

PERSONAL DETAILS

Name Bill Dennison
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Education:

1984 PhD The University of Chicago (Biology)
1979 MS University of Alaska (Biological Oceanography)
1976 B.A. Western Michigan University (Biology, Environmental Science)

Appointments:

2002- Vice President for Science Application and Professor, University of Maryland Center of Environmental Science
2000-2002 Reader, Department of Botany, University of Queensland, Brisbane, Australia
1995-2000 Senior Lecturer, Department of Botany, University of Queensland, Brisbane QLD Australia
1992-1994 Lecturer, Department of Botany, University of Queensland, Brisbane QLD Australia
1987-1992 Research Assistant Professor, Horn Point Laboratory, University of Maryland Center for Environmental Science
1984-1987 Coastal Marine Scholar, Marine Sciences Research Center, Stony Brook University, NY

Professional Activities:

Chair, Science and Technical Advisory Committee, Maryland Coastal Bays Program (2008-present)

Member (Governor appointee), Science and Technical Advisory Committee, Chesapeake Bay Program (2010-present)

Chair, Science and Technical Reporting and Analysis group, Chesapeake Bay Program (2010-present)

Chair, Tidal Monitoring and Analysis Workgroup, Chesapeake Bay Program (2004-2010)

Judging Panel, BBVA Foundation (Madrid, Spain) Ecology and Conservation Biology Award; 6,000 Euros (2008)

Member, Maryland BayStat (2007-present)

Member, Academic Affairs Advisory Council, University System of Maryland (2009-2013)

Director, International Riverfoundation, Brisbane, Australia (2004-present)

Judging Panel, International Riverprize (Brisbane, Australia) \$A300,000 (2003-2008)

Member, Land-Ocean Interactions in the Coastal Zone Scientific Steering Committee (2003-2009)

Overseer, Sea Education Association, Woods Hole, MA (2007-present)

Deputy Chair, Scientific Expert Panel, Healthy Waterways Partnership (Brisbane, Australia) (1995-2002)

Fields of special competence:

Marine ecology

Seagrass ecophysiology

Water quality

Ecosystem health assessment

Science communication

Publications:

A complete list of publications is available on the publications tab above, but an overview is presented here as well as a list of some selected publications.

Journal articles: I have authored or co-authored over 100 peer review journal articles. The citation reports for these articles are the following: Web of Knowledge 'h' index is 44 with 6433 total citations and the Google Scholar 'h' index is 52 with 10,061 total citations. I have mentored a series of graduate students and scientific colleagues, so I have typically chosen to forgo first author status, with some exceptions. I have published in a diversity of different journals (35) about a diversity of topics (seagrasses, mangrove, corals, macroalgae, phytoplankton, bacteria and viruses, science communication, education, coastal management, eutrophication).

Book chapters: I have authored or co-authored 25 book chapters in a variety of research and education books. These book chapters also cover a diversity of topics including marine biology, conservation, methods, science integration and communication.

Books: I have co-authored or co-edited 12 books in a variety of topics including coastal ecosystems, science integration and science communication. These books all feature high resolution graphics, incorporating conceptual diagrams, photographs, maps, figures and tables to complement the text.

Science communication products : By far, the most prolific effort that I have made has been in the realm of science communication products including brochures, newsletters, booklets, reports, books, and posters. There are currently 367 science communication products on the IAN Press website. The hallmark of these products is high quality graphical design aimed at a broad audience. These publications are authorship inclusive, with several to dozens to hundreds of contributors involved in each publication. Each of these products receives intense review through co-authors, outside reviewers, copy editors, design editors and stakeholders. Some of these products are translated into a variety of different languages and they are distributed via a variety of networks to decision makers, stakeholders, resource managers, scientists, and to the interested public.

Ten Selected Publications:

Orth RJ, Carruthers TJB, **Dennison WC** , Duarte CM, Fourqurean JW, Heck KLJ, Hughes AR, Kendrick GA, Kenworthy WJ, Olyarnik S, Short FT, Waycott M, Williams SL (2006) A Global Crisis for Seagrass Ecosystems. *Bioscience* 56(12):987

Dennison WC , Orth RJ, Moore KA, Stevenson JC, Carter V, Kollar S, Bergstrom PW, Batiuk RA (1993) Assessing Water-Quality with Submersed Aquatic Vegetation. *Bioscience* 43(2):86

Longstaff BJ, Carruthers TJB, **Dennison WC** , Lookingbill TR, Hawkey JM, Thomas JE, Wicks EC, Woerner J, (2010) Integrating and Applying Science, IAN Press, Cambridge, MD, 244 pp

Waycott M, Duarte CM, Carruthers TJB, Orth RJ, **Dennison WC** , Olyarnike S, Calladine A, Fourqurean JW, Heck KLJ, Hughese AR, Kendricki GA, Kenworthy WJ, Short FT, Williams SL (2009) Accelerating loss of seagrasses across the globe threatens coastal ecosystems. *Proc. Natl. Acad. Sci.* 106(30): 12377=

Williams MR, Longstaff BJ, Buchanan C, Llanso R, **Dennison WC** (2009) Development and evaluation of a spatially-explicit index of Chesapeake Bay health. *Mar. Poll. Bull.* 59(1-3): 14...

Dennison WC (2008) Environmental problem solving in coastal ecosystems: A paradigm shift to sustainability. *Estuarine, Coastal and Shelf Science* 77(2): 185ü

Duarte CM, **Dennison WC** , Orth RJ, Carruthers TJB (2008) The charisma of coastal ecosystems: addressing the imbalance. *Estuaries and Coasts* 31(2): 233&

Dennison WC , Lookingbill TR, Carruthers TJB, Hawkey JM, Carter SM (2007) An eye-opening approach to developing and communicating integrated environmental assessments. *Front. Ecol. Environ.* 5(6): 307r

Dennison WC , Thomas JE, Cain CJ, Carruthers TJB, Hall MR, Jesien RV, Wazniak CE, Wilson DE (2009) Shifting Sands: Environmental and cultural change in Maryland's Coastal Bays. IAN Press, Cambridge, MD, 396 pp

Petersen JE, Kennedy VS, **Dennison WC** , Kemp WM (2009) Enclosed Experimental Ecosystems and Scale: Tools for Understanding and Managing Coastal Ecosystems. Springer, 222 pp.

Teaching:

I enjoy teaching both undergraduate and graduate students, and have found ways to teach even while on a primarily research appointment (postdoctoral researcher) or with administrative duties (current job). I spent ten years with intensive teaching duties as well (University of Queensland). My favorite teaching delivery mode is immersive short courses (days to semester long), which I have written about (Studying nature in situ: Immersive education for better integrated water management; Journal of Contemporary Water Education and Management, 2013). I have taught immersive short courses in Puerto Rico, Bermuda, the Great Barrier Reef, and Stradbroke Island, Australia. In addition, I have taught aboard a tall ship throughout the Atlantic Ocean as part of Sea Semester, based in Woods Hole, Massachusetts. In regular semester courses, I recently enjoyed converting my class into an 'inverted' or 'flipped' classroom while using the interactive video network with five remote locations.

I have taught a wide variety of courses in small (z) to large (300+) classrooms, using a variety of technologies (e.g., smart boards, clickers, multiple projectors), but including rudimentary teaching aids in remote settings (e.g., shipboard flip charts, sand sculptures). I have taught at every undergraduate level (freshman non-majors to senior majors) and at various graduate levels (Honours, Masters, PhD). I have also led several efforts in developing online teaching materials for high school teachers (Teach Ocean Science; USAUS-H2O Virtual Environment Program).

Mentoring undergraduate and graduate students has been particularly rewarding to me. I am particularly proud of the diversity of the pursuits that students that I have mentored have undertaken. In addition to the standard academic pursuits, former students who have gone on to become a NASA Space Shuttle astronaut, an Emmy award winning National Geographic videographer, an underwater habitat educator/entrepreneur, an Australian International Volunteer, and a Chinese Academy of Science researcher.

It is my belief that university teaching is undergoing a major revolution in delivery mechanisms and funding models. The development of online materials, massive open online courses, flipped classrooms, and other teaching innovations has and will continue to change university teaching. I do not feel that these innovations have, nor ever will, replace the need for committed, passionate and effective teachers. In one sense, some people seem 'born to teach', which is an affliction that I seem to possess.

Teaching examples:

Designed and taught undergraduate biology and ecology courses at all levels, lecture, lab and field, University of Queensland, State University of New York@ Stony Brook, Salisbury University (1985-present)

Designed and taught graduate courses, University of Queensland, Bermuda Biological Station for Research, University of Maryland Center for Environmental Science, (1987-present)

Designed and taught professional short courses, Science Communication and Integrated Assessment, Maryland, Florida, California, Holland, Mexico, Thailand (2003-present)

Course titles:

Science for Environmental Management

Visual Science Communication

Marine Botany

Introduction to Biology

Ecophysiology of corals, mangroves and seagrasses

Plant Diversity

Coral reef biology and geology

Tropical marine ecology

Academic leadership:

I have been involved in creating and forming three large multi-institutional, multi-disciplinary research efforts. 1) The development of the Multiscale Enclosed Ecosystem Research Center (MEERC) was an effort that I helped initiate and then ten years later, helped synthesize (Enclosed Experimental Ecosystems and Scale: Tools for Understanding and Managing Coastal Ecosystems, Springer, 2009). The MEERC project was funded by the U.S. Environmental Protection Agency for ten years (\$1 million/year) and was based at the University of Maryland Center for Environmental Science. It was focused on the effect of various aspects of spatial, temporal and complexity scales on key ecological processes. 2) Another large effort was a large Cooperative Research Centre (CRC) that I helped initiate while at the University of Queensland. We formed the CRC for Coastal, Estuary and Waterway Management, which ran from 1999-2006 (\$3AU million/year). The Coastal CRC was a consortium of four universities and several agencies that focused on developing better coastal management systems. 3) I helped with the creation of the National Socio-Environmental Synthesis Center (SESYNC: www.sesync.org) in 2011 in Annapolis, funded by the National Science Foundation (\$6 million/year for 5 years, renewable for 5 more years). SESYNC is focused on multi-disciplinary synthesis and on learning how to improve the synthesis process. In all of the these efforts, I was forming a team to develop the major proposal concepts, initiating the dialog between various partners, lining up institutional support including matching funds, and participating in the sponsor site visit(s).

I served as the co-Principal Investigator for a Global Seagrass Trajectories working group at the National Center for Ecological Analysis and Synthesis (NCEAS) which developed a global data base of seagrass expansions and declines, then analyzed this data to determine the net rate of seagrass decline globally (conservatively, one soccer field every 30 minutes since 1980). We also determined that seagrasses have a 'charisma gap' compared with much more widely recognized coral reefs and tropical rain forests and have initiated a variety of efforts to close this charisma gap.

Since 2002, I have served in an academic leadership position at the University of Maryland Center for Environmental Science. In my Vice President position, I have backed up the President, served on the Academic and Executive Councils, served as the UMCES representative on the University System of Maryland's provost council, served as the UMCES representative to the Council for

Environmental Deans and Directors, and worked with Laboratory Directors, faculty, staff and graduate students. I have represented UMCES to all levels of state government, including the Governor, Department Secretaries, Maryland elected officials, and various agency staff.

I often think that my one real talent is being able to recognize and foster the development of excellent people. I enjoy recruiting excellent scientists and surrounding myself with intelligent, passionate and talented people. I have had the good fortune to work with some of these excellent colleagues for many years to decades. In addition, I have helped various people realize different career paths and, in all cases, enjoy staying in touch with those people whose lives I have touched.

Local and regional activities:

In a variety of locations throughout my career, I have developed an active local and regional suite of activities in the science and management realm. During my postdoctoral tenure at Stony Brook, New York, I discovered an algal bloom new to science, locally known as brown tide as a result of my seagrass field work. This algal species was eventually identified as *Aureococcus anophagefferens*, and a major research effort was initiated to study its causes and impacts which I was involved in, and since then, I have served as a advisor or reviewer for continued blooms in Long Island and Texas.

During my junior faculty stint at Horn Point Laboratory, University of Maryland Center for Environmental Science, I joined a team to develop habitat requirements for Chesapeake Bay seagrasses, and led an effort to synthesize and publish these results (Dennison et al., 1993, *Bioscience*).

My local and regional involvement ramped up considerably during my ten years in Brisbane, Australia. It began when I assembled a group of scientists interested in Moreton Bay, and then helped form the Healthy Waterways program. I served in a variety of leadership roles in the Healthy Waterways program, including leading the effort to develop and implement an Ecosystem Health Monitoring Program, chairing Scientific Expert Panels and various task forces. In terms of a legacy from this ten year stint in Australia, I helped to a) produce five books on Moreton Bay and its watershed (available on IAN Press), b) create a sustainable long term monitoring and reporting program (www.healthywaterways.org), and c) obtain funds and design a world class research station (Moreton Bay Research Station). In addition to these products and programs, the other legacy is the former students and postdoctoral fellows who worked in my laboratory and who have gone on play an active role in science and management within the Austral-Asian region.

While in Australia, I also was heavily involved in the Great Barrier Reef science and management. I was elected President of the Australian Coral Reef Society, helped establish the need and then form a water quality monitoring program for the Great Barrier Reef and often served as a reviewer for the Great Barrier Reef Marine Park Authority programs and publications. I have maintained an involvement with the Great Barrier Reef, which led to the establishment of a Great Barrier Reef report card (funded by the Queensland State Department of Premier and Cabinet), and am currently working to incorporate climate change indicators and reporting (funded by the Great Barrier Reef Foundation).

Returning to Chesapeake Bay, I have chaired the Tidal Monitoring and Analysis Workgroup, revamped the Chesapeake reporting framework and produced annual report cards since 2006, joined the Science and Technical Advisory Committee and was the inaugural chair of the Science and

Technical Analysis and Reporting group. I serve on the Management Board and work closely with the Chesapeake Bay Program leadership team. I recently led an effort to synthesize the lessons learned from restoration efforts over the past couple of decades (New Insights: Science-based evidence of water quality improvements, challenges and opportunities in the Chesapeake, in press), re-evaluate and re-invigorate the integrated monitoring program of the Bay and its watershed (Building and Sustaining Integrated Networks project; ongoing),

I also chair the Science and Technical Advisory Committee of the Maryland Coastal Bays Program, and one of the accomplishments of this effort is a synthesis book (Shifting Sands: Environmental and cultural change in Maryland's Coastal Bays, 2009).

International activities:

One of the things that living abroad does is provide you with a different perspective on the world. I had the good fortune to live in Australia for ten years, totally immersed in life far from the U.S. The Australian culture, politics, cuisine, and attitudes may appear superficially to be an offshoot of U.S. culture with our shared language, but there are many fundamental differences. In particular, the view of the world from outside the U.S. is quite different than from within the U.S. My family has dual citizenship in Australia and the U.S.

I served for six years (2003-2009) on the Scientific Steering Committee of the Land-Ocean Interactions in the Coastal Zone program, a part of the International Geophysical and Biological Programme. In this capacity, I worked with an international team of scientists to develop synthetic assessments, build science communication capacity and create working relationships that have continued to the present.

I have developed collaborations in a variety of different countries, including India and China. In India and China, our group is working with local scientists to develop environmental report cards for coastal regions (India) and major rivers (China). Working closely with the Secretariat of the Pacific Environment Programme based in Samoa, our group has developed a reporting framework for the 21 states and territories of the Pacific Ocean and conducted assessments of several island nations (Samoa, Palau, Fiji).

I have been involved in a premier European graduate training program (Erasmus Mundas), both in delivering education modules and mentoring graduate students.

My Integration and Application Network group has taught science communication short courses in Poland, Portugal, Singapore, Thailand, Philippines, Australia, Tanzania. I spent a sabbatical at the International WaterCentre in Brisbane, Australia in 2011, and participated in teaching graduate students from 21 countries.

I have been involved in the annual International Riversymposium, held annually in various Australian locations, since its inception in 1998. I have served on the program committee and as a session chair, panel member and presenter. I also have been serving as a Director for the International River Foundation since 2004. Both of these activities provide opportunities to develop international connections.

Grantsmanship:

One of the key determinants of a successful program is the ability to obtain the necessary resources, which can be broadly categorized as time and money. The time component refers to obtaining the necessary time and energy commitments of academic researchers, resource managers and policy makers devoted to an environmental issue. The money component translates into the ability to attract and retain good people as well as provide the physical spaces and associated infrastructure, expendable supplies and necessary travel. I have a long term consistent track record of obtaining these resources through grants and contracts, philanthropy, and institutional resource allocations. One of my philosophies within academia is to look outside the institution for major support and then obtain institutional support as matching funds for developing increased capacity.

Another aspect of grantsmanship that is vitally important in the shifting world of government and philanthropy funding is to develop and maintain a diverse portfolio of funding sources. This is something that I have excelled in accomplishing, and continue to develop an ever broadening funding base.

One of the developments in the evolution of funding for the Integration and Application Network component of the University of Maryland Center for Environmental Science has been to have a) an overall steady funding increase from outside sources in spite of vagaries of federal and state budgets, and b) more and more projects that involve an enquiry from a potential partner who has a certain amount of money to achieve a certain project aim. So rather than apply for grants or bid for projects with a certain amount of risk, these enquiry based projects, following some negotiation, are non-competitive. This model is that has developed means that much more of the effort is based on developing results and products than writing proposals. It is my belief that we need to expand this model more broadly so that more academic researchers can focus on results and products instead of proposals, particularly unsuccessful proposals which represent one of the least productive uses of time in academia.

Media activities:

As part of my efforts to influence environmental policy and management, I have had an active media presence in local, regional and national media outlets, both in Australia and in the U.S. I am regularly asked to comment on various issues, currently regarding Chesapeake Bay issues. This media presence is not a role that I actively sought out, but I have learned the value of the media in shaping public policy and establishing the role of science in environmental management. I have not saved or documented my media citations until recently, but I have had a varied and consistent media presence since my postdoctoral fellowship at Stony Brook, in Australia and in the U.S. in a wide diversity of print and electronic media outlets.

Career Path:

My career has not been a linear academic progression. Upon completing my undergraduate degree from Western Michigan University, I worked for the U.S. Fish & Wildlife Service for a little over one year before returning to graduate school at the University of Alaska. Upon completing my M.S. degree, I worked for a private research consulting firm (Kinnetic Laboratories, Inc.) for one year

before returning to graduate school at The University of Chicago. These short stints in government and consulting helped me focus my graduate programs so I completed them in relatively short time periods (M.S. = 2 years; Ph.D. = 3.5 years) and was able to better appreciate the role and value of academia from both within and outside academia.

During my postdoctoral fellowship at Stony Brook University, I made two important choices that influenced my career path. One was to follow up on the discovery of a novel phytoplankton bloom (brown tide) with applied research and community engagement. The other choice was to spend six months in Australia conducting research on the Great Barrier Reef. These choices to a) conduct applied research with community engagement in addition to basic research and b) conduct collaborative research in Australia have served to influence my career path to the present.

While at the University of Queensland, my original intent was to develop a comprehensive research program for Moreton Bay, but through a progression of challenges and opportunities, I ended up serving an active role in science leadership and becoming actively involved with management and policy. Ultimately, I felt that our successful model of integrated science and management needed to be both tested at a larger scale, but also in a more globally visible location, hence my move back to Chesapeake Bay.

Throughout my career, I have enjoyed creating functional work spaces to conduct research, conduct scientific syntheses and meet with stakeholders for various science applications. I have grown programs throughout my career, thus seem to always be looking to develop, improve and expand work spaces. I enjoy this exercise of creating functional work spaces to support talented and creative people.

As a result of my non-traditional academic career path, I have not obtained major environmental awards or honors, published as many scientific papers as possible, or developed a narrow specialization niche. Rather, I have reveled in celebrating the success of others (e.g., International Riverprize, awards that my students have received), enjoyed pioneering new publication techniques and approaches (e.g., science communication products, online conceptual diagram tools), and found satisfaction in achieving proficiency across a wide diversity of topics.

Reflecting on my career path which has a) blended science and management, b) had phases of intense research, teaching and administration, and c) spanned two continents, I feel that my contribution is that of a catalyst. While a chemical catalyst is more difficult to measure and quantify than the reactants or products, it is key to effecting chemical transformations. Serving in this catalytic role, I feel as though I have helped a) create better and lasting science programs and infrastructure, b) develop lasting environmental management policies and programs, that have led to c) better environmental outcomes.