

BROCK B. BERNSTEIN

EDUCATION

Ph.D. Biological Oceanography, Scripps Institution of Oceanography - 1977

B.A. Literature, Claremont Men's College - 1972

PROFESSIONAL HISTORY

Independent Consultant, 1998 to present

President, National Fisheries Conservation Center, 1997 to present

Member, Marine Board, National Research Council, 1994 to 1997

Member, Board of Directors of Dynatest, Inc., an international engineering firm, 1994 to 1996

Vice President and Founding Partner, EcoAnalysis, 1984 to 1997

Senior Project Manager, Welsford Research Group, 1981-83

Research Associate, Dalhousie University, 1982-83

Principal Investigator, Marine Ecological Consultants, 1979-81

Killam Postdoctoral Fellow, Dalhousie University, 1977-79

QUALIFICATIONS

Dr. Bernstein is an environmental scientist with broad experience in designing and evaluating environmental programs, structuring management and research initiatives, and developing policy. He has field research experience in a range of coastal and oceanic environments and has also worked on a wide variety of management and policy issues. These include the redesign of core compliance monitoring programs for major regional management efforts, the evaluation and/ or development of large-scale assessment programs, methods to improve fisheries management, and the development of large-scale information management strategies. His experience has led to his appointment to many technical advisory and review committees, including several National Academy of Sciences panels. One panel recommended improvements in marine monitoring nationwide and another examined alternatives for improving the governance and management systems used to manage coastal and ocean resources.

Dr. Bernstein's scientific background and interpersonal skills have contributed to his ability both to help resolve difficult environmental and management issues involving groups of varied stakeholders and to develop creative solutions to important problems in environmental management. During the National Academy study of monitoring, he constructed a technical framework for the effective design of marine monitoring programs that remains in wide use in both the U.S. and Europe. He has also created planning tools to facilitate various aspects of environmental program design, managed multidisciplinary technical teams, and facilitated and/ or mediated a broad range of information sharing, conflict resolution, planning, and problem-solving efforts.

RELEVANT EXPERIENCE

- **Facilitator** of a USEPA technical workshop on the hydrology and ecology of the San Francisco Bay-Delta to develop information to support revisions to the state's Water Quality Control Plan for the San Francisco Bay Delta Estuary.
- **Facilitator** of multistakeholder effort initiated by the San Diego Regional Water Quality Control Board to develop coordinated regional monitoring programs for the San Diego River watershed and all coastal estuaries in the region. The goal is to integrate all water quality, water supply, and aquatic habitat monitoring and assessments to track status and trends and prioritize management actions.
- **Project manager** for a comprehensive assessment, for the CA Ocean Science Trust, of oil and gas platform decommissioning alternatives off the southern CA coast. The assessment integrates narrative evaluation with a mathematical decision model.
- **Project manager** for an assessment, for the CA Ocean Protection Council, of ocean observing systems' ability to meet information needs in key areas such as salmon recovery, ocean energy development, discharges, oil spills, and harmful algal bloom. Recommendations were based on analysis of both technical and institutional aspects of observing systems.
- **Lead author** of two workplans for complex, long-term regional assessment efforts in Orange County, the Nitrogen and Selenium Management Program (NSMP) and the Toxicity Reduction Investigation Program (TRIP). For both the NSMP and TRIP, chaired external scientific review panels that evaluated TMDL targets, interpretation of monitoring results, and major decision points.
- **Lead technical consultant** for the California Monitoring Council, a statewide effort of the Resources Agency and CalEPA, initiated by SB 1070, to improve access to and integration of data and information from water quality and aquatic resources monitoring programs.
- **Facilitator** for an in-depth external review, initiated by California Audubon and the National Fish and Wildlife Foundation, of the California Condor Recovery Program. Prepared an initial issues white paper.
- **Facilitator** for development of comprehensive monitoring guidance for water quality regulatory agencies and agricultural coalitions participating in the Irrigated Lands Regulatory Program in the Central Valley, CA. Negotiated monitoring program objectives and designs.
- **Chair and facilitator** of the Stakeholder Advisory Committees for the CA State Water Board's development of sediment quality objectives; numeric nutrient endpoints for estuaries, coastal bays, and harbors; and biological objectives for perennial wadeable streams.
- **Member** of external review panels for California's Surface Water Ambient Monitoring Program (SWAMP) and the California Integrated Water Quality System (CIWQS). Drafted both reports and assisted both management teams in developing responses to the reviews' recommendations.
- **Facilitator** for the Pribilof Islands Collaborative, which includes Aleut islanders, commercial fishing interests, and conservation organizations. Efforts focus on a number of key issues, including conceptual modeling of the population status of the northern fur seal.
- **Organizer and convener** of a consensus conference on marine reserves science, modeled on the National Institutes of Health's format. Produced a consensus statement addressing the potential use of marine reserves as a fisheries management tool.

- **Facilitator** of multistakeholder efforts to develop and implement regional receiving water monitoring programs for the San Gabriel, Los Angeles, Santa Clara, San Luis Rey, and San Diego River watersheds in southern California. Programs combine both ambient and compliance monitoring.
- **Co-project manager** of a nationwide evaluation for NOAA of the effectiveness of stakeholder processes in marine protected area designation efforts.
- **Facilitator** of a collaborative, multistakeholder effort to develop a model stormwater monitoring program design for the southern California region. Drafted final report.
- **Consultant** to the Orange County Stormwater Program for 10 years. Led development of all wet and dry weather monitoring programs, provided technical support, and led negotiations among the County (the lead permittee), individual cities, and regulatory agencies.
- **External reviewer** for several large research and environmental management programs, focusing on oceanography, fisheries, spill impacts, data integration, and information management.
- **Member** of a team that prepared an independent and in-depth review of scientific and management issues related to the Marine Stewardship Council's certification of the Bering Sea and Gulf of Alaska pollock fisheries. Responsible for reviewing ecosystem issues.
- **Co-project manager** of an external evaluation of the National Marine Fisheries Service's performance on key environmental statutes. Then helped facilitate the development of action plans, including agency and Regional Council staff, to improve poor performance.
- **Co-project manager** of a national effort, funded by the Packard Foundation, to improve communication among parties to fisheries disputes and to resolve specific conflicts.
- **Consultant** to the University of Maryland's Center for Environmental Science (UMCES), responsible for developing the internal support and infrastructure for a new effort to integrate and synthesize policy-relevant science related to the Chesapeake Bay as a whole.
- **Project leader** of an in-depth external evaluation of the Pew Charitable Trusts' marine protection program. The project included both retrospective and prospective assessments of the program's strategy and overall effectiveness, as well as of specific program elements.
- **Consultant** to the Alameda County (CA) stormwater program. Evaluated regulatory and management information needs and developed new long-term monitoring designs.
- **Project manager** for a large, multi-year policy analysis of the exposure of school children in California to electric and magnetic fields. The project combined formal decision analysis with the more subjective process-related and value-laden aspects of policy development.
- **Member of the Executive Committee** of the National Research Council's Marine Board, helping to identify national priorities for research, management, technology development.
- **Project manager** for developing a coordinated regional monitoring strategy for BASMAA, the seven stormwater management programs in the San Francisco Bay area.
- **Co-coordinator** for an intensive review of the first five years' activity of the San Francisco Estuary Regional Monitoring Program (RMP) for Trace Substances. Designed the review process, guided and supported the work of the review panel of experts, and drafted the final report. Then facilitated a reorganization of objectives and decision-making processes.
- **Designed and facilitated workshops** on fisheries bycatch in Alaska. These first-of-their-kind workshops included heads of major gear type associations, senior fisheries scientists and managers, onshore processors, and environmental groups.

- **Member of a National Research Council committee** that developed recommendations for improving mechanisms and processes of coastal governance on a national scale. Effort focused on means of broadening effective stakeholder participation in decision making. The committee's report was published as the book *Striking a Balance*.
- **Expert witness** for Cal Trout, the Mono Lake Committee, and the National Audubon Society. Prepared and presented expert testimony that evaluated monitoring plans to track restoration of streams feeding Mono Lake, CA. Created a simple framework to identify assumptions and prepared written exhibits that explained statistical concepts in layman's terms. Suggested ways to improve the study design process and resolve conflicts. Defended expert evaluations and opinions under cross examination.
- **Project manager** for developing a regional environmental monitoring program for the Santa Monica Bay Restoration Commission. Designed conceptual structure to integrate scientific and management perspectives. Facilitated technical workgroups and developed detailed implementation scenario.
- **Member of a National Research Council committee** to develop database management and data integration strategies for international global change research. The committee's report was published as the book *Finding the Forest in the Trees - The Challenge of Combining Diverse Environmental Data*.
- **Member of a National Research Council committee** to assess marine monitoring practice. The report, *Managing Troubled Waters*, included design protocols and recommendations to make monitoring information more useful to decision makers. The committee also performed an in-depth case study of marine environmental monitoring in California (*Monitoring Southern California's Coastal Waters*).

PEER-REVIEWED REPORTS AND PUBLICATIONS

B. Bernstein, A. Bressler, P. Cantle, M. Henrion, D. John, S. Kruse, D. Pondella, A. Scholz, T. Setnicka, S. Swamy. In preparation. Evaluating alternatives for decommissioning California's offshore oil and gas platforms. To be submitted to Integrated Environmental Monitoring and Assessment.

B. Bernstein, A. Bressler, P. Cantle, M. Henrion, D. John, S. Kruse, D. Pondella, A. Scholz, T. Setnicka, S. Swamy. In preparation. A mathematical decision model to support evaluation of decommissioning alternatives for offshore oil and gas platforms. To be submitted to Integrated Environmental Monitoring and Assessment.

B. Bernstein, K. Merkel, B. Chesney, and M. Sutula, 2011. Recommendations for a southern California regional eelgrass monitoring program. Prepared for the National Marine Fisheries Service. Technical Report #632. Southern California Coastal Water Research Project, Costa Mesa, CA.

B. Bernstein. 2010. SWAMP Assessment Framework. Prepared for the Surface Water Ambient Monitoring Program. California State Water Resources Control Board. Sacramento, CA.

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B. Bernstein, A. Bressler, P. Cantle, M. Henrion, D. John, S. Kruse, D. Pondella, A. Scholz, T. Setnicka, S. Swamy. 2010. Evaluating alternatives for decommissioning California's offshore oil and gas platforms. California Ocean Science Trust, Oakland, CA.

B. Bernstein, B. Moore, G. Sharp, R. Smith. 2009. Assessing urban runoff program progress through a dry weather hybrid reconnaissance monitoring design. *Environmental Monitoring and Assessment*. 157: 287-304.

E.D. Stein and B. Bernstein. 2008. Integrating probabilistic and targeted compliance monitoring for comprehensive watershed assessment. *Environmental Monitoring and Assessment*. 114: 117 - 129.

Final Report of the California Integrated Water Quality System (CIWQS) Review Panel. 2008. Technical Report #561. Southern California Coastal Water Research Project, Costa Mesa, CA. (one of 8 coauthors)

E.D. Stein and B. Bernstein. 2007. Integrating probabilistic and targeted compliance monitoring for comprehensive watershed assessment. Southern California Coastal Water Research Project Annual Report, Costa Mesa, CA. pp. 171 - 181.

Review of California's Surface Water Ambient Monitoring Program (SWAMP). 2006. Technical Report #486. Southern California Coastal Water Research Project, Westminster, CA. (one of 7 coauthors)

Model Monitoring Technical Committee. 2004. Model monitoring program for municipal separate storm sewer systems in southern California. Technical Report, #419. Southern California Coastal Water Research Project, Westminster, CA.

M.J. Allen, R.W. Smith, E.T. Jarvis, V. Raco-Rands, B.B. Bernstein, and K.T. Herbinson. 2004. Temporal trends in southern California coastal fish populations relative to 30-year trends in oceanic condition. Southern California Coastal Water Research Project Biennial Report 2003-2004. pp. 264-285.

B. Bernstein, S. Iudicello, C. Stringer, and MRAG Americas, Inc. 2004. Lessons learned from recent marine protected area designations in the United States. Prepared by the National Fisheries Conservation Center under contract to NOAA.
<http://mpa.gov/resources/publications/lessonslearned/> .

B.B. Bernstein and S.B. Weisberg. 2003. Southern California's marine monitoring systems: Ten years after the National Academy of Sciences evaluation. *Environmental Monitoring and Assessment*. 81: 3-14.

B.B. Bernstein, J.F. Griffith, S.W. Weisberg. 2002. Microbial source tracking workshop: Workgroup findings and recommendations. Technical Report, #363. Southern California Coastal Water Research Project, Westminster, CA.

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B. Bernstein and K. Schiff. 2002. The Stormwater Monitoring Coalition: Research needs in southern California. Southern California Coastal Water Research Project Biennial Report 2001-2002. pp. 310-323.

B. Bernstein and K. Schiff. 2002. Stormwater research needs in southern California. Technical Report, #358. Southern California Coastal Water Research Project, Westminster, CA.

B.B. Bernstein, H. Blough, S. Iudicello, G. Parkes, and R. Trumble. 2002. Issues to be considered by the evaluation team for the Bering Sea and Gulf of Alaska walleye pollock fishery. Prepared by the National Fisheries Conservation Center under contract to the World Wildlife Fund and submitted to the Marine Stewardship Council's certification team.

B.B. Bernstein and S.B. Weisberg. 2002. Southern California's marine monitoring systems ten years after the National Research Council evaluation. Proceedings of the EMAP "Coastal Monitoring through Partnerships" Symposium (April 24-27, 2001). Southern California Coastal Water Research Project Biennial Report 2001-2002. pp. 268-275.

B. Bernstein, K. Florig, with L. Geisinger, M. Henrion, J. Jostes, and A. Sheppard. 2001. Managing magnetic fields in California public schools. California Department of Health Services and the Public Health Institute. Oakland, CA.

Convener of the Symposium: You Win Some, You Lose Some: The Costs and Benefits of Litigation in Fisheries Management. 2001. *Ocean and Coastal Law Journal*. 7 (1): 1-74.

B.B. Bernstein and S. Iudicello. National evaluation of cooperative data gathering in fisheries: A report to the National Marine Fisheries Service. National Fisheries Conservation Center. Ojai, CA.

B.B. Bernstein, T. Mahoney, and K. Sweeney. 1999. A cluster review of the Marine Protection Program. Prepared under contract to the Pew Charitable Trusts.

B.B. Bernstein, M.J. Allen, J. Dorsey, M. Gold, M.J. Lyons, G. A. Pollock, D. Smith, J.K. Stull, G.Y. Wang. 1999. Compliance monitoring in a regional context: Revising seafood tissue monitoring for risk assessment. *Ocean and Coastal Management*. 42: 399-418.

D.A. Aseltine-Neilson, B.B. Bernstein, M.L. Palmer-Zwahlen, L.E. Reige, and R.W. Smith. 1999. Comparisons of turf communities from Pendleton Artificial Reef, Torrey Pines Artificial Reef, and a natural reef using multivariate techniques. *Bulletin of Marine Science*. 65(1): 37-57.

B.B. Bernstein and M. Drennan. 1998. Proceedings of the NWQMC National Conference. *Monitoring: Critical Foundations to Protect Our Waters*. Washington, D.C.: U.S. EPA. pp. III-133 - III-136.

B.B. Bernstein. 1998. *Confronting Complexity: Solving Multidisciplinary Environmental Problems*. The Netherlands: Kluwer Academic Publishers.

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National Research Council. 1997. *Striking a Balance*. Washington, D.C.: National Academy Press. (One of 13 co-authors).

B.B. Bernstein, R. Hoenicke, C. Tyrell. 1997. Planning tools for developing comprehensive regional monitoring programs. *Environmental Monitoring and Assessment*. 48(3):297-306.

B.B. Bernstein and J.O. O'Connor. 1997. Five-year program review, Regional Monitoring Program for Trace Substances in the San Francisco Estuary. RMP Technical Report 28, San Francisco Estuary Institute, Richmond, CA.

B.B. Bernstein, M.J. Allen, J. Dorsey, M. Gold, M. Lyons, G.A. Pollock, D. Smith, J.K. Stull, G. Wang. 1996. Rethinking seafood tissue monitoring for regional risk assessment. *Proceedings of the Oceans 96 Symposium*, 2:897-903.

R.W. Smith and B.B. Bernstein. 1996. Quantifying and testing for effects of outfalls on biological communities. *Proceedings of the Oceans 96 Symposium*, 2:619-623.

J.D. Sahl and B.B. Bernstein. 1995. Developing policy in an uncertain world. *Int. J. Sustain. Dev. World Ecol.* 2(1995):124-135.

B.B. Bernstein and L. Goldfarb. 1995. Thinking of biology: A conceptual tool for generating and evaluating ecological hypotheses. *Bioscience*. 45(1):32-39.

National Research Council. 1995. *Finding The Forest In The Trees: The Challenge Of Combining Diverse Environmental Data*. Washington, D.C.: National Academy Press. (One of nine co-authors).

B.B. Bernstein, B.E. Thompson and R.W. Smith. 1993. A combined science and management framework for developing regional monitoring objectives. *Coastal Management*. 21:185-195.

B.B. Bernstein. 1992. A framework for trend detection: coupling ecological and managerial perspectives. In: *Ecological Indicators*, ed. D. H. McKenzie. London: Elsevier Applied Sciences. pp. 1101-1114.

B. Thompson, B.B. Bernstein, R. Smith and R. Packard. 1991. Assessment of monitoring and data management needs in Santa Monica Bay. Technical Report, #255. Southern California Coastal Water Research Project, Westminster, CA.

B.B. Bernstein and J. Dorsey. 1991. Marine monitoring in heterogeneous environments. *Journal of Environmental Management*. 32: 227-240.

W.M. Eichbaum and B.B. Bernstein. 1991. Current issues in environmental management: A case study of Southern California's marine monitoring system. *Coastal Management*. 18(4):433-445.

B.B. Bernstein and R.W. Smith. 1991. Errors in errors in hypothesis testing. *In: Biological Criteria: Research and Regulation. Proceedings of a Symposium. U.S. EPA. EPA-440/ 5-91-005, July 1991: 104-109.*

National Research Council. 1990. *Managing Troubled Waters: The Role of Marine Environmental Monitoring.* Washington, D.C.: National Academy Press. (One of 11 coauthors.)

National Research Council. 1990. *Monitoring Southern California's Coastal Waters.* Washington, D.C.: National Academy Press. (One of 6 coauthors.)

B.B. Bernstein and J. Dorsey. 1989. Marine monitoring in heterogeneous environments. *Proceedings of the Oceans '89 Symposium, Seattle, WA, September 18-21, 1989. Vol. 2: 652-658.*

W.M. Eichbaum and B.B. Bernstein. 1989. Comprehensive analysis of marine monitoring in Southern California. *Proceedings of the Oceans '89 Symposium, Seattle, WA, September 18-21, 1989. Vol. 2: 337-343.*

C.J. Schroder, D.B. Scott, F.S. Medioli, B.B. Bernstein, and R.R. Hessler. 1988. Larger agglutinated Foraminifera: Comparison of assemblages from central North Pacific and western North Atlantic (Nares Abyssal Plain). *Journal of Foraminiferal Research. 18(1): 25-41.*

R.W. Smith, B.B. Bernstein, and R.L. Cimberg. 1988. Community-environmental relationships in the benthos: Applications of multivariate analytical techniques. *In: Marine Organisms As Indicators, ed. D.F. Soule and G.S. Kleppel. NY: Springer-Verlag. pp. 247-326.*

B.B. Bernstein and R.W. Smith. 1986. Community approaches to monitoring. *Proceedings of the Oceans 86 Monitoring Strategies Symposium, Vol. 3: 934-939.*

B.B. Bernstein and J. Zalinski. 1986. A philosophy for effective monitoring. *Proceedings of the Oceans 86 Monitoring Strategies Symposium, Vol. 3: 1024-1029.*

B.B. Bernstein, R.W. Smith, and B.E. Thompson. 1985. Sampling design and replication for benthic monitoring. *Southern California Water Research Project (SCCWRP), Biennial Report, 1983-1984: 21-35.*

R.W. Smith and B.B. Bernstein. 1985. Index 2: Index of pollutant stress in coastal sediments. Prepared for NOAA, under contract to Brookhaven National Laboratory: 44 pp.

R. Mahon, R.W. Smith, B.B. Bernstein, and J.S. Scott. 1984. Spatial and temporal patterns of groundfish distribution on the Scotian Shelf and in the Bay of Fundy, 1970-1981. *Canadian Technical Report of Fisheries and Aquatic Science. 1300: xii + 164 p.*

B.B. Bernstein and A. Campbell. 1983. Contribution to the development of methodology for sampling and tagging small juvenile lobsters (*Homarus americanus*). *Canadian MS Report of Fisheries and Aquatic Sciences. 1741:34 p.*

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B.B. Bernstein, S.C. Schroeter, and K.H. Mann. 1983. Sea urchin (*Strongylocentrotus droebachiensis*) aggregating behavior investigated by a subtidal multifactorial experiment. Canadian Journal of Fisheries and Aquatic Sciences. 40:1975-1986.

B.B. Bernstein and R.W. Welsford. 1983. Design of a flexible cage for benthic ecological experiments in high energy marine environments. Canadian MS Report of Fisheries and Aquatic Sciences. 1221: 26 p.

B.B. Bernstein and J. Zalinski. 1983. An optimum sampling design and power tests for environmental biologists. Journal of Environmental Management. 16:35-43.

B.B. Bernstein. 1982. Negotiating with the environment. The Negotiation Newsletter. 2(7):2-3. April 1982.

B.B. Bernstein and K.H. Mann. 1982. Changes in the nearshore ecosystem of the Atlantic coast of Nova Scotia, 1968-1981. Northwest Atlantic Fisheries Organization: Symposium on Environmental Conditions in the Northwest Atlantic During 1970-1979. 5:101-105.

B.B. Bernstein. 1981. Ecology and economics: Complex systems in changing environments. Annual Review of Ecology and Systematics. 12:309-330.

B.B. Bernstein and R.W. Welsford. 1981. An assessment of feasibility of using high-calcium quicklime as an experimental tool for research into kelpbed/ sea urchin ecosystems in Nova Scotia. Canadian Technical Report of Fisheries and Aquatic Science. 968: ix + 51p.

B.B. Bernstein, B.E. Williams, and K.H. Mann. 1981. The role of behavioral responses to predators in modifying urchins' (*Strongylocentrotus droebachiensis*) destructive grazing and seasonal foraging patterns. Marine Biology. 63:39-49.

B.B. Bernstein and N. Jung. 1979. Selective pressures and coevolution in a kelp canopy community in Southern California. Ecological Monographs. 49:335-355.

B.B. Bernstein and J. Meador. 1979. Temporal persistence of biological patch structure in an abyssal benthic community. Marine Biology. 51:179-183.

B.B. Bernstein, R.R. Hessler, R. Smith, and P.A. Jumars. 1978. Spatial dispersion of benthic Foraminifera in the abyssal central North Pacific. Limnology and Oceanography. 23:401-416.

PRESENTATIONS

More than 60 presentations at scientific and technical conferences on topics including: study design, data analysis, database development, resource management and regulatory policy, the design of collaborative efforts, facilitation and mediation, and organizational change.

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