference or similarity groups can be determined through simple queries. If more elaborate analyses are used, they will be determined and performed by M. Stekoll. After obtaining our results, we will overlay the biological features of the species, particularly those that relate to taxonomy and life history. The influence of these genetic features on the group preferences will be discussed.
6. Manuscript preparation. I will prepare the first draft of the manuscript in MS Word. Stekoll will prepare the graphics in MS Excel or another program and edit the

manuscript. I will be responsible for the final submission to *Botanica Marina* and for the final report.

**C -- Cooperating Agencies, Contracts, and Other Agency Assistance.** None at this time.

## **SCHEDULE**

### **A-- Measurable Project Tasks for FY 01 (October 1,2000 - September 30, 2001)**

(By) January 1, 2001:

1. Correct typographic errors and update nomenclature of the voucher specimen database as much as possible in Newport.
2. Visit Berkeley for 2 weeks to work on nomenclatural problems and examine type specimens -- further update the database.

(By) April 1, 2001:

3. Complete an abstract and/or poster or talk on the project for the Annual Restoration Workshop.
4. Attend the Workshop in Anchorage.
5. Visit Juneau for 9 days to check the taxonomy of the voucher specimens, distribute and glue the annotation labels, and correct the database. Borrow particularly difficult specimens.

(By) July 1, 2001:

6. Complete checklists and begin work on the analyses, graphics and manuscript.
7. Visit Juneau for another 9 days to make final corrections to the specimens and database, do the analyses.
8. Attend the Phycological Society of America meeting; give talk on the project.

(By) September 30, 2001:

9. Complete the manuscript and submit it to a peer-reviewed journal.
10. Prepare and submit the final report.

### **B-- Project Milestones and Endpoints**

July 1, 2001:           --Completion of collection annotations and database corrections.  
                              --Completion of analyses.  
Sept. 30, 2001:       --Completion and submission of manuscript.

**Completion Date:**     September 30, 2001

## **PUBLICATIONS AND REPORTS**

Hansen, G. I., and M. S. Stekoll. "A checklist and distributional analysis of marine algal species collected as vouchers during the CHIA-Exxon Valdez oil spill studies". We will submit our manuscript during the summer of 2001 to *Botanica Marina*, a journal that frequently includes biogeographic studies of this type.

## **PROFESSIONAL CONFERENCES.**

Phycological Society of America, Estes Park, Colorado. June 2001. "A distributional analysis of marine algal species collected by the University of Alaska during the Exxon Valdez oil spill studies in south-central Alaska".

## **COORDINATION AND INTEGRATION OF RESTORATION EFFORT.**

The data published in this report will most directly assist the "Ecosystem Synthesis/GEM Transition" projects and should be considered a part of the ecosystem characterization of the entire EVOS area. In addition to providing an analysis of the habitat types used for damage assessment, the report will also provide vital base-line data for the future Gulf Ecosystem Monitoring program.

Currently, G. Hansen has projects on Alaskan marine algae and/or ecosystem characterization in progress or recently completed with the following people:

- 1 **Sandra C. Lindstrom** (Hansen & Lindstrom, "A Flora of the Benthic Marine Algae of Alaska". NSF supported & currently in progress. Two months of salary remain on this project for Hansen during the 2000-2001 academic year. However, the actual completion of this project will not occur until the Fall of 2001, after the proposed study is submitted.) Please see the comment below.
- 2 **Kathy A. Miller** (Miller & Hansen, "A checklist of the marine algae of the Kenai Fjords National Park" -- currently on hold since unsupported).
- 3 **Jane Middleton** (I identified the many of the collections of Middleton and Dudiak used in their ADF&G oil spill reports and later by Bridget Callahan in her Checklist of the Marine Algae of Kachemak Bay. Middleton & Hansen are planning "A Guide to the Algae of Kachemak Bay" which is yet unsupported)
- 4 **Tom Suchanek and Gail Irvine** ("Characterization of habitat types present along the Shelikof Strait" -- I participated in the algal checklists and percent cover studies of this NPS funded project. The report is completed but not yet published)
- 5 **Tuck Hines, Greg Ruiz, John Chapman, Nora Foster, Howard Feder, and James Carlton** ("Biological Invasions of Cold-Water Ecosystems: Ballast-Mediated Introductions in Port Valdez/Prince William Sound, Alaska" -- I did the marine plant sections of this report, RCAC/Sea Grant funded and just completed.)

The data provided by the proposed project will assist in the completion of studies # 1, 2, and 3 and add insight to follow-up studies on # 4 and 5. It is particularly important that the proposed project be completed before #1 and 2 above so that credit for the CHIA collections can be given to the appropriate people and funding agencies.

**EXPLANATION OF CHANGES IN CONTINUING PROJECTS.** Not applicable..

***PROPOSED PRINCIPAL INVESTIGATOR:***

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Oregon State University  
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## ***PRINCIPAL INVESTIGATOR QUALIFICATIONS***

Gayle I. Hansen is a Marine Algal Taxonomist, Ph. D.(1976), specializing in the Alaskan and Oregon floras (see the attached CV). She is probably best known for her part in the British Columbia Marine Algal Flora series (1981, 1983) and for her *Checklist and Biogeographic Analysis of the Marine Algae of Oregon* (1997). As algal taxonomist for the CHIA project, she contributed to the design of the intertidal algal studies and trained the algal technicians (many whom had been her students) in appropriate algal identification and sampling methods. During the CHIA study, Hansen and the technicians collected and pressed the entire site voucher collection. Each year's collection was sent to Oregon where she identified the specimens with the aid of a compound microscope and the appropriate literature. In a volunteer effort, Hansen and a computer specialist designed and programmed the initial voucher database. When funding became available, 2 part-time assistants joined her to curate, label, and catalog the entire collection by the 1994 deadline. The CHIA Algal Voucher Collection is now kept by the University of Alaska in Juneau except for one reference set of specimens that is permanently left with Dr. Hansen. The database (still in need of proofing and updating) is kept in Oregon with a copy in Juneau for use with the specimens.

Responsibilities: Correcting the taxonomy and nomenclature of the CHIA-EVOS algal voucher-specimen collection and annotating the sheets; correcting the database and adding habitat information; preparing the regional checklists; working with Stekoll on the biogeographic analyses and graphics, and writing and submitting the final manuscript for publication.

## ***OTHER KEY PERSONNEL***

1. -- Michael S. Stekoll, Ph. D. (Professor of Biology, UAS and SFOS/UAF)  
Juneau Center for the School of Fisheries and Ocean Sciences  
University of Alaska Southeast  
11120 Glacier Highway  
Juneau, Alaska 99801  
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Responsibilities: Dr. Stekoll will coauthor the paper and will be responsible primarily for helping with the biogeographic analyses, graphics preparation, and manuscript editing. Dr. Stekoll served as PI for the EVOS-CHIA algal studies as well as for the Herring Bay experimental and monitoring studies. Without his impetus and support, the CHIA algal voucher collections would never have been made.

2. -- A student worker from either UAJ or OSU. Responsibilities: Help with attaching annotation labels to each of the 7,300 voucher specimens.
3. -- EVOS/CHIA field personnel.  
Many of the CHIA algal technicians made heroic efforts to help us with our original collections. These included: Mandy Lindeberg, Robin Jenne, Brenda Konar, C. J. Rey, and Nancy Douglas. Larry Deysher, head of the CIK algal project was also extremely helpful. These and others will be acknowledged for their contributions in our paper.

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- Garbary, D. J., G. I. Hansen, and R. F. Scagel. 1983. The marine algae of British Columbia and northern Washington: Division Rhodophyta (red algae), Class Florideophyceae, Orders Acrochaetiales and Nemaliales. *Syesis* 15, Supp. 1: 1-106.
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- Hansen, G. I. 1999. Chapter 9C1. Marine Plants in Prince William Sound, Alaska. 34 pp. In *Biological invasions of cold-water coastal ecosystems: ballast-mediated introductions into Port Valdez and Prince William Sound, Alaska*, by Hines, A. H., G. M. Ruiz, J. Chapman, G. I. Hansen, J. T. Carlton, N. Foster, and H. M. Feder. RCAC Project Report for RFP 632,98.1.
- Lindstrom, S. C. 1977. An annotated bibliography of the benthic marine algae of Alaska. *ADF&G Technical Data Report* No. 31. ADF&G, Juneau. 172 pp..
- Lindstrom, S. C., N. I. Calvin, and R. J. Ellis. 1986. Benthic marine algae of the Juneau, Alaska area. *Contributions to Natural Science* No. 6. B. C. Provincial Museum. 10 pp.
- O'Clair, R. M., and S. C. Lindstrom. 2000. *North Pacific Seaweeds*. Plant Press, Auke Bay. 159 pp.
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## CURRICULUM VITAE - GAYLE INGRID HANSEN - Jan. 1, 2000

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### MAJOR INTERESTS:

Research and teaching in phycology, non-vascular plants, aquaculture, and conservation biology; research and consulting work on algal taxonomy, biogeography, and ecology; bibliographic and floristics database development; electronic publishing.

### SPECIFIC INTERESTS:

Systematics and phylogeny of algae, alpha taxonomy, biogeography and floristics, biodiversity and conservation of marine algae, introduced species, harmful algal blooms, algal morphology, life histories of marine algae, culture techniques, edible and pharmaceutically important algae, algal harvesting techniques, marine and fresh-water fungi, diseases of marine algae, history of marine biology.

### PERSONAL:

Place of birth: Arlington, Virginia, USA

Citizenship: USA

**PRESENT POSITION:** Associate Professor (Senior Research), Oregon State University  
at the Hatfield Marine Science Ctr. in Newport, Oregon

### EDUCATION:

Ph.D. Botany, January 1976, University of North Carolina, Chapel Hill, N. C.

Dissertation title: The Morphology and Life History of *Cirrucarpus carolinensis* sp. nov.  
(Kallymeniaceae, Cryptonemiales). (With: Prof. Max Hommersand)

M.S. Botany, September 1968, University of Vermont, Burlington, Vt.

Thesis title: Yeasts from Lake Champlain: Their Occurrence and Physiology.  
(With: Profs. Kenneth Fisher and Donald Johnstone)

A.B. Botany, June 1966, University of Connecticut, Storrs, Ct.

### GRANTS AND AWARDS:

Hansen, G. I., and S. C. Lindstrom. Fall 1998-Fall 2001. A Flora of the Benthic Marine Algae of Alaska: Phase 1, An Inventory of the Existing Collections. NSF Biotic Surveys and Inventories.

Hansen, G. I. 1998-2000. Oregon's Impoverished Marine Flora: Targeting Areas for Conservation. OSU Research Council, Oregon Sea Urchin Commission, and Oregon Dept. of Fish and Wildlife.

Coenan, C. and G. Hansen. Summer 1991 - Holt Marine Education Fellowship. Preparing a visitor's pamphlet on algae for the park at Cape Perpetua

Hansen, G. I. Summer 1985 to Summer 1986 - Eloise Gerry Fellow of Graduate Women in Science.

Hansen, G. I. Spring 1976 to Summer 1977 - W. G. Farlow Fellowship, Harvard University, for research on red algae..

Hansen, G. I. Summer 1974 - Coker Fellowship, University of North Carolina, for Ph. D. research.

### MEMBERSHIPS:

Phycological Soc. of America, International Phycological Soc., European Phycological Soc., Western Soc. of Naturalists. **E-mail Lists:** Algae-L, PSA, Taxacom, Phycotoxins, Marbio.

### DATABASES AND MAJOR HERBARIUM COLLECTIONS PREPARED:

Hansen, G. I., and S. C. Lindstrom. (In Progress). A WEB-based Database on the Existing Collections of the Benthic Marine Algae from Alaska. NSF.

Hansen, G. (In Progress). A Database on CD of the Herbarium Collections of Benthic Marine Algae from Oregon. OSU.

Hansen, G. 2000. OSU collections of Oregon benthic marine algae: approximately 5,000 curated, accessioned, and inventoried specimens.

Hansen, G. 1996. A Bibliographic Database on CD of Global Harmful Algal Blooms. US EPA.

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- Hansen, G. 1993. AMA - the collections. The identified and curated 7,300 sheets of marine algae collected as vouchers during the University of Alaska damage assessment studies of the EXXON Valdez Oil Spill. Univ. of Alaska, Juneau.

#### **PAPERS, REPORTS, AND WEB PUBLICATIONS:**

- Cho, T. O., S. M. Boo, and G. Hansen. [Submitted]. Taxonomy of the genus *Ceramium* (Ceramiaceae, Rhodophyta) from Oregon, U. S. A. *Phycologia*.
- Cho, T. O., H.-G. Choi, G. Hansen, & S. M. Boo. [Submitted]. *Corallophila eatoniana* (Farlow) comb nov. (Ceramiaceae, Rhodophyta) from the Pacific Coast of North America. *J. Phycol.*
- Tan, I., J. Blomster, G. Hansen, E. Leskinen, & C. Maggs. 1999. Molecular phylogenetic evidence for a reversible morphogenetic switch controlling the gross morphology of two common genera of green seaweeds, *Ulva* and *Enteromorpha*. *Mol. Biol. Evol.* 16: 1011-1018.
- Foster, M. S., G. I. Hansen, and Y. U. L. Amrein. 1999. History of the Western Society of Naturalists. Santa Barbara Museum of Natural History Contributions in Science 2: 42 pp.
- Hansen, G. I. 1999. Chapter 9C1. Marine Plants in Prince William Sound, Alaska. 34 pp. In *Biological invasions of cold-water coastal ecosystems: ballast-mediated introductions into Port Valdez and Prince William Sound, Alaska*, by Hines, A. H., G. M. Ruiz, J. Chapman, G. I. Hansen, J. T. Carlton, N. Foster, and H. M. Feder. RCAC Project Report for RFP 632,98.1.
- Chapman, JC, and Hansen, GI. 1997. Survey and risk analysis of introduced aquatic species in Port Valdez, Alaska. Smithsonian Environmental Research Council Report No. xx, 32 pp.
- Ruiz, G. M., A. H. Hines, (J. Chapman, and G. I. Hansen). 1997. The risk of non-indigenous species invasion in Prince William Sound associated with oil tanker traffic and ballast water management: pilot study. RCAC Project Report for FRP 632.97.1. 98 pages. (I wrote the macro- and micro-algal sections)
- Suchanek, T.H., E.E. Sotka, C.E. Hewitt, S.C. Lindstrom, E.A. Pavia, R.C. Helm, G.I. Hansen, and M. Blakesley. (In manuscript form since 1995 with the first author). Intertidal and shallow subtidal benthic communities of the Shelikof Strait, Alaska. McCulloch Foundation Monograph Series.
- Hansen, G. I. 1997. A Checklist of the Macrobenthic Marine Algae and Seagrasses of Oregon. <<http://hmsc.orst.edu/people/ghansen/orflora/pdf>>
- Hansen, G. I. 1997. A revised checklist and preliminary assessment of the macrobenthic marine algae of Oregon. In *Conservation and Management of Native Flora and Fungi*, eds. T. Kaye, A. Liston, R. M. Love, D. Luoma, R. J. Meinke, and M. V. Wilson, pp. 1-26. Oregon State University Press, Corvallis (OR).
- Hansen, G. I. 1996. Josephine Tilden (1869-1957). In *Prominent Phycologists of the 20th Century*, ed. by D. Garbary and M. Wynne, pp. 184-193. Lancelot Press Ltd., Hantsport (NS).
- Hansen, G. I. 1994 and 1996. Regulations for seaweed harvesting on the west coast of North America, 1994 and 1996. Hand-outs for the Western Society of Naturalists, Monterey, each 12 pp. [cited many places but not reviewed]
- Hansen, G. I. 1989. *Schizymenia dawsonii* and its relationship to the genus *Sebdenia* (Gigartinales, Rhodophyta). *Taxon* 38: 54-59.
- 1986. A newly discovered host of the seagrass epiphyte *Smithora naiadum* (Bangiophyceae, Rhodophyta). *Can. J. Bot.* 64: 900-901.
- Garbary, D. J., G. I. Hansen, and R. F. Scagel. 1985. Additions to the marine algae of Barkley Sound, Vancouver Island. *Syesis* 17: 43-45.
- Hansen, G. I., and S. C. Lindstrom. 1984. A morphological study of *Hommersandia maximicarpa* gen. et sp. nov. (Kallymeniaceae, Rhodophyta) from the North Pacific. *J. Phycol.* 20(4): 476-488.
- Hansen, G. I., and D. J. Garbary. 1984. Sexual reproduction in *Audouinella arcuata* and comments on the Acrochaetiaceae (Rhodophyta). *Br. Phyc. J.* 19: 175-184.
- Garbary, D. J., G. I. Hansen, and R. F. Scagel. 1983. The marine algae of British Columbia and northern Washington: Division Rhodophyta (red algae), Class Florideophyceae, Orders Acrochaetiales and Nemaliales. *Syesis* 15, Supp. 1: 1-106.

- Bird, C. J., D. J. Garbary, and G. I. Hansen. 1981. Observations on *Ptilothamnionopsis lejolisea* (Farl) Dix. (Ceramiaceae, Rhodophyta) in northwestern North America. *Syesis* 14: 109-113. (Published 1982)
- Hansen, G. I., D. J. Garbary, and R. F. Scagel. 1981. New records and range extensions for Alaskan marine algae. *Syesis* 14: 115-123. (Published 1982)
- Hansen, G. I., and R. F. Scagel. 1981. A morphological study of *Antithamnion boreale* (Gobi) Kjellmann and its relationship to the genus *Scagelia* Wollaston (Ceramiaceae, Rhodophyta). *Bull. Torrey Bot. Club* 108: 205-212.
- Garbary, D. J., G. I. Hansen, and R. F. Scagel. 1981. The marine algae of British Columbia and northern Washington: Division Rhodophyta (red algae), Class Bangiophyceae. *Syesis* 13: 137-195.
- 1980. A revised classification of the Bangiophyceae. *Nova Hed.* 33: 145-166
- Hansen, G. I. 1980. A morphological study of *Fimbrifolium*, a new genus in the Cystocloniaceae (Gigartinales, Rhodophyta). *J. Phycol.* 16: 207-217.
- 1977. A comparison of the species of *Cirrularcarpus* (Kallymeniaceae, Rhodophyta). *Occasional Papers of the Farlow Herbarium* 12: 23-34.
- 1977. *Cirrularcarpus carolinensis*, a new species in the Kallymeniaceae (Rhodophyta). *Occasional Papers of the Farlow Herbarium* 12: 1-22.
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#### **ABSTRACTS AND NOTES PUBLISHED AND/OR PRESENTED:**

- Hansen, G. I. 1999. A biogeographic study of the seaweeds of Port Valdez, Alaska. 14<sup>th</sup> International Botanical Congress and the Phycological Society of America Meetings, 1-7 Aug. 1999, St. Louis, MO. [Poster]
- Lindstrom, S. C., and G. I. Hansen. 1999. *A Flora of the Benthic Marine Algae of Alaska*, status and future prospects. 14<sup>th</sup> International Botanical Congress and the Phycological Society of America Meetings, 1-7 Aug. 1999, St. Louis, MO. [Poster]
- Hansen, G. I., & S. C. Lindstrom. 1999. *The Benthic Marine Algae of Alaska*: a preliminary report on the inventory of existing collections. 14<sup>th</sup> International Botanical Congress and the Phycological Society of America Meetings, 1-7 Aug. 1999, St. Louis, MO. [Poster]
- Choi, H.-G., T. O. Cho, G. W. Saunders, G. I. Hansen, and S. M. Boo. 1999. Phylogenetic relationships among selected Ceramiaceae (Rhodophyta) based on nuclear SSU rDNA sequences. 14<sup>th</sup> International Botanical Congress and the Phycological Society of America Meetings, 1-7 Aug. 1999, St. Louis, MO. [Poster]
- Hansen, G. I., and S. C. Lindstrom. 1999. *The Benthic Marine Algae of Alaska*: a preliminary report on the inventory of existing collections. The 13<sup>th</sup> Northwest Algal Symposium, 14-16 May 1999, Yachats, OR. [Poster]
- Hansen, G. I., and S. C. Lindstrom. 1999. *The Benthic Marine Algae of Alaska*: the metadata structure for the inventory of existing collections. NBII/USGS and NSF Biological Informatics Activities, 16-17 March 1999, Denver, CO. [Talk]
- Hansen, G. 1999. Cryptogenic seaweeds, seagrasses, and marine lichens in Port Valdez, Alaska: who are they and how did they get there? First National Conference on Marine Bioinvasions, 24-27 Jan. 1999. Cambridge, MA. [Talk]
- Hansen, G. I. 1997. Botanical Beach and the early history of phycology in the Pacific northwest. 11th Northwest Algal Symposium, 9 May 1997, Victoria, BC. [Plenary address]
- Hansen, G. I. 1995 & 1996. The Oregon seaweed flora: depauperate or just understudied. (The Conservation and Management of Oregon's Native Flora, 15-17 Oct 1995, Corvallis, OR, and Western Society of Naturalists, 4-7 January 1996, Port Townsend, WA. [Talk]
- Hansen, G. I. and T. F. Mumford. 1994. Current (1994) regulations for the commercial, personal, and scientific collection of seaweeds on the West Coast of North America. Western Soc. Naturalists Meetings, 26-30 Dec 1994, Monterey, CA. [Talk]
- Hansen, G. I., T. F. Mumford, and E. Gilman. 1994. Current status of seaweed harvesting and management on the west coast of North America. 8th NW Algal Symposium, Humboldt State University, Arcata, CA. [Plenary address]
- Hansen, G. I. 1989. In memoriam: Maurice A. Dube (1927-1989). (4th NW Algal Symposium, Walla Walla College Marine Station, Anacortes), and the Phycological Newsletter 25 (2): 4-5.

- 1989. Nori farming in Anacortes, Washington: a political dilemma. 4th NW Algal Symposium, Walla Walla College Marine Station and the XIIIth International Seaweed Symposium, Vancouver. [Poster]
- 1987-1988. Numerous letters to the editor of the Anacortes American on the positive aspects of aquaculture.
- 1986. A preliminary study of a new genus in the Cystocloniaceae (Rhodophyta) from British Columbia. West. Soc. Nat. Meetings, Univ. Hawaii, Hilo. [Talk]
- 1986. Meeting Reports -- The Second Northwest Algal Symposium. Phycological Newsletter 22 (2): 8.
- 1986. A re-evaluation of *Callophyllis cristata* (Kallymeniaceae, Rhodophyta). Western Soc. Naturalists Meetings, Monterey, and the 2nd NW Algal Symposium, Bamfield Marine Station. [Talk]
- 1986. R. F. SCAGEL, a dedication. (2nd Northwest Algal Symposium, Bamfield Marine Station).
- 1985. Meeting Reports -- The First Northwest Algal Symposium. Phycological Newsletter 21 (1): 5.
- 1984. A newly discovered host of *Smithora naiadum* (Bangiophyceae, Rhodophyta). 1st Northwest Algal Symposium, Friday Harbor, WA. [Talk].
- Hansen, Gayle I., and Sandra C. Lindstrom. 1983. A morphological study of *Hommersandia maximicarpa* gen. et sp. nov. (Kallymeniaceae, Rhodophyta) in the North Pacific. Western Soc. Nat. Meetings, Simon Fraser University, BC.
- Hansen, Gayle I., and Robert F. Scagel. 1980. The reproductive morphology of *Opuntiella californica* (Solieriaceae, Rhodophyta). J. Phycol. 16, Supp.: 17. Botany 80, Vancouver, BC. [Talk]
- Hansen, Gayle I., and Robert T. Wilce. 1980. The morphology and taxonomy of *Kallymenia schmitzii* DeToni (Cryptonemiales) from the Arctic. J. Phycol. 16, Supp.: 17. Botany 80, Vancouver, BC. [Talk]
- Garbary, D., G. Hansen, and R. Scagel. 1979. A revised classification of the Bangiophyceae. Presented by DG at the Can. Bot. Assoc. meetings - 1979.
- Hansen, Gayle I. 1977. *Rhodophyllis dichotoma* (Lepechin) Gobi from New England. J. Phycol. 13, Supp.: 26. International Seaweed Symposium, Santa Barbara, CA.. [Talk]
- 1977. The vegetative and reproductive morphology of *Rhodophyllis dichotoma* (Lepechin) Gobi (Gigartinales) from New England. Northeast Algal Symposium Abstracts. Northeast Algal Symposium, Woods Hole, MA. [Talk]
- 1976. An unusual life history in *Cirrulicarpus* (Kallymeniaceae). J. Phycol. 12, Supp.: 26. American Institute of Biological Sciences meeting. [Talk]
- 1974. A morphological and life history study of a new species of *Cirrulicarpus* (Kallymeniaceae, Rhodophyta) from North Carolina. J. Phycol. 10, Supp.: 4. American Institute of Biological Sciences meeting. [Talk]

## RESEARCH AND CONSULTING EXPERIENCE:

- Sept. 1989--present. Research Associate Professor, Dept. of Botany and Plant Pathology, Hatfield Marine Science Center of Oregon State University: biodiversity database development, herbarium curation, research on the Oregon and Alaskan seaweed floras, harmful microalgal blooms, and the history of marine biology.
- 1997--present. Algal collections for faculty at numerous universities including: Montana Tech. (MT), SUNY at Binghamton (NY), St. Anselm's College (NH), Queens University (Ireland), University of North Carolina (NC), Univ. of British Columbia (Canada), Univ. of SW Louisiana (LA), and the University of Guelph (Canada).
- Jan. 1996--1997. Phycological consultant to Big Island Abalone, an aquaculture company growing *Haliotis* spp. in co-culture with *Palmaria mollis* at the NELHA facility in Kona, Hawaii. Cultivating *Palmaria* in unialgal cultures, writing import permits for algae, giving advice on mass cultivation of red algae, etc. [Contract]
- Dec. 1993--March 1994. Visiting Scientist, CSIRO Marine Laboratories, Hobart, Tasmania, Australia. Learning the Australian marine algal flora. [Service]
- Sept. 1989--Nov. 1993. Research Associate, University of Alaska in residence at the Hatfield Marine Science Center of Oregon State University - Algal Taxonomist for the State of Alaska damage assessment studies of the 1989 EXXON Valdez Oil Spill: collecting, identifying and processing the algal voucher collection; developing and analyzing the voucher database; training the field crew in voucher collection techniques and algal identification; helping to create and/or refine the experimental design whenever possible. (Note: This is the State litigation study of intertidal damage.)

Summer 1992, 1993, 1994. Katmai National Park and the Kodiak Islands, Alaska. Algal Taxonomist for rocky intertidal studies (% cover and beach surveys) conducted along the Shelikof Strait by the Univ. California at Davis. [Contract]

Jan. 1993--June 1993. Newport, OR. Scientific Advisor to the Kelp Harvest Committee of Oregon's Division of State Lands. Drafting regulations for the harvest of bull kelp, *Nereocystis luetkeana*, in Oregon coastal waters. [Service]

March 1992--March 1993. Newport, OR. Member, Rocky Shores Advisory Council to the Oregon Ocean Policy Committee. Drafting policies for the Oregon state legislature on resource management of rocky intertidal areas.

Spring 1992. Newport, OR. Yaquina Head Outstanding Natural Area, BLM, U. S. Dept. Interior. Identification of marine algal specimens from Yaquina Head, Oregon, and editing a brochure on marine algae. [Contract]

Spring and Summer 1990. Homer, Alaska. Identification of Alaskan marine algal specimens collected for oil-spill monitoring projects for Alaska Fish and Game. [Contract]

Summer 1989. Florida Keys. Identification of marine algae for fish herbivory studies in the Florida Keys by Prof. T. Koslow of Dalhousie University. [Service]

Fall 1988. Anacortes, WA. Preparation of a large collection of frozen identified marine algae for pharmaceutical study by Prof. W. Gerwick of Oregon State University. [Service]

January--June 1988. Anacortes, WA. Collecting and identifying marine algae, Carolina Biological Supply Co. [Contract]

August--November 1987. Anacortes, WA.. Selecting, collecting, and identifying species of temperate marine algae for screening for natural products that inhibit the growth of cancerous cells for the National Cancer Institute [Contract]

May 1985--Nov. 1987. Research Associate, Bamfield Marine Station, Bamfield, British Columbia: research on the morphology and systematics of new species of marine red algae occurring in the northeast Pacific.

Sept. 1983--1989. Research Associate, Western Washington University in residence at the Friday Harbor Laboratories, the Bamfield Marine Station, or the Shannon Point Marine Ctr.: research on reproductive development in marine red algae and on the history of marine biology. [concurrent with position at UBC and FHL]

Jan. 1983--1989. Research Associate, University of British Columbia in residence at the Friday Harbor Laboratories, the Bamfield Marine Station, or the Shannon Point Marine Ctr.: taxonomic and biogeographic research on red algae. [concurrent with position at WWU & FHL]

June 1982--May 1985. Research Botanist, Friday Harbor Laboratories, University of Washington: research on floristics, biogeography, and taxonomy of marine algae. [concurrent with positions at WWU & UBC]

August 1978--Jan. 1981. Research Associate, Department of Botany, University of British Columbia: working with R. F. Scagel and D. J. Garbary on the marine algal flora of British Columbia and Northern Washington and on the distribution and morphology of red and brown algae occurring in British Columbia and Alaska.

Spring 1976--Summer 1977 - Research Fellow, Farlow Herbarium of Harvard University: studies on red algal morphology.

Fall 1968--Fall 1970. Aquatic Biologist with a specialty in algae (GS 7,9, and 11) for the Research Division, National Fisheries Center and Aquarium, U. S. Department of Interior, Washington, D. C.: research on the growth of marine algae in aquaria using artificial seawater.

Summer 1966. Research Assistant to Dr. Donald Squires, Deputy Director, Museum of Natural History, Smithsonian Institute: zoogeographic mapping and taxonomy of deep-water corals, short paper on improving museum exhibits.

## **TEACHING EXPERIENCE:**

### ***MARINE AND/OR GENERAL PHYCOLOGY***

Spring and Summer 1992, 1993, 1994, 1995 - Instructor, Oregon State U.Seataqua Program, teaching "Our Valuable Seaweeds" to the public or to aquarium volunteers: a short 2-day course on the importance, use and identification of marine algae.

Summer 1993, 1994, 1995 - Co-Instructor with Evelyn McConnaughey, OSU's Seataqua Program, teaching "Collecting, Cooking, and Cultivating Sea Vegetables to the public: a 1 and 1/2 day course.

Summer 1991 and 1994 - Instructor, Oregon State U.: teaching an intensive 2-week (8-12 hrs/day) graduate-level course on Marine Algal Taxonomy. The course included lectures, labs, and numerous field trips.

June and July 1991 - Instructor, Oregon State U.: teaching a 4-week intensive course on Field Marine Botany for teachers.

May 1990 and 1991 - Instructor, Oregon State U.: teaching the 1-week Marine Algal section of the Marine Biology program for undergraduates.

March to June 1989 - Visiting Lecturer for Western Washington U.: teaching an 10-week undergraduate course on Algae at the Shannon Point Marine Ctr.

June 1988 and Summer 1989 - Visiting Lecturer for OSU's Hatfield Marine Science Ctr. teaching a 1-week intensive course on Marine Algae for high school biology teachers and a 4-week fellowship writing a booklet on Marine Algae in the Laboratory -- for high school biology courses.

March 1989 - Instructor at the Breazeale Interpretive Center for a weekend course on "Our Valuable Seaweeds" May and June 1987 - Instructor at the Bamfield Marine Station for a 3-week intensive course on Marine Algae and Habitat Diversity.

March to June 1982 - Visiting Lecturer at the Friday Harbor Laboratories, U. of Washington: teaching an undergraduate 10-week intensive course in Phycology.

Summer 1981 - Visiting Lecturer at the Friday Harbor Laboratories, U. of Washington: team-teaching with R. F. Scagel a graduate-level intensive 6-week course in Marine Algology.

Sept. 1981 to Jan. 1982 - Assistant Professor, Limited Term at Simon Fraser U.: teaching an upper level undergraduate course on Algal Systematics. Summer 1977 - Lecturer for Suffolk U.: teaching a 6-week course on Marine Botany at the R. S. Friedmann Cobscook Bay Labs in Edmunds, Maine.

### **MARINE ECOLOGY**

Fall 1994 - Instructor for OSU and EPA, Newport: teaching a 1 week course on The Seaweeds and Seagrasses of Estuaries.

Summer 1978 - Lecturer for Suffolk U.: teaching 3 weeks of a 6-week course on Marine Ecology at the R. S. Friedmann Cobscook Bay Labs in Maine. I concentrated on macro-algal ecology during my half of the course.

### **NON-VASCULAR PLANTS**

Feb. 1985 to May 1985 - Visiting Assistant Professor at Simon Fraser U.: substitute teaching the last half of a course (the fungi and bryophytes) on Non-Vascular Plants (replacing Dr. L. Druehl).

Jan. 1981 to Jan. 1982 - Assistant Professor, Limited Term, at Simon Fraser U.: organizing and teaching the spring and fall courses (both lecture and lab) on Non-Vascular Plants.

Spring 1975 - Lecturer at the U. of North Carolina: teaching lectures and labs for the non-vascular plant part of a course on Plant Diversity.

### **INTRODUCTORY BOTANY**

Fall 1977 to Spring 1978 - Visiting Assistant Professor at U. Massachusetts, Amherst: teaching the laboratories for a course in Introductory Botany.

### **ASSORTED COURSES**

Fall 1970 to Summer 1973 - Graduate Teaching Assistant at the U. of North Carolina: laboratory instructor in General Botany, Algae, Marine Phycology, and a Survey of the Plant Kingdom.

Fall 1966 to Spring 1968 - Graduate Teaching Fellow at the U. of Vermont: laboratory instructor in General Microbiology, Advanced Microbiology, and Phycology.

### **SERVICE:**

May 2000. Invited Participant in NSF's Biotic Surveys and Inventories Workshop, Orcas Island, WA

Spring 1999. Organizer (with Martha Apple) for 13<sup>th</sup> Northwest Algal Symposium, 14-16 May 1999, Yachats, OR.

Winter 1996 - Invited Participant in "The Microbial World: the Foundation of the Biosphere", sponsored by the American Academy of Microbiology, Daytona Beach (FL), January 19-21: a white paper preparation conference.

Fall 1995 - "Working Scientists" Panel Member for Symposium on Undergraduate Women in Science, Corvallis, OR, Oct. 14th.

Spring 1995 - Seminar Series Organizer, Hatfield Marine Science Ctr., Newport, Oregon.

Winter 1993 - Member-at-Large (Meeting Organizer), Western Society of Naturalists Meetings, Newport, Oregon.

Summer 1991 - Oregon Coast Aquarium, Newport. Scientific reviewer of the signage for displays and exhibits on marine algae.

1987 - 1996 - Adviser, Northwest Algal Symposium -- for all new meeting organizers.  
Spring 1986 - Organizer, 2nd Northwest Algal Symposium, Bamfield Marine Station, Bamfield, British Columbia.  
Fall 1984 - Founder, Convener and Organizer, 1st Northwest Algal Symposium, Friday Harbor Laboratories, Washington.

**EDITORIAL EXPERIENCE:**

1976 to present - Reviewer for the Journal of Phycology, the European Journal of Phycology, the National Science Foundation, and the Guggenheim Foundation.  
Summers 1964 and 1965 - Editorial Assistant, Publications Branch, Office of Education, U. S. Department of Health, Education and Welfare: editing and proof-reading manuscripts, galley and page proofs being published by HEW.

**TECHNICAL EXPERIENCE:**

Identification of macro and microalgae, isolation and culture techniques (for algae, fungi, bacteria, and viruses), histochemical techniques (including fluorescent stains), photomicrography, photomacrography, pen and ink illustration, curatorial skills, SCUBA diving (NAUI), computer skills (including word processing and database use --MS Word, Wordstar, Papyrus, MS Excell, MS PowerPoint, MS Access, some FoxPro).

**2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET**

October 1, 2000 - September 30, 2001

<b>Budget Category:</b>	Authorized FY 2000	Proposed FY 2001						
Personnel (including benefits)		\$28,288.0						
Travel		\$8,005.0						
Contractual		\$6,825.0						
Commodities		\$350.0						
Equipment		\$2,500.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal		\$45,968.0				Estimated FY 2002		
OSU Indirect Cost Rate = 43%		\$19,766.0						
Project Total		\$65,734.0						
Full-time Equivalentents (FTE)		0.4						
Dollar amounts are shown in thousands of dollars.								
Other Resources								
Comments:								

**FY01**

Prepared:

Project Number:  
 Project Title: A checklist and distributional analysis of  
 marine algal species collected as vouchers during the CHIA-  
 EVOS studies  
 Name: Gayle I. Hansen

**2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET**

October 1, 2000 - September 30, 2001

<b>Personnel Costs:</b>			Months Budgeted	Monthly Costs	Overtime	
Name	Position Description					
Gayle I. Hansen	Principal Investigator \$18400 + 48% fringe		4.0	6808.0		
Yet to be determined	Curatorial Assistant \$960 + 10% fringe-\$1056		0.5	2112.0		
Subtotal			4.5	8920.0	0.0	
<b>Personnel Total</b>						
<b>Travel Costs:</b>		Ticket Price	Round Trips	Total Days	Daily Per Diem	
Description (flight costs are from: Travel.Yahoo.Com)						
1. Newport to Juneau to examine and annotate specimens, analyze the data, and discuss the manuscript additional = car rental at \$40/day		550.0	2	18 18	120.0 40.0	
2. Newport to Berkeley to examine Alaskan type specimens, use the library, and discuss problem species with the experts additional = limosine service to Berkeley		265.0 40.0	1 1	12	110.0	
3. Newport to Anchorage for the EVOS Trustees meeting		500.0	1	3	140.0	
4. Newport to Estes Park, Colorado, for the PSA meetings additional = Limosine service to the meeting additional = meeting registration		550.0 80.0 300.0	1 1 1	5	110.0	
<b>Travel Total</b>						

**FY01**

Prepared:

Project Number:  
 Project Title: A checklist and distributional analysis of marine algal species collected as vouchers during the CHIA-EVOS studies  
 Name: Gayle I. Hansen

**2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET**

October 1, 2000 - September 30, 2001

<b>Contractual Costs:</b>		
Description		
	Dr. Mike Stekoll, lead algal PI on the EVOS/CHIA studies, will co-author the paper. He will provide 2 weeks of time to help primarily with data analysis and graphics. He will also edit the final manuscript.	
	2 weeks of time	salary \$3,478
		benefits \$1,033
		51.3% overhead \$2,314
		Total \$6,825
		<b>Contractual Total</b>
<b>Commodities Costs:</b>		
Description		
	Herbarium and computer supplies: MS Office Professional and Quatro Pro, herbarium paper and glue, brushes, printer ink, diskettes, etc.	
	Long Distance phone calls to M. S. Stekoll	
		<b>Commodities Total</b>

**FY01**

Prepared: April 12, 2000

Project Number:  
 Project Title: A checklist and distributional analysis of marine algal species collected as vouchers during the CHIA-EVOS studies  
 Name: Gayle I. Hansen

**2001 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET**

October 1, 2000 - September 30, 2001

<b>New Equipment Purchases:</b>		Number of Units	Unit Price
Description			
1. Notebook computer to house the database, use for data analyses and manuscript preparation. It must be fast to handle the database and portable for transport to Juneau and Berkeley. IBM Thinkpad 600X series are good (MicroWarehouse quotes them as starting at \$2500) My current notebook computer is old and slow and almost completely worn out from other projects. It really should be replaced for this project.		1	2500.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		<b>New Equipment Total</b>	
<b>Existing Equipment Usage:</b>		Number of Units	
Description			
Zeiss Axioskope Microscope (Both microscopes are for examining algal specimens) Zeiss SR Stereo Microscope  And my extensive algal library....!		1 1	

**FY01**

Project Number:  
 Project Title: A checklist and distributional analysis of marine algal species collected as vouchers during the CHIA-EVOS studies  
 Name: Gayle I. Hansen

Prepared: April 12, 2000