SUMMARY OF FACULTY ACTIVITIES

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Summary of Administrative and Service Activities

Dr. Daniel M. Dauer's administrative experience includes activities as (1) Director of the Benthic Ecology Laboratory (1985 to present), (2) Principal Investigator on **191** awards of external funding, (3) Principal Investigator of the Chesapeake Bay Monitoring Program for the Virginia Department of Environmental Quality (1996 to present), (4) Associate Director of the Applied Marine Research Laboratory (1985 - 1990 and 1996 - 2000), (5) Chairman of the Department of Biological Sciences (1990 - 1996), (6) Chairman of several critical departmental committees, (7) Chairman of several professional society committees, (8) Chairman for numerous master's and doctoral students and (9) President of the International Polychaetology Association (2016-2019).

Dr. Dauer has successfully supervised **191** grants and contracts during his 47 years at Old Dominion University. Total funding of these awards amounts to **$36,005,837.** External funding supports two full-time technicians - a laboratory manager and a data manager in the Benthic Ecology Lab. Each year the Benthic Ecology Laboratory supports 2 graduate research assistants and 2-5 undergraduate research assistants. As Director of the Benthic Ecology Laboratory, Dr. Dauer (1) administers the financial and technical aspects of all projects, (2) conducts regular staff meetings with all personnel to discuss the progress of each project, (3) supervises the activities of all employees (10-13 per year), (4) reviews the overall results of the analyses and approves the quality assurance/quality control protocols, (5) is responsible for the review and submission of all data products and required reports, and (6) participates in meetings, workshops, and coordinates sessions with the contracting agencies.

Dr. Dauer serves as the Principal Investigator for Virginia's Chesapeake Bay Monitoring Program. The monitoring program collects water quality, phytoplankton, and benthic data from sites within both the mainstem of the Chesapeake Bay and Virginia's three major tributaries, the James River, the York River and the Rappahannock River. The program was initiated in 1985 to measure progress in reducing levels of eutrophication and contamination as reflected in changes in water quality and the bay's living resources. Dr. Dauer supervises all activities dealing with the administration of this program and coordinates all comprehensive reports interpreting the data collected by Virginia monitoring program. This program presently supports five faculty in five departments of the College of Sciences, eight full-time techncians, 2-4 Graduate Research Assistants and three Undergraduate Research Assistants.

As Associate Director of the Applied Marine Laboratory (AMRL) from 1985 to 1990 and 1996 to 2000, Dr. Dauer often represented the Director in various meetings and workshops relating to current projects and the development of future projects. He also coordinated activities involving projects with several principal investigators in preparation of proposals and final reports.

Dr. Dauer was the Chairman of the Department of Biological Sciences from 1990 to 1996. The department consisted of a diverse faculty of 27 faculty members, 8 classified staff, 600 undergraduate majors, 60 master's and over 40 doctoral students. Four degrees are offered: a Bachelor of Science in Biology, a Master's of Science in Biology, a doctoral degree in Ecological Sciences and a doctoral degree in Biomedical Sciences. Important responsibilities include supervision of an annual budget of approximately $2,000,000; annual performance evaluations of all faculty and staff; promotion and tenure decisions; and hiring and termination decisions. The department maintains three important facilities - the Animal Facility, the Electron Microscopy Facility and the Biological Sciences Support Facility (BSSF). The Animal Facility maintains organisms used in teaching and research activities. The Electron Microscopy Facility maintains both scanning and transmission electron microscopes to support teaching and research needs. The BSSF supports teaching and research activities including maintaining supplies and chemical inventories, producing chemical solutions and media, maintaining field vehicles, and maintaining the capital equipment inventory.

During Dr. Dauer's tenure as department chair, important accomplishments included: (1) guiding the department through several years of austere and declining budget appropriations, (2) maintaining faculty and staff morale during those difficult years, (3) implementing reform of the department's committee structure resulting in substantial reduction in the number of standing committees, (4) implementation of the first major revision of the undergraduate biology curriculum in over 20 years, (5) updating and revising the department's policy and procedures manual, and (6) developing a positive working relationship with the department's Executive Committee inaugurated during his first semester as department chair.

Dr. Dauer's past departmental administrative activities include being Chairman of the Department Executive Committee (2006-2007), Promotion and Tenure Committee (1989-1990, 1996-1998), Chairman of the Budget and Finance Committee (1987-1989, 2005-2006), Chairman of the Overhead Committee (1983-1987) and Chairman of several Search Committees for faculty positions within the department.

Dr. Dauer served as a member of the Executive Committee (1986-1992, 1994-1996, 1999-2002) and Chairman of the Nominations Committee (1986 to 1992) of the Atlantic Estuarine Research Society. He also hosted and supervised all arrangements for the spring 1988 and spring 2001 meeting of this society. Dr. Dauer co-hosted with the Assistant Director of the Virginia Institute of Marine Sciences the 19th Annual Marine Benthic Ecology Meetings in 1991 attended by over 500 scientists with 161 talks presented. Dr. Dauer was a member of the Organizing Committee for the 18th Biennial Conference of the Estuarine Research Federation (ERF) held October 16-21, 2005, in Norfolk, Virginia. He was specifically in charge of recruiting and training 110 student volunteers. ERF had 1,200 registrants for this meeting. In 2006 Dr. Dauer was elected as the Secretary of ERF (2005-2007) and also served on the Governing Board of the Society. He was an elected delegate representing the USA on the Advisory Council of the International Polychaetology Association (IPA) from 1996 through

2016. In August 2016 at the IPA conference in Cardiff, Wales he was elected the President of the IPA (2016-2019) and presently serves on the Advisory Board as Past President.

He was a member of the Scientific Organizing Committee of the Estuarine & Coastal Sciences Association Symposium 47 entitled "Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide." The symposium was held in Figueira da Foz, Portugal from September 14-19, 2010.

Dr. Dauer has served as the Chairman (Major Professor) for 37 master's students and two doctoral students and is presently the Chairman for three master's students at Old Dominion University. In addition he served as the co-director for a doctoral student from the University of Lisbon, Lisbon, Portugal.

Dr. Dauer has trained four addition doctoral students from foreign universities in the fields of feeding ecology (Dr. Erica V. Pardo, Departamento de Zoologia Instituto de Biologia, Universidade Estadual de Campinas Campinas, São Paulo, Brazil; Dr. Katrine Worsaae, University of Copenhagen, Copenhagen Denmark) and the use of marine and estuarine benthic communities as indicators of ecological health (Dr. Jose A. de-la-Ossa-Carretero, Department of Marine Sciences and Applied Biology. University of Alicante. Alicante. Spain; Dr. Kalina M. Brauko, Center of Marine Studies, Federal University of Paraná, Pontal do Paraná, Brazil). All four doctoral students had residence in the Benthic Ecology Lab of ODU for their training and were supported by their home universities.

Summary of Research Activities

Dr. Daniel M. Dauer has **89** papers published or in press, has published **162** Technical Reports, has **191** grant and contract awards totaling **$30,968,757** as the Principal Investigator and **$36,005,837** including awards as a Co-Principal Investigator, has made **330** presentations at scientific meetings or invited seminars, and hosted four professional society meetings.

Dr. Dauer's research concerns the ecology of marine and estuarine benthic communities. Benthic communities are composed of plants and animals that live associated with the bottom of aquatic ecosystems including organisms that live on or within sediments or attached onto hard surfaces. His research includes three main themes: (1) the use of benthic community structure as an indicator of environmental quality; (2) benthic community dynamics, particularly factors that affect the establishment and maintenance of community composition; and (3) the interaction of functional morphology and feeding behavior in determining the distribution and abundance of marine animals.

Dr. Dauer's research has often emphasized the marine polychaetes, a group of annelids that generally dominate most sedimentary habitats. Within the polychaetes, he is an authority concerning functional morphology and feeding behavior, particularly of the spionid polychaetes. Spionid polychaetes are a diverse family of marine worms that live and feed at the interface of the sediment surface and the overlying water mass. Spionid polychaetes are particularly amenable to laboratory experimentation and observation, and gather food particles with a single pair of ciliated tentacles that project from the animal's head.

I. Benthic Community Structure as an Indicator of Environmental Quality

Major contributions of Dr. Dauer's work in determining environmental quality as indicated by the benthic community include: (1) the development of functional groups of benthic community species to be used in determining environmental health, (2) the development of criteria for determining the environmental health of benthic communities of Chesapeake Bay, (3) the development of benthic restoration goals and an index to quantitatively determine the environmental health of the benthic communities of Chesapeake Bay, (4) the development and application of trend analyses to benthic communities of the Chesapeake Bay, (5) the development of inferential links between long-term trends in water quality trends and benthic communities, (6) international recognition of the general application of research accomplishments in Chesapeake Bay to other aquatic systems throughout the world, (7) development of an experimental design to test the effects of tributyltin (a major, but toxic, ingredient of anti-fouling paint) on marine communities resulting in strict state standards for waters of the Chesapeake Bay, (8) experimental field testing of the effectiveness of a variety of approaches to assessing the environmental quality of marine systems using benthic communities, (9) use of a stratified random sampling field design allowing estimates of the areal extent of environmental degradation with a known level of statistical confidence, (10) a pioneering study

relating watershed level processes to the biotic integrity of estuarine benthic communities, (11) a pioneering study relating independent measures of estuarine habitat quality to biotic integrity, (12) a pioneering study to develop statistical approaches to determine the most likely sources of stress responsible for degraded benthic community conditions in the Chesapeake Bay and (13) on-going efforts to aid Maryland and Virginia in using benthic community condition in meeting assessment efforts required by the Clean Water Act for reporting overall condition and identification of impaired waters - 305(b)/303(d) reporting. For additional details see the Addendum "Summary of Selcted Significant Purlications."

II. Benthic Community Dynamics

Major contributions of Dr. Dauer's work in benthic community dynamics include: (1) the pioneering application of the theory of island biogeography to marine sedimentary and hard substratum communities; (2) ecological dynamics of community development including niche expansion and contraction by pioneering species and the spatial scales of colonization; (3) the ecological significance of adult dispersal in community dynamics particularly the role of adult immigration and emigration events by species with indirect development; (4) the roles of competition, predation and physical refuges in controlling benthic community structure; (5) the use of composite variables in testing hypotheses concerning factors affecting the distribution and abundance of benthic communities; and (6) use of stable isotopes (carbon, nitrogen and sulfur) in conjunction with gut content analyses to examine trophic interactions of shallow water benthic communities.

III. Functional Morphology and Feeding Behavior

Prior to Dr. Dauer's research on feeding behavior and functional morphology emphasizes spionid polychaetes as ecological models. This diverse and ubiquitous group of marine annelids was generally thought to be surface deposit feeders with a simple morphology of the feeding tentacles. The pair of feeding tentacles was thought to consist of a median food groove lined by cilia that transported deposited particles to the pharynx for ingestion. Major contributions of Dr. Dauer's work on the interaction of functional morphology and feeding behavior in spionid polychaetes include: (1) the discovery of multiple feeding behaviors related to bottom current flow; (2) the introduction of the term *interface feeders* to designate species that feed in the benthic boundary layer and employ aspects of surface deposit feeding, bedload feeding and suspension feeding; (3) the discovery of seven functional groups of cilia used in feeding behavior of spionid polychaetes; (4) the discovery of the relationship between functional morphology of feeding and systematics within the spionid polychaetes; (5) the discovery of the relationship between complexity of feeding behavior and complexity of functional morphology; (6) the discovery of specialized morphologies associated with spionid species that live in specialized habitat types; and (7) application of optimal foraging theory in designing controlled experiments concerning particle contact, retention, transport and ingestion of marine and estuarine surface deposit feeders.

Recent Research Activities

Dr. Dauer's present research activities include being the Principal Investigator of the Chesapeake Bay Monitoring Program for the Virginia Portion of the Chesapeake Bay. The Chesapeake Bay's living resources have been severely impacted over the last 50 years due to increased levels of contaminants entering the Bay and to cultural eutrophication in which excessive nutrient concentrations lead to ecological unbalance of the system (algal blooms, fish kills, low amounts of dissolved oxygen, declines in the biota). In 1997 the Bay Program evaluated the progress towards reducing nutrient inputs into the Chesapeake Bay. Dr. Dauer lead a team of Virginia scientists and environmental managers in producing an integrated analysis of patterns of watershed use, loads of nutrients entering the Bay, and long-term trends in water quality and the condition of the living resources including the phytoplankton, zooplankton, benthos and submerged aquatic vegetation. He continues to date to direct the annual analyses of status and trends of water quality, phytoplankton, and benthos for Virginia's waters.

International recognition of Dr. Dauer's contributions to understanding, protecting and restoring coastal and estuarine communities, as well as his basis research contributions in feeding behavior and trophic dynamics, has resulted in several invited presentations as well chairing or co-chairing international sessions of talks.

In 2010 Dr. Dauer served as a Member of the Scientific Organizing Committee of the Estuarine & Coastal Sciences Association Symposium 47 entitled *Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide***.** The symposium was held in Figueira da Foz, Portugal from September 14-19, 2010. In addition at this meeting he gave an invited keynote address on the theme of the meeting entitled *Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide*. Figueira da Foz, Portugal. Finally he was the session chair for a series of talks with the theme *How comparable are ecological assessment criteria and approaches worldwide?*

Also in 2010, Dr. Dauer together with Drs. Angel Borja (Spain) and Andre Grémare (France) convened a session of talks with theme *Benthic indicators: responding to different human pressures and assessing integrative quality status* at the International Council for the Exploration of the Sea annual meeting in Nantes, France in September 20-24, 2010. Based upon the talks in this session a series of nine manuscripts are in press in a special issue of the journal *Environmental Indicators.* Drs. Dauer, Borja and Grémare served as guest editors of this special issue.

In 2009 , he co-chaired with Drs. Angel Borja (Spain), Mike Elliot (England) and Simon Simenstad (USA) a session of talks with the theme *Medium and long-term recovery of marine and estuarine systems, as guide to presenting useful information in new scenarios to restore ecological integrity* at the 2009 meeting of the American Society of Limnology and Oceanography in Nice, France. Dr. Dauer gave the introductory presentation/lecture for this session. Based upon the talks in this session a series of six papers were published in a special

issue of the journal *Estuaries and Coasts* with Drs. Dauer, Borja Elliot and Simonstad as guest editors of this special issue.

In 2007 Dr. Dauer was an invited speaker at EcoSummit 2007 in Beijing, China. He was invited by Dr. Angel Borja (AZTI-Tecnalia, Marine Research Division, Pasaia, Spain) and Dr. João Carlos Marques (Institute of Marine Research University of Coimbra, Coimbra, Portugal) to give a presentation entitled *Integrative approaches to assessing estuarine ecosystem integrity. Metrics, indicators, indices, criteria, combinatorial strategies, and interpretive paradigms - the USA. experience.* Also in 2007, he gave an invited seminar at the University of Lisboa in Portugal entitled *Challenges in coastal and transitional waters: science-management interactions, adaptive management and adaptive monitoring.* Dr. Dauer was also an invited speaker in a session co-chaired with Dr. Borja at the 2007 meeting of the Estuarine Research Federation in Providence, Rhode Island. The session was entitled *Assessing Ecological Integrity: Using Multiple Indices and Ecosystem Components*

In 2006, he was invited by Dr. Alberto Basset of the University of Leece, Italy, to be a keynote speaker at an international conference entitled *Management and sustainable development of protected transitional waters*. Dr. Dauer's talk was entitled *Monitoring, assessment of restoration and management. Ecological foundation and governance. Chesapeake Bay, USA (1985-2005).* During his stay in Italy he gave an invited talk entitled *Trophic dynamics of benthic invertebrates: studies of ecology, evolution and energetics* at the Stazione Zoologica di Napoli of the University of Naples on the island of Ischia

In 2006, Dr. Dauer co-hosted with Angel Borja (AZTI-Tecnalia, Marine Research Division, Pasaia, Spain) a special session on marine and estuarine benthic community indices at the American Society of Limnology and Oceanography meeting in Victoria, British Columbia. The session was entitled *Assessing the environmental quality status in estuarine and coastal systems comparing methodologies and indices.* Based upon the talks in this session a series of nine manuscripts were produced that were published in a special issue of the journal *Environmental Indicators.* Drs. Dauer and Borja served as co-editors of this special issue and Dr. Dauer was an author on four of the nine published papers..

In 2005, he was invited by Dr. Jean-Claude Dauvin, Director of the Wimereux Marine Laboratory in France, to be a keynote speaker at a workshop entitled *Colloque: Indicateurs Benthiques.* The purpose of this workshop was to develop a monitoring program for the Seine River estuary. His presentation was entitled *Twenty years (1985-2004) of benthic monitoring of Chesapeake Bay, USA. Accomplishments, advances and applications.* Also in 2005, one of the other invited keynote speakers at the Wimereux workshop, Dr. Michael Elliot, Director of the Institute of Estuarine and Coastal Studies at the University of Hull, England, invited Dr. Dauer to present a seminar at his university. Dr. Dauer's talk was entitled *Trophic dynamics of benthic invertebrates: studies of ecology, evolution and energetics.*.

Dr. Dauer's research concerning feeding behavior presently includes application of optimal foraging theory to interface feeding polychaetes. His present research on functional morphology includes comparative studies of species of the spionid genus *Boccardia* done collaboratively with Dr. Geoff Read of NIWA (National Institute of Water and Atmospheric Research) of Wellington, New Zealand. Four species of *Boccardia* from New Zealand were studied for functional morphology of the feeding palps and are being compared to two species of *Boccardia* from Vancouver Island, British Columbia. The molecular systematics of all six species of *Boccardia* are being analyzed using nucleotide sequencing. Of particular emphasis are two pairs of species, one each from New Zealand and Vancouver Island, which have very similar morphologies but occupy different spatial niches - one of each pair being predominantly a sediment dweller and the other species either a shell borer or sandstone crevice dweller.

Dr. Dauer was the co-advisor with Dr. Marie Jose Costa of a doctoral student from the University of Lisbon, Portugal. The student Paula Chainho worked on a dissertation involving using macrobenthic communities to characterize the environmental health of Portugal's estuaries. This is an important effort that affects the design of benthic monitoring programs as part of the European Waterframe Directive. Dr. Chainho has a doctoral fellowship that allows her to come to Dr. Dauer's lab for three months in each of four consecutive years for additional training and collaboration in statistical design and analysis.

Dr. Dauer has developed a research program that has successfully sought and acquired external funding with a record of continuous funding since 1976 from organizations including the U.S Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Army Corps of Engineers, the National Oceanic and Atmospheric Administration, Virginia Sea Grant, the Virginia Department of Environmental Quality, the Virginia Commission of Game and Inland Fisheries, the Virginia Port Authority, the Virginia Department of Highways and Transportation and a variety of private firms.

Dr. Dauer directs ODU's Benthic Ecology Laboratory, a facility consisting of two staff offices and two research laboratories in the Physical Sciences Building.

Summary of Teaching Experience

Dr. Daniel M. Dauer's commitment to excellence in teaching is reflected in his consistently high student evaluations, his participation in unstructured courses, his encouragement of undergraduate research, his requirement of good writing skills for all biology students and his direction of numerous graduate students. His teaching accomplishments were recognized by the award of the 1999 Outstanding Faculty Award from the State Council of Higher Education of Virginia and in 1998 by the receiving Old Dominion University's highest faculty award, the Tonnelson Distinguished Faculty Award.

Dr. Dauer teaches four structured courses: (1) Invertebrate Zoology (Bio. 307), (2) Marine Ecology (Bio. 415/515), (3) Marine Ecology Laboratory (Bio 442/552) and (4) Marine Benthic Ecology (Bio. 750/850). The Invertebrate Zoology course is a junior level survey course. The two marine ecology courses are for seniors and graduate students, while Marine Benthic Ecology is a graduate level course for master's and doctoral students.

For all senior or graduate level courses, Dr. Dauer requires written reports or term papers that represent a substantial portion of the student's final grades. Good writing skills are considered an essential element of the education of all biology majors. All written materials are critically reviewed for syntax, grammar, writing style, clarity of presentation, attentiveness to detail, selection of data presentation methods, and review of pertinent literature. Detailed comments are included on the text along with a summary of comments and criticisms to enable the students to improve their writing skills. Although Dr. Dauer is typically characterized as a demanding instructor, student evaluations are consistently above the departmental average with average values for the Overall Performance of the Instructor of ranging from **5.3** to **5.6** on a **6.0** scale.

A significant portion of Dr. Dauer's teaching activity is devoted to supervision of undergraduates in unstructured courses that require research projects. Students acquire experience in applying the scientific method to an actual experimental problem, learn how to write a manuscript in proper scientific style and participate in at least one extended cruise (2-3 days) on the research vessel *Slover*. Students desiring research experience are actively recruited from either the Invertebrate Zoology or Marine Ecology courses. Two of these students received Sigma Xi awards for outstanding undergraduate research at ODU. Dr. Dauer's advanced marine course, Marine Benthic Ecology, requires original research projects of the graduate students. Often the final projects are presented at scientific meetings. One class project presented at the Atlantic Estuarine Research Society meeting in Fall 1997 won an award for best student presentation.

Summary of Honors, Awards and Recognition

Dr. Dauer was included in the top 2% of marine biologists based upon career citations in Stanford University's 2021 ***World's Top 2% Scientists.*** This ranking, considered the most prestigious worldwide, is based on the bibliometric information contained in the Scopus database and includes more than 180,000 researchers from the more than 8 million scientists considered to be active worldwide, with 22 scientific fields and 176 subfields taken into account. https://www.imim.es/news/441/stanford-university-publishes-the-worlds-top-2-scientists-ranking-and-clarivate-analytics-publishes-the-highly-cited-researchers-list Their study provides standardized information on citations, h-index, co-authorship adjusted hm-index, citations to papers in different authorship positions and a composite indicator. https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/3>

In June of 2010, Dr. Dauer was one of 20 researchers from eight countries authoring contributed to a paper that quantitatively analyzes assessments of the environmental condition of coastal and marine ecosystems along coastlines in the United States and Europe. The paper, titled "Assessing coastal benthic macrofauna community condition using best professional judgment - Developing consensus across North America and Europe," was published in the *Marine Pollution Bulletin*. This paper was selected for inclusion in Science for Environment Policy, the European Commission's environmental news service for policymakers, which is distributed to more than 11,000 subscribers worldwide. Science for Environment Policy provides access to the latest policy-relevant scientific research. Tailored to the needs of policymakers, the service facilitates direct links between environmental policy and research.

In December of 2010 a second paper was selected for inclusion in Science for Environment Policy, the European Commission's environmental news service for policymakers. Dauer was one of a team of four international scientists who contributed to a paper that assessed the rates of recovery and restoration of coastal and marine ecosystems on a world-wide basis. This new analysis of degraded ecosystems indicated that, although some restoration can take less than five years, when there has been a century of degradation, it can take a minimum of 15-25 years. The paper, titled " Medium- and long-term recovery of estuarine and coastal ecosystems: patterns, rates and restoration effectiveness" was published recently in the journal *Estuaries and Coasts*.

Dr. Dauer was a co-author of a paper selected as the 2005 paper of the year of the journal *Human and Ecological Risk Assessment*. This work involved a multidisciplinary case study designed to assess the impacts of an oil refinery effluent, primarily polynuclear aromatic hydrocarbons, on aquatic biota in the Delaware River. The study resulted in six papers published in a special issue of the journal.

In 2002 Dr. Dauer was given the Venerable Clam Award of the Atlantic Estuarine Research Society (AERS). AERS is a research and educational organization concerned with coastal and estuarine ecosystems of the Mid-Atlantic states. This society was the first estuarine

scientific society in the United States and is credited with inspiring and promoting the creation of the international society, the Estuarine Research Federation. The Venerable Clam award is given in recognition of long-term service to the society.

In 1999 Dr. Dauer was given the Outstanding Faculty Award from the State Council of Higher Education of Virginia. This is Virginia's highest faculty award and was given in recognition of superior accomplishments in teaching, research and public service. The presentation was made by Governor James S. Gilmore, III. Dr. Dauer was also presented to both houses of the Virginia General Assembly and the Governor's cabinet.

Dr. Dauer was designated an Eminent Scholar in 1998. A select number of full professors may be designated as eminent scholars. The criteria for selection as an eminent scholar include a long and consistent record of achievement in scholarly research contributions. The individual should be easily recognized by other eminent authorities in the same discipline and it is important that new works in the scholar's discipline frequently cite the individual's work. The research contributions of the scholar should have been a benchmark, reflecting the evolution of the discipline. The Eminent Scholars Committee's recommendation stated: "Upon review, the committee found that Dr. Dauer has secured a significant amount of external funding and maintained an outstanding record of scholarly publications in the most prestigious journals in his discipline. The committee was particularly impressed with the frequency with which colleagues have cited his work, perhaps the greatest compliment to a researcher. In all the committee found that the accumulated evidence clearly reflects a consistent pattern of scholarly pursuits that are indicative of a leadership position in the field." Provost Jo Ann Gora concluded her recommendation by stating that "Your accomplishments and recognition in the fields of benthic community ecology and polychaete biology are truly extraordinary and merit this award."

In 1998, Dr. Dauer was awarded the University's Distinguished Faculty Award, the Alan Rufus Tonelson Award. This is the University's highest faculty award and was given "In recognition of outstanding contributions to the intellectual development of Old Dominion University." The award recognized his career contributions in research, teaching and service.

Dr. Dauer was also invited to give four presentations (two oral and two poster presentations) at the Third International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS) held in Stockholm, Sweden in August 1997. As part of the conference the posters were judged for (1) the relevance of the research to solving water-related problems, (2) the soundness of the scientific approach, and (3) the clarity of the presentation. Three awards were made and the posters presented by Dr. Dauer received third place.

Dr. Dauer was selected as the recipient of the University's Research, Scholarship, and Creative Achievement Award in 1993. The awad is presented to a tenured member of the ODU faculty who has exhibited consistent excellence in his/her research efforts. The purpose of the award is to recognize the accomplishments of faculty who achieve national prominence for high-quality research and scholarship.

Curriculum Vitae

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Education

B.S. (Biology, 1970), Old Dominion University
Ph.D. (Biology, 1974), University of South Florida

Research Interests

Marine Ecology, Benthic Ecology, Quantitative Ecology, Polychaete Systematics and Ecology, Invertebrate Zoology.

Experience

Academic :

Eminent Scholar Emeritus, 2015, Department of Biological Sciences, Old Dominion University.
Professor Emeritus, 2015, Department of Biological Sciences, Old Dominion University.
Eminent Scholar, 1998 to 2015, Department of Biological Sciences, Old Dominion University.
Professor, 1987 to 2015, Department of Biological Sciences, Old Dominion University.
Associate Professor, 1981 to 1987, Department of Biological Sciences, Old Dominion University.
Assistant Professor, 1975 to 1981, Department of Biological Sciences, Old Dominion University.

Administrative :

Director, 1985 to present, Benthic Ecology Laboratory, Old Dominion University.
Associate Director for Benthic Studies, 1996 to 2002, Applied Marine Research Laboratory, Old Dominion University.
Chairman, 1990 to 1996, Department of Biological Sciences, Old Dominion University.
Associate Director, 1985 to 1990, Applied Marine Research Laboratory, Old Dominion University.

Experience (Continued)

Research :

Visiting Research Scientist, 2004, Duke University Marine Lab, Beaufort, North Carolina.

Visiting Research Scientist, 2002, Bamfield Marine Lab, Bamfield, British Columbia, Canada.

Visiting Research Scientist, 2002, NIWA (National Institute of Water and Atmospheric Research), Wellington, New Zealand.

Visiting Research Scientist, 1998, Duke University Marine Lab, Beaufort, North Carolina.

Visiting Research Scientist, 1983, Lizard Island Research Station, Lizard Island, Australia.

Postdoctoral Research Associate, 1974-1975, Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina, Field Station, Georgetown, South Carolina.

Postdoctoral Research Associate, State of Florida Grant to Dr. J.L. Simon, Summer 1974, Effects of Dredging on Marine Benthic Communities, Biology Department, University of South Florida.

Other:

Graduate Teaching Assistant, Winter-Spring 1974, Biology Department, University of South Florida.

Graduate Research Assistant, 1972-1974, NSF Grant to Dr. J.L. Simon, Biology Department, University of South Florida.

Graduate Teaching Assistant, Fall 1971, Biology Department, University of South Florida.

Undergraduate Research Assistant, Summer 1969, Allan Hancock Foundation, University of Southern California, under Drs. Olga Hartman and Kristian Fauchald.

Honors and Awards

Outstanding Faculty Award, State Council of Higher Education of Virginia. Virginia's highest faculty award given in recognition of superior accomplishments in teaching, research and public service, 1999.

Distinguished Faculty Award, Old Dominion University. The University highest faculty award given in recognition of outstanding contributions in teaching, research and service, 1998.

Outstanding Presentation at the Third International Conference on the Environmental Management of Enclosed Coastal Seas held in Stockholm, Sweden, 1997.

Outstanding Faculty Research Award, Old Dominion University. Given in recognition of a career of excellence in research contributions, 1993.

Most Inspirational Faculty Member, chosen by Eric Brasseur, at induction into Who's Who in American Colleges and Universities, 1993.

Experience (Continued)

Outstanding Graduate Student Research Award, Sigma Xi, University of South Florida, 1973-1974.

Member, Beta Beta Beta Biological Honor Society, Old Dominion University, Charter Member, 1969.

Undergraduate Tuition Scholarship, Old Dominion University, 1966.

Publications (Total - 89)

Special Journal Issue 2008 (Total – 9 papers)

Special Issue of the journal *Ecological Indicators* entitled *Assessing the environmental quality status in estuarine and coastal systems: comparing methodologies and indices*. Edited by Angel Borja and Daniel M. Dauer.

Borja, A. and D.M. Dauer. 2008. Assessing the environmental quality status in estuarine and coastal systems: comparing methodologies and indices, *Ecological Indicators* 8: 331-337.

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Juanes, J.A., X. Guinda, A. Puente, and J.A. Revilla. 2008. Macroalgae, a suitable indicator of the ecological status of coastal rocky communities in the NE Atlantic. *Ecological Indicators*. 8: 351-359.

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Weisberg, S.B., B. Thompson, J.A. Ranasinghe, D.E. Montagne, D.B. Cadien, D.M. Dauer, D. Diener, J. Oliver, D.J. Reish, R.G. Velarde, and J.Q. Word. 2006. The level of agreement among experts applying best professional judgment to assess the condition of benthic infaunal communities. pp. 165-171, IN Southern California Coastal Water Research Project. Biennial Report 2005-2006. S.B. Weisberg and K. Miller (eds).

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Teixeira H., Á. Borja, S. B. Weisberg, J. A. Ranasinghe, D. B. Cadien, D. M. Dauer, J.-C. Dauvin, S. Degraer, R. J. Diaz, A. Grémare, I. Karakassis, R. J. Llansó, L. L. Lovell, J. C. Marques, D. E. Montagne, A. Occhipinti-Ambroggi, R. Rosenberg, R.l Sardá, L.C. Schaffner and R. G. Velarde. 2009. Assessing coastal benthic macrofuana community condition using best professional judgement: Developing consensus across North America and Europe. pp. 43-59, IN Southern California Coastal Water Research Project. Biennial Report 2009. K. Schiff and K. Miller (eds).

Dauer, D.M., H.G. Marshall, J.R. Donat, M. F. Lane, S. Doughten, F.J. Hoffman and R. Kurada. 2010. An update of current status and long-term trends in water quality and living resources in the Virginia tributaries from 1985 through 2009. Final report to the Virginia Department of Environmental Quality. 77 pp.

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Dauer, D.M., H.G. Marshall, J.R. Donat, M. F. Lane, S. Doughten, C. Johnson. 2014. An update of current status and long-term trends in water quality and living resources in the Virginia tributaries from 1985 through 2012. Final report to the Virginia Department of Environmental Quality. 65 pp.

Dauer , D.M., T.A. Egerton, J.R. Donat, M.F. Lane, S.C. Doughten, C. Johnson, and M. Arora. 2014. Current status and long-term trends in water quality and living resources in the Virginia Tributaries and Chesapeake Bay Mainstem from 1985 through 2013. Final report to the Virginia Department of Environmental Quality. 64 pp.

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Dauer , D.M., T.A. Egerton, J.R. Donat, M.F. Lane, S.C. Doughten, C. Johnson, and M. Arora. 2015. Current status and long-term trends in water quality and living resources in the Virginia Tributaries and Chesapeake Bay Mainstem from 1985 through 2014. Final report to the Virginia Department of Environmental Quality. 62 pp.

Llansó, R.J., D.M. Dauer and M.F. Lane 2016. Chesapeake Bay B-IBI Recalibration. Final report to the Virginia Department of Environmental Quality. 31 pp.

Dauer , D.M., T.A. Egerton, J.R. Donat, M.F. Lane, S.C. Doughten, C. Johnson, and M. Arora. 2017. Current status and long-term trends in water quality and living resources in the Virginia Tributaries and Chesapeake Bay Mainstem from 1985 through 2015. Final report to the Virginia Department of Environmental Quality. 67 pp.

Dauer, D.M. 2017. Biological condition of Money Pont benthic communities, Southern Branch of the Elizabeth River (2010, 2013, 2016) . Final report to The Elizabeth River Project. 136 pp.

Dauer, D.M. 2020. Benthic biological monitoring program of the Elizabeth River watershed (1999 and 2019). Final report to The Elizabeth River Project and Virginia Institute of marine Science. 74 pp plus appendices.

Dauer, D.M. 2020. Swimming Point benthic community condition (2019). Final report to GEI Consultants, Glastonbury, CT. 69 pp.

Grants and Contracts Awarded (191 Awards)

TOTAL FUNDING
Principal Investigator **$30,968,757**
Total Funding (Includes funding as Co-PI) **$36,005,837**

Old Dominion University Faculty Research Summer Grant. "Systematics and Zoogeographic analysis of the polychaete fauna of peninsular Florida." **1976**.
($2,400)

Virginia Water Resources Research Center. "The environmental impact of nonpoint pollutants on benthic invertebrates in the Lynnhaven River System." **1976**.
($9,200)

Brown and Root, Inc. "Marine environmental study off Cape Charles, Virginia." **1977.**
($117,000)

Brown and Root, Inc. "Benthos of Old Plantation Creek, Eastern Shore of Virginia." **1977.**
($5,293)

Brown and Root, Inc. "Benthos of Kings Creek and Cherrystone Inlet, Eastern Shore of Virginia." **1978.**
($10,653)

Brown and Root, Inc. "Distribution of *Amastigos* sp. in the lower Chesapeake Bay." **1978**.
($12,931)

National Oceanic and Atmospheric Administration, Ocean Dumping Program, "An assessment of the ecological impact of open ocean disposal of materials dredged from a highly industrialized estuary." With R.W. Alden and J.H. Rule. **1978.**
($138,238)

National Oceanic and Atmospheric Administration, Ocean Dumping Program, "An assessment of the ecological impact of open ocean disposal of materials dredged from a highly industrialized estuary." **1979.**
($177,000)

National Oceanic and Atmospheric Administration, Ocean Dumping Program, "An assessment of the ecological impact of open ocean disposal of materials dredged from a highly industrialized estuary." **1980.**
($130,000)

Awards (Continued)

U.S. Fish and Wildlife Service, "Benthos of the Atlantic Channel." **1981.**
($3,500)

U. S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: noncommercial benthos monitoring study at the Norfolk Disposal site." **1981.**
($16,643)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: lower bay benthos." **1981.**
($93,456)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: inner shelf benthos." **1981.**
($104,367)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: benthic microcosm analysis." **1982.**
($92,000)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: lower bay benthos." Continuation. **1982.**
($115,740)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: inner shelf benthos." Continuation. **1982.**
($143,830)

National Oceanic and Atmospheric Administration, Ocean Assessments Division, "Benthic toxicant effects, variability and monitoring implications for the New York Bight." **1983.**
($97,013)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: lower bay benthos." Continuation. **1983.**
($69,183)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: inner shelf benthos." Continuation. **1983.**
($96,885)

Awards (Continued)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: Dam Neck Site." **1983.**
($189,950)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: report preparation." **1983.**
($6,912)

National Oceanic and Atmospheric Administration, Ocean Assessments Division, "Benthic toxicant effects, variability and monitoring implications for the New York Bight." Extension to March, **1984.**
($25,168)

National Oceanic and Atmospheric Administration, Ocean Assessments Division, "Benthic toxicant effects, variability and monitoring implications for the New York Bight." Extension to August, **1984.**
($37,565)

U.S. Army Corps of Engineers, "Environmental studies of the proposed Norfolk Harbor deepening project: Benthos of the Dam Neck Interim Site." **1984.**
($17,916)

Virginia Department of Highways and Transportation, "Environmental studies associated with the Thimble Shoals Channel." **1984.**
($59,268)

National Oceanic and Atmospheric Administration, Northeastern Monitoring Program, "Sorting, identification, enumeration and biomass analysis of macrofaunal samples from the Northeastern U.S." **1984.**
($67,892)

State Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **1985.**
($45,940)

Virginia Port Authority, "New container-ship berth facility impact study at Norfolk International Terminals." **1985.**
($8,600)

U.S. Army Corps of Engineers, "Benthos of Craney Island." **1985.**
($9,900).

Awards (Continued)

Virginia Department of Highways and Transportation, "Benthic fauna in the vicinity of the Hampton Bridge-Tunnel." **1985.**
($5,400).

State Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1986.** (Jan. through June).
($24,248)

U.S. Fish and Wildlife Service, "Benthic macrofauna of Chisman and Bennett Creeks." **1986.**
($5,076).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1986.** (July through Dec.).
($31,107).

Virginia Water Control Board, "Effects of anoxic/hypoxic events on the benthos of the Lower Chesapeake Bay." Chesapeake Bay Program. **1986.**
($14,628).

Virginia Water Control Board, "Comparison of benthic collection gear." Chesapeake Bay Program. **1986.**
($15,573).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1987.** (January through June 1987).
($32,635).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1987.** (July 1987 through June 1988).
($75,000).

Virginia Commission of Game and Inland Fisheries, "Back Bay benthic resources assessment." **1987.** (May 1987 through June 1988).
($12,300).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1988.** (July 1988 through June 1989).
($80,000).

Awards (Continued)

Virginia Water Control Board, "Benthic biological monitoring of the Elizabeth River." Elizabeth River Long-Term Monitoring Program. **1988.** (July 1988 through June 1989). ($153,386).

Virginia Port Authority. "Benthic resource assessment for Norfolk International Terminals." **1989.** (June 1989 through September 1989). ($13,159).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1989.** (July through December 1989). ($42,600).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1990.** (January 1990 through June 1990). ($62,600).

Virginia Water Control Board, "Virginia Chesapeake Bay Program: Synthesis report for the water quality, plankton and benthic biological monitoring programs, 1984-89." Chesapeake Bay Program. **1990.** (March 1990 through December 1990). ($85,924).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1990.** (June 1990 through December 1990). ($55,230).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1991.** (January 1991 through June 1991). ($46,945).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1991.** (June 1991 through December 1991). $57,993).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1992.** (January 1992 through December 1992). ($112,120).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1993.** (January 1993 through December 1993). ($112,120).

Awards (Continued)

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1994.** (January 1994 through June 1994). ($56,060).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1994.** (July 1994 through June 1995). ($123,011).

Virginia Water Control Board, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. Continuation, **1995.** (July 1995 through December 1995). ($65,548).

Virginia Coast Institute, "Macrofaunal Communities of Hog Island Bay. **1995.** ($7,370).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **1996.** (January 1996 through December 1996).
($159,627).

Virginia Department of Environmental Quality, "Extension of benthic restoration goals index to tidal freshwater areas of Chesapeake Bay and its tributaries." **1996.** (August 1996 through September 1997).
($75,000).

Virginia Department of Environmental Quality, "Total organic carbon of sediments at benthic monitoring sites." **1996**. (August 1996 through September 1997).
($11, 218).

Virginia Department of Environmental Quality, "Benthic community indicators trend report for the Virginia benthic monitoring program (March 1985 - September 1995)." **1996**. (August 1996 through November 1997).
($10,000).

Virginia Department of Environmental Quality, "Virginia Chesapeake Bay Program water quality and living resources reevaluation effort for 1985 through 1996." **1996.** (August 1996 through September 1997).
($10,000).

Awards (Continued)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **1997.** (January 1997 through December 1997).
($165, 255).

Virginia Coastal Resources Management Program, "Sediment contamination and toxicity assessments in support of the development of benthic restoration goals and sediment quality criteria." Chesapeake Bay Program. **1997.** (April 1997 through November 1997).
($48,988).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." **1997.** (January 1997 through December 1997).
($804,719).

Virginia Department of Environmental Quality, "Virginia Chesapeake Bay Program. Water quality and living resources reevaluation effort for 1985-1996." Chesapeake Bay Program. **1997.** (August 1996 through February 1998).
($114,686).

Virginia Department of Environmental Quality, "Representation of Virginia Monitoring Program at Chesapeake Bay Program Subcommittee and Workshop Meetings." Chesapeake Bay Program. **1997.** (January 1997 through April 1998).
($13,638).

Virginia Department of Environmental Quality, "Participation in conference calls and meetings in support of the 1997 revaluation. " Chesapeake Bay Program. **1997.** (January 1997 through April 1998).
($15,000).

Virginia Department of Environmental Quality, "Development of a real-time data interpretation system for special reports and presentations for the Chesapeake Bay Program." Chesapeake Bay Program. **1997.** (January 1997 through December 1997).
($25,382).

U.S. Environmental Protection Agency, Atlantic Ecology Division, Mid-Atlantic Integrated Assessment Program. "Collection of sediment samples for grain size, chemical analyses and toxicity." **1997.** (July 1997 through September 1997).
($6,089).

Awards (Continued)

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **1998.** (January 1998 through December 1998).
($881,257).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **1998.** (January 1998 through December 1998).
($167,704).

U.S. Environmental Protection Agency, Chesapeake Bay Environmental Effects Committee. Administered through the Virginia Sea Grant Program. "Benthic community responses to multiple contaminants." **1998**. (January 1998 through December 1998).
($66,200).

Virginia Department of Environmental Quality, "Update of status and trends in water quality and living resources in the Virginia Chesapeake Bay through 1997." Chesapeake Bay Program. **1998.** (January 1998 through December 1998).
($30,000).

Virginia Department of Environmental Quality, "Measuring Sediment carbon, nitrogen, and organic carbon at Virginia benthic sampling sites." Chesapeake Bay Program. **1998.** (December 1998 through December 1999).
($8,000).

Virginia Department of Environmental Quality, "Update of Status and trends in water quality and living resources in the Virginia Chesapeake Bay through 1998." Chesapeake Bay Program. **1998.** (December 1998 through December 1999).
($57,545).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **1999.** (January 1999 through December 1999).
($760,229).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **1999.** (January 1999 through December 1999).
($173,741).

Awards (Continued)

U.S. Environmental Protection Agency, Chesapeake Bay Environmental Effects Committee. Administered through the Virginia Sea Grant Program. "Benthic community responses to multiple contaminants." **1999.** (January 1999 through December 1999).
($117,540).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Elizabeth River Watershed." Chesapeake Bay Program. **1999.** (July 1999 through June 2000).
($100,700).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2000.** (January 2000 through December 2000).
($895,515).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2000.** (January 2000 through December 2000).
($178,606).

Virginia Department of Environmental Quality, "Update of status and trends in water quality and living resources in the Virginia Chesapeake Bay." Chesapeake Bay Program. **2000.** (June 2000 through December 2000).
($40,000).

Virginia Department of Environmental Quality, "Sediment sampling protocol for the ambient toxics monitoring components of the Chesapeake Bay Program Monitoring Strategies." Chesapeake Bay Program. **2000.** (August 2000 through June 2001).
($8,800).

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2000.** (July 2000 through June 2001).
($37,000).

Virginia Department of Environmental Quality, "Macroinvertebrate benthos and sediment sampling. Assessing Virginia's estuaries and tidal tributaries." Chesapeake Bay Program. **2000.** (August 2000 through September 2000).
($1,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2001.** (January 2001 through December 2001).
($911,128).

Awards (Continued)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2001.** (January 2001 through December 2001).
($164,179).

Virginia Department of Environmental Quality, "Implementation and maintenance of CIMS (Chesapeake Information Management System) for the Virginia Monitoring Program." Chesapeake Bay Program. **2001.** (January 2001 through December 2001).
($55,648).

United States Environmental Protection Agency, "Development of diagnostic approaches to determine sources of anthropogenic stress affecting benthic community condition in the Chesapeake Bay." **2001.** (January 2001 through December 2001).
($45,000)

University of Maryland, "Determination of Benthic Community Condition in Delaware Bay." **2001.** (April 2001 through March 2002).
($76,691).

Virginia Department of Environmental Quality, "2000 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake." Chesapeake Bay Program. **2001.** (May 2001 through November 2001).
($42,000)

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2001.** (July 2001 through June 2002).
($38,258).

Virginia Department of Environmental Quality, "Benthic Community Condition in Paradise Creek of the Southern branch of the Elizabeth River." Chesapeake Bay Program. **2001.** (July 2001 through June 2002).
($14,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2002.** (January 2002 through December 2002).
($997,164).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2002.** (January 2002 through December 2002).
($167,451).

Awards (Continued)

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2002.** (January 2002 through December 2002).
($112,000).

Virginia Department of Environmental Quality, "2001 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake." Chesapeake Bay Program. **2002.**
(January 2002 through December 2002).
($15,000 - $15,000).

University of Maryland, "Determination of Benthic Community Condition in Delaware Bay." **2002.** (April 2002 through March 2003).
($87,769).

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2002.** (July 2002 through June 2003).
($38,258).

Virginia Department of Environmental Quality, "Benthic-IBI Sampling for Ambient Toxics Monitoring component of the Chesapeake Bay Program Monitoring Strategies." **2002.**
(September 2002 through April 2003).
($8,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2003.** (January 2003 through December 2003).
($917,224).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2003.** (January 2003 through December 2003).
($170,634).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2003.** (January 2003 through December 2003).
($114,128).

Virginia Department of Environmental Quality, "2001 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake." Chesapeake Bay Program. **2003.**
(January 2003 through December 2003).
($15,000).

Awards (Continued)

Virginia Department of Environmental Quality, “Benthic-IBI Sampling for Ambient Toxics Monitoring component of the Chesapeake Bay Program Monitoring Strategies. The Pamunkey River and the Mattaponi River." **2003.** (September 2003 through April 2004). ($9,700).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2004** (January 2004 through December 2004).
($904,865).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2004.** (January 2004 through December 2004).
($174,217).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2004.** (January 2004 through December 2004).
($126,385).

Virginia Department of Environmental Quality, “2001 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake.” Chesapeake Bay Program. **2004.** (January 2004 through December 2004).
($15,315).

Virginia Department of Environmental Quality, “Comparison of ‘standardized Young grab’ and composite ‘Petite Ponar grab’ samples for the calculation of benthic indices of biological integrity (B-IBI).” Chesapeake Bay Program. **2004.** (August 2004 through June 2005).
($20,000).

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2004.** (July 2004 through June 2005).
($39,400).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2005.** (January 2005 through December 2005).
($932,441).

Awards (Continued)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2005.** (January 2005 through December 2005).
($192,282).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2005.** (January 2005 through December 2005).
($119,671).

Virginia Department of Environmental Quality, "2003 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake." Chesapeake Bay Program. **2005.** (January 2005 through December 2005).
($15,729).

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2005.** (July 2005 through June 2006).
($40,464).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2006.** (January 2006 through December 2006).
($941,935).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2006.** (January 2006 through December 2006).
($201,931).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2006.** (January 2006 through December 2006).
($125,296).

Virginia Department of Environmental Quality, "2005 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake." Chesapeake Bay Program. **2006.** (January 2006 through December 2006).
($16,468).

Awards (Continued)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay - impaired waters analyses." Chesapeake Bay Program. **2006.** (January 2006 through December 2006).
($30,828).

U.S. Army Corps of Engineers, "Determination of the ecological condition of the benthic communities of the Lynnhaven River watershed, Virginia Beach, Virginia." **2006**. (July 2006 through June 2007).
($140,000).

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2006.** (July 2006 through June 2007).
($42,200).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2007.** (January 2007 through December 2007).
($1,015,303).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2007.** (January 2007 through December 2007).
($205,941).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2007.** (January 2007 through December 2007).
($127,426).

Virginia Department of Environmental Quality, "2006 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake." Chesapeake Bay Program. **2007.** (January 2007 through December 2007).
($16,748).

Virginia Department of Environmental Quality, "2008 Impaired Waters Assessment for Chesapeake Bay Benthos." Chesapeake Bay Program. **2007**. (May 2007 through June 15 2007)
($9,731)

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2007.** (July 2007 through June 2008).
($43,380).

Awards (Continued)

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2008.** (January 2008 through December 2008).
($1,031,716).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2008.** (January 2008 through December 2008).
($215,648).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2008.** (January 2008 through December 2008).
($129,720).

Virginia Department of Environmental Quality, "2007 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake." Chesapeake Bay Program. **2008.** (January 2008 through December 2008).
($17,049).

Virginia Department of Environmental Quality, "Benthic Biological Monitoring Program of the Elizabeth River." Chesapeake Bay Program. **2008.** (July 2008 through June 2009).
($20,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2009.** (January 2009 through December 2009).
($1,076,375).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2009.** (January 2009 through December 2009).
($229,233).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2009.** (January 2009 through December 2009).
($134,659).

Awards (Continued)

Virginia Department of Environmental Quality, “2008 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake.” Chesapeake Bay Program. **2009.** (January 2009 through December 2009).
($17,699).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2010.** (January 2010 through June 2010).
($484,132).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2010.** (January 2010 through June 2010).
($85,062).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of the Chesapeake Bay Program for the Virginia Monitoring Program." Chesapeake Bay Program. **2010.** (January 2010 through June 2010).
($67,330).

Virginia Department of Environmental Quality, “2008 Update of Status and Trends in Water Quality and Living Resources of the Chesapeake.” Chesapeake Bay Program. **2010.** (January 2010 through June 2010).
($8,849).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2010.** (July 2010 through June 2011).
($1,007,573).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2010.** (July 2010 through June 2011).
($229,233).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2010.** (July 2010 through June 2011).
($78,476).

Virginia Department of Environmental Quality, " Assessment of the ecological value of benthos to higher trophic levels in Chesapeake Bay.” Chesapeake Bay Program. **2010.** (July 2010 through December 2010).
($16,719).

Awards (Continued)

Virginia Department of Environmental Quality, "2010 Linkages Between Water Clarity, Nutrients, and Phytoplankton Health in Chesapeake Bay." Chesapeake Bay Program. **2010.** (July 2010 through December 2010). ($12,075).

NiSource (GEI Consultants, Inc.). "Benthic community health – Swimming Point sediment remediation project." **2010.** (September 2010 through June 2011). ($27,000).

Living River Restoration Trust. "Benthic community health – Money Point sediment remediation project." **2010.** (September 2010 through May 2011). ($20,000).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2010.** (January 2011 through June 2011). ($86,545).

Virginia Department of Environmental Quality, " Assessment of the ecological value of benthos to higher trophic levels in Chesapeake Bay." Chesapeake Bay Program. **2010.** (January 2011 through June 2011). ($16,719).

Virginia Department of Environmental Quality, "2010 Linkages between water clarity, nutrients, and phytoplankton health in Chesapeake Bay." Chesapeake Bay Program. **2010.** (January 2011 through June 2011). ($24,150).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2011.** (July 2011 through July 2012). ($1,051,424).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2011.** (July 2011 through July 2012). ($217,435).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2011.** (July 2011 through July 2012). ($103,915).

Awards (Continued)

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2012.** (July 2012 through July 2013). ($1,086,002)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2012.** (July 2012 through July 2013). ($226,753).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2012.** (July 2012 through July 2013). ($87,642).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2013.** (July 2013 through July 2014). ($1,068,042)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2013.** (July 2013 through July 2014). . ($226,753).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2013.** (July 2013 through July 2014). ($128,609).

Living River Restoration Trust. "Benthic community health – Money Point sediment remediation project." **2013.** (September 2013 through May 2014). ($25,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2014.** (July 2014 through July 2015). ($1,068,042)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2014.** (July 2014 through July 2015). ($226,753).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2014.** (July 2014 through July 2015). ($89,213).

Awards (Continued)

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2015.** (July 2015 through July 2016). ($1,116,510)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2015.** (July 2015 through July 2016). ($242,644).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2015.** (July 2015 through July 2016). ($89,246).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2016.** (July 2016 through July 2017). ($1,128,753)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2016.** (July 2016 through July 2017). ($240,644).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2016.** (July 2016 through July 2017). ($101,488).

Living River Restoration Trust. "Benthic community health – Money Point sediment remediation project." **2016.** (July 2016 through June 2017). ($25,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2017.** (July 2017 through July 2018). ($1,125,410)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2017.** (July 2017 through July 2018). ($239,544).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2017.** (July 2017 through July 2018). ($101,488).

Awards (Continued)

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2018.** (July 2018 through July 2019). ($1,125,460)

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2018.** (July 2018 through July 2019). ($239,544).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2018.** (July 2018 through July 2019). ($99,245).

NiSource (GEI Consultants, Inc.). "Benthic community health – Swimming Point sediment remediation project." **2019.** (June 2019 through August 2020). ($37,854).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2019.** (July 2019 through July 2020). ($1,183,890).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2019.** (July 2019 through July 2020). ($255,542).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2019.** (July 2019 through July 2020). ($113,565).

Virginia Institute of Marine Science, "Analysis of the Benthic Biological Ecological Condition of the Elizabeth River (2019). " Special appropriation of the Virginia General Assembely. **2019.** (July 2019 through July 2020). ($170,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2020.** (July 2020 through July 2021). ($1,226,264).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2020.** (July 2020 through July 2021). ($255,452).

Awards (Continued)

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2020.** (July 2020 through July 2021). ($112,745).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2021.** (July 2021 through July 2022). ($1,233,664).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2021.** (July 2021 through July 2022). ($262,852).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2021.** (July 2021 through July 2022). ($112,745).

Virginia Institute of Marine Science, “Determination of the ecological condition of the benthic communities of the Elizabeth River Watershed (2021). **2021.** (July 2021 through June 2022).
($30,000).

Virginia Department of Environmental Quality, "Chesapeake Bay Program. Water quality and living resources program." Chesapeake Bay Program. **2022.** (July 2022 through July 2023). ($1,272,764).

Virginia Department of Environmental Quality, "Benthic biological monitoring of the Lower Chesapeake Bay." Chesapeake Bay Program. **2022.** (July 2022 through July 2023). ($260,952).

Virginia Department of Environmental Quality, "Data Management and Data Analysis in support of baseline status and trend analyses for Chesapeake Bay Program management decisions. Chesapeake Bay Program. **2022.** (July 2022 through July 2023). ($112,745).

Virginia Institute of Marine Science, “Determination of the ecological condition of the benthic communities of the Elizabeth River Watershed (2022). **2022.** (July 2022 through June 2022).
($30,000).

Presentations at Scientific Meetings and Invited Seminars (Total - 330)

Dauer, D.M. 1971. Polychaete fauna associated with Gulf of Mexico sponges. Southeastern Regional Meeting of American Society of Zoologists - Division of Invertebrate Zoology, Duke University Marine Lab.

Dauer, D.M. 1972. Polychaete fauna associated with Gulf of Mexico sponges. Florida Academy of Sciences Annual Meeting, Orlando, Fla.

Simon, J.L. and D.M. Dauer. 1973. Repopulation of an intertidal habitat following defaunation: I. Defaunation and initial colonization. Annual meeting of the American Society of Zoologists, Houston, Texas.

Dauer, D.M. and J.L. Simon. 1973. Repopulation of an intertidal habitat following defaunation: II. General aspects of the first year of study. Annual meeting of the American Society of Zoologists, Houston, Texas.

Simon, J.L. and D.M. Dauer. 1975. Reestablishment of a benthic community following natural defaunation. Sixth Symposium of the Belle W. Baruch Series in Marine Science, Georgetown, South Carolina.

Dauer, D.M. and W.G. Conner. 1976. Organic sewage input and secondary productivity of benthic polychaete populations. Virginia Academy of Science, Annual Meeting, George Mason Univ.

Dauer, D.M. 1977. The effects of nonpoint pollutants upon benthic invertebrates of the Lynnhaven River System. Annual meeting of the Virginia Water Resources Research Center, Richmond, Va.

Robinson, W.W. and Dauer, D.M. 1978. Impact of nonpoint pollution on benthic invertebrates of the Lynnhaven River System. I. Introduction. Virginia Academy of Science Annual Meeting, VPI & SU.

Dauer, D.M. and W.W. Robinson. 1978. Impact of nonpoint pollution on benthic invertebrates of the Lynnhaven River System. II. General conclusions. Virginia Academy of Science Annual Meeting, VPI & SU.

Otsuka, C.A. and D.M. Dauer. 1978. Marine fouling community dynamics in Lynnhaven Bay. Virginia Academy of Science Annual Meeting, VPI & SU.

Dauer, D.M. 1979. Functional morphology and feeding behavior of spionid polychaetes. Annual meeting of the American Society of Zoologists, Tampa, Fla.

Presentations (Continued)

Dauer, D.M. 1979. Palp behavior and particle rejection mechanisms in spionid polychaetes. Annual meeting of the American Society of Zoologists, Tampa, Fla.

Dauer, D.M. 1980. Benthic biological monitoring of the Norfolk Disposal Site. Northeastern Monitoring Program, Management Meeting, Easton, Maryland.

Dauer, D.M. 1980. Feeding behavior and the distribution of spionid polychaetes. Invited seminar, University of Delaware.

Dauer, D.M. 1981. Functional morphology and feeding behavior of *Paraprionospio pinnata* (Polychaeta: Spionidae). Joint Meeting of the Atlantic and Southeastern Estuarine Research Societies. Wilmington Beach, North Carolina.

Dauer, D.M. 1981. Benthic biological monitoring of the Norfolk Disposal Site. Northeastern Monitoring Program, Benthic Management Meeting, Sandy Hook, New Jersey.

Dauer, D.M. 1981. Functional morphology and feeding behavior of *Scolelepis squamata* (Polychaeta: Spionidae). Benthic Ecology Meeting. Yale University.

Dauer, D.M. 1981. Functional morphology and ciliary mechanisms of *Paraprionospio pinnata* (Polychaeta: Spionidae). Benthic Ecology Meetings. Yale University.

Dauer, D.M. 1981. Dredge spoil disposal in the marine environment. Marine Science Symposium. Old Dominion University.

Dauer, D.M., R.M. Ewing, G.H. Tourtellotte, H.R. Barker, J.W. Sourbeer, Jr. 1981. Oyster shells and artificial worm tubes: the role of refuges in structuring benthic infaunal communities. Virginia Academy of Science Annual Meeting, Old Dominion University.

Dauer, D.M. 1982. Environmental studies at a proposed mid-Atlantic dredge material disposal site. Oceans 82 meeting of the Marine Technology Society and the Institute of Electrical and Electronics Engineers. Washington, D.C.

Dauer, D.M. 1982. Multivariate models and benthic impact assessment. Northeastern Monitoring Program. Management Meeting. Millford, Connecticut.

Dauer, D.M., R.M. Ewing, W.T. Harlan and H.R. Barker. 1982. Nocturnal movements of the macrobenthos of the Lafayette River, Norfolk, Virginia. Benthic Ecology Meeting. Harvard University.

Dauer, D.M. 1982. Benthic Impact Assessment: the use of multivariate models and simulated data. Workshop on meaningful measures of marine pollution effects. Pensacola Beach, Florida.

Presentations (Continued)

Alden, R.W., J.R. Rule and D.M. Dauer. 1982. Monitoring of the environmental quality of a coastal water disposal site. U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency Special Environmental Workshop. Washington, D.C.

Dauer, D.M. 1983. Polychaete feeding guilds: promises and problems. Invited seminar, Virginia Institute of Marine Science.

Dauer, D.M. 1983. Polychaete feeding guilds as ecological variables. Northeastern Monitoring Program. Management Meeting, Millford, Connecticut.

Dauer, D.M. 1983. Sediment toxicology and benthic biological monitoring - Discussion leader. Northeastern Monitoring Program. Management Meeting. Millford, Connecticut.

Dauer, D.M. 1983. Feeding behavior and functional morphology of *Streblospio benedicti* (Polychaeta: Spionidae). First International Polychaete Conference, Sydney, Australia.

Dauer, D.M. 1983. Feeding biology of the estuarine spionid polychaete *Streblospio benedicti*. Estuarine Research Federation Conference, Virginia Beach, Virginia.

Dauer, D.M. 1983. Benthic monitoring of the lower Chesapeake Bay. Northeastern Monitor Program. Old Dominion University, Norfolk, Virginia.

Dauer, D.M. and R.M. Ewing. 1984. Feeding behavior and functional morphology of two spionid polychaetes from Lizard Island, Australia. Benthic Ecology Meeting, Goucher College.

Dauer, D.M. 1984. Potential systematic significance of the tentacular morphology of spionid polychaetes. American Society of Zoologists. Special session on polychaetes in honor of Dr. Marian H. Pettibone, Denver, Colorado.

Dauer, D.M. 1985. Behavior, ecology and systematic significance of spionid polychaetes of the Chesapeake Bay, Department of Biological Sciences, Old Dominion University.

Dauer, D.M. 1985. Behavioral and morphological constraints upon particle selection mechanisms in deposit-feeding polychaetes. Benthic Ecology Meeting, University of South Carolina.

Dauer, D.M. 1985. Benthic biological monitoring of the lower Chesapeake Bay, Chesapeake Bay Monitoring Subcommittee, Edgewater, Maryland.

Rodi, A.J., Jr. and D.M. Dauer. 1986. Macrobenthic distribution within the James River Estuary. Benthic Ecology Meeting, University of Massachusetts.

Presentations (Continued)

Dauer, D.M., R.M. Ewing and A.J. Rodi, Jr. 1986. Vertical distribution within the sediment of the macrobenthos in the lower Chesapeake Bay. Atlantic Estuarine Research Society, University of Delaware.

Dauer, D.M. 1986. Benthic biological monitoring of the lower Chesapeake Bay - State of the Bay. Chesapeake Bay Monitoring Subcommittee, Colonial Beach, Virginia.

Dauer, D.M. 1986. Feeding behavior and functional morphology of *Polydora commensalis*. Second International Polychaete Conference, Copenhagen, Denmark.

Dauer, D.M. 1986. A commensal polychaete associated with hermit crabs. Atlantic Estuarine Research Society and Southeastern Atlantic Research Society Joint Meeting, Sneeds Ferry, North Carolina.

Dauer, D.M. 1987. Benthic biological monitoring of the lower Chesapeake Bay. Virginia Water Control Board, Richmond, Virginia.

Dauer, D.M. 1987. Hypoxic/anoxic effects on the macrobenthos of the lower Chesapeake Bay. Benthic Ecology Meeting, North Carolina State University.

Dauer, D.M. 1987. Maryland Chesapeake Bay Program, Invited Review Participant, Havre de Grace, Maryland.

Ewing, R.M. and D.M. Dauer. 1987. Hypoxic/anoxic effects on burrowing depth of the macrobenthos of the lower Chesapeake Bay. Atlantic Estuarine Research Society Meeting, St. Michael's, Maryland.

Dauer, D.M. 1988. Marsh Invertebrates. Invited Lecture. Virginia Marine Science Museum, Virginia Beach.

Ewing, R.M., J.A. Ranasinghe and D.M. Dauer. 1988. Evaluation of the efficiency and comparability of five benthic sampling devices. I. Univariate Comparisons. Benthic Ecology Meeting, Portland, Maine.

Ewing, R.M., J.A. Ranasinghe and D.M. Dauer. 1988. Evaluation of the efficiency and comparability of five benthic sampling devices. II. Multivariate Comparisons. Atlantic Estuarine Research Society, Hampton, Virginia.

Rodi, A.J., Jr. and D.M. Dauer. 1988. Methods for identifying impacted macrobenthic communities: a comparison. Atlantic Estuarine Research Society, Hampton, Virginia.

Lane, M.F. and D.M. Dauer. 1989. Macrobenthic community structure of Back Bay, Virginia. Benthic Ecology Meeting, Chesapeake Biological Laboratory, Solomons, Maryland.

Presentations (Continued)

Dauer, D.M. 1989. Estuarine benthic ecology: stressed communities and stressed researchers. Atlantic Estuarine Research Society, Duke Marine Lab, Beaufort, North Carolina.

Dauer, D.M. and R.M. Ewing. 1989. Feeding behavior and functional morphology of *Malacoceros indicus*. Third International Polychaete Conference, University of California at Long Beach, Long Beach, California.

Hess, C.A., D.M. Dauer, R.M. Ewing and A.J. Rodi, Jr. 1990. Chesapeake Bay long-term monitoring program: Spatiotemporal trends in benthic abundance 1985-1989. Benthic Ecology Meetings, Mobile, Alabama.

Seibel, J.C., D.M. Dauer, R.M. Ewing and A.J. Rodi, Jr. 1990. Chesapeake Bay long-term monitoring program: Spatiotemporal trends in benthic biomass 1985-1989. Atlantic Estuarine Research Society, Virginia Institute of Marine Science.

Dauer, D.M. 1990. Long-term monitoring of the lower Chesapeake Bay. IV. Benthos. American Society of Limnology and Oceanography, College of William and Mary, Williamsburg, Virginia.

Lane, M.F. and D.M. Dauer. 1990. Macrobenthic communities of Back Bay, Virginia. Symposium of the ecology of Back Bay, Virginia Marine Science Museum, Virginia Beach, Virginia.

Dauer, D.M. 1990. Stressed communities and macrobenthic models. Atlantic Estuarine Research Society, Cape May, New Jersey.

Dauer, D.M. 1990. Long-term trends in the benthos of the lower Chesapeake Bay. Chesapeake Research Consortium. Baltimore, Maryland.

Dauer, D.M. 1990. Long-term spatial and temporal patterns in macrobenthic assemblages of Chesapeake Bay. Chesapeake Research Consortium. Baltimore, Maryland.

Bertelsen, R.J. and D.M. Dauer. 1991. Trend analysis and the Norfolk Disposal Site. Marine Benthic Ecology Meetings, Williamsburg, Virginia.

Alden, R.W. and D.M. Dauer. 1991. Power and robustness of trend detection in Chesapeake Bay benthos. Marine Benthic Ecology Meetings, Williamsburg, Virginia.

Dauer, D.M. 1991. Biological criteria, environmental health and macrobenthic community models. Marine Benthic Ecology Meetings, Williamsburg, Virginia.

Presentations (Continued)

Dauer, D.M. 1991. Long-term trends in the macrobenthos of the lower Chesapeake Bay. Marine Benthic Ecology Meetings, Williamsburg, Virginia.

Dauer, D.M. 1991. Responses of estuarine benthos to episodic low dissolved oxygen exposure and to contaminated sediments. 10th International Estuarine Research Conference, San Francisco, California.

Dauer, D.M. 1991. Ecologically valuable species strategy. Invited participant. Maryland Department of Natural Resources. Solomons, Maryland.

Dauer, D.M. 1992. Development of estuarine community bioassessment protocols. U.S. Environmental Protection Agency. Invited participant. Arlington, Virginia.

Dauer, D.M. 1992. Biological criteria development and its impact on future surface water quality regulations. Invited seminar in Permitting Issues for the '90s: Strategy for Achieving Compliance, Virginia Water Pollution Control Association. Richmond, Virginia.

Ranasinghe, J.A., D.M. Dauer, R.J. Diaz and L.C. Schaffner. 1992. A process for defining characteristics of macrobenthic assemblages as goals for environmental restoration. Marine Benthic Ecology Meetings, Newport, Rhode Island.

Dauer, D.M., Ewing, R.M. and J.A. Ranasinghe. 1992. Benthic biological criteria and the detection of stressed communities: biomass parameters and collection gear dependency. Marine Benthic Ecology Meetings, Newport, Rhode Island.

Ranasinghe, J.A., D.M. Dauer, R.J. Diaz and L.C. Schaffner. 1992. A process for defining characteristics of macrobenthic assemblages as goals for environmental restoration. Atlantic Estuarine Research Society, North Topsail Shores, North Carolina.

Dauer, D.M. 1992. Biological criteria, benthos and monitoring of the lower Chesapeake Bay. Virginia Water Control Board, Richmond, Virginia.

Dauer, D.M. 1992. Functional Morphology of spionid polychaetes: the role of latero-frontal cirri of the tentacular palps in particle capture, retention and transport. Fourth International Polychaete Conference, Angers, France.

Dauer, D.M. 1992. Long-term trends in the macrobenthic communities of the lower Chesapeake Bay (1985-1990). Atlantic Estuarine Research Society, Annapolis, Maryland.

Dauer, D.M. 1992. Effect of low dissolved oxygen events on macrobenthic community structure in e lower Chesapeake Bay (1985-1991). Atlantic Estuarine Research Society, Annapolis, Maryland.

Presentations (Continued)

Dauer, D.M. 1992. Biological community measurement: Virginia Benthic Biological Monitoring Program. Estuarine and near coastal marine bioassessment and biocriteria workshop meeting. Annapolis, Maryland.

Dauer, D.M. 1992. Virginia Benthic Biological Monitoring Program. Estuarine benthic indicators. Annapolis, Maryland.

Ranasinghe, J.A., D.M. Dauer, L.C. Schaffner, R.J. Diaz, S.B. Weisberg and J.B. Frithsen. 1993. Habitat-specific measures of benthic community status. Atlantic Estuarine Research Society. Charlottesville, Virginia.

Alden, R.W., R.M. Ewing, D.M. Dauer and J.A. Ranasinghe. 1993. Comparability of benthic faunal data from different sampling gears. Marine Benthic Ecology Meeting, Mobile, Alabama.

Dauer, D.M. 1993. Long term trends in the benthos of Chesapeake Bay (1985-1991). Marine Benthic Ecology Meeting, Mobile, Alabama.

Ranasinghe, J.A., J.B. Frithsen, D.M. Dauer, L.C. Scott and A.F. Holland. 1993. Identification of Chesapeake Bay benthic macrofaunal assemblages. Marine Benthic Ecology Meeting, Mobile, Alabama.

Alden, R.W., R.M. Ewing, D.M. Dauer and J.A. Ranasinghe. 1993. Comparability of benthic faunal data from different sampling gears. Marine Benthic Ecology Meeting, Mobile, Alabama.

Dauer, D.M. 1993. Long term trends in the benthos of Chesapeake Bay (1985-1991). Association of Southeastern Biologists. Virginia Beach, Virginia.

Swift, D.J.P., G.T.F. Wong, D.M. Dauer and A.W. Niedoroda. 1993. Residence time of particulate-reactive pollutants in the estuary bed, lower Chesapeake Bay: biology-based estimates of sea bed mixing rates. 12th Biennial International Estuarine Research Federation. Hilton Head Island, South Carolina.

Niedoroda, A.W., Swift, D.J.P., G.T.F. Wong, and D.M. Dauer. 1993. Residence time of particulate-reactive pollutants in the estuary bed, lower Chesapeake Bay: numerical simulation of resuspension and contaminant loss. 12th Biennial International Estuarine Research Federation. Hilton Head Island, South Carolina.

Dauer, D.M. and R.W. Alden III. 1994. Eutrophication and macrobenthic communities of the lower Chesapeake Bay: long-term trends in the benthos and water quality (1985-1991). Atlantic Estuarine Research Society, Atlantic City, New Jersey.

Presentations (Continued)

Smith, M.E. and D.M. Dauer. 1994. Eutrophication and macrobenthic communities of the lower Chesapeake Bay. I. Acute effects of low dissolved oxygen in the Rappahannock River. Marine Benthic Ecology Meeting. Mystic, Connecticut.

McDonnell, J.L. and D.M. Dauer. 1994. Eutrophication and macrobenthic communities of the lower Chesapeake Bay. II. Chronic effects of organic enrichment in Pocomoke Sound. Marine Benthic Ecology Meeting. Mystic, Connecticut.

Dauer, D.M. and R.W. Alden III. 1994. Eutrophication and macrobenthic communities of the lower Chesapeake Bay. III. Long-term trends in the benthos and water quality (1985-1991). Marine Benthic Ecology Meeting. Mystic, Connecticut.

Smith, M.E. and D.M. Dauer. 1994. Eutrophication and macrobenthic communities of the lower Chesapeake Bay. I. Acute effects of low dissolved oxygen in the Rappahannock River. Chesapeake Research Conference. Toward a Sustainable Coastal Watershed: The Chesapeake Experiment. Norfolk, Virginia.

McDonnell, J.L. and D.M. Dauer. 1994. Eutrophication and macrobenthic communities of the lower Chesapeake Bay. II. Chronic effects of organic enrichment in Pocomoke Sound. Chesapeake Research Conference. Toward a Sustainable Coastal Watershed: The Chesapeake Experiment. Norfolk, Virginia.

Dauer, D.M. 1994. Long-term trends in the Lower Chesapeake Bay (1985-1992). Chesapeake Research Conference. Toward a Sustainable Coastal Watershed: The Chesapeake Experiment. Norfolk, Virginia.

Ranasinghe, A.J., S. B. Weisberg and D.M. Dauer. 1994. Assessment of Chesapeake Bay benthic macroinvertebrate resource condition in relation to water and sediment quality stressors. Chesapeake Research Conference. Toward a Sustainable Coastal Watershed: The Chesapeake Experiment. Norfolk, Virginia.

Ranasinghe, A.J., S. B. Weisberg, D.M. Dauer, L.C. Schaffner, R.J. Diaz and J.B. Frithsen. 1994. Benthic restoration goals, restoration goals index and the health of the Chesapeake Bay. Executive Council of the Chesapeake Bay Program, Jefferson Patterson Park, Maryland.

Dauer, D.M. 1994. Restoration goals for the benthos of the Chesapeake Bay - empirical versus theoretical expectations. Atlantic Estuarine Research Society, Ocean City, Maryland.

Presentations (Continued)

Dauer, D.M. 1995. Dynamics of an estuarine ecosystem - The Chesapeake Bay experience. Long-term trends in the macrobenthic communities. International Symposium on Long-term changes in marine ecosystems: methods of analysis, case studies and between-site comparisons, Arcachon, France.

Ranasinghe, A.J., S. B. Weisberg and D.M. Dauer. 1995. Dynamics of an estuarine ecosystem - The Chesapeake Bay experience. Relationship of benthic community condition to water and sediment quality. International Symposium on Long-term changes in marine ecosystems: methods of analysis, case studies and between-site comparisons, Arcachon, France.

Leonard, T.M., A.J. Rodi, Jr. and D.M. Dauer. 1995. Macrobenthic community structure in Pocomoke Sound Virginia. Marine Benthic Ecology Meeting, New Brunswick, New Jersey.

Alden, R.W. III, D.M. Dauer, J.A. Ranasinghe, J. Volstad and S.B. Weisberg. 1995. The Chesapeake Bay Restoration Program - Accomplishments and new approaches to benthic macroinfaunal monitoring. Benthic Ecology Meeting, New Brunswick, New Jersey.

Leonard, T.M., A.J. Rodi, Jr. and D.M. Dauer. 1995. Macrobenthic community structure in Pocomoke Sound Virginia. Atlantic Estuarine Research Society, Solomons, Maryland.

Dauer, D.M. 1995. Functional morphology and feeding behavior of *Marenzellaria viridis*. Fifth International Polychaete Conference. Qindoa, Peoples Republic of China.

Dauer, D.M. and R.J. Diaz. 1995. Benthic community data in the James River Region. Toxics Compilation Meeting for the James River Region. Old Dominion University, Norfolk, Virginia.

Dauer, D.M. 1996. Ecology of the macrobenthos of Chesapeake Bay - from large scale patterns of regional environmental health to small scale patterns of particle capture. Department of Oceanography, Old Dominion University, Norfolk, Virginia.

Dauer, D.M. 1996. Interaction of feeding behavior, functional morphology and hydrodynamics in two species of spionid polychaetes with contrasting feeding modes. Marine Benthic Ecology Meetings, Columbia, South Carolina.

Rodi, A.J. Jr. and D.M. Dauer. 1996. Synonymy of *Marenzelleria viridis* (Verrill) and *Marenzelleria jonesi* Maciolek (Polychaeta: Spionidae). Marine Benthic Ecology Meetings, Columbia, South Carolina.

Dauer, D.M. 1996. Interaction of feeding behavior, functional morphology and hydrodynamics in two species of spionid polychaetes with contrasting feeding modes. Atlantic Estuarine Research Society, Hampton, Virginia.

Presentations (Continued)

Rodi, A.J. Jr. and D.M. Dauer. 1996. Synonymy of *Marenzelleria viridis* (Verrill) and *Marenzelleria jonesi* Maciolek (Polychaeta: Spionidae). Atlantic Estuarine Research Society, Hampton, Virginia.

Dauer, D.M. 1996. Benthic restoration goals for tidal freshwater regions of the Chesapeake Bay. Data Analysis Workgroup of the Monitoring Subcommittee of the Chesapeake Bay Program, Annapolis, Maryland.

Lewis, D.J. and D.M. Dauer. 1996. Benthic community analysis of Hog Island Bay. Second Eastern Shore Natural Resources Symposium. Natural resource values and vulnerabilities. Kiptopeke, Virginia.

Scarboro, C.L., J.E. Schratweiser and D.M. Dauer. 1996. Nocturnal movements of the macrobenthos of the Lafaeyette River Virginia. Atlantic Estuarine Research Society, Atlantic Beach, North Carolina.

Lewis, D.J., K.A Pflanz and D.M. Dauer. 1996. Comparison of two benthic sampling devices among several benthic habitat types. Atlantic Estuarine Research Society, Atlantic Beach, North Carolina.

Dauer, D.M. and J.A. Ranasinghe. 1997. Chesapeake Bay benthic monitoring results. I. Long-term trends at fixed-point stations. Atlantic Estuarine Research Society, Kiptopeke, Virginia.

Ranasinghe, J.A. and D.M. Dauer. 1997. Chesapeake Bay benthic monitoring results. II. Degraded area estimates: Evolution of a monitoring program. Atlantic Estuarine Research Society, Kiptopeke, Virginia.

Leonard, T.M., Rodi, Jr., A.J. and D.M. Dauer 1997. *Macoma balthica* in Pocomoke Sound, Virginia. Marine Benthic Ecology Meeting, Portland, Maine.

Dauer, D.M. and J.A. Ranasinghe. 1997. Chesapeake Bay benthic monitoring results. I. Long-term trends at fixed-point stations. Marine Benthic Ecology Meeting, Portland, Maine.

Ranasinghe, J.A. and D.M. Dauer. 1997. Chesapeake Bay benthic monitoring results. II. Degraded area estimates using probability based sampling. Marine Benthic Ecology Meeting, Portland, Maine.

Alden, III, R.W., S. B. Weisberg, J. A. Ranasinghe and D. M. Dauer. 1997. Optimizing temporal sampling strategies for benthic environmental monitoring programs. Marine Benthic Ecology Meeting, Portland, Maine.

Presentations (Continued)

Dauer, D.M., J. A. Ranasinghe, S. B. Weisberg and R. W. Alden III. 1997. Interaction of restoration, management and monitoring of the Chesapeake Bay, USA The benthic biological monitoring program. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Dauer, D.M., J. A. Ranasinghe, S. B. Weisberg and R. W. Alden III. 1997. The Chesapeake Bay Restoration Program: the benthic monitoring program - I. Development of restoration goals and an estuarine Benthic Index of Biotic Integrity (B-IBI) quantifying goal attainment. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Dauer, D.M., J. A. Ranasinghe, S. B. Weisberg and R. W. Alden III. 1997. The Chesapeake Bay Restoration Program: the benthic monitoring program - II. Optimizing temporal sampling strategies using fixed-point stations for long-term trends and probability-based spatial sampling for status estimates. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Alden, III, R. W. and D.M. Dauer. 1997. Design of long-term monitoring programs: Approaches taken and lessons learned in the Chesapeake Bay Program. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Weisberg, S.B., J.A. Ranasinghe, D.M. Dauer, L.C. Schaffner, R.J. Diaz and J.B. Frithsen. 1997. Chesapeake Bay Benthic Monitoring Program: I. Development of restoration goals and an index quantifying attainment. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Dauer, D.M. and J.A. Ranasinghe. 1997. Chesapeake Bay Benthic Monitoring Program: II. Trends using fixed-point stations. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Ranasinghe, J. A., and D. M. Dauer. 1997. Chesapeake Bay Benthic Monitoring Program: III. Status estimates using probability sampling. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Alden, R.W., III, S. B. Weisberg, J. A. Ranasinghe, and D. M. Dauer. 1997. Chesapeake Bay Benthic Monitoring Program: IV. Optimizing temporal sampling. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Dauer, D.M. , R. W. Alden III and J. A. Ranasinghe. 1997. Chesapeake Bay Benthic Monitoring Program: V. Linking trends in the benthos with trends in water quality. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Presentations (Continued)

Ranasinghe, J.A. , D. M. Dauer, S. B. Weisberg and Raymond W. Alden III . 1997. Interaction of restoration, management and monitoring of the Chesapeake Bay, USA. The benthic biological monitoring program. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Dauer, D.M. and J.A. Ranasinghe. 1997. Benthic community condition, water quality, sediment quality and watershed characteristics. Implementation Committee, Chesapeake Bay Program, Annapolis, Maryland.

Ranasinghe, J.A. and D.M. Dauer. 1997. Benthic community condition, water quality, sediment quality and watershed characteristics. Monitoring Subcommittee, Chesapeake Bay Program, Annapolis, Maryland.

Dauer, D.M. 1998. From watersheds to worms - flow, food and function. Duke University Marine Laboratory, Beaufort, North Carolina.

Lewis, D.J. and D.M. Dauer. 1998. Macrobenthic community analysis of Hog Island Bay, Virginia. Marine Benthic Ecology Meeting, Melbourne, Florida.

Scarboro, C.L. and D.M. Dauer. 1998. Macrofaunal community structure of the Pagan River, a nutrient enriched Virginia estuary. Marine Benthic Ecology Meeting, Melbourne, Florida.

Dauer, D.M. 1998. Patterns in status and trends of water quality and macrobenthic communities of the lower Chesapeake Bay. Workshop on Synthesis of the technical underpinnings of the Virginia lower tributary strategies: bay program agency and academic partners coming together in support of Lower Virginia Tributary goal setting and strategy development. Virginia Institute of Marine Science, Gloucester Point, Virginia.

Lewis, D.J. and D.M. Dauer. 1998. Macrobenthic community analysis of Hog Island Bay, Virginia. Atlantic Estuarine Research Society. Beaufort, North Carolina.

Scarboro, C.L. and D.M. Dauer. 1998. Macrofaunal community structure of the Pagan River, a nutrient enriched Virginia estuary. Atlantic Estuarine Research Society. Beaufort, North Carolina.

Dauer, D.M. 1998. From watersheds to worms - flow, food and function. East Carolina University. Greenville, North Carolina.

Ranasinghe, J.A. and D.M. Dauer. 1998. Spatial and temporal biodiversity patterns in Chesapeake Bay benthic invertebrates. Symposium on Conservation of biological diversity: A key to restoration of the Chesapeake Bay Ecosystem and beyond. Annapolis, Maryland.

Presentations (Continued)

Dauer, D.M. 1998. Functional morphology and feeding behavior of *Spio setosa.* Sixth International Polychaete Conference. Curitiba, Brazil.

Dauer, D.M. 1998. Hydrodynamics, functional morphology and feeding behavior in the benthic boundary layer. Atlantic Estuarine Research Society. Stone Harbor, New Jersey.

Ranasinghe, J.A. and D.M. Dauer. 1998. Chesapeake Bay benthic monitoring I. Spatially random sampling improves management information as well as knowledge of benthic communities. Atlantic Estuarine Research Society. Stone Harbor, New Jersey.

Dauer, D.M. and J.A. Ranasinghe. 1998. Chesapeake Bay benthic monitoring II. Recommendations for improving biological integrity based upon associations between benthic community condition, stress exposure, and watershed factors. Atlantic Estuarine Research Society. Stone Harbor, New Jersey.

Dauer, D.M. 1998. Chesapeake Bay Restoration Program - Where are we now? Education Night. First Presbyterian Church. Norfolk, Virginia.

Dauer, D.M. 1998. Macrobenthic communities and estuarine monitoring. The Chesapeake Bay experience. Biological assessment in Florida's marine and estuarine ecosystems. Invertebrate Workshop. Florida Department of Environmental Protection. Tallahassee, Florida.

Weisberg, S.B., J.A. Ranasinghe, D.M. Dauer, L.C. Schaffner, R.J. Diaz and J.B. Frithsen. 1998. Chesapeake Bay Benthic Monitoring Program: I. Development of restoration goals and an index quantifying attainment. Maryland Water Council. Baltimore, Maryland.

Dauer, D.M. and J.A. Ranasinghe. 1998. Chesapeake Bay Benthic Monitoring Program: II. Trends using fixed-point stations. Maryland Water Council. Baltimore, Maryland.

Ranasinghe, J. A., and D. M. Dauer. 1998. Chesapeake Bay Benthic Monitoring Program: III. Status estimates using probability sampling. Maryland Water Council. Baltimore, Maryland.

Alden, R.W., III, S. B. Weisberg, J. A. Ranasinghe, and D. M. Dauer. 1998. Chesapeake Bay Benthic Monitoring Program: IV. Optimizing temporal sampling. Maryland Water Council. Baltimore, Maryland.

Dauer, D.M. , R. W. Alden III and J. A. Ranasinghe. 1998. Chesapeake Bay Benthic Monitoring Program: V. Linking trends in the benthos with trends in water quality. Maryland Water Council. Baltimore, Maryland.

Presentations (Continued)

Ranasinghe, J.A., L. C. Scott, and D. M. Dauer. 1998. Chesapeake Bay Benthic Monitoring I: Spatially random sampling improves management information as well as knowledge of benthic communities. Conference concerning Federally Supported Science and the Chesapeake Bay Program. Patuxent National Wildlife Center, Maryland.

Dauer, D. M. and J. A. Ranasinghe. 1998. Chesapeake Bay Benthic Monitoring II: Recommendations for improving biological integrity based on associations between benthic community condition, stress exposure, and watershed factors. Conference concerning Federally Supported Science and the Chesapeake Bay Program. Patuxent National Wildlife Center, Maryland.

Dauer, D.M., 1999. Hydrodynamics, functional morphology and feeding behavior in the benthic boundary layer. American Society of Limnology and Oceanography. Santa Fe, New Mexico.

Ranasinghe, J.A., L. C. Scott, and D. M. Dauer. 1999. Chesapeake Bay Benthic Monitoring I: Spatially random sampling improves management information as well as knowledge of benthic communities. Benthic Ecology Meeting, Louisiana State University, Baton Rouge, Louisiana.

Dauer, D. M. and J. A. Ranasinghe. 1999. Chesapeake Bay Benthic Monitoring II: Recommendations for improving biological integrity based on associations between benthic community condition, stress exposure, and watershed factors. Benthic Ecology Meeting, Louisiana State University, Baton Rouge, Louisiana.

Dauer, D. M., R.W. Alden III, A.J. Rodi, Jr. 1999. Colonization potential of macrobenthic communities in a highly urbanized estuarine watershed. Benthic Ecology Meeting, Louisiana State University, Baton Rouge, Louisiana.

Gildwarg, G. S., C. L. Scarboro, and D. M. Dauer. 1999. Estuarine eutrophication effects on macroinfaunal community structure in the absence of low dissolved oxygen events. Benthic Ecology Meeting, Louisiana State University, Baton Rouge, Louisiana.

Dauer. D.M. 1999. Quantifying healthy benthic communities. Army Cops of Engineers Elizabeth River Study Steering Committee. Chesapeake, Virginia.

Dauer, D. M., R.W. Alden III, A.J. Rodi, Jr. 1999. Colonization potential of macrobenthic communities in a highly urbanized estuarine watershed. Atlantic Estuarine Research Society. Virginia Institute of Marine Science, Glouster Point, Virginia.

Presentations (Continued)

Gildwarg, G. S., C. L. Scarboro, and D. M. Dauer. 1999. Estuarine eutrophication effects on macroinfaunal community structure in the absence of low dissolved oxygen events. Atlantic Estuarine Research Society. Virginia Institute of Marine Science, Glouster Point, Virginia.

Dauer, D.M. 1999. Chesapeake Bay Restoration Program - Where are we now? Kiwanis Club of Norfolk, Norfolk, Virginia.

Dauer, D.M. 1999. Perspectives of the Elizabeth River watershed. Keynote address. State of the River, Technical Author's Retreat of the Elizabeth River Project. Irvington, Virginia.

Dauer, D.M., R.W. Alden III, A.J. Rodi, Jr., and J.A. Ranasinghe. 1999. Colonization potential of marobenthic communities in a highly urbanized estuarine watershed. 15th Biennial International Estuarine Research Federation Conference, New Orleans, Louisiana.

Ranasinghe, J.A. and D.M. Dauer. 1999. Chesapeake Bay Benthos: An example of successful interaction between living resource monitoring, modeling and research. 15th Biennial International Estuarine Research Federation Conference, New Orleans, Louisiana.

Ranasinghe, J.A., D.E. Russell, F.W. Kutz, J.B. Frithsen, J.F. Paul, R. Batuik, J.L. Hyland, J. Scott and D.M. Dauer. 1999. Two indices of benthic community yield similar results for sites in Chesapeake Bay. 15th Biennial International Estuarine Research Federation Conference, New Orleans, Louisiana.

Dauer, D.M. 1999. Mid-Atlantic Integrated Assessment Benthic Index Development Workshop. Invited participant and moderator for session on Data Processing and Compatibility. U.S. Environmental Protection Agency. Versar, Inc., Columbia, Maryland.

Dauer, D.M. 1999. The bottom line. Leadership Summit. Annual meeting of the Elizabeth River Project. Norfolk, Virginia.

Dauer, D.M. 1999. The bottom line. Fall for the River. Annual meeting honoring river restoration supporters of the Elizabeth River Project. Norfolk, Virginia.

Dauer, D.M. 2000. Effects of dredging on benthic communities. Public Forum on potential dredging of Crab Creek. Talbot Hall, Norfolk, Virginia.

Dauer, D.M. 2000. Areal extent of degraded benthic communities and colonization potential of Scuffeltown Creek. Sediment Subcommittee. Elizabeth River Project. Hampton Roads Regional Center, Chesapeake, Virginia.

Presentations (Continued)

Alden, R.W. III, D.M. Dauer, J.A. Ranasinghe, L.C. Scott, and R. J. Llansó. 2000. Verification and optimization of a benthic index of biotic integrity. Benthic Ecology Meetings. University of North Carolina at Wilmington, Wilmington, North Carolina.

Dauer, D. M., E.V. Pardo and K. Worsaae. 2000. A tale of two worms: optimal foraging theory, functional morphology and feeding behavior. Benthic Ecology Meetings. University of North Carolina at Wilmington, Wilmington, North Carolina.

Diaz, R. J., G.R. Cutter and D.M. Dauer. 2000. Estimating the status of benthic communities and habitat quality in the Virginia Chesapeake Bay. Benthic Ecology Meetings. University of North Carolina at Wilmington, Wilmington, North Carolina.

Lane, M. F. and D.M. Dauer. 2000. A comparison of subtidal and intertidal benthic communities along an estuarine gradient. Benthic Ecology Meetings. University of North Carolina at Wilmington, Wilmington, North Carolina.

Llansó, R.J., D.M. Dauer and L.C. Scott. 2000. Use of a benthic index of biotic integrity to detect eutrophic conditions in Chesapeake Bay. Benthic Ecology Meetings. University of North Carolina at Wilmington, Wilmington, North Carolina.

Rodi, Jr., A. J., R.W. Alden III and D.M. Dauer. 2000. Macrobenthic colonization of contaminated sediments: unexpected results. Benthic Ecology Meetings. University of North Carolina at Wilmington.

Scott, L. C., R.W. Alden III, J.A. Ranasinghe, D.M. Dauer and R.J. Llansó. 2000. Improvement of a benthic index of biotic integrity for tidal freshwater and oligohaline habitats. Benthic Ecology Meetings. University of North Carolina at Wilmington.

Williams, T. L. and D.M. Dauer. 2000. Trophic relationships of various benthic organisms with different feeding modes analyzed using multiple stable isotopes. Benthic Ecology Meetings. University of North Carolina at Wilmington.

Dauer, D.M. 2000. Sediment contaminants - biological effects and remediation. Virginia-Maryland Natural Resources Colloquium sponsored by the Chesapeake Research Consortium. Presentation to the Secretaries of Natural Resources of Virginia and Maryland and their senior staff. Mount Airy Plantation, Upper Marlboro, Maryland.

Dauer, D.M. 2000. Forests, fertilizers and flushing: the Chesapeake Bay story. Presentation in a symposium entitled Ecological threats to the Chesapeake Bay sponsored by the Biology Graduate Student Organization, Department of Biological Sciences , Old Dominion University, Norfolk, Virginia.

Presentations (Continued)

Dauer, D.M. 2000. Benthic communities - Why are they important? How bad is their status? Can they be restored? Elizabeth River Project. State of the River 2000 Conference, Norfolk, Virginia.

Dauer, D.M. 2000. Restoration of the Chesapeake Bay. United Methodist Mens Group. Deep Creek United Methodist Church. Chesapeake, Virginia.

Dauer, D. M., E.V. Pardo and K. Worsaae. 2000. A tale of two worms: optimal foraging theory, functional morphology and feeding behavior. American Society of Limnology and Oceanography. Copenhagen, Denmark.

Dauer, D.M. and R.J. Llansó. 2000. Status and trends in the benthic of the Chesapeake Bay (1985-1999). Annual workshop of the Data Analysis Workgroup of the Monitoring Subcommittee of the Chesapeake Bay Program, Annapolis, Maryland.

Dauer, D.M. 2000. Moderator for the Summit Meeting of the Leadership Review Board of the Elizabeth River Project. Norfolk, Virginia.

Dauer, D.M. 2000. Session chair. Atlantic Estuarine Research Society Meeting, Smithsonian Environmental Research Center, Edgewater, Maryland

Dauer, D.M. 2000. The Elizabeth River Watershed. Benthic Communities and Environmental Health. Remediation Advisory Board of the Norfolk Naval Shipyard. Portsmouth, Virginia.

Christman, C.S. and D.M. Dauer. 2001. Development of a diagnostic tool to determine the cause of benthic community degradation in the Chesapeake Bay. Benthic Ecology Meetings. University of New Hampshire, Durham, New Hampshire.

Stegmeier, S.B. and D.M. Dauer. 2001. Assessing the impact of migratory behavior on population and community dynamics of the macrobenthos of the Lafayette River, Norfolk, Va. Atlantic Estuarine Research Society Meeting, Old Dominion University. Norfolk, Virginia.

Christman, C.S. and D.M. Dauer. 2001. Development of a diagnostic tool to determine the cause of benthic community degradation in the Chesapeake Bay. Atlantic Estuarine Research Society Meeting, Old Dominion University. Norfolk, Virginia.

Dauer, D.M. and R.J. Llansó. 2001. Hierarchical nesting of partnerships and probability based sampling to determine levels of benthic community degradation in the Chesapeake Bay. EMAP Symposium 2001: Coastal monitoring through partnerships, Pensacola, Florida.

Presentations (Continued)

Llansó, R.D., D.M. Dauer and L.C. Scott. 2001. Application of the Benthic Index of Biotic Integrity to environmental monitoring in Chesapeake Bay. EMAP Symposium 2001: Coastal monitoring through partnerships, Pensacola, Florida.

Christman, C.S. and D.M. Dauer. 2001. Development of a diagnostic tool to determine the cause of benthic community degradation in the Chesapeake Bay. EMAP Symposium 2001: Coastal monitoring through partnerships, Pensacola, Florida.

Pardo, E.V. and D.M. Dauer. 2001. Particle size selection in individuals from epifaunal versus infaunal populations of the nereid polychaete *Nereis (Neanthes) succinea*. Seventh International Polychaete Conference, Reykjavik, Iceland.

Dauer, D.M.., H. T. Mahon, T. L. Williams and R. Sardá. 2001. Trophic dynamics and feeding biology of interface feeding polychaetes: techniques, interpretations and future directions. Seventh International Polychaete Conference, Reykjavik, Iceland.

Dauer, D.M.. 2001. Benthic communities, sediment contamination and the Elizabeth River. Presentation to the Learning Bridges Program of Norfolk Academy on behalf of the Elizabeth River Project, Virginia Children's Museum, Portsmouth, Virginia.

Dauer, D.M. 2001. The Elizabeth River Project - A River Reborn. Public forum on CBS affiliate and Cox Communication, Inc. Honorable Irvine B. Hill, moderator. Panel composed of Delegate Thelma Drake, Member of the Chesapeake Bay Commission; Craig Seltzer, U.S. Army Corps of Engineers; Shep Miller, President of the Rotary Club of Norfolk; Peter Schmidt, former head of the Virginia Department of Environmental Quality; and Nancy Chandler, Norfolk realtor and event sponsor. A public forum concerning the restoration of the river particularly the proposed $13 million sediment contaminant remediation demonstration project and wetlands restoration. Nauticus, Norfolk, Virginia.

Dauer, D.M. 2001. Toxics Workgroup. Invited presentations on five topics: (1) The development and validation of the Benthic Index of Biotic Integrity for the Chesapeake Bay; (2) Linkage of benthic community condition to water quality, sediment quality, nutrient loads and patterns of land use in Chesapeake Bay; (3) The use of probability-based sampling and the Benthic Index of Biotic Integrity to determine areal estimates of degraded benthic community condition at different spatial scales within the Chesapeake Bay; (4) The use and ease of interpretation of long term trends in the Benthic Index of Biotic Integrity; and (5) A progress report on the development of a multivariate statistical approach to determining cause of dergadation in benthic communities of the Chesapeake Bay. Annapolis, Maryland.

Dauer, D.M. and R.J. Llansó. 2001. Spatial scales and probability based sampling in determining levels of benthic community degradation in the Chesapeake Bay. 16th International Estuarine Research Conference, St. Pete Beach, Florida.

Presentations (Continued)

Llansó, R.J., D.M. Dauer and L.C. Scott. 2001. Application of the Benthic Index of Biotic Integrity to environmental monitoring in Chesapeake Bay. 16th International Estuarine Research Conference, St. Pete Beach, Florida.

Dauer, D.M. 2002. Benthic communities, water quality and diagnostic approaches to determine sources of stress. Part 1. Comparison of environmental health of benthic communities of the Elizabeth River watershed to the rest of the Chesapeake Bay. Part 2. Comparison of water quality of the Elizabeth River watershed to the rest of Chesapeake Bay. Part 3. Diagnostic approaches to determine sources of stress affecting benthic community condition in Chesapeake Bay. Elizabeth River Monitoring Committee, Chesapeake, Virginia.

Mahon, H.K. and D.M. Dauer. 2002. Responses of juvenile *Streblopio benedicti* (Spionidae) to chemical cues bound to glass beads. Benthic Ecology Meeting, Orlando, Florida.

Diaz, R.J. and D.M. Dauer. 2002. Assessment of benthic habitat quality in the lower Chesapeake Bay, USA using multiple methods and metrics. Benthic Dynamics: In-situ Surveillance of the Sediment-water Interface, University of Aberdeen, Scotland.

Mahon, H.K. and D.M. Dauer. 2002. Responses of juvenile *Streblopio benedicti* (Spionidae) to chemical cues bound to glass beads. Atlantic Estuarine Research Society meeting, University of Delaware, Lewes, Delaware.

Llansó, R.J., M. Olson, Jon H. Vølstad and D.M. Dauer. 2002. Dissolved oxygen goals for benthic communities of Chesapeake Bay. Maryland Water Quality Monitoring Program Principal Investigators Meeting.

Dauer, D.M. 2002. The health of the benthic community of the Elizabeth River. Public forum on the Elizabeth River. Sponsored by the Elizabeth River Project. Chesapeake, Virginia.

Mahon, H.K. and D.M. Dauer. 2002. Responses of juvenile *Streblopio benedicti* (Spionidae) to chemical cues bound to glass beads. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Dauer, D.M., H. K. Mahon, A.R. Mahon and G. B. Read. 2002. Integration of functional morphology and molecular biology - *Boccardia* species from New Zealand and British Columbia. Invited symposium, "Morphology, molecules, evolution and phylogeny of the polychaete and related taxa." Osnabück, Germany.

Dauer, D.M. 2002. The health of the benthic community of Paradise Creek, Elizabeth River. Paradise Creek Restoration Plan, Steering Committee Meeting, Portsmouth, Virginia.

Presentations (Continued)

Dauer, D.M. 2003. The health of the benthic community of Paradise Creek, Elizabeth River. Paradise Creek Sediment Restoration Committee, Virginia Department of Environmental Quality, Virginia Beach, Virginia.

Dauer, D.M. 2003. The health of the benthic community of Paradise Creek, Elizabeth River. Monitoring Committee, Elizabeth River Project, Chesapeake, Virginia.

Mahon, H.K. and D.M. Dauer. 2003. Feeding responses of *Marenzellaria viridis* (Polychaeta: Spionidae) to organic compounds bound to glass microbeads. Benthic Ecology Meeting, University of Connecticut, Gorton, Connecticut.

Dauer, D.M., H. K. Mahon, A.R. Mahon and G. B. Read. 2003. Integration of functional morphology and molecular biology - *Boccardia* species from New Zealand and British Columbia. Benthic Ecology Meeting, University of Connecticut, Gorton, Connecticut.

Dauer, D.M., M. F. Lane and R. J. Llansó. 2003. Development of diagnostic approaches to determine source as of anthropogenic stress affecting benthic community condition in the Chesapeake Bay. Benthic Ecology Meeting, University of Connecticut, Gorton, Connecticut.

Dauer, D.M. 2003. Trophic dynamics and feeding biology of interface feeding polychaetes: techniques, interpretations and future directions. Station Marine de Wimereux, Wimereux, France.

Dauer, D.M. 2003. Estuarine benthic communities: indices of environmental health, spatial sample allocation, and effective communication techniques. University of Lisboa, Lisboa, Portugal.

Dauer, D.M., R.J. Llansó, R. J. Diaz, and L.C. Schaffner. 2003. Benthic biotic integrity, habitat quality and diagnosing causes of degradation in Chesapeake Bay, USA. 17th Biennial International Estuarine Research Federation Conference, Seattle, Washington.

Dauer, D.M. 2003. Elizabeth River Watershed. Water Quality and Living Resources. Poor Quality but Improving. Chesapeake Bay Monitoring Data Analysis Workshop. Sponsored by the Tidal Monitoring and Analysis Workgroup National Wildlife Visitors Center, Laurel, MD.

Dauer, D.M. 2003. Elizabeth River Watershed. Water Quality and Living Resources. Poor Quality but Improving. Monitoring Advisory Committee. Elizabeth River Project. Portsmouth, Virginia.

Dauer, D.M. 2004. Diagnosing causes of degradation in benthic communities of Chesapeake Bay: accomplishments and effective communication with the public and regulators. Duke University Marine Lab, Beaufort, North Carolina.

Presentations (Continued)

Tatem, S. A. and D.M. Dauer. 2004. Spatial and trophic relationships among macrobenthic species of an intertidal sand flat. Benthic Ecology Meeting, University of South Alabama, Mobile, Alabama.

Mahon, H.K..and D.M. Dauer. 2004. Particle size and organic coating effects on feeding in the neridid polychaete *Neanthes succinea* (Polychaeta: Nereididae). Benthic Ecology Meeting, University of South Alabama, Mobile, Alabama.

Llansó, R.J., J. Vølstad, and D. M. Dauer. 2004. Decision process for identification of estuarine benthic impairments in Chesapeake Bay, USA. EPA-EMAP (Environmental Monitoring and Assessment Program) Symposium 2004. Integrated Monitoring & Ass1essment for Effective Water Quality Management. Newport, Rhode Island.

Dauer, D.M., R.J. . Llansó, and M. F. Lane. 2004. Diagnosing causes of benthic community degradation in Chesapeake Bay, USA. EPA-EMAP (Environmental Monitoring and Assessment Program) Symposium 2004. Integrated Monitoring & Ass1essment for Effective Water Quality Management. Newport, Rhode Island.

Dauer, D.M., P. Chainho, R.J. Llansó and R.J. Diaz 2004. Patterns of taxocene discrimination and species diversity along the estuarine gradient of a homiohaline estuary (Chesapeake Bay, USA). Eighth International Polychaete Conference, Madrid, Spain.

Chainho, P, Chaves, M.L., Costa, J.L., Costa, M.J. and D.M. Dauer. 2004. Adaptive responses of benthic communities to environmental stress in the Mondego River estuary with special reference to the family Spionidae. Eighth International Polychaete Conference, Madrid, Spain.

Mahon, H.K..and D.M. Dauer. 2004. Particle selection dynamics of surface deposit feeding guilds: roles of organic coatings, particle size and adaptive morphologies. Eighth International Polychaete Conference, Madrid, Spain.

Mahon, A.R. Mahon, H.K. , Dauer, D.M. and Read, G.R. 2004. Morphological, molecular and biogeographic relationships among several species of *Boccardia* (Polychaeta: Spionidae) from the Pacific Ocean. Eighth International Polychaete Conference, Madrid, Spain.

Dauer, D.M., 2004. Session Chair - Reproductions and Ecology. Eighth International Polychaete Conference, Madrid, Spain.

Dauer, D.M. 2004. Tribute to the late Joseph L. Simon (March 18, 1937 - March 22, 2004). Eighth International Polychaete Conference, Madrid, Spain.

Mahon, H.K..and D.M. Dauer. 2004. Particle selection dynamics of surface deposit feeding guilds: roles of organic coatings, particle size and adaptive morphologies. Atlantic Estuarine

Presentations (Continued)

Research Society Meeting, New Jersey Meadowlands Environment Center, Lyndhurst, New Jersey.

Tatem, S.A.and D.M. Dauer. 2004. Spatial and trophic relationships among macrobenthic species of an intertidal sand flat. Atlantic Estuarine Research Society Meeting, New Jersey Meadowlands Environment Center, Lyndhurst, New Jersey.

Chainho, P., J.L. Costa, M.L. Chaves, D.M. Dauer and M.J. Costa. 2004. Defining the best sampling season to assess benthic ecological conditions in Portuguese estuaries. 38th European Marine Biology Symposium, Aveiro, Portugal.

Mahon, H.K.and D.M. Dauer. 2005. Particle selection dynamics of surface deposit feeding guilds: roles of organic coatings, particle size and adaptive morphologies. Society for Integrative and Comparative Biology Meeting, San Diego, California.

Tatem, S.A.and D.M. Dauer. 2005. Spatial and trophic relationships among macrobenthic species of an intertidal sand flat. Society for Integrative and Comparative Biology Meeting, San Diego, California.

Dauer, D.M. 2005. Trophic dynamics of benthic invertebrates: studies of ecology, evolution and energetics. Department of Biological Sciences, Old Dominion University, Norfolk, Virginia.

Dauer, D. M., R. J. Llansó, M. F. Lane. 2005. Twenty years (1985-2004) of benthic monitoring of Chesapeake Bay, USA. Accomplishments, advances and future directions. Benthic Ecology Meetings, Virginia Institute of Marine Science, College of William and Mary, Williamsburg, Virginia.

Mahon, H.K..and D.M. Dauer. 2005. Particle selection dynamics of surface deposit feeding guilds: roles of organic coatings, particle size and adaptive morphologies. Benthic Ecology Meetings, Virginia Institute of Marine Science, College of William and Mary, Williamsburg, Virginia.

Tatem, S.A.and D.M. Dauer. 2005. Spatial and trophic relationships among macrobenthic species of an intertidal sand flat. Benthic Ecology Meetings, Virginia Institute of Marine Science, College of William and Mary, Williamsburg, Virginia.

Llansó, R.J. and D. M. Dauer. 2005. Chesapeake Bay Program. Long-Term Benthic Monitoring Component. Results for 2004. Tidal Monitoring and Analysis Subcommittee Workshop. Patuxent National Wildlife Center, Maryland.

Dauer, D.M. 2005. Trophic dynamics of benthic invertebrates: studies of ecology, evolution and energetics. Department of Biological Sciences, University of Hull, Hull, England.

Presentations (Continued)

Dauer, D.M. 2005. Twenty years (1985-2004) of benthic monitoring of Chesapeake Bay, USA. Accomplishments, advances and applications. Colloque: Indicateurs Benthiques. Seine Aval Program. Wimereux Marine Laboratory, Wimereux, France.

Dauer, D.M. 2005. Benthic community restoration potential in the Elizabeth River. Field experiments with PAH contaminated sediments. Monitoring Advisory Committee of the Elizabeth River Monitoring Program. Hampton Roads Sanitation District. Virginia Beach, Virginia.

Llansó, R.J. and D. M. Dauer. 2005. Benthic Community Indicators in Chesapeake Bay. Living Resources Analysis Workgroup. Chesapeake Bay Program Office, Annapolis, Maryland.

Dauer, D.M., R.J. Llansó, R. J. Diaz, and L.C. Schaffner. 2005. Twenty Years (1985-2004) of Benthic Monitoring of Chesapeake Bay, USA. Accomplishments, Advances and Applications. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Llanso, R. J., R.J. Diaz, R. J., D.M. Dauer, D. M., R.D. Seitz and D. Forsell. 2005. Benthos of diving duck feeding habitats of Chesapeake Bay, USA. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Dauer, D. M. and R.W. Alden, III. 2005. Sediment contaminant remediation and benthic community restoration potential in an urbanized watershed, the Elizabeth River, Virginia. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Chainho, P., J.L. Costa, M.L. Chaves, M.J. Costa, and D.M. Dauer. 2005. Comparison of the classifications obtained by using different approaches to assess the ecological quality in a poikilohaline environment: the Mondego River estuary, Portugal. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Mahon, H. K. and D. M. Dauer. 2006. Particle selection in *Macoma balthica* (Bivalvia): the effects of organic coating and particle size. Benthic Ecology Meeting, Quebec, Canada.

Tatem, S. A. and D. M. Dauer. 2006. Trophic relationships among macrobenthic species of an intertidal sand flat. Benthic Ecology Meeting, Quebec, Canada.

Walsh, C.G. and D. M. Dauer. 2006. Diet differences in the mummichog, *Fundulus heteroclitus*, comparing populations from tidal creeks with highly urbanized and highly forested watersheds in Chesapeake Bay, USA. Benthic Ecology Meeting, Quebec, Canada.

Borja, A. and D.M. Dauer. 2006. Session co-chairs and organizers of session entitled: Assessing the environmental quality status in estuarine and coastal systems: comparing methodologies and indices. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Presentations (Continued)

Chainho, P., J.L. Costa, M.J. Costa, and D.M. Dauer. 2006. The use of multimetric indices to classify Portuguese estuaries with different hydromorphological characteristics. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Borja, A., D.M. Dauer, R.J. Diaz, R.J. Llansó, I. Muxika, J.G., Rodríguez, and L.C. Schaffner. 2006. Comparison between B-IBI and AMBI indices in Chesapeake Bay: assessing benthic quality condition using different tools. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Dauer, D.M., M.F. Lane, and R.J. Llansó. 2006. The Chesapeake Bay Benthic Index of Biotic Integrity, designated use and water depth effects. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Llansó, R. J., Vølstad, J. H. and D.M. Dauer. 2006. Different *Ecological Indicators* performance in assessing environmental status: a case study on estuarine eutrophication. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Dauer, D.M., A. Borja and R.J. Diaz. 2006. Assessing the Environmental Quality Status in Estuarine and Coastal Systems. Summary, Salient Points and Solutions. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Mahon, H. K. and D. M. Dauer. 2006. Energy maximization strategies of two surface deposit-feeding gastropods. Atlantic Estuarine Research Society, Baltimore, Maryland.

Marshall, H.G., D.M. Dauer, K.K. Nesius, M.F. Lane, R.V. Lacouture, and T. Egerton. 2006. Restoration of the Chesapeake Bay (1985-2005). Spatial and temporal patterns in primary productivity. Atlantic Estuarine Research Society, Baltimore, Maryland.

Mroz, R. J., J. D. Shields, and D. M. Dauer. 2006. The parasitic fauna of the red-jointed fiddler crab (*Uca minax*) from Chesapeake Bay's Elizabeth River system. Atlantic Estuarine Research Society, Baltimore, Maryland.

Walsh, C.G. and D. M. Dauer. 2006. Diet differences in the mummichog, *Fundulus heteroclitus*, comparing populations from tidal creeks with highly urbanized and highly forested watersheds in Chesapeake Bay, USA. Atlantic Estuarine Research Society, Baltimore, Maryland.

Dauer, D.M. 2006. Trophic dynamics of benthic invertebrates: studies of ecology, evolution and energetics. Laboratorio di Ecologia del Benthos. Stazione Zoologica di Napoli. Ischia, Italy.

Dauer, D.M. 2006. Invited Keynote Speaker. Monitoring, assessment of restoration and management. Ecological foundation and governance. Chesapeake Bay, USA (1985-2005). TWReferenceNET, "Management and sustainable development of protected transitional waters." University of Leece, Leece Italy.

Presentations (Continued)

Dauer, D.M. 2007. Nutrient scoring system for the Elizabeth River State of the River Report for the Elizabeth River. Virginian Department of Environmental Quality, Virginia Beach, Virginia.

Dauer, D.M. 2007. Benthic community scoring and grading system for the Elizabeth River State of the River Report for the Elizabeth River. Virginian Department of Environmental Quality, Virginia Beach, Virginia.

Walsh, C.G. and D. M. Dauer. 2007. Diet differences in the mummichog, *Fundulus heteroclitus*, comparing populations from tidal creeks with highly urbanized and highly forested watersheds in Chesapeake Bay, USA. Joint meeting of the Atlantic Estuarine Research Society and the Southeastern Research Society. Pine Knoll Shores, North Carolina.

Mahon, H. K. and D. M. Dauer. 2007. Particle selection of a surface deposit-feeding bivalve and a surface deposit-feeding polychaete: considerations of morphology and function. Joint meeting of the Atlantic Estuarine Research Society and the Southeastern Research Society. Pine Knoll Shores, North Carolina.

Walsh, C.G. and D. M. Dauer. 2007. Diet differences in the mummichog, *Fundulus heteroclitus*, comparing populations from tidal creeks with highly urbanized and highly forested watersheds in Chesapeake Bay, USA. Benthic Ecology Meeting, Atlanta, Georgia.

Mahon, H. K. and D. M. Dauer. 2007. Energy maximization strategies of two surface deposit feeding nereidid polychaetes. Benthic Ecology Meeting, Atlanta, Georgia.

Mroz, R.J. and D. M. Dauer. 2007. Patterns in parasite communities of the red-jointed fiddler crab (*Uca minax*) inrelation to anthropogenic stress. Benthic Ecology Meeting, Atlanta, Georgia.

Seitz, R.D., D.M. Dauer and R.J. Llansó 2007. Variation in macrobenthos of the Chesapeake Bay: depth, oxygen, and temporal effects. Benthic Ecology Meeting, Atlanta, Georgia.

Dauer, D.M. 2007. Challenges in coastal and transitional waters: science-management interactions, adaptive management and adaptive monitoring. University of Lisboa, Lisboa, Portugal.

Dauer, D.M. 2007. Integrative approaches to assessing estuarine ecosystem integrity. Metrics, indicators, indices, criteria, combinatorial strategies, and interpretive paradigms - the USA. experience. EcoSummit 2007, Beijing, China.

Dauer, D.M. 2007. Lynnhaven River benthic community condition (2006). U.S. Army Corps of Engineers Lynnhaven River Restoration Meeting. Hampton Roads Planning District Commission, Chesapeake, Virginia.

Presentations (Continued)

Mahon, H. K. and D. M. Dauer. 2007. Energy maximization strategies of four surface deposit feeding polychaetes: considerations of morphology and function. 9th International Polychaete Conference, Portland, Maine.

Mahon, A.R., D.M. Dauer, H.K. Mahon, and K.M. Halanych. 2007. Molecular differentiation of three morphologically similar spionid polychaetes using cytochrome oxidase I (COI). 9th International Polychaete Conference, Portland, Maine.

Dauer, D.M. 2007. Integrative approaches to assessing estuarine ecosystem integrity: actions, awareness and accountability. 19th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Llansó, R.J., D.M. Dauer, and J.Volstad. 2007. Assessing ecological integrity for impaired waters decisions in Chesapeake Bay, USA. 19th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Sullivan, S.E., M.W. Prinz, L.D. Orensky, and D.M. Dauer. 2008. Habitat value of artificial oyster reefs in the Chesapeake Bay. Atlantic Estuarine Research Society, George Mason University, Fairfax, Virginia.

Dauer, D.M., M. F. Lane., N. R Chaganty and R.J. Llansó. 2008. Trends in water quality, chlorophyll and primary productivity of Chesapeake Bay (1985-2007). Atlantic Estuarine Research Society, George Mason University, Fairfax, Virginia.

Dauer, D.M. 2008. Invited participant in Adriaitc Sea Coastal Monitoring Workshop sponsored by LaguNet. Kotor, Monengro.

Borja, A., D.M. Dauer, M. Elliott, and C. Simenstad. 2009. Session convenors. Medium and long-term recovery of marine and estuarine systems, as guide to presenting useful information in new scenarios to restore ecological integrity. American Society of Limnology and Oceanography. Nice, France.

Dauer, D.M., A. Borja, M. Elliott, and C. Simenstad. 2009. Integrative approaches to assessing coastal ecosystem integrity. Introductory tutorial lecture. American Society of Limnology and Oceanography. Nice, France.

Dauer, D.M., M. F. Lane., N. R Chaganty and R.J. Llansó. 2009. Long-term patterns of trends in water quality and benthos of Chesapeake Bay (1985-2007). Lessons and limits of restoration efforts. American Society of Limnology and Oceanography. Nice, France.

Presentations (Continued)

Ranasinghe, A.. A. Borja and D.M. Dauer. 2009. Assessing ecological integrity using multiple indices and ecosystem components: The sequel. 20th Biennial International Coastal and Estuarine Research Federation Conference, Portland, Oregon.

Dauer, D.M. 2010. Member of the Scientific Organizing Committee of the Estuarine & Coastal Sciences Association Symposium 47 entitled **"**Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide**."** The symposium was held in Figueira da Foz, Portugal from September 14-19, 2010.

Dauer, D.M. 2010. Invited keynote address at the Estuarine & Coastal Sciences Association Symposium 47 entitled **"**Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide." Figueira da Foz, Portugal.

Dauer, D.M. 2010. Session chair. "How comparable are ecological assessment criteria and approaches worldwide?" Estuarine & Coastal Sciences Association Symposium 47 Figueira da Foz, Portugal.

Ángel Borja, D.M. Daniel Dauer and A. Grémare. 2010. Session chairs. Benthic indicators: responding to different human pressures and assessing integrative quality status. International Council for the Exploration of the Sea annual meeting in Nantes, France.

Teixeira H., Á. Borja, S. B. Weisberg, J. A. Ranasinghe, D. B. Cadien, D. M. Dauer, J.-C. Dauvin, S. Degraer, R. J. Diaz, A. Grémare, I. Karakassis, R. J. Llansó, L. L. Lovell, J. C. Marques, D. E. Montagne, A. Occhipinti-Ambroggi, R. Rosenberg, R.l Sardá, L.C. Schaffner and R. G. Velarde. 2010. Do experts across North America and Europe produce comparable assessments of marine benthic infaunal community condition using best professional judgement**?** International Council for the Exploration of the Sea annual meeting in Nantes, France.

Webb, A.M. and D.M. Dauer. 2011. Benthic community assessment prior to sediment contaminant restoration in the Southern Branch of the Elizabeth River, Chesapeake Bay. Atlantic Estuarine Research Society, Kitty Hawk, North Carolina.

Dauer, D.M. 2011. Invited Keynote Speaker. A single index or a single index paradigm. Lessons from the Chesapeake Bay Experience. National Coastal Condition Assessment Benthic Indicator Work Group, U.S. Environmental protection Agency. Office of Water, Costa Mesa, CA.

Byron, K. W., D.M. Dauer, M. F. Lane, R.J. Llansó and R. J. Diaz . 2012. Secondary Production - A functional approach to assess the ecological value of macrobenthic communities to higher trophic levels. Atlantic Estuarine Research Society. Cape May, New Jersey.

Presentations (Continued)

Dauer, D.M., M. F. Lane, R.J. Llansó and R. J. Diaz. 2012. Secondary production as a functional metric in assessing the ecological value of macrobenthic communities to higher trophic levels (Chesapeake Bay, USA). 50th ECSA (Estuarine & Coastal Sciences Association) Conference: Today's science for tomorrow's Management. Venice, Italy.

Byron, K. W., D.M. Dauer, M. F. Lane, R.J. Llansó and R. J. Diaz. 2012. Secondary Production – A functional approach to assess the ecological value of macrobenthic communities to higher trophic levels. Benthic Ecology Meeting, Norfolk, Virginia.

Webb, A.M. and D.M. Dauer. 2012. Benthic community condition in a highly contaminated estuarine watershed (PAHs) compared to near-field and far-field watersheds in the Chesapeake Bay. Benthic Ecology Meeting, Norfolk, Virginia.

Webb, A.M. and D.M. Dauer. 2012. Benthic community condition in a highly contaminated estuarine watershed (PAHs) compared to near-field and far-field watersheds in the Chesapeake Bay. Atlantic Estuarine Research Society, Wallops Island, Maryland.

Byron, K. W. and D.M. Dauer. 2012. Developing a seasonal autoregressive integrated moving average (SARIMA) model for benthic productivity in the Chesapeake Bay. Atlantic Estuarine Research Society. Chincoteague, Virginia.

Byron, K. W. and D.M. Dauer. 2013. The unseasonal benthos: SAR.MA models applied to the benthic community of the Chesapeake Bay suggest a lack of seasonality. Benthic Ecology Meeting, Savannah, Georgia.

Webb, A.M. and D.M. Dauer. 2013. Species richness, abundance, biomass, and secondary productivity responses in PAH metabolizing benthic macroinvertebrate communities. Benthic Ecology Meeting , Savannah, Georgia.

Seitz, R., D. M. Dauer, and R.J. Llansó. 2013. Anthropogenic effects on long-term patterns of benthic species richness and functional diversity in Chesapeake Bay. Benthic Ecology Meeting, Savannah, Georgia.

Byron, K. W. and D.M. Dauer. 2013. The unseasonal benthos: SARMA models applied to the benthic community of the Chesapeake Bay suggest a lack of seasonality. Benthic Ecology Meeting, San Diego, California.

Good, M.A. and D.M. Dauer. 2014. Naturalization of salt marsh restoration sites in the Elizabeth River, Virginia, assessed by feeding activity and trophic level of mummichogs (*Fundulus heteroclitus*). Atlantic Estuarine Research Society, Richard Stockton College, Galloway, New Jersey.

Presentations (Continued)

Martin, C.R.W. and D.M. Dauer. 2014. Preliminary analysis of benthic condition after sediment remediation in the Elizabeth River. Atlantic Estuarine Research Society, Richard Stockton College, Galloway, New Jersey.

Llansó, R.J., J. Dew-Baxter, D. Zaveta, D.M. Dauer, and T. Parham. 2014. Restoration and degradation trajectories of the benthic communities of the Maryland Chesapeake Bay: Interdecadal trends in benthic condition. Maryland Water Monitoring Council Annual Conference, Linthicum, Maryland.

Llansó, R.J., Dauer, D.M. and M.F. Lane. 2015. Linear and non-linear trends of macrobenthos in Chesapeake Bay relative to water quality and streamflow. Coastal and Estuarine Research Federation Conference, Portland, Oregon.

Brauko, K.M., Dauer, D.M., and P.L. Lana. 2015. Consistency of responses of macrofaunal trophic guilds to sewage discharges at nested scales of variation in a subtropical estuary. Coastal and Estuarine Research Federation Conference, Portland, Oregon.

Rodi, A.J. and D.M. Dauer. 2016. Invasive Worm from the South? First report and establishment of the polychaete *Hermundura americana* in the Chesapeake Bay. Atlantic Estuarine Research Society, Virginia Beach, Virginia.

Dauer, D.M., K. M. Brauko, R.J. Llansó, and Mike F. Lane. 2016. Taxocene patterns of benthic secondary productivity along an estuarine gradient. 12th International Polychaetology Conference, Cardiff, Wales.

Dauer, D.M. 2016. Chair for Functional Morphology session. 12th International Polychaetology Conference, Cardiff, Wales.

Dauer, D.M., R.J. Llansó, and Mike F. Lane. 2017. Chesapeake Bay Benthic Monitoring Program - Innovations and Accomplishments. Chesapeake Bay Program Criteria Assessment Protocol Work Group. Webinar.

Rodi, A.J. and D.M. Dauer. 2017. First report and establishment of the polychaete *Hermundura americana* in the Chesapeake Bay. Benthic Ecology meeting. Myrtle Beach, South Carolina.

Dauer, D.M., K. M. Brauko, R.J. Llansó, and Mike F. Lane. 2017. Patterns of benthic secondary productivity along an estuarine gradient. Benthic Ecology meeting. Myrtle Beach, South Carolina.

Dauer, D.M., Llansó, R.J., and M.F. Lane. 2017. Chesapeake Bay Benthic Monitoring Program. Innovations and Accomplishments. Two and half hour webinar to the Chesapeake Bay Program, Criteria Assessment Protocol Workgroup.

Presentations (Continued)

Llansó, R.J., Dauer, D.M. and M.F. Lane. 2017. Benthos and water clarity. Part II of the Scientific and Technical Advisory Committee (STAC) workshop on *Understanding and Explaining 30+ Years of Water Clarity Trends in the Bay's Tidal Waters.* Annapolis, Maryland May 2-3.

Dauer, D.M., Llansó, R.J., and M.F. Lane. 2017. Benthic community condition trends in the Chesapeake Bay – 30 years and what progress? Coastal and Estuarine Research Federation Conference. Providence, Rhode Island.

Llansó, R.J., Dauer, D.M., Seitz, R.D., and M.F. Lane. 2017. Assessment of Ecological Value of Benthic Habitats, Coastal and Estuarine Research Federation Conference. Providence, Rhode Island.

Rodi, A.J. and D.M. Dauer. 2018. A line in the sand: What's stopping the spread of the introduced species, *Hermundura americana* (Polychaeta:Pilargidae), throughout the Chesapeake Bay**?** Benthic Ecology Meeting. Corpus Christi, Texas.

Dauer, D.M., Llansó, R.J., and M.F. Lane. 2018. Benthic community condition trends in the Chesapeake Bay – 30 years and what progress? Benthic Ecology Meeting. Corpus Christi, Texas.

Dauer, D.M., Llansó, R.J., and M.F. Lane. 2018. Benthic community condition trends in the Chesapeake Bay – 30 years and what progress? Atlantic Estuarine Research Society. Rehoboth, Delaware.

Llansó, R.J., Dauer, D.M., Seitz, R.D., and M.F. Lane. 2018. Assessment of Ecological Value of Benthic Habitats Using Functional Diversity Traits. Atlantic Estuarine Research Society. Rehoboth, Delaware.

Llansó, R.J., Dauer, D.M., Seitz, R.D. and M.F. Lane. 2018. Assessment of Ecological Value of Benthic Habitats Using Functional Diversity Traits. State of the Science Workshop on Wildlife and Offshore Wind Development. New York State Energy Research and Development Authority. Woodbury, New York.

Rodi, A.J., Dauer, D.M., Llansó, R.J and S. Arcuri. 2019 Is the genie out of the bottle? The spread of the introduced species *Hermundura americana* (Polychaeta:Pilargidae) throughout the Chesapeake Bay. Atlantic Estuarine Research Society. Woodbridge, Virginia.

Llansó, R.J., Dauer, D.M., and M.F. Lane. 2019. Relationship of benthic community condition measures with flow and hypoxia in Chesapeake Bay. Atlantic Estuarine Research Society. Woodbridge, Virginia.

Presentations (Continued)

Dauer, D.M., Llansó, R.J., Lane, M.F., and R. Murphy. 2019. Benthic community condition trends in the Chesapeake Bay – linear and non-linear trends for the past 30 years. Atlantic Estuarine Research Society. Woodbridge, Virginia.

Dauer, D.M. 2019. Presidential opening address. 13th International Polychaete Conference, Long Beach, California.

Dauer, D.M., Rodi, A. J., Llansó, R.J., and S Arcuri. 2019. The recent spread of the non-indigenous species, *Hermundura americana* (Polychaete: Pilargidae) throughout the Chesapeake Bay. 13th International Polychaete Conference, Long Beach, California.

Dauer, D.M. 2019. Elizabeth River Watershed, 20 years of restoration efforts. Elizabeth River Sediment Remediation Partnership. Portsmouth, Virginia.

Dauer, D.M., Rodi, A. J., Llansó, R.J., and S Arcuri. 2019. The recent spread of the non-indigenous species, *Hermundura americana* (Polychaete: Pilargidae) throughout the Chesapeake Bay. Coastal and Estuarine Research Federation Conference. Mobile Alabama.

Llansó, R.J., Dauer, D.M., R.D. Seitz, and M.F. Lane. 2019. Assessment of ecological value of benthic habitats in offshore wind energy area. Coastal and Estuarine Research Federation Conference. Mobile, Alabama.

Llansó, R.J., A. Borja and D.M. Dauer. 2019. Wind energy: effect on ecological function. Session convenerss. Coastal and Estuarine Research Federation Conference. Mobile, Alabama.

Dauer, D.M. 2020. Overview of benthic community monitoring of the Elizabeth River. State of the River 2020 Advisory Committee. Virginia Department of Quality Tidewater Regional Office. Virginia Beach, Virginia.

Turner, C., L. Horth and D.M. Dauer. 2021. Estuarine eutrophication, nutrient load reduction, and benthic ecological condition in the Pagan River watershed, Smithfield, Virginia. Ecological Society of America. All virtual meeting.

Muhic, W.K., L. Horth and D.M. Dauer. 2021. Long-term changes in the benthic communities of an urban watershed: The Elizabeth River's Southern Branch. Ecological Society of America. All virtual meeting.

Llansó, R.J., Dauer, D.M., and M.F. Lane. 2021. Chesapeake Bay Benthic Monitoring Program: Quantifying Environmental Change. Coastal and Estuarine Research Federation Conference. All virtual meeting.

Presentations (Continued)

Turner, C., L. Horth and D.M. Dauer 2021. Estuarine eutrophication effects on the ecological condition of the benthos in the Pagan River watershed. Coastal and Estuarine Research Federation Conference. All virtual meeting.

Muhic, W.K., L. Horth and D.M. Dauer 2021. Checking in on the Elizabeth River's Southern Branch, 20 years of change in an urban watershed. Coastal and Estuarine Research Federation Conference. All virtual meeting.

Presentations at International Meetings and Invited Seminars (Total 83) :

Dauer, D.M. 1983. Feeding behavior and functional morphology of *Streblospio benedicti* (Polychaeta: Spionidae). First International Polychaete Conference, Sydney, Australia.

Dauer, D.M. 1986. Feeding behavior and functional morphology of *Polydora commensalis*. Second International Polychaete Conference, Copenhagen, Denmark.

Dauer, D.M. and R.M. Ewing. 1989. Feeding behavior and functional morphology of *Malacoceros indicus*. Third International Polychaete Conference, University of California at Long Beach, Long Beach, California.

Dauer, D.M. 1991. Responses of estuarine benthos to episodic low dissolved oxygen exposure and to contaminated sediments. 10th International Estuarine Research Conference, San Francisco, California.

Dauer, D.M. 1992. Functional Morphology of spionid polychaetes: the role of latero-frontal cirri of the tentacular palps in particle capture, retention and transport. Fourth International Polychaete Conference, Angers, France.

Swift, D.J.P., G.T.F. Wong, D.M. Dauer and A.W. Niedoroda. 1993. Residence time of particulate-reactive pollutants in the estuary bed, lower Chesapeake Bay: biology-based estimates of sea bed mixing rates. 12th Biennial International Estuarine Research Federation. Hilton Head Island, South Carolina.

Niedoroda, A.W., D.J.P. Swift, G.T.F. Wong, and D.M. Dauer. 1993. Residence time of particulate-reactive pollutants in the estuary bed, lower Chesapeake Bay: numerical simulation of resuspension and contaminant loss. 12th Biennial International Estuarine Research Federation. Hilton Head Island, South Carolina.

Dauer, D.M. 1995. Dynamics of an estuarine ecosystem - The Chesapeake Bay experience. Long-term trends in the macrobenthic communities. International Symposium on Long-term changes in marine ecosystems: methods of analysis, case studies and between-site comparisons, Arcachon, France.

Presentations (Continued)

Ranasinghe, A.J., S. B. Weisberg and D.M. Dauer. 1995. Dynamics of an estuarine ecosystem - The Chesapeake Bay experience. Relationship of benthic community condition to water and sediment quality. International Symposium on Long-term changes in marine ecosystems: methods of analysis, case studies and between-site comparisons, Arcachon, France.

Dauer, D.M. 1995. Functional morphology and feeding behavior of *Marenzellaria viridis*. Fifth International Polychaete Conference. Qindoa, Peoples Republic of China.

Dauer, D.M., J. A. Ranasinghe, S. B. Weisberg and R. W. Alden III. 1997. Interaction of restoration, management and monitoring of the Chesapeake Bay, USA The benthic biological monitoring program. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Dauer, D.M., J. A. Ranasinghe, S. B. Weisberg and R. W. Alden III. 1997. The Chesapeake Bay Restoration Program: the benthic monitoring program - I. Development of restoration goals and an estuarine Benthic Index of Biotic Integrity (B-IBI) quantifying goal attainment. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Dauer, D.M., J. A. Ranasinghe, S. B. Weisberg and R. W. Alden III. 1997. The Chesapeake Bay Restoration Program: the benthic monitoring program - II. Optimizing temporal sampling strategies using fixed-point stations for long-term trends and probability-based spatial sampling for status estimates. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Alden, III, R. W. and D.M. Dauer. 1997. Design of long-term monitoring programs: Approaches taken and lessons learned in the Chesapeake Bay Program. Third International Conference on the Environmental Management of Enclosed Coastal Seas, Stockholm, Sweden.

Weisberg, S.B., J.A. Ranasinghe, D.M. Dauer, L.C. Schaffner, R.J. Diaz and J.B. Frithsen. 1997. Chesapeake Bay Benthic Monitoring Program: I. Development of restoration goals and an index quantifying attainment. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Dauer, D.M. and J.A. Ranasinghe. 1997. Chesapeake Bay Benthic Monitoring Program: II. Trends using fixed-point stations. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Ranasinghe, J. A., and D. M. Dauer. 1997. Chesapeake Bay Benthic Monitoring Program: III. Status estimates using probability sampling. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Presentations (Continued)

Alden, R.W., III, S. B. Weisberg, J. A. Ranasinghe, and D. M. Dauer. 1997. Chesapeake Bay Benthic Monitoring Program: IV. Optimizing temporal sampling. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Dauer, D.M. , R. W. Alden III and J. A. Ranasinghe. 1997. Chesapeake Bay Benthic Monitoring Program: V. Linking trends in the benthos with trends in water quality. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Ranasinghe, J.A. , D. M. Dauer, S. B. Weisberg and Raymond W. Alden III . 1997. Interaction of restoration, management and monitoring of the Chesapeake Bay, USA. The benthic biological monitoring program. 14th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Dauer, D.M. 1998. Functional morphology and feeding behavior of *Spio setosa.* Sixth International Polychaete Conference. Curitiba, Brazil

Dauer, D.M., R.W. Alden III, A.J. Rodi, Jr., and J.A. Ranasinghe. 1999. Colonization potential of marobenthic communities in a highly urbanized estuarine watershed. 15th Biennial International Estuarine Research Federation Conference, New Orleans, Louisiana.

Ranasinghe, J.A. and D.M. Dauer. Chesapeake Bay Benthos: An example of successful interaction between living resource monitoring, modeling and research. 15th Biennial International Estuarine Research Federation Conference, New Orleans, Louisiana.

Ranasinghe, J.A., D.E. Russell, F.W. Kutz, J.B. Frithsen, J.F. Paul, R. Batuik, J.L. Hyland, J. Scott and D.M. Dauer. 1999. Two indices of benthic community yield similar results for sites in Chesapeake Bay. 15th Biennial International Estuarine Research Federation Conference, New Orleans, Louisiana.

Dauer, D. M., E.V. Pardo and K. Worsaae. 2000. A tale of two worms: optimal foraging theory, functional morphology and feeding behavior. American Society of Limnology and Oceanography. Copenhagen, Denmark.

Pardo, E.V. and D.M. Dauer. 2001. Particle size selection in individuals from epifaunal versus infaunal populations of the nereid polychaete *Nereis (Neanthes) succinea*. Seventh International Polychaete Conference, Reykjavik, Iceland.

Dauer, D.M.. , H. T. Mahon, T. L. Williams and R. Sardá. 2001. Trophic dynamics and feeding biology of interface feeding polychaetes: techniques, interpretations and future directions. Seventh International Polychaete Conference, Reykjavik, Iceland.

Presentations (Continued)

Dauer, D.M. and R.J. Llansó. 2001. Spatial scales and probability based sampling in determining levels of benthic community degradation in the Chesapeake Bay. 16th International Estuarine Research Conference, St. Pete Beach, Florida.

Llansó, R.J., D.M. Dauer and L.C. Scott. 2001. Application of the Benthic Index of Biotic Integrity to environmental monitoring in Chesapeake Bay. 16th International Estuarine Research Conference, St. Pete Beach, Florida.

Diaz, R.J. and D.M. Dauer. 2002. Assessment of benthic habitat quality in the lower Chesapeake Bay, USA using multiple methods and metrics. Benthic Dynamics: In-situ Surveillance of the Sediment-water Interface, University of Aberdeen, Scotland.

Mahon, H.K. and D.M. Dauer. 2002. Responses of juvenile *Streblopio benedicti* (Spionidae) to chemical cues bound to glass beads. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Dauer, D.M., H. K. Mahon, A.R. Mahon and G. B. Read. 2002. Integration of functional morphology and molecular biology - *Boccardia* species from New Zealand and British Columbia. Invited symposium *Morphology, molecules, evolution and phylogeny of the polychaete and related taxa.* Osnabrück, Germany.

Dauer, D.M.. 2003. Trophic dynamics and feeding biology of interface feeding polychaetes: techniques, interpretations and future directions. Station Marine de Wimereux, Wimereux, France.

Dauer, D.M. 2003. Estuarine benthic communities: indices of environmental health, spatial sample allocation, and effective communication techniques. University of Lisboa, Lisboa, Portugal.

Dauer, D.M. R.J. Llansó, R. J. Diaz, and L.C. Schafner. 2003. Benthic biotic integrity, habitat quality and diagnosing causes of degradation in Chesapeake Bay, USA. 17th Biennial International Estuarine Research Federation Conference, Seattle, Washington.

Dauer, D.M., P. Chainho, R.J. Llansó and R.J. Diaz 2004. Patterns of taxocene discrimination and species diversity along the estuarine gradient of a homiohaline estuary (Chesapeake Bay, USA). Eighth International Polychaete Conference, Madrid, Spain.

Chainho, P, Chaves, M.L., Costa, J.L., Costa, M.J. and D.M. Dauer. 2004. Adaptive responses of benthic communities to environmental stress in the Mondego River estuary with special reference to the family Spionidae. Eighth International Polychaete Conference, Madrid, Spain.

Presentations (Continued)

Mahon, H.K..and D.M. Dauer. 2004. Particle selection dynamics of surface deposit feeding guilds: roles of organic coatings, particle size and adaptive morphologies. Eighth International Polychaete Conference, Madrid, Spain.

Mahon, A.R. Mahon, H.K. , Dauer, D.M. and Read, G.R. 2004. Morphological, molecular and biogeographic relationships among several species of *Boccardia* (Polychaeta: Spionidae) from the Pacific Ocean. Eighth International Polychaete Conference, Madrid, Spain.

Dauer, D.M., 2004. Session Chair - Reproduction and Ecology. Eighth International Polychaete Conference, Madrid, Spain.

Dauer, D.M., 2004. Tribute to the late Joseph L. Simon (March 18, 1937 - March 22, 2004). Eighth International Polychaete Conference, Madrid, Spain.

Chainho, P., J.L. Costa, M.L. Chaves, D.M. Dauer and M.J. Costa. 2004. Defining the best sampling season to assess benthic ecological conditions in Portuguese estuaries. 38th European Marine Biology Symposium, Aveiro, Portugal.

Dauer, D.M. 2005. Trophic dynamics of benthic invertebrates: studies of ecology, evolution and energetics. Department of Biological Sciences, University of Hull, Hull, England.

Dauer, D.M. 2005. Twenty years (1985-2004) of benthic monitoring of Chesapeake Bay, USA. Accomplishments, advances and applications. Colloque: Indicateurs Benthiques. Seine Aval Program. Wimereux Marine Laboratory, Wimereux, France.

Dauer, D.M., R.J. Llansó, R. J. Diaz, and L.C. Schaffner. 2005. Twenty Years (1985-2004) of Benthic Monitoring of Chesapeake Bay, USA. Accomplishments, Advances and Applications. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Llanso, R. J., R.J. Diaz, R. J., D.M. Dauer, D. M., R.D. Seitz and D. Forsell. 2005. Benthos of diving duck feeding habitats of Chesapeake Bay, USA. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Dauer, D. M. and R.W. Alden, III. 2005. Sediment contaminant remediation and benthic community restoration potential in an urbanized watershed, the Elizabeth River, Virginia. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Chainho, P., J.L. Costa, M.L. Chaves, M.J. Costa, and D.M. Dauer. 2005. Comparison of the classifications obtained by using different approaches to assess the ecological quality in a poikilohaline environment: the Mondego River estuary, Portugal. 18th Biennial International Estuarine Research Federation Conference, Norfolk, Virginia.

Mahon, H. K. and D. M. Dauer. 2006. Particle selection in *Macoma balthica* (Bivalvia): the effects of organic coating and particle size. Benthic Ecology Meeting, Quebec, Canada.

Presentations (Continued)

Tatem, S. A. and D. M. Dauer. 2006. Trophic relationships among macrobenthic species of an intertidal sand flat. Benthic Ecology Meeting, Quebec, Canada.

Walsh, C.G. and D. M. Dauer. 2006. Diet differences in the mummichog, *Fundulus heteroclitus*, comparing populations from tidal creeks with highly urbanized and highly forested watersheds in Chesapeake Bay, USA. Benthic Ecology Meeting, Quebec, Canada.

Borja, A. and D.M. Dauer. 2006. Session co-chairs and organizers of session entitled: Assessing the environmental quality status in estuarine and coastal systems: comparing methodologies and indices. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Chainho, P., J.L. Costa, M.J. Costa, and D.M. Dauer. 2006. The use of multimetric indices to classify Portuguese estuaries with different hydromorphological characteristics. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Borja, A., D.M. Dauer, R.J. Diaz, R.J. Llansó, I. Muxika, J.G., Rodríguez, and L.C. Schaffner. 2006. Comparison between B-IBI and AMBI indices in Chesapeake Bay: assessing benthic quality condition using different tools. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Dauer, D.M., M.F. Lane, and R.J. Llansó. 2006. The Chesapeake Bay Benthic Index of Biotic Integrity, designated use and water depth effects. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Llansó, R. J., Vølstad, J. H., D.M. Dauer. 2006. Different *Ecological Indicators* performance in assessing environmental status: a case study on estuarine eutrophication. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Dauer, D.M., A. Borja and R.J. Diaz. 2006. Assessing the Environmental Quality Status in Estuarine and Coastal Systems. Summary, Salient Points and Solutions. American Society of Limnology and Oceanography. Victoria, British Columbia, Canada.

Dauer, D.M. 2006. Trophic dynamics of benthic invertebrates: studies of ecology, evolution and energetics. Laboratorio di Ecologia del Benthos. Stazione Zoologica di Napoli. Ischia, Italy.

Dauer, D.M. 2006. Monitoring, assessment of restoration and management. Ecological foundation and governance. Chesapeake Bay, USA (1985-2005). TWReferenceNET, "Management and sustainable development of protected transitional waters." University of Leece, Leece Italy.

Presentations (Continued)

Dauer, D.M. 2007. Challenges in coastal and transitional waters: science-management interactions, adaptive management and adaptive monitoring. University of Lisboa, Lisboa, Portugal.

Dauer, D.M. 2007. Integrative approaches to assessing estuarine ecosystem integrity. Metrics, indicators, indices, criteria, combinatorial strategies, and interpretive paradigms - the USA. experience. EcoSummit 2007, Beijing, China.

Mahon, H. K. and D. M. Dauer. 2007. Energy maximization strategies of four surface deposit feeding polychaetes: considerations of morphology and function. 9th International Polychaete Conference, Portland, Maine.

Mahon, A.R., D.M. Dauer, H.K. Mahon, and K.M. Halanych. 2007. Molecular differentiation of three morphologically similar spionid polychaetes using cytochrome oxidase I (COI). 9th International Polychaete Conference, Portland, Maine.

Dauer, D.M. 2007. Integrative approaches to assessing estuarine ecosystem integrity: actions, awareness and accountability. 19th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Llanso, R.J., D.M. Dauer, and J.Volstad. 2007. Assessing ecological integrity for impaired waters decisions in Chesapeake Bay, USA. 19th Biennial International Estuarine Research Federation Conference, Providence, Rhode Island.

Borja, A., D.M. Dauer, M. Elliott, and C. Simenstad. 2009. Session convenors. Medium and long-term recovery of marine and estuarine systems, as guide to presenting useful information in new scenarios to restore ecological integrity. American Society of Limnology and Oceanography. Nice, France.

Dauer, D.M., A. Borja, M. Elliott, and C. Simenstad. 2009. Integrative approaches to assessing coastal ecosystem integrity. Introductory tutorial lecture. American Society of Limnology and Oceanography. Nice, France.

Dauer, D.M., M. F. Lane., N. R Chaganty and R.J. Llansó. 2009. Long-term Patterns of trends in water quality and benthos of Chesapeake Bay (1985-2007). Lessons and limits of restoration efforts. American Society of Limnology and Oceanography. Nice, France.

Ranasinghe, A.. A. Borja and D.M. Dauer. 2009. Assessing Ecological Integrity Using Multiple Indices and Ecosystem Components: The Sequel. 20th Biennial International Coastal and Estuarine Research Federation Conference, Portland, Oregon.

Dauer, D.M. 2010. Member of the Scientific Organizing Committee of the Estuarine & Coastal Sciences Association Symposium 47 entitled **"**Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide**."** The symposium was held in Figueira da Foz, Portugal from September 14-19, 2010.

Presentations (Continued)

Dauer, D.M. 2010. Invited keynote address at the Estuarine & Coastal Sciences Association Symposium 47 entitled **"**Integrative tools and methods in assessing ecological quality in estuarine and coastal systems worldwide." Figueira da Foz, Portugal.

Dauer, D.M. 2010. Session chair. "How comparable are ecological assessment criteria and approaches worldwide?" Estuarine & Coastal Sciences Association Symposium 47 Figueira da Foz, Portugal.

Ángel Borja, D.M. Daniel Dauer and A. Grémare. 2010. Session chairs. Benthic indicators: responding to different human pressures and assessing integrative quality status. International Council for the Exploration of the Sea annual meeting in Nantes, France.

Teixeira H., Á. Borja, S. B. Weisberg, J. A. Ranasinghe, D. B. Cadien, D. M. Dauer, J.-C. Dauvin, S. Degraer, R. J. Diaz, A. Grémare, I. Karakassis, R. J. Llansó, L. L. Lovell, J. C. Marques, D. E. Montagne, A. Occhipinti-Ambroggi, R. Rosenberg, R.l Sardá, L.C. Schaffner and R. G. Velarde. 2010. Do experts across North America and Europe produce comparable assessments of marine benthic infaunal community condition using best professional judgement**?** International Council for the Exploration of the Sea annual meeting in Nantes, France.

Dauer, D.M., M. F. Lane, R.J. Llansó and R. J. Diaz. 2012. Secondary production as a functional metric in assessing the ecological value of macrobenthic communities to higher trophic levels (Chesapeake Bay, USA). 50th ECSA (Estuarine & Coastal Sciences Association) Conference: Today's science for tomorrow's Management. Venice, Italy.

Byron, K. W. and D.M. Dauer. 2013. The unseasonal benthos: SAR.MA models applied to the benthic community of the Chesapeake Bay suggest a lack of seasonality. Coastal and Estuarine research Federation Conference, San Diego, California.

Llansó, R.J., Dauer, D.M. and M.F. Lane. 2015. Linear and non-linear trends of macrobenthos in Chesapeake Bay relative to water quality and streamflow. Coastal and Estuarine research Federation Conference, Portland, Oregon.

Brauko, K.M., D. M. Dauer, D.M., and P.L. Lana. 2015. Consistency of responses of macrofaunal trophic guilds to sewage discharges at nested scales of variation in a subtropical estuary. Coastal and Estuarine research Federation Conference, Portland, Oregon.

Dauer, D.M., K. M. Brauko, R.J. Llansó, and Mike F. Lane. 2016. Taxocene patterns of benthic secondary productivity along an estuarine gradient. 12th International Polychaetology Conference, Cardiff, Wales.

Dauer, D.M. 2016. Chair for Functional Morphology session. 12th International Polychaetology Conference, Cardiff, Wales.

Presentations (Continued)

Dauer, D.M., Llansó, R.J., and M.F. Lane. 2017. Benthic community condition trends in the Chesapeake Bay – 30 years and what progress? Coastal and Estuarine Research Federation Conference. Providence, Rhode Island.

Llansó, R.J., Dauer, D.M., R.D. Seitz, and M.F. Lane. 2017. Assessment of Ecological Value of Benthic Habitats, Coastal and Estuarine Research Federation Conference. Providence, Rhode Island.

Dauer, D.M. 2019. Presidential opening address. 13th International Polychaete Conference, Long Beach, California.

Dauer, D.M., Rodi, A. J., Llansó, R.J., and S. Arcuri. 2019. The recent spread of the non-indigenous species, *Hermundura americana* (Polychaete: Pilargidae) throughout the Chesapeake Bay. 13th International Polychaete Conference, Long Beach, California.

Dauer, D.M., Rodi, A. J., Llansó, R.J., and S Arcuri. 2019. The recent spread of the non-indigenous species, *Hermundura americana* (Polychaete: Pilargidae) throughout the Chesapeake Bay. Coastal and Estuarine Research Federation Conference. Mobile Alabama.

Llansó, R.J., Dauer, D.M., R.D. Seitz, and M.F. Lane. 2019. Assessment of ecological value of benthic habitats in offshore wind energy area. Coastal and Estuarine Research Federation Conference. Mobile, Alabama.

Llansó, R.J., A. Borja and D.M. Dauer. 2019. Wind energy: effect on ecological function. Session convenors. Coastal and Estuarine Research Federation Conference. Mobile, Alabama.

Llansó, R.J., Dauer, D.M., and M.F. Lane. 2021. Chesapeake Bay Benthic Monitoring Program: Quantifying Environmental Change. Coastal and Estuarine Research Federation Conference. All virtual meeting.

Turner, C., L. Horth and D.M. Dauer 2021. Estuarine eutrophication effects on the ecological condition of the benthos in the Pagan River watershed. Coastal and Estuarine Research Federation Conference. All virtual meeting.

Muhic, W.K., L. Horth and D.M. Dauer 2021. Checking in on the Elizabeth River's Southern Branch, 20 years of change in an urban watershed. Coastal and Estuarine Research Federation Conference. All virtual meeting.

Addendum: Summary of Selected Significant Publications

Benthic Community Structure as an Indicator of Environmental Quality

- **Development of functional groups of macrobenthos used to determine the environmental health of marine and estuarine ecosystems.** In assessing the ecological impacts of low dissolved oxygen events on the macrobenthic communities of Chesapeake Bay, two functional groups of species were proposed to discriminate stressed benthic communities of the Chesapeake Bay. These two groups were based upon life history characteristics and response to environmental stress and termed initially as opportunistic and equilibrium species groups. This approach is now widely adopted for use in the Chesapeake Bay and other estuaries and was the precursor to the pollution indicative and pollution sensitive metrics of the Chesapeake Bay Benthic Index of Biotic Integrity (See Weisberg et al. 1997 below).

  Dauer, D.M., J.A. Ranasinghe and A.J. Rodi, Jr. 1992. Effects of low dissolved oxygen levels on the macrobenthos of the lower Chesapeake Bay. *Estuaries.* 15: 384-391.

- **Development of criteria for determining the environmental health of benthic communities of Chesapeake Bay**. Graphical models of macrobenthic community structure were presented to assess the environmental health of estuarine benthic communities. These models represent an easily understood depiction of complex biological data and were designed for presentation to environmental managers. Metrics used were community biomass, abundance of individuals, species diversity, depth distribution of biomass within the sediment, equilibrium species biomass and opportunistic species biomass. Each model displays the metric as a function of salinity. The development of multiple metrics of benthic community structure to assess the environmental health of benthic communities was another contribution leading to th development of the Chesapeake Bay Benthic Index of Biotic Integrity (See Weisberg et al. 1997 below). This publication is widely cited internationally by applied benthic ecologists in publications dealing with anthropogenic sources of environmental stress.

  Dauer, D.M. 1993. Biological criteria, environmental health and estuarine macrobenthic community structure. *Marine Pollution Bulletin* 26: 249-257.

- **Development of restoration goals for macrobenthic communities of the Chesapeake Bay**. Habitat-specific goals for the major benthic communities of the Chesapeake Bay were developed for ten benthic community metrics at seven habitat types. This project resulted in the development of a practical and conceptually sound framework for assessing progress towards the attainment of environmental conditions that allow the establishment and maintenance of benthic communities of the highest ecological value.

Selected Significant Publications (Continued)

Ranasinghe, J.A., S.B. Weisberg, D.M. Dauer, L.C. Schaffner, R.J. Diaz and J.B. Frithsen. 1994. Chesapeake Bay benthic community restoration goals. Report for the U.S. Environmental Protection Agency, Chesapeake Bay Office and the Maryland Department of Natural Resources. 49 pp.

Ranasinghe, J.A., S.B. Weisberg, D.M. Dauer, L.C. Schaffner, R.J. Diaz, and J. B. Frithsen. 1998. Chesapeake Bay benthic community restoration goals. pp. 87-89, In, S.I. Hartwell (ed.), *Biological habitat quality indicators for essential fish habitat*. NOAA Technical Memorandum NMFS-F/SPO

❒ **Development and application of trend analyses to benthic communities of the Chesapeake Bay.** The Benthic Ecology Laboratory of Old Dominion University produced the first trend analyses conducted on macrobenthic communities of the Chesapeake Bay. This approach uses a series of powerful nonparametric trend tests that have been adopted bay-wide for trend analyses.

Dauer, D.M. 1991. Long-term trends in the benthos of the lower Chesapeake Bay. In: New *Perspectives in the Chesapeake System. A Research and Management Partnership.* J. A. Mihursky and A. Chaney (eds). Chesapeake Research Consortium. pp. 527-536.

Dauer, D.M. 1994. Long-term trends in the Lower Chesapeake Bay (1985-1992): IV. Benthos. In: *Proceedings of the Chesapeake Research Conference. Toward a Sustainable Coastal Watershed: The Chesapeake Experiment.* P. Hill and S. Nelson (eds). Chesapeake Research Consortium Publication No. 149, pp. 430-440.

❒ **Development of inferential links between water quality trends and benthic community trends.** Dauer and Alden (1995) was the first to relate in a quantitative manner long-term trends in water quality to long-term trends in benthic communities of the Chesapeake Bay. The trends in the indicators of benthic biological community health were inferentially related to trends observed in water quality conditions in the tributaries and mainstem of Chesapeake Bay. All major water quality and biotic trends appeared to correspond in an ecologically meaningful manner. Dauer (1997) was an invited presentation at an International Symposium entitled *Long-term changes in marine ecosystems: methods of analysis, case studies and between-site comparisons*, held in Arcachon, France in 1994. Both studies concluded that trends in opportunistic and equilibrium species composition of the benthic community were the best indicators of the ecological significance of the trends observed.

Dauer, D.M. and R.W. Alden III. 1995. Long-term trends in the macrobenthic communities of the lower Chesapeake Bay (1985-1991). *Marine Pollution Bulletin* 30: 840-850.

Dauer, D.M. 1997. Dynamics of an estuarine ecosystem: Long-term trends in the macrobenthic communities of the Chesapeake Bay, USA (1985-1993). *Oceanologica Acta* 20: 291-298.

Selected Significant Publications (Continued)

- **Development of a benthic community index for assessing attainment of restoration goals for macrobenthic communities of the Chesapeake Bay**. An Index of Biotic Integrity (B-IBI) was developed for assessing in a quantitative manner whether benthic communities of the Chesapeake Bay have met restoration goals. The B-IBI provides a means for comparing relative condition of benthic invertebrate communities across habitat types. Seven benthic habitat types were identified and community metrics were selected for each habitat type. Scoring thresholds for each metric were determined based the distribution of metric values from samples considered to represent reference condition, i.e., unaltered by anthropogenic sources of stress. The index is scaled from 1 to 5 where a value of 3.0 or greater indicates attainment of restoration goals.

  Weisberg, S.B., J.A. Ranasinghe, D.M. Dauer, L.C. Schaffner, R.J. Diaz and J.B. Frithsen. 1997. An estuarine benthic index of biotic integrity (B-IBI) for Chesapeake Bay. *Estuaries* 20: 149-158.

- **Experimental design to test the potential toxic effects of an anti-fouling chemical, tributyltin, on the biota of Chesapeake Bay.** A wide variety of toxic chemicals are used to reduce the fouling of ships and boats in marine waters. To be environmentally acceptable, such chemicals must be effective at reducing fouling but have only small-scale toxic effects. Tributyltin, a very effective anti-fouling chemical, was suspected of having detrimental effects on marine organisms beyond those directly attached to the hulls of ships. Because it was widely used in marine industries, any environmental regulations that would reduce its use would be controversial. Dr. Dauer designed and implemented a blind-test in which marine snails were collected from a variety of locations representing a gradient of concentration of tributyltin in the water. Samples of the snails were sent to two independent academic labs with no knowledge of the locations of the samples and tested for abnormalities induced by tributyltin. As a result of this experimental design the Commonwealth of Virginia set rigid water quality standards controlling the use of tributyltin.

  Bryan G.W., P.E. Gibbs, R.J. Huggett, L.A. Curtis, D.S. Bailey and D.M. Dauer. 1989. Effects of tributyltin pollution on the mud snail, *Ilyanassa obsoleta,* from the York River and Sarah Creek, Chesapeake Bay. *Marine Pollution Bulletin* 20: 458-462.

- **Testing the effectiveness of approaches to assessing the environmental quality of marine systems using benthic communities.** In this study a widely used graphical approach, the abundance-biomass comparison method the ABC method), for assessing the environmental quality of marine systems was tested using data from an estuary. Estuaries have strong gradients of environmental factors that produce high levels of natural stress. The ABC approach assumed that naturally unstressed communities would have high dominance in biomass by a few species (long-lived, equilibrium species) and few if any species that greatly dominated abundance patterns. Conversely, highly stressed communities would have a high

Selected Significant Publications (Continued)

dominance in abundance by a few species (short-lived, opportunistic species) and no species dominating biomass patterns. The use of the ABC method in estuaries is limited by the presence of many species adapted to high levels of natural stress. Alternate and multiple approaches for assessing the environmental quality of benthic communities of estuaries were proposed. Multiple approaches will increase the statistical robustness of environmental assessments.

Dauer, D.M., M. W. Luckenbach and A.J. Rodi, Jr. 1993. Abundance biomass comparison (ABC method): effects of an estuarine gradient, anoxic/hypoxic events and contaminated sediments. *Marine Biology* 116: 507-518.

❒ **Pioneering development of relationships between benthic community condition, water quality, sediment quality and watershed stressors on a bay-wide scale for the Chesapeake Bay**. In this study, associations between macrobenthic communities, measures of pollution of the water column and sediment, and measures of anthropogenic activities throughout the watershed were examined for the Chesapeake Bay, USA. Correlation analysis was used to examine associations between sites with poor benthic condition and measures of pollution exposure in the water column and sediment with three major associations identified: (1) Benthic community condition was strongly correlated with low dissolved oxygen events. Low dissolved oxygen events were spatially extensive occurring in 32 of the 61 spatial segments studied of the Chesapeake Bay. (2) Benthic community condition was negatively related to sediment contamination. Sediment contamination was spatially limited to a few specific locations including Baltimore Harbor and the Southern Branch of the Elizabeth River and only seven of 61 segments had any contaminants exceeding levels considered detrimental to benthos. (3) After removing the effects of low dissolved oxygen events, the residual variation in benthic community condition was weakly correlated with surrogates for eutrophication - water column concentrations of total nitrogen, total phosphorus and chlorophyll *a*. In addition, associations between benthic condition and anthropogenic inputs and activities in the watershed were also studied with four major associations identified: (1) Benthic condition was negatively correlated with measures of urbanization (i.e. population density, point source loadings, and total nitrogen loadings) and positively correlated with watershed forestation. (2) At the tributary level, the frequency of low dissolved oxygen events and levels of sediment contaminants were positively correlated with population density and percent of urban land use. Sediment contaminants were also positively correlated with point source nutrient loadings. (3) Water column total nitrogen concentrations were positively correlated with nonpoint nutrient loadings and agricultural land use while total phosphorus concentrations were not correlated with land use or nutrient loadings. (4) Chlorophyll *a* concentrations were positively correlated with nitrogen and phosphorus concentrations in the water column and with agricultural land use but were not correlated with nutrient loads.

Selected Significant Publications (Continued)

Dauer, D.M., J. A. Ranasinghe, and S. B. Weisberg. 2000. Relationships between benthic community condition, water quality, sediment quality, nutrient loads, and land use patterns in Chesapeake Bay. *Estuaries* 23: 80-96.

Below are comments from the two reviewers of this paper*:*

> "This pioneering effort linking benthic community ecology with the larger scale disciplines of landscape (or watershed) ecology is exciting and likely to improve the contributions of benthic ecology to environmental management decision-making."
>
> "This is a very fine effort to actually use benthic monitoring data as it was intended - in order to help make better environmental management decisions."

❒ **Statistical Verification of the Benthic Index of Biotic Integrity**. In this study a series of multivariate statistical and simulation techniques were employed to evaluate and verify properties of the B-IBI. The evaluation process focused on verifying various aspects of the B-IBI: (1) whether the threshold values employed to calculate scores for B-IBI metrics are effective; (2) whether the sets of metrics comprising the B-IBI can detect statistically significant differences between sites known to be degraded and sites known to be unstressed (reference); (3) which of the metrics provide the greatest discriminating power; (4) the minimum and optimal sets of metrics that should be used to produce defensible B-IBIs for each habitat; (5) confidence limits of B-IBI scores for reference areas and degraded areas in each habitat; and (6) assessment of the sensitivity of the B-IBIs to changes in the raw values of individual metrics. Overall, the B-IBI was verified as being sensitive, stable, robust, and statistically sound.

Alden, R.W. III, D.M. Dauer, J.A. Ranasinghe, L.C. Scott, and R.J. Llansó. 2002. Statistical Verification of the Chesapeake Bay Benthic Index of Biotic Integrity. *Environmetrics* 13: 473- 498.

❒ **Probability-based Sampling and Areal Estimates of Degradation**. Biological monitoring programs traditionally use fixed-point stations for the collection of field data. Such stations are useful for long-term trend analyses but spatial extrapolation to larger bodies of water is not possible. Knowing the areal extent of degradation is a particularly useful in assessing the effectiveness of restoration efforts at different spatial scales B tidal creeks, rivers, the Bay. After careful and quantitative consideration of the effects of reducing temporal sampling frequency on the statistical power to detect long-term tends at fixed stations (Alden et al. 1997), the number of cruises each year to the fixed stations was reduced to allow the addition of a probability-based sampling program in 1996. In this program the Chesapeake Bay was divided into 10 sampling strata and each stratum was sampled at 25 random locations

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selected by a GIS system. A total of 250 random locations are sampled each year. Such random sampling allows the program to estimate, with a known confidence interval, the actual area of benthic bottom of each stratum that fails or attains the Benthic Restoration Goals as indicated by the value of the B-IBI. This pioneering effort to combine probability-based sampling, the Benthic Restoration Goals and the B-IBI has since been applied in other benthic studies of the Chesapeake Bay from spatial scales ranging from small tidal creeks with a benthic bottom area of less than 0.1 km^2 to the entire 11,607 km^2 of benthic bottom of Chesapeake Bay (Dauer and Llansó 2003). This combined approach has been successfully applied to each of the 67 Chesapeake Bay tidal water segments providing information at spatial scales never before available (Llansó et al. 2003).

Alden, R.W. III, S.B. Weisberg, J.A. Ranasinghe and D.M. Dauer. 1997. Optimizing temporal sampling strategies for benthic environmental monitoring programs. *Marine Pollution Bulletin* 34: 913-922.

Dauer, D.M. and R. J. Llansó. 2003. Spatial scales and probability based sampling in determining levels of benthic community degradation in the Chesapeake Bay. *Environmental Monitoring and Assessment* 81: 175-186.

Llansó, R.J., D.M. Dauer, J.H. Vølstad, and L.S. Scott. 2003. Application of the Benthic Index of Biotic Integrity to environmental monitoring in Chesapeake Bay. *Environmental Monitoring and Assessment* 81: 163-174.

❒ **Relating Benthic Habitat Quality to Benthic Community Condition**. In this study several ecological hypotheses relating habitat quality and benthic biotic integrity were tested. An independent measure of habitat quality was obtained using the SPI (Sediment Profile Imaging) approach in which a specially designed camera system penetrates the sediment and creates an image that is assessed for habitat quality. Benthic habitat quality is assessed by calculation of the Organism-Sediment Index (OSI). The OSI defines quality of benthic habitats by evaluating images for depth of the apparent color RPD layer, successional stage of macrofauna, the presence of gas bubbles in the sediment (an indication of high rates of methanogenisis), and the presence of reduced sediment at the sediment-water interface that would indicate current or recent low dissolved oxygen conditions. This study examined the relationship between patterns of habitat quality and benthic biotic integrity as measured by the B-IBI at 200 probability-based stations from Virginia=s tidal waters. There four possible relationships between the habitat quality and biotic integrity were examined. (1) Both habitat quality and biotic integrity are high. A strong positive relationship was found supporting the hypothesis that when habitat quality is restored biotic integrity will improve. (2) Both habitat quality and biotic integrity are low. Again a strong relationship was found supporting the hypothesis that when habitat quality deteriorates then biotic integrity will degrade. These two cases of direct relationships between habitat quality and biotic integrity accounted for 51% of the sites studied. There are two possible cases of an inverse relationship between habitat

Selected Significant Publications (Continued)

quality and biotic integrity. (3) High habitat quality but low biotic integrity occurred in 39% of the sites studied. This result is consistent with the hypothesis that a lag time may exist between restoration of habitat quality and the attainment of high biotic integrity through such ecological processes as rates of recruitment and community succession. (4) The existence of low habitat quality but high biotic integrity does not make ecological sense and this was the rarest case with only 10% of the sites placed into this category.

Diaz, R.J., G. R. Cutter, Jr. and D. M. Dauer. 2003. A comparison of two methods for estimating the status of benthic habitat quality in the Virginia Chesapeake Bay. *Journal of Experimental Marine Biology and Ecology* 285-286: 371-381.

❒ **Development of a Sediment Contaminant Diagnostic Tool**. The objective of this study was to develop analytical tools that are capable of classifying regions in Chesapeake Bay identified as having degraded benthic communities into categories distinguished by the type of stress experienced by those communities. Sediment contaminants and bottom low dissolved oxygen concentrations were identified as the primary sources of anthropogenic stress on benthic communities and an attempt was made to develop multivariate statistical tools that could distinguish between these sources of stress. In this initial diagnostic project a statistical procedure was developed in order to assess when sediment contaminants were most likely the cause of benthic community degradation. A linear predictive discriminant function was developing using the probability-based samples of the Maryland and Virginia Benthic Monitoring Programs. There were insufficient samples to develop a tool including low dissolved oxygen as a stressor. However, the developed function is capable of discriminating contaminated sites from sites affected by all other potential sources of stress in any of the seven benthic habitat types of Chesapeake Bay. Presently additional validation of this diagnostic tool is being conducted the staff of Old Dominion University and Versar, Inc. This final validation will be competed with implementation recommendations by January, 2005. Future efforts to include additional stressor groups such as low dissolved oxygen are anticipated.

Dauer, D.M., M. F. Lane and R. J. Llansó. 2002. Development of diagnostic approaches to determine source as of anthropogenic stress affecting benthic community condition in the Chesapeake Bay. Final Report to the US. Environmental Protection Agency. 64 pages.

❒ **Testing depth-related patterns in benthic community condition** In the Chesapeake Bay, the estuary has been stratified based on designated water use criteria. A shallow-water designated use category from the intertidal to the 2-m depth contour is designed to protect underwater bay grasses and the many fish and crab species that depend on seagrass bed habitats. Alternatively, a shallow water zone down to the 4-m depth threshold has also been defined as the zone of maximum anthropogenic impact upon natural ecosystem functions. In this study, the question of whether separate shallow-water strata should be created within the

Selected Significant Publications (Continued)

existing Chesapeake Bay benthic monitoring program strata was examined. Benthic community condition differences between shallow water and deep water regions were tested by comparing depth strata for each of two depth thresholds, and three Chesapeake Bay regions: (1) the York River entire estuarine gradient from the tidal fresh-water to the polyhaline zone, (2) the Southern Branch of the Elizabeth River, and (3) the Virginia mainstem portion of the bay. These last two polyhaline regions were characterized as having the best and worst benthic community condition in Chesapeake Bay. Depth strata were defined by the 2-m and 4-m thresholds that are intended to emphasize (1) restoration of submerged aquatic vegetation, or (2) the zone of maximum anthropogenic impact. No significant depth-related differences in benthic condition were found at the scale of the entire tidal York River. Differences with depth were manifested only in the low mesohaline and polyhaline zones. No differences were found in the Southern Branch of the Elizabeth River or in the Virginia mainstem. This study suggested that an adaptive monitoring change of stratification into shallow and deeper regions is not required for the probability-based benthic monitoring program.

Dauer, D.M., R.J. Llansó, and M.F. Lane. 2008. Depth-related patterns in benthic community condition along an estuarine gradient in Chesapeake Bay, USA. *Ecological Indicators* 8: 417-424.

❒ **Developing Biological Criteria for Impaired Waters Assessments**. To meet the requirements of the Clean Water Act, the States of Maryland and Virginia are in the process of developing biological criteria for evaluating estuarine waters for reporting overall condition and identification of impaired waters, i.e. 305(b)/303(d) reporting. The Chesapeake Bay Benthic Index of Biotic Integrity (B-IBI) is the basis for these biological criteria. The objectives of this project were to (1) develop a method for deciding whether the Chesapeake Bay tidal waters are biologically impaired, based upon the B-IBI, and (2) produce assessments for each of the 85 Chesapeake Bay segments and sub-segments containing benthic community data. . The method uses reference conditions to identify degradation and designate impairment, but unlike most biological listing methods, it incorporates uncertainty into the impairment decision. Consideration of habitat specificity and uncertainty in reference conditions produces results with fewer Type I errors (calling a segment impaired when it is not). Fewer type I errors avoids unnecessary listing and remediation and helps focus restoration efforts where they are most needed. Uncertainty arises from natural stressors that mask the signal from pollution effects, patchiness in the distribution of macroinvertebrates, and small sample size. The assessments of Chesapeake Bay segments using this method produced impairment classifications that were generally consistent with expectations based on known patterns of human disturbance in the watershed. This is taken as confirmation of the general utility of the method in estuarine management decisions.

Selected Significant Publications (Continued)

Llansó, R.J., D.M. Dauer, and J.H. Vølstad. 2009. Assessing ecological integrity for impaired waters decisions in Chesapeake Bay, USA. *Marine Pollution Bulletin* 59: 48-53.

❒ **Evaluating and comparing indices of benthic condition applicable to Chesapeake Bay** (Llansó et al. 2009b). Three indices of benthic condition developed for different regions of the U.S. Atlantic coast are applicable to the Chesapeake Bay. The implementation of these indices have been carried out by the agencies that developed them, and thus, because of overlapping responsibilities, the indices are being applied to the same geographical region, and the question arises as to how the results of these indices compare. In this study, the results of three indices (the B-IBI, EMAP-Virginian Province, and MAIA benthic indices) calculated on the same data, and the assessments of two monitoring programs that employed these indices (the CBP and the MAIA) were compared. Level of agreement of index results, sampling designs, and statistical estimation methods were evaluated, and differences between assessments using each of the three indices, were tested for significance. The study revealed a moderate to high level of agreement between the ratings of individual sites classified into degraded and non-degraded categories by the indices and by separate categories of water and sediment quality based on dissolved oxygen, sediment contaminant, and toxicity data. However, the assessments that employed these indices produced significantly different estimates of degradation that were due to unbalanced type I and II errors and differences in estimation methods. This study concluded that the greatest challenge in applying estuarine and coastal indices of biological condition is to accurately estimate condition above or below restorative thresholds, and that choice among existing indices does matter.

Llansó, R.J., J.H. Vølstad, D.M. Dauer, and J.R. Dew. 2009. Assessing benthic community condition in Chesapeake Bay: Does the use of different benthic indices matter? *Environmental Monitoring and Assessment* 150:119–127.

❒ **Assessment of the relative role of hypoxia and other environmental factors upon changes in density, biomass, and diversity of macrobenthic communities by depth in Chesapeake Bay** Recent concerns of increasing hypoxia in Chesapeake Bay prompted us to analyze benthic program data to determine benthic community patterns by depth in association with dissolved oxygen (DO) changes relative to changes in other environmental factors. Environmental factors such as temperature, salinity, median grain size, and organic carbon content of sediments influence benthic communities in estuaries to a large extent. DO also influences benthic community structure, but its significance in the Chesapeake Bay has not been evaluated at large spatial scales (i.e., the entire Chesapeake Bay). In this study, the influence of DO upon benthic density, biomass, and diversity relative to other physical variables was determined. Using regression models and an information-theoretic approach (Akaike's Information Criteria), the study found that DO was an important predictor of benthic density, biomass, and diversity by depth. Though other physical variables affected benthic density, oxygen was the single best predictor for benthic density in the Chesapeake Bay in the summer. Biomass and diversity patterns were also directly related to DO. At low oxygen levels, biomass was extremely low,

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suggesting loss of foraging habitat for fish and crabs and substantial loss of benthic production in mesohaline and polyhaline habitats below 4.5 mg l-1 DO.

Seitz, R.D., W.C. Long, D.M. Dauer, and R. J. Llansó. 2009. Impacts of hypoxia on benthic species and their predators in Chesapeake Bay. *Journal of Experimental Marine Biology and Ecology*. 381:S4-S12.

❒ **Evaluating the relationships between hypoxia and macrobenthic production in Chesapeake Bay.** The interaction of hypoxia and energy in Chesapeake Bay was evaluated using the 1996-2004 Maryland and Virginia benthic random samples collected in summer. Dissolved oxygen (DO) data measured at the time of sampling were assumed to be representative of the stations' annual condition. Daily production was estimated from individual species ash-free dry weights and Edgar's (1990) equation P = 0.0049 * B0.80 * T0.89, where B is ash-free dry weight and T is water temperature. This study found that production of the macrobenthic community was significantly related to DO. On a daily basis, hypoxia reduces secondary production in the Chesapeake Bay by 90%.

Sturdivant, S.K, R. J. Díaz, R.J. Llansó, and D.M. Dauer. 2014. Relationship between hypoxia and macrobenthic production in Chesapeake Bay. *Estuaries and Coasts.* 37: 1219-1232.

Benthic Community Dynamics

❒ **Pioneering application of the theory of island biogeography to marine sedimentary environments.** In this study the MacArthur and Wilson Theory of Island Biogeography was applied to a marine intertidal habitat whose benthic community was naturally defaunated by an intense red tide. The colonization process was followed for two years and the fit of an observed species colonization curve (calculated from observed immigration and emigration rates) was compared to the predicted curve of the theory. This was the first application of this theory to a marine benthic community. The theory proved to generally applicable to "habitat" islands such as intertidal habitats.

Dauer, D.M. and J.L. Simon. 1976a. Repopulation of the polychaete fauna of an intertidal habitat following natural defaunation: species equilibrium. *Oecologia* 22: 99-117.

❒ **Pioneering application of the theory of island biogeography to marine hard substratum communities.** Marine hard substratum communities are composed of species with fundamentally different adaptations than species characteristic of sedimentary habitats. Hard substratum communities are often dominated by species with vegetative growth (macroalgae and colonial animals) and by animals that are suspension feeders. In this study, the effect of

Selected Significant Publications (Continued)

"island size" on the rate of colonization was experimentally studied using replicated plexiglass islands of three different sizes. Island size, historical events (order of colonization of species) and changing competitive abilities within species (size-dependent competitive ability) determined the ultimate community composition.

Otsuka, C.M. and D.M. Dauer. 1981. Fouling community dynamics in Lynnhaven Bay, Virginia. *Estuaries* 5: 10-22.

❒ **Analysis of the spatial scale of colonization events during secondary succession of on intertidal community.** In this study, the spatial dynamics of community colonization were examined using three parallel transects oriented down the intertidal gradient of a habitat defaunated by an intense red tide. This study concluded that similar patterns of immigration and emigration occurred over spatial scales of hundreds of meters establishing the applicability of using a transect method to characterize larger spatial scales.

Dauer, D.M. and J. L. Simon. 1975. Lateral or along-shore distribution of the polychaetous annelids of an intertidal sandy habitat. *Marine Biology* 31: 363-370.

❒ **Analysis of niche expansion and contraction related to interspecific interactions during secondary succession of an intertidal community.** In this study, the habitat component of the ecological niche was examined during colonization events of an intertidal habitat defaunated by an intense red tide. During early stages of colonization pioneering species occupied broad spatial areas of the intertidal habitat gradient. As colonization proceeded and density dependent interactions became significant, species occupied much smaller regions of the habitat indicating niche contraction.

Dauer, D.M. and J.L. Simon. 1976b. Habitat expansion among polychaetous annelids repopulating a defaunated marine habitat. *Marine Biology* 27: 169-177.

❒ **Role of adult immigration/emigration events by species with indirect development in marine benthic community dynamics.** Marine species with indirect development were thought to disperse to new habitats only through the larval stage of the life cycle. Once going through metamorphosis to the adult stage, adults were considered to be sessile and any dispersal was accidental due to passive transport of bottom currents. In this study most of the initial colonization of a defaunated habitat was through adult immigration not larval immigration. The results of this study helped to changed how benthic ecologists interpret the dynamics of colonization.

Dauer, D.M. and J.L. Simon. 1976a. Repopulation of the polychaete fauna of an intertidal habitat following natural defaunation: species equilibrium. *Oecologia* 22: 99-117.

Selected Significant Publications (Continued)

❒ **Ecological significance of adult dispersal in community dynamics.** The importance of adult dispersal of benthic species with larval development was poorly understood because such dispersal is nocturnal. Few marine or estuarine benthic ecologists conducted field research at night, and therefore, nocturnal dispersal events were poorly understood , quantified or even known. Adult individuals dispersing through the water column were captured at night with plankton nets. The study was conducted for over a year and the flux of benthic organisms moving in the water mass was quantified on flooding and ebbing tides in a small estuary. There was a net flux of organisms out of the estuary with important consequences for understanding the flow of organic matter within tidal ecosystems.

Dauer, D.M., R.M. Ewing, J.W. Sourbeer, W.T. Harlan, and T. L. Stokes, Jr. 1982a. Nocturnal movements of the macrobenthos of the Lafayette River, Virginia. *Internationale Revue der gesamten Hydrobiologie* 67: 761-775.

❒ **Resolution of a paradox concerning the distribution of an estuarine endemic species.** *Marenzelleria viridis* (= *Scolecolepides viridis*) is a sedimentary-dwelling polychaete endemic to estuaries of North America. Although populations of this species reach maximum abundances in low salinity regions of an estuary (the oligohaline region) their gametes are not viable in low salinities. How these dense populations were maintained and the location of populations where fertilization occurred remained a paradox for decades. Through nocturnal sampling of the water column for bottom-dwelling benthic organisms, it was demonstrated that this species migrates as adults down the estuary into high salinity waters where they spawn and die. After metamorphosis juveniles migrate up the estuary into the low salinity regions, thus maintaining high population densities. All migrations are with nocturnal tidal currents during winter months.

Dauer, D.M., R.M. Ewing, G.H. Tourtellotte, and H.R. Barker, Jr. 1980. Nocturnal swimming of *Scolecolepides viridis* (Polychaeta: Spionidae). *Estuaries* 3: 148-149.

Dauer, D.M., R.M. Ewing, J.W. Sourbeer, W.T. Harlan, and T. L. Stokes, Jr. 1982a. Nocturnal movements of the macrobenthos of the Lafayette River, Virginia. *Internationale Revue der gesamten Hydrobiologie* 67: 761-775.

❒ **Roles of competition and predation in controlling benthic community structure.** Understanding the relative roles of different biotic factors in structuring communities is a broad objective of many ecological experiments. In this experiment two types of density-dependent interactions, competition and predation, were experimentally studied in the field. Predation-limitation was studied using predator-exclusion cages to keep out the dominant predators (crabs and fish). Competition for food was studied by artificially enriching sediments with a variety of types and dosages of materials: (1) inorganic nutrients to stimulate *in situ* benthic diatom production, (2) addition of both inorganic nutrients and organic carbon and (3) addition of a high organ carbon source (manure and blood meal) to

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stimulate bacterial production. Caged and uncaged areas were enriched. If predation limitation dominated we expected all caged treatments to have higher densities of organisms than uncaged treatments (independent of enrichment) and if competition for food was limiting we expected all enriched treatments to have higher densities of organisms (independent of caging). Results confirmed the overwhelming importance of predation with enrichment treatments significant only within caged treatments.

Dauer, D.M., R.M. Ewing, G.H. Tourtellotte, W.T. Harlan, J.W. Sourbeer, and H. R. Barker Jr. 1982b. Predation pressure, resource limitation and the structure of benthic infaunal communities. *Internationale Revue der gesamten Hydrobiologie* 67: 477-489.

❒ **Role of physical refuges from predation in controlling benthic community structure.** Understanding the relative roles of biotic versus abiotic factors in structuring communities is a broad objective of many ecological experiments. In this experiment mimics of natural structures that may impede predation on organisms dwelling in sedimentary environments were placed into the field in a series of replicated treatments. Two types of natural structures that may act as refuges from predation were studied - clumps of oyster shells and dense clumps of worm tubes. Treatments included different spatial arrangements of oyster clumps (shells of oyster held together with fishing wire) and different densities of projecting tubes (glass tubing attached to plexiglass bases). The artificial oyster clumps were placed onto the sediment surface and the artificial tubes were partially buried within the sediment. Results indicated significant treatment effects for all artificial structures with higher densities of sedimentary organisms associated with physical refuges compare to control areas with no physical refuges.

Dauer, D.M., G.H. Tourtellotte, and R.M. Ewing. 1982c. Oyster shells and artificial worm tubes: the role of refuges in structuring benthic infaunal communities. *Internationale Revue der gesamten Hydrobiologie* 67: 661-677.

❒ **The use of composite variables in testing hypotheses concerning factors affecting the distribution and abundance of benthic communities**. Benthic ecology has a long history of using feeding categories to characterize the composition of benthic communities. Classification of species into feeding categories is often accomplished by using information on closely related species and assuming that such closely related species have similar feeding behaviors. Benthic ecologists have assumed that a combination of sedimentary and hydrodynamic factors affecting food availability determine the distribution and abundance of species using different types of feeding mechanisms (deposit feeders, suspension feeders, predators, etc.). A variety of published studies using correlative analyses inferred relationships between the abundance of benthic species of different feeding categories and environmental parameters such as water depth, sediment type and amount of organic matter. In this study, it was demonstrated that for two of three data sets, random groupings of species

Selected Significant Publications (Continued)

gave as many or more significant correlations with environmental parameters , as groups based upon feeding categories. It was proposed that future studies test whether categorical groupings were better than random groupings before proceeding with any further analyses.

Dauer, D.M. 1984. The use of polychaete feeding guilds as composite variables. *Marine Pollution Bulletin* 15: 301-305.

Functional Morphology and Feeding Behavior

❒ **Interaction of boundary layer flow and feeding behavior.** Marine and estuarine organisms that feed at the sediment-water interface live in a dynamic environment with continual deposition and resuspension of particles. In this study six species of surface-feeding spionid polychaetes were observed to change their feeding behaviors as a function of flow along the bottom. In slow moving currents individuals place their feeding tentacles on the sediment surface feeding on deposited particles. In the presence of a current the feeding tentacles were placed into the water column to collect suspended or resuspended particles. Thus these species switched their feeding behavior as a function of flow. This behavior is adaptive in part because suspended particles have higher nutritional values than deposited particles.

Dauer, D.M., C.A. Maybury, and R.M. Ewing. 1981. Feeding behavior and general ecology of spionid polychaetes. *Journal of Experimental Marine Biology and Ecology* 54: 21-38.

❒ **Introduction of the term "interface feeders".** Marine benthic communities have historically been stated to be dominated by suspension feeders and deposit feeders. Many earlier ecological studies attempted to understand what factors affected the distribution of suspension feeders versus deposit feeders in benthic communities. It is now recognized that many species change their feeding behavior as a function of flow and can switch between deposit feeding at low flow to suspension feeding at higher flows. The term "interface feeders" was proposed for those species that are able to feed on deposited, suspended and resuspended particles at the sediment water interface.

Dauer, D.M., C.A. Maybury, and R.M. Ewing. 1981. Feeding behavior and general ecology of spionid polychaetes. *Journal of Experimental Marine Biology and Ecology* 54: 21-38.

❒ **The discovery of six functional groups of cilia on the feeding tentacles of spionid polychaetes.** Prior to these studies the widespread and diverse group of spionid polychaetes was thought to be obligate deposit feeders with a simple feeding tentacle structure. The

Selected Significant Publications (Continued)

tentacle was thought to consist of a food groove lined by cilia that transported particles from the sediment surface to the mouth of the worm. Six functional groups of cilia were discovered: (1) frontal cilia that line the median groove of the tentacle and transport particles to the pharynx, (2) latero-frontal cilia organized as compound cilia (cirri) that deflect suspended particles onto the frontal surface, (3) lateral cilia that beat in metachronal waves creating vortices that trap suspended particles, (4) non-motile cirri located at the tips of papillae that act as mechno-sensory structures, (5) basal transverse cilia at the base of the tentacle that aid in particle rejection and (6) non-motile cilia located in transverse rows that hold particle-capturing mucus onto the tentacle surface in highly turbulent environments.

Dauer, D.M. 1983. Functional morphology and feeding behavior of *Scolelepis squamata* (Polychaeta: Spionidae). *Marine Biology* 77: 279-285.

Dauer, D.M. 1984. Functional morphology and feeding behaviour of *Streblospio benedicti* (Polychaeta; Spionidae). *Linnean Society of New South Wales*, pp. 418-429.

Dauer, D.M. 1985. Functional morphology and feeding behavior of *Paraprionospio pinnata* (Polychaeta: Spionidae). *Marine Biology* 85: 143-151.

Dauer, D.M. 1987. Potential systematic significance of spionid polychaete tentacular morphology. *Bulletin of the Biological Society of Washington,* No. 7, pp. 41-45.

Dauer, D.M. 1991. Functional morphology and feeding behavior of *Polydora commensalis*. *Ophelia* Suppl. 5: 607-614.

Dauer, D.M. and R.M. Ewing. 1991. Feeding behavior and functional morphology of *Malacoceros indicus* from Lizard Island, Australia. *Bulletin of Marine Science* 48: 395-400.

Dauer, D.M. 1997. Functional morphology and feeding behavior of *Marenzelleria viridis* (Polychaeta: Spionidae). *Bulletin of Marine Science* 60: 512-516.

Dauer. D.M. 2000. Functional morphology and feeding behavior of *Spio setosa*. *Bulletin of Marine Science* 67: 269-275.

Dauer, D.M., H. K. Mahon and R, Sardá. 2003. Functional morphology and feeding behavior of *Streblospio benedicti* and *S. shrubsolii* (Polychaeta: Spionidae). *Hydrobiologia* 496: 207-213.

❒ **The discovery of a relationship between functional morphology and systematics within the spionid polychaetes.** By examining different species from numerous habitats around the world, it was discovered that species within the same genus had very similar kinds of

Selected Significant Publications (Continued)

functional ciliary groups that differed from species from different genera. Morphology of the feeding tentacles was proposed as an ancillary character in understanding phylogenetic relationships within this very diverse group of species.

Dauer, D.M. 1987. Potential systematic significance of spionid polychaete tentacular morphology. *Bulletin of the Biological Society of Washington*, No. 7, pp. 41-45.

❒ **The discovery of a relationship between complexity of feeding behavior and complexity of functional morphology within the spionid polychaetes.** Based upon the studies cited above, six functional groups of cilia can be found on the feeding tentacles of spionid polychaetes. For any particular species the number of functional groups varies from one to four. In this study, it was proposed that feeding complexity (the ability to use more that one mode of feeding) was directly related to the morphological complexity of the feeding tentacle (the number of ciliary groups).

Dauer, D.M. and R.M. Ewing. 1991. Feeding behavior and functional morphology of *Malacoceros indicus* from Lizard Island, Australia. *Bulletin of Marine Science* 48: 395-400.

❒ **The discovery of highly specialized morphologies on spionid species with unique habitat requirements.** *Scolelepis squamata* is a species that is restricted to the high energy portion of sandy beaches where waves break creating a turbulent environment. This species lacks a food groove to transport food particles to the mouth. The feeding tentacle has numerous rows of very short, non-motile cilia that function to hold the very sticky mucus on the tentacle surface. This species feeds by firmly capturing particles in the mucus and retracting the entire tentacle in a highly coiled pattern onto the mouth. In the turbulent environment of the habitat, particles transported along a food groove would be easily eroded off the tentacle. *Polydora commensalis* lives in burrows it creates in snail shells occupied by hermit crabs. This species captures food particles brought into the snail shell by the respiratory current of the hermit crab. The worm's existence is precarious because the hermit crab will eat the worm. The tentacles of this worm are abundantly provided with mechano-sensory cilia that constantly sense the presence of the legs of the hermit crab helping the worm to avoid being eaten by the crab while capturing the abundant food particles in the respiratory current of the crab. In general, species living in very specialized habitats have specialized morphologies of the feeding tentacles.

Dauer, D.M. 1983. Functional morphology and feeding behavior of *Scolelepis squamata* (Polychaeta: Spionidae). *Marine Biology* 77: 279-285.

Dauer, D.M. 1991. Functional morphology and feeding behavior of *Polydora commensalis*. *Ophelia* Suppl. 5: 607-614.

Teaching Activities (Continued)

ADDENDUM
TEACHING SUMMARY

Undergraduate Research

In the past several years Dr. Dauer has directed usually one to three undergraduates per year in a research topic in the field of marine benthic ecology. Students are selected who plan to apply to a marine graduate school and who wish to obtain research experience. Dr. Dauer actively recruits students from either the Invertebrate Zoology or Marine Ecology courses. Two of these students received Sigma Xi awards for outstanding undergraduate research at ODU. Both have finished their master's degrees in Marine Biology, one at the University of Delaware and the other at Long Beach State University. Eight others went onto to graduate school including at ODU, the Virginia Institute of Marine Science and the University of North Carolina at Chapel Hill.

Undergraduate Work Experiences

Work in Dr. Dauer's research laboratory is approved for Work Study Credit.

Graduate Student Supervision . Major Professor of graduate student thesis and non-thesis research projects

A. Non-thesis Master's Research Projects:

1. Stewart, D.E. The effect of substrate and tidal level on the distribution of *Laeonereis culveri* (Webster), (Graduated, Spring 1976, Dept. Biol. Sci.)

2. Hayden, L.M. Subtidal benthic invertebrates of the Lynnhaven Roads area, (Graduated, Fall 1977, Dept. Biol. Sci.)

3. Tourtellotte, G.H. Subtidal benthic invertebrates of Lynnhaven, Broad, and Linkhorn Bays, (Graduated, Spring 1978, Institute of Oceanography).

4. Geason, D.B. Movement of adult macrobenthic invertebrates of the lower Chesapeake Bay, (Graduated, Fall 1979, Institute of Oceanography).

5. Johnson, D.W. Predator exclusion and nutrient enrichment effects on winter populations of macrobenthic invertebrates of Broad Bay, Virginia, (Graduated, Fall 1979, Institute of Oceanography).

6. Easley, B.W. A study of *Libonela ovalis* and its parasitism of bluefish, *Pomatomus saltatrix*, in the James River Estuary, (Graduated, Spring 1981, Dept. Biol. Sci.)

Teaching Activities (Continued)

7. Hecht, M. Macrobenthic communities of the Southern Branch of the Elizabeth River, (Graduated, Fall 1989)

8. Rodi, Jr., A.J. Macrobenthic communities of the James River Estuary, Virginia, (Graduated, Summer 1990).

9. Leonard, T.M. Macrobenthic communities of Pocomoke Sound, (Graduated, Fall, 1995).

10. Pflanz, K.A. Intertidal and subtidal macrobenthic community structure along a salinity gradient in the York and Mattaponi rivers, Virginia. (Graduated, Spring, 1998).

11. Williams, T. L. Trophic relationships of macrobenthos of Cape Henlopen, Delaware using stable isotopic analysis. (Graduated Spring 2000).

12. Scarboro, C. L. Macrofaunal community structure of the Pagan River, a nutrient enriched Virginia estuary. (Graduated Fall 2000).

13. Christman, C.S. Development of a multivariate diagnostic tool to determine the cause of degrade benthic community structure. (Graduated Spring 2002).

14. Bauer, S. M. Trophic dynamics of fishes and benthic invertebrates within the Lafayette River, Norfolk, Virginia. (Anticipated Graduation Summer 2007).

15. Walsh, C.G. Diet differences in the mummichog, *Fundulus heteroclitus*, comparing populations from tidal creeks with highly urbanized and highly forested watersheds in Chesapeake Bay, USA. (Graduated December 2009).

16. Sullivan, S. The biology and ecology of the mud crabs (Xanthidae) of the Chesapeake Bay with focus on interactions with an invasive parasitic castrator). (Graduated December 2009).

17. Ragsdale, A. Fouling community dynamics and invasive species. (Graduated Spring 2016).

18. Muhic, W.K. Long-term changes in the benthic communities of an urban watershed – the Elizabeth River watershed. (Graduated Spring 2022).

B. Master's Theses:

1. Otsuka, C.M. Colonization of artificial substrates in the Lynnhaven River, (Graduated, Fall 1977).

2. Seymour, C.P. Animal-sediment relationship study of the Western Branch of the Lynnhaven River, (Graduated, Fall 1979).

Teaching Activities (Continued)

3. Ewing, R.M. The structure of a subtidal benthic community off Cape Charles, Virginia, (Graduated, Fall 1979).

4. Hawthorne, S.D. Macrobenthic invertebrates of industrialized seaport ecosystem, (Graduated, Fall 1980).

5. Stokes, T.L. Motility and palp behavior of three species of spionid polychaetes, (Graduated, Summer 1982).

6. Harlan, W.T. The ecological significance of the mud snail *Ilyanassa obsoleta* Say (Mollusca: Nassarridae) upon the benthic community of Broad Bay, Virginia, (Graduated Summer 1983).

7. Barker, Jr., H.R. Effects of dominant species removal on subtidal community development. (Graduated Summer 1983).

8. Morris, C.T. Nocturnal movements of the macrobenthos of the Lafayette River, Virginia, (Graduated Fall 1986).

9. Lane, M.L. Macrobenthic communities of Back Bay, Virginia. (Graduated Spring 1992).

10. Hunley, W.S. Historical comparisons between past and present macrobenthic communities of the Southern Branch of the Elizabeth River, Virginia. (Graduated Spring 1993).

11. Smith, M.E. Macrofaunal community structure along hypoxia gradient in the Rappahannock River, Virginia. (Graduated, Fall 1994).

12. McDonnell. J.L. Macrofaunal community structure in the vicinity of a seafood processing plant in Pocomoke Sound, Virginia. (Graduated, Summer 1995).

13. Lewis, D. J. Macrofaunal community structure of Hog Island Bay. (Graduated, Spring 1999).

14. Mahon, H.K. Behavioral responses of juvenile and adult *Streblospio benedicti* (Spionidae) to dissolved chemical cues. (Graduated December 2003).

15. Tatem, S. A. Trophic relationships among three distinct deposit-feeding macrobenthic species of an intertidal sand flat. (Graduated May 2008)

16. Webb, A. Determination of the ecological condition of the benthic communities of the Money Point phase 2 restoration area. (Graduated May 2013)

Teaching Activities (Continued)

17. Good, M. Naturalization of salt marsh restoration sites in the Elizabeth River, Virginia, assessed by feeding activity and trophic level of mummichogs (*Fundulus heteroclitus*) as measured by gut content and stable isotope analysis. (Graduated Spring 2016).

18. Martin, C. Efficacy of sediment contaminant remediation of the benthos in a segment of the Southern Branch of the Elizabeth River. (Graduated Spring 2022).

19. Turner, C. C. Estuarine eutrophication, nutrient load reduction, and benthic ecological condition in the Pagan River watershed, Smithfield, Virginia. (Anticipated graduation Fall 2022).

C. Doctoral Dissertations

1. Bertelsen, R.D. Effects of flow on the transport of marine nematodes. (Graduated Spring 1997).

2. Paula Maria Chainho de Oliveira. Contribution to the Development of a Benthic Index of Biotic Integrity for Portuguese Estuaries. (Co-Adviser with Dr. Maria José Costa of the Instituto de Oceanografia, Campo Grande. Lisboa. Portugal.). (Graduated Fall 2007).