

ANNUAL REPORT
CENTER FOR ENVIRONMENTAL DIAGNOSTICS
AND
BIOREMEDIATION

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Prepared by

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The University of West Florida
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The Center for Environmental Diagnostics and Bioremediation (CEDB) was established in 1990 to enable the University of West Florida to strengthen its working relationship with the Gulf Breeze Environmental Research laboratory (GBERL) of the U.S. Environmental Protection Agency, to implement new collaborative research programs in applied environmental sciences, and to enhance educational and training opportunities for undergraduate and graduate students. The funds appropriated by the legislature (E&G funds) for the Center are utilized to recruit tenure-earning faculty whose expertise is in contemporary molecular biology, genetics, and environmental assessment. These core faculty, as well as other research faculty (not tenure-earning; funded largely by extramural grants), enable the CEDB to serve as a unique resource to build viable research programs pertinent to the assessment and improvement of environmental health, to provide opportunities for undergraduate and graduate students to participate in contemporary research endeavors, to enrich the curriculum through course offerings, and to contribute to public service.

I. Goals/Objectives for 2001-2002

A. Develop and maintain a productive research program with support from external sources.

Assessment measures

Amount of funding received; success in securing peer-reviewed competitive grants; publications and reports; presentations at professional meetings; utility and application of research results.

Assessment findings

External support for single-year and multi-year projects in force during 2001-2002 in the CEDB amounted to \$4,099,679. Most of this support (88.8%; \$3,642,713) was derived through peer-reviewed, national level competitive grants from agencies such as the National Science Foundation (NSF), Environmental Protection Agency (EPA), and U.S. Department of Agriculture (USDA). These grants attest to the quality and external recognition of the research output of the CEDB faculty.

In addition to the grants from national sources, CEDB faculty secured support from regional and state agencies (9% of the funds received; \$368,216) and through congressional earmarks (2.2% of funds received; \$88,750; as a subcontract from the University of South Florida). These projects are indicative of CEDB's responsiveness to regional /state needs in environmental research, and to partnering with sister institutions to pursue projects of system-wide interest.

The scholarly output of CEDB faculty included 20 peer-reviewed publications, four technical reports, and 10 presentations at national/international meetings. The communicated findings, ongoing research, and new initiatives led to the establishment of interinstitutional collaborations and preparation of new proposals for extramural funding.

The published results contribute to the advancement of knowledge in diverse areas: molecular biology, microbial ecology, marine ecology, photobiology and photochemistry, and biochemistry – as evidenced from their publication in peer-reviewed journals. The research in several current projects is relevant to national priorities: impact of agricultural runoff on Total

Maximum Daily Loads in water bodies (USDA); Science to Achieve Results: Estuarine and Great Lakes Program (EPA); and bioterrorism (U.S. Army). The results from work supported through state/local agencies facilitated implementation of management strategies for bacterial contamination in recreational waters and for Wet Prairie habitat restoration and evaluation.

The above findings indicate that CEDB continues to be highly successful in securing external support and maintaining an extraordinarily productive research program.

Program decisions

The CEDB Director discussed the findings at faculty meetings, resulting in the following conclusions and decisions.

1. In order to ensure the successful operation of current research programs, the annual assignments for CEDB faculty should enable a larger proportion of their time to be devoted to research. The CEDB Director, in collaboration with the Chair of Biology Department, modified the assignments as needed.

2. Some of the new projects require new equipment. The CEDB Director provided the needed funds through the Center's Seed Funds, carry-forward funds, and salary savings.

3. Additional doctoral-level scientists are needed to successfully implement the current projects and to expand the research program. Through national search, two post-doctoral associates have been recruited to join the Center in June and August 2002. The CEDB Director will seek institutional resources to recruit additional tenure-earning faculty to take advantage of the emerging opportunities for applied environmental research.

4. Additional laboratory space is needed to implement the current and anticipated projects. The CEDB Director, with the cooperation of the Chair of biology department, was able to secure an additional research laboratory (for Dr. Joe Lepo, who joined as a tenure-earning faculty member in 2001-2002) and shared space in a greenhouse.

B. Increase CEDB's participation in research relevant to local/regional needs.

Assessment measures

Partnerships with local/regional organizations; implementation of relevant research programs; securing financial support.

Assessment findings

The CEDB continues to expand its involvement in the assessment and improvement of regional environmental health. This research is pursued with funding from sources such as the Florida Department of Health (Escambia County Health Department), Northwest Florida Water Management District, West Florida Regional Planning Council, City of Pensacola, Santa Rosa County, Bay Area Resource Council, Florida Department of Agricultural and Consumer Services, Florida Department of Environmental Protection, and Three Rivers RC & D. The projects pursued are directly relevant to regional needs.

In view of the increasing concern for environmental pollution and potential impacts on human health in Northwest Florida, the CEDB established a Partnership for Environmental Research and Community Health (PERCH) in collaboration with the health departments of Escambia and Santa Rosa Counties, and requested a special appropriation from the United States Congress. In FY 2002, UWF was granted congressional appropriations (\$850,000 via EPA;

\$850,000 via CDC) to conduct environmental health studies in Escambia and Santa Rosa Counties. The CEDB Director formed a 25-member Advisory Committee, assembled a multi-investigator team – faculty from CEDB and Environmental Studies at UWF; faculty from University of South Florida and Georgia Institute of Technology; the health departments in Escambia and Santa Rosa Counties – and developed proposals for review by the granting agencies in May/June 2002. This project is a major endeavor for addressing the concerns of citizens in Northwest Florida, and involves consultation through the Advisory Committee with representatives of city and county governments (e.g., Pensacola, Milton, Navarre Beach, Escambia County, Santa Rosa County), Escambia County Utilities Authority, Northwest Florida Water Management District, Florida Department of Environmental Protection, Florida Department of Health, U.S. Environmental Protection Agency, as well as representatives of industries, professional organizations, and environmental advocacy groups.

Program decisions

The CEDB Director discussed the findings at faculty meetings, and with the Advisory Committee for Environmental Health Studies. The conclusions and decisions are as follows.

1. The initiation of the PERCH project in 2002-2003 will add a substantial load of research responsibility on the existing faculty in the CEDB who already have several projects to manage. It is necessary to recruit additional doctoral-level scientists, as post-doctoral research associates and/or as faculty.

2. The annual assignments of current faculty have to be adjusted to ensure that commitments to funded grants are met.

3. Additional equipment will be needed to implement the new projects.

4. Additional laboratory space will be needed for the new projects.

5. CEDB's analytical chemistry laboratory (Wetlands Research Laboratory, WRL) needs to be strengthened – with base funding for support personnel and operating expenses, and renovated facilities – to secure and maintain certification through NELAP (National Environmental Laboratory Accreditation Program). The validation of quality assurance/control accorded by NELAP certification is critical for environmental health assessments.

The CEDB Director is responsible for follow-up actions. The actions pertinent to #1, 2, 3, and 4 are similar to those listed for Goal A. For item #5, the WRL improvements and requests for supplemental funding have been included in the Strategic Planning Priorities submitted to the Provost.

C. Provide financial support and research participation and training opportunities for students and professionals.

Assessment measures

Number of students and professionals supported; educational and career development benefits.

Assessment findings

During 2001-2002, CEDB provided financial support and research opportunities for 11 graduate students, 38 undergraduate students, 6 post-doctoral associates, and 7 middle/high school teacher-interns. For nine of the above students a special training grant from EPA

provided support that included payment for tuition and research expenses, as well as stipend. Progress reports and interviews indicate that the educational experience of students is substantially enhanced by participation in contemporary research, training in emerging technologies, and integration of theoretical knowledge with laboratory experimentation and field studies. Many of the participating students utilized the research opportunities to conduct directed individual studies for academic credit or for thesis projects (at the graduate level).

The CEDB has also fostered interdisciplinary collaboration, involving university faculty from other disciplines as well as participation of teachers and students from area high schools and middle schools. For example, in the USDA project on agricultural runoff, the CEDB researchers are collaborating with the Department of Environmental Studies and the College of Professional Studies, utilizing experimental agricultural tracts at Tate High School, and providing stipends (internships) to seven teachers from area high schools and middle schools to enable their participation in research and development of pertinent instructional modules for environmental education.

The CEDB also takes pride in providing professional development opportunities for post-doctoral associates. These associates are an important asset for various research projects, including assistance in the mentoring of students and other laboratory personnel. The post-doctoral associates who worked in the CEDB have benefited from their association and research output, and received academic appointments at other institutions. For example, Dr. Wei-Jun Yang (Ph.D., University of Tokyo) was appointed as a Professor in Life Sciences at Zhejiang University, Peoples Republic of China, in June 2002; and Dr. Shea Tuberty (Ph.D., Tulane University) will be joining Appalachian State University, Boone, NC, as a tenure-track faculty member in Fall 2002.

Program decisions

The CEDB Director discussed the assessment findings at faculty meetings and came to the following decisions.

1. Continue to request financial support for students and postdoctoral associates through external grants.
2. Continue to foster interdisciplinary collaboration, and secure support for strengthening environmental education through internships for teachers.

The CEDB Director will coordinate the implementation of these decisions involving faculty in the CEDB and appropriate academic departments at the university.

D. Enrich and Supplement the course offerings and academic program support provided by the biology department.

Assessment measures

Courses taught; contribution to biology curriculum; academic advising; student recruitment and retention activities; supervision of directed studies; supervision of thesis research.

Assessment findings

Since its creation in 1990, the CEDB considered classroom teaching, research supervision, and academic advising as integral components of the Center's mission. During

2001-2002, CEDB faculty served as academic advisors for about 80 undergraduate majors in biology and marine biology, and provided financial support for and supervised the research activities of 11 graduate students and 38 undergraduate students.

Although the CEDB faculty were heavily involved in externally-funded research programs (and thus had a reduction in teaching load), they made significant contributions to the biology curriculum by teaching core undergraduate courses in *Genetics* and *Ecology*, as well as undergraduate/graduate elective courses in *Marine Field Ecology*, *Experimental Oceanography*, *Marine Biotechnology*, and *Genetic Engineering*. In addition to the above formal courses, CEDB faculty coordinated the *Biology Seminar* course in Fall and Spring semesters. The CEDB faculty secured support for ship time through the Florida Institute of Oceanography to provide field experiences and on-board training in oceanographic techniques. Assessment of teaching effectiveness through the portfolios for annual evaluation, including course materials, performance in examinations, and student evaluations indicate that the CEDB faculty members are excellent teachers.

Among the graduate students supervised by the CEDB faculty, three have successfully defended their M.S. thesis at UWF (Keith Simmon, Kerry Flaherty, Eva Pasko). The CEDB faculty also served as committee members for Ph.D. students at LeHigh University (Kathleen G. Kresge; defended in April 2002); University of Joensuu, Finland (Jaana Sipura; in progress); University of Texas-Houston, M.D. Anderson Cancer Center (Jarrah Meador; in progress).

In addition, two Ph.D. students supported by the CEDB, Iris Knoebl (Oregon State University) and Natalie Karouna-Renier (Rensselaer Polytechnic Institute), defended their dissertations in Spring 2002.

The CEDB faculty has also participated in student recruitment efforts at UWF (i.e., Admissions Phone-A-Thon; UWF Saturday Open House for prospective students). By engaging in these activities, academic advising, research training, and teaching of seven different courses, the CEDB faculty plays an important role in the education and training of students. The integration of research expertise and opportunities with formal teaching is a noteworthy contribution of the CEDB towards the enrichment of biology curriculum.

Program decisions

The CEDB Director discussed the assessment results with the Chair of Biology Department, in which the CEDB faculty have tenure or tenure-earning status, and during faculty meetings. The resulting decisions are as follows.

1. The CEDB Director and the Chair of the biology department will ensure that reasonable opportunities will be provided to the faculty for teaching formal courses, taking into consideration that commitments to grant-funded research are met.
2. The resignation of Dr. Malcolm Shields, tenured Associate Professor, CEDB/Biology, creates a void in teaching genetics, genetic engineering, and bioinformatics. A replacement faculty member needs to be recruited to serve the needs in CEDB and Biology during 2002-2003.
3. With increasing opportunities for environmental health studies, recruitment of additional faculty with joint appointments in CEDB and Biology can lead to the enrichment of the curriculum as well as enhanced research endeavors.

The CEDB Director is responsible for follow-up actions, and has already included these requests among strategic planning priorities submitted to the Provost.

E. Provide service to the institution, profession, and community

Assessment measures

Number and diversity of service activities; internal/external recognition; benefits.

Assessment findings

The CEDB faculty provided extensive service to the institution, profession, and community. Service to the institution involved membership on more than twenty committees at the departmental, college, and university levels – including: College of Arts and Sciences Council; University Employee Benefits Committee; University Scientific Diving Control Board; University Health and Safety Committee; Library Committee; and Faculty Search Committees.

Services to the profession included contributions as members of review panels for federal grants, reviewers of manuscripts for journals, and leadership roles in professional organizations. The following examples denote the extent of professional service.

Dr. K.R. Rao. Member, Proposal Review Panel, National Center for Environmental Research and Quality Assurance (NCERQA), Estuarine Indicators Program.

Dr. M.S. Shields. Member, Proposal Review Panel, National Center for Environmental Research and Quality Assurance (NCERQA), Phytoremediation Program.

Dr. R.A. Snyder. Editorial Board, *Journal of Eukaryotic Microbiology*.

Dr. W.H. Jeffrey. Member, Proposal Review Panel, Biocomplexity GEN-EN Program, National Science Foundation.

Dr. W.H. Jeffrey. Member, Advisory Board, Florida Center for Environmental Studies.

Dr. W.H. Jeffrey. Chair, Advisory Committee, Florida Institute of Oceanography.

Dr. W.H. Jeffrey. Chair, Raytheon Polar Services, Palmer Area User Committee (National Science Foundation)

Dr. W.H. Jeffrey. Co-Chair, “Viruses and Prokaryotes in Aquatic Systems III,” American Society for limnology and Oceanography, Ocean Sciences Meeting, Honolulu, HI.

Dr. W.H. Jeffrey. Member, Florida Sea Grant Ad Hoc Committee on Marine Biotechnology

Collectively CEDB faculty reviewed more than 20 manuscripts for a variety of journals: *Applied Environmental Microbiology*; *Aquatic Microbiology*; *Aquatic Microbial Ecology*; *FEMS Microbiology Ecology*; *General and Comparative Endocrinology*; *Journal of Eukaryotic Microbiology*; *Journal of Experimental Zoology*; *Limnology and Oceanography*; *Marine Biology*; *Marine Ecology Progress Series*; *Journal of Experimental Marine Biology and Ecology*; *Comparative Biochemistry and Physiology*; and *Environmental Toxicology and Chemistry*.

The CEDB faculty provided valuable public service to the community and for the enrichment of science education at pre-college levels. Representative examples of services in the former category are:

Dr. R.A. Snyder. Chair, Board of Directors, South Santa Rosa Utilities, Inc.

Dr. R.A. Snyder. Member, Citizens Advisory Committee, Santa Rosa County Commission.

Dr. J.E. Lepo. Member, Escambia County Citizens Environmental Council.

Drs. R.A. Snyder and J. E. Lepo. Members, Bay Area Resource Committee.

Drs. M.S. Shields, R. A. Snyder, and J. E. Lepo. Members, Northwest Florida Legislative Delegation Science Advisory Panel.

Dr. J.E. Lepo. Facilitator and Technical Advisor for the Santa Rosa County Task Force on Stormwater Runoff.

Dr. R.A. Snyder. Panelist, Public Forum on the Proposed Yellow River Dam (sponsored by Bay Area Resources Council).

Dr. J.E. Lepo. Member, Environmental Advisory Board, City of Pensacola.

Dr. K.R. Rao. Chair, Executive Committee, Partnership for Environmental Research and Community Health (PERCH).

Dr. W.H. Jeffrey. Member, Information and Analysis Planning Team (Ground Level Ozone), Escambia County.

All of the CEDB faculty contributed their time to enrich K-12 science education by participating in a variety of activities. Examples are as follows.

- § Judging projects displayed at the Regional Science and Engineering Fair.
- § Award of Summer Research Scholarship by the CEDB for the winner of best environmental science project in the Science and Engineering Fair; and providing research opportunities for the scholarship recipient. (Ms. Fallon Mihalic, who worked as a student intern with CEDB faculty, won the first place award at the State level competition.)
- § Providing internship opportunities for science teachers from area Middle/High Schools to provide environmental laboratory experiences.
- § Laboratory tours for area school children.
- § Display at Bay Day 2001, a hands-on environmental awareness program for sixth graders in Escambia County.
- § Contributions to Integrating Algebra and Science through Technology program, organized by Pensacola Junior College.
- § Contributions to the Florida Collaborative for Excellence in Teacher Preparation.
- § Volunteer Teacher, Gulf Breeze Elementary School.
- § Guest speaker, Math and Science Day, Escambia Public Schools.
- § Technical Advisor, Brentwood Elementary Magnet School of Communication and Technology, Internet Science and Technology Fair.
- § Lectures to Science Seminars for Superior Students from high schools.

Program decisions

The CEDB Director discussed the assessments results at faculty meetings and reached the following decisions.

1. The CEDB's service activities have been numerous, diverse, and beneficial for the institution, profession, and community.

2. Notwithstanding the increasing work load generated by the continuing and new research grants, teaching and academic program support in biology, the CEDB faculty are encouraged to continue their professional service contributions at the present level.

The CEDB Director will facilitate participation in service endeavors and make appropriate resources available in support of pertinent activities.

II. Major accomplishments and changes in programs and services for 2001-2002

A. External funding received by the CEDB for new one-year and multi-year projects initiated in 2001-2002 amounted to \$2,421,088 of which 86.5% was derived through peer-reviewed, national level competitive grants from EPA and USDA.

B. The CEDB formed a Partnership for Environmental Research and Community Health (PERCH) in collaboration with the health departments of Escambia and Santa Rosa Counties, and secured congressional appropriation to conduct environmental health studies in Northwest Florida.

C. The CEDB developed partnerships (through formation of four separate consortia) with diverse institutions in the country to pursue interdisciplinary research projects: Science to Achieve Results: Estuarine and Great Lakes Program; Bioterrorism; Integrated Research Challenges in Environment; and Environmental Health Studies in Northwest Florida.

D. The Wetlands Research laboratory (WRL) underwent an external review and site visit for certification by NELAP (National Environmental Laboratory Accreditation Program) and submitted responses to reviewer comments. The WRL has increased its analytical services for environmental health studies conducted by the Escambia County Health Department.

E. Personnel changes: Dr. J.E. Lepo joined the CEDB as a tenure-earning Associate Professor in August 2001, following extensive service as a Research Assistant professor. Dr. Malcolm Shields, who joined the CEDB as one of the founding faculty members in 1991, resigned effective July 2002 to work at Idaho State University where he plans to help develop an environmental biotechnology program with support from the Department of Energy.

III. Goals/Objectives for 2002-2003

A. Improve Wetlands Research Laboratory (WRL) operations, through facilities renovation, personnel recruitment, and NELAP certification.

B. Fill the faculty position vacated by Dr. M. Shields.

C. Initiate PERCH research projects, and other projects pertinent to regional environmental health.

D. Continue to maintain a productive research program.

E. Continue to provide financial support and research opportunities for students and professionals.

F. Continue to augment and supplement the course offerings and academic program support in the affiliated academic departments.

G. Continue to provide service to the institution, profession, and community.

IV. Priorities/Goals for 2003-2007

A. Recruit additional tenure-track faculty in the areas of environmental chemistry, environmental modeling/risk assessment, molecular diagnostics, and toxicology.

B. Expand office/laboratory facilities for CEDB, in conjunction with facilities expansion for biology and/or environmental studies.

C. Strengthen collaboration among the various academic units within the university to foster

interdisciplinary programs in environmental/community health studies in the region.

D. Strengthen interinstitutional partnerships to foster interdisciplinary research programs of national priority.

E. Maintain a productive research program.

F. Augment and supplement the course offerings and program support in the affiliated academic department(s).

G. Maintain a strong record of service to the institution, profession, and community.

V. Principal Unmet Budgetary Needs

A. Establish an operating budget (E&G) for the Wetlands Research Laboratory (\$120,000 for salary plus benefits; \$30,000 for expenses).

B. Support for renovation of WRL. Estimated cost: \$220,000 (\$100,000 committed by PMO, Administrative Affairs; the rest to be covered by Academic Affairs).

C. Additional funding to CEDB (\$30,000 for salaries plus benefits) to recruit a new support staff member (USPS or A&P) to handle the increasing workload in the office, which presently has only one staff member.

D. Additional funding to CEDB (\$20,000 increment for expenses) to cover increased operational costs. The expense budget allocated to the CEDB was \$50,000 in 1990; it was reduced to \$38,000 in 1992, and has remained at that level through 2002.

VI. Distinguished Individual Accomplishments

Dr. W.H. Jeffrey continues to be successful in securing competitive grants from the National Science Foundation (current grants: \$639,578; new grants approved: \$616,895).

Drs. J.E. Lepo and *R.A. Snyder* succeeded in obtaining competitive multi-year grants amounting to \$2,095,111 from the Environmental Protection Agency and the U.S. Department of Agriculture.

Dr. R.A. Snyder has been awarded tenure and promoted to the rank of Associate Professor effective August 2002.

Dr. K.R. Rao directed the establishment of PERCH (Partnership for Environmental Research and Community Health), and submitted research proposals to the Environmental Protection Agency and the Centers for Disease Control to secure the appropriated funds (\$1,700,000) for environmental health studies in Escambia and Santa Rosa Counties.

Ms. T.L. Streeter, Office Manager, as the lone staff member in the office is doing an admirable job in coping with the workload created by the increasing number of grants and personnel, as well as added responsibilities related to purchasing, accounting, payroll, and external/internal communications.

VII. External Grants

Current Grants

Ultraviolet Radiation Induced DNA Damage in Bacterioplankton in the Southern Ocean II, (PI: <i>W. Jeffrey</i>), NSF , 8/1/98 - 12/31/01	\$349,422
EPA GED/UWF Science Training in Ecology Program, (PI: <i>K. R. Rao</i> and <i>W. Jeffrey</i>), EPA , 4/10/98 - 8/9/02	\$898,024
Collaborative Research: UV Effects on Marine Production of Phytoplankton: Assessing the Impact of UVB, (PI: <i>W. Jeffrey</i>), NSF , 10/1/98 – 6/30/02	\$161,697
Environmental Monitoring of South Palafox Marina, (PI: <i>J. Lepo</i>), City of Pensacola , 7/1/98 - 9/30/02	\$ 34,636
Water Quality Monitoring in Escambia County Bathing Places, (PI: <i>M. Shields</i>), Florida Department of Health, Escambia County , 3/7/00-6/30/02	\$ 69,272
LEXEN: Hitchhiking: a mechanism for bacterial speciation in an extremely cold environment, (PI: <i>W. Jeffrey</i>), National Science Foundation , 10/1/00 – 9/30/03	\$138,459
Wet Prairie Habitat Restoration 2001. (PI: <i>R. Snyder</i>), Northwest Florida Water Management District , 4/1/01 - 3/31/02	\$ 7,081
Santa Rosa County Stormwater Runoff Task Force, (PI: <i>J. Lepo</i>), Santa Rosa County, Board of County Commissioners , 5/1/00 - 3/31/02	\$ 6,000
Bayou Grande and Bayou Texar Water Quality Monitoring, (PI: <i>M. Shields</i> and <i>J. Lepo</i>), Florida Department of Health, Escambia County , 7/1/01 - 6/30/02	\$130,000
Biological Survey of FCT Project: Town of Century North Escambia River Management Plan, (PI: <i>R. Snyder</i>), West Florida Regional Planning Council , 7/23/01 –6/30-02	\$ 1,800
Characterization and Management of Effluent from Aquaculture Ponds in Florida - A Treatment System Evaluation, (PI: <i>J. Lepo</i>), Florida Department of Agricultural and Consumer Services, US EPA, Florida DEP, Three Rivers RC & D , 7/16/01 – 12/31/02	\$ 23,000
A synthesis of Water Quality Data from the National Estuarine Research Reserve System Wide Monitoring Program (PI: <i>J. Caffrey</i>), National Oceanic and Atmospheric Administration, via South Carolina Department of Natural Resources , 8/13/01 - 12/31/02	\$ 51,948

Impact of Agricultural Runoff on Total Maximum Daily Loads (PI: <i>J. Lepo</i> and <i>R. Snyder</i>), U.S. Department of Agriculture , 10/1/00 - 9/14/04	\$532,000
Bayou Texar Nutrient Level Water Quality Sampling, (PI: <i>R. Snyder</i>), West Florida Regional Planning Council , 10/15/01 – 9/30/02	\$ 2,000
Phytopathogens as Bioterrorism Agents, (PI: <i>J. Lepo</i>), University of South Florida (US Army) , 11/02/01 – 11/30/02	\$ 88,750
Microbial Biofilms as indicators of Estuarine Ecosystem Condition, (PI: <i>J. Lepo</i> and <i>R. Snyder</i>), Part of Consortium for Estuarine Ecoinicators Research for the Gulf of Mexico, STAR EaGLES Cooperative Agreement, USEPA , 9/1/01 - 8/31/05	\$1,563,111
An Assessment of the Source of Human Sewage Waste Input into Coldwater and Pond Creeks, (PI: <i>R. Snyder</i>), Bay Area Resource Council , 2/6/02 – 12/31/02	\$ 18,998
Microzooplankton Sample Analysis, (PI: <i>R. Snyder</i>), USEPA , 9/28/01 – 9/30/02	\$ 2,400
Wet Prairie Habitat Restoration Evaluation and Management Strategies for the Garcon Point Water Management Area, (PI: <i>R. Snyder</i>), Northwest Florida Water Management District , 4/01/02 - 3/31/03	\$ 7,081
Collaborative Proposal: Interactive Effects of UV Radiation and Vertical Mixing on Phytoplankton and Bacterial Productivity of Ross Sea Phaeocystis Blooms, (PI: <i>W. Jeffrey</i>), NSF , 9/1/02-8/31/05	\$356,109
Tracking Source of Fecal Contamination in Environmental Waters, (PI: <i>J. Lepo</i>), Florida Department of Health, Escambia County , 7/1/02 - 6/30/03	\$130,000
Oceanographic Techniques, (PI: <i>W. Jeffrey</i>), FIO , Shiptime	\$ 6,000

Pending Grants

The Interactive Effects of UV Radiation and Temperature on Lake Ecosystems. Integrated Research Challenges in Environment, (PI: <i>W. Jeffrey</i>), NSF , 10/1/02 - 9/30/07 (Approved)	\$263,626
Assessment of Environmental Pollution and Community Health in Northwest Florida, (PI: <i>K. R. Rao</i>), EPA , 7/1/02 - 12/31/03	\$752,780
Environmental Health Studies in Escambia and Santa Rosa Counties, Florida, (PI: <i>K. R. Rao</i>), CDC , 8/1/02 - 7/31/02	\$ 926,217

Evaluation of Ciliate Protozoans as a First Food for Red Snapper <i>Lutanus campechanus</i> larvae, (PI: <i>R. Snyder</i>), Fisheries Development and Utilization Research and Development Grants and Cooperative Agreements , 1/01/03 – 6/30/04	\$101,587
Importance of microalgal production on the northern Gulf of Mexico nearshore sand bottom: nutrient trapping and support of fisheries Production, (PI: <i>R. Snyder</i>), CIAP (NOAA) , 2002-2003	\$ 7,000.
An Assessment of the Degradation of Environmental Quality of Pensacola Bay Coastal Waters as a Result of Increasing Human Waste Input, (PI: <i>R. Snyder</i>), CIAP (NOAA) , 2002-2003	\$ 35,000
Mechanisms of Adaptations of Antarctic Marine Bacterioplankton to Solar Ultraviolet Radiation, (PI: <i>W. Jeffrey</i>), NSF , 2002-2005	\$233,070
Marine Field Ecology. (PIs: <i>W. Jeffrey and R. Snyder</i>), FIO , Shiptime, 2002-2003	\$ 16,000

VIII. Faculty Publications and Presentations

Publications

Jeffrey, W.H. and D.L. Mitchell. Measurement of UVB induced DNA damage in marine planktonic communities. 2001. In J. Paul (ed) *Methods in marine microbiology*. Vol. 30. Academic Press, NY. pp. 469-485.

Booth, M.G, L. Hutchinson, M. Brumsted, P. Aas, R.B. Coffin, R.C. Downer, Jr., C.A. Kelley, M.M. Lyons, J.D. Pakulski, S.L. Holder Sandvik, **W.H. Jeffrey**, and R.V. Miller. 2001. Quantification of RecA as an Indicator of Repair Potential in Marine Bacterioplankton Communities of Antarctica. *Aquatic Microbial Ecology* 24: 51-59.

Booth, M.G., **W.H. Jeffrey**, and R.V. Miller. RecA expression in response to solar ultraviolet radiation in the marine bacterium *Vibrio natriegens*. *Microb. Ecol. (In press)*.

Meador, J., **W.H. Jeffrey**, J.P. Kase, J.D. Pakulski, S. Chiarello, and D.L. Mitchell. Seasonal fluctuation of DNA photodamage at Palmer Station, Antarctica. *Photochem. Photobiol.* 75:266-271.

Mitchell, D.L., J. Meador, and **W.H. Jeffrey**. Research Note: The proportion of direct and indirect UV photoproducts varies with depth in the marine water column. *Photochem. Photobiol.* 75:257-265.

Kelley, C.A., and **W.H. Jeffrey**. 2002. Dissolved methane concentrations profiles and air-sea fluxes from 41° S to 27° N. *Global Biogeochemistry (In press)*.

Buma, A.G.J., P. Boelen and **W.H. Jeffrey**. UVR-induced DNA damage in aquatic organisms. In: W. Helbling and H. Zagarese (eds.), Comprehensive series in Photosciences "UV effects in aquatic organisms and ecosystems." (In press).

Wilhelm, S.W., **W.H. Jeffrey**, C.A. Suttle, and D.L. Mitchell. Estimation of Biologically Damaging UV levels in Marine Surface Waters with DNA and Viral Dosimeters. *Photochem. Photobiol.* (In press).

Durkin, S., S.R. Jeffrey, D. Karentz, J. P. Kase, C. Lacavich, L. Norden, J.D. Pakulski, B. Tiffany, M. Voytek, and **W.H. Jeffrey**. Molecular Analysis of Bacterial Community Structure in the Coral Surface Microlayer and Water Column Samples from Key Largo, FL. *Coral Reefs* (Submitted).

Pakulski, J.D., A. Baldwin, A. Dean, S. Durkin, D. Karentz, C.A. Kelley, K. Scott, H. J. Spero, S. Wilhelm and **W. H. Jeffrey**. Scale Effects of Solar Radiation in the Marine Environment: 1. Influence of Latitude on the Photobiology of Heterotrophic Bacteria. *Limnology & Oceanography* (Submitted).

Arnosti, C., S. Durkin, and **W.H. Jeffrey**. Patterns of enzyme activities among pelagic microbial communities: Implications for cycling of dissolved organic carbon. *Limnology & Oceanography* (Submitted).

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