

Brandon S. Sackmann, Ph.D.

Senior Consultant



Education and Credentials

Ph.D., Oceanography, University of Maine, Orono, Maine, 2007

B.S., Oceanography (minor in Applied Mathematics), University of Washington, Seattle, Washington, 2001

Certified Geographic Information Systems Professional (GISP), GIS Certification Institute (No. 67677), 2014

Certified Senior Ecologist, Ecological Society of America, 2014

Graduate Certification in GIS, University of Maine, Orono, Maine, 2007

Professional Affiliations

Society of Environmental Toxicology and Chemistry

Ecological Society of America

American Society of Limnology and Oceanography

The Oceanography Society

World Aquaculture Society

Professional Profile

Dr. Brandon Sackmann is an oceanographer and biogeochemical modeler with 18 years of experience working for academic and oceanographic research institutions, state environmental agencies, and private clients. He specializes in marine ecology, satellite remote sensing, and ocean optics. Dr. Sackmann has a strong foundation in multivariate and geostatistical analysis, mathematical modeling, machine and deep learning, computer vision, and scientific data programming/visualization. He is currently working to develop a computer-vision system to automatically annotate and identify features of interest in images of sediment collected using Integral's sediment profile imaging (SPI) system. Dr. Sackmann has also designed, built, and deployed automated, real-time environmental sensor systems to collect water quality data from both fixed locations (e.g., moorings) and moving platforms (e.g., passenger ferries), and has first-hand experience developing comprehensive marine data management systems.

Dr. Sackmann has worked with clients in a variety of sectors, including chemical manufacturing, oil and gas, and renewable energy, to develop statistically robust methods for merging disparate environmental data sets together to conduct investigations across a wide range of time and space scales. He previously served as a technical lead in the development of a number of 3-dimensional hydrodynamic and water quality models of Puget Sound, Washington, and adjacent marine waters. The models focused on nutrient and dissolved oxygen dynamics and were developed, in part, as regulatory tools to support Washington State's implementation of the Clean Water Act in Puget Sound. The models were developed in collaboration with the U.S. Environmental Protection Agency Region 10 and are currently being used to describe both the biogeochemistry and water quality of this complex estuarine system, and to make future predictions based on anticipated regional climate change, land use changes, and increased anthropogenic stress over time.

Dr. Sackmann holds a graduate certification in geographic information systems (GIS) from the University of Maine and has received certification as both a GIS Professional (GISP) from the GIS Certification Institute and a Senior Ecologist from the Ecological



Society of America. He is also an adjunct faculty member at The Evergreen State College in Olympia, Washington.

Continuing Education and Training

Postdoctoral Fellowship at the Monterey Bay Aquarium Research Institute, Moss Landing, California, 2007–2008

National Science Foundation (NSF) Graduate Research Fellowship, University of Maine, Orono, Maine, 2003–2004 and 2005–2007

Graduate Provost Fellowship in the NSF GK-12 Graduate Teaching Fellows Program, University of Maine, Orono, Maine, 2004–2005

Washington NASA Space Grant Consortium OUR Earth Fellowship, University of Washington, Seattle, Washington, 1999

Deep Learning Specialization (five-course sequence), Coursera, 2018

PSMJ Project Management Bootcamp, Seattle, Washington, 2014

Delft3D Software Days (short course), San Francisco, California, 2013

Dream Ocean Satellite Image Workshop Fisheries and Aquaculture, Oregon State University, Newport, Oregon, 2013

Wavelet Methods for Data Analysis (short course), Applied Physics Laboratory/University of Washington, Seattle, Washington, 2005

Spatio-Temporal Statistical Analysis of Multi-Platform Optical Ocean Observations (intensive summer course), University of Maine, Walpole, Maine, 2003

Optical Oceanography (intensive summer course), University of Maine, Walpole, Maine, 2001

Achievements and Awards

United States Utility Patent No. 62/662,936 (provisional), Mapping Benthic Habitat Conditions and Seafloor Deposits.

Exceptional Results Award; Team Award—Puget Sound Modeling Team, Washington State Department of Ecology, Olympia, Washington, 2013

Creative Solutions Award; Team Award—Marine Monitoring (award shared with Dr. Christopher Krembs), Washington State Department of Ecology, Olympia, Washington, 2011

Outstanding Student Paper (Invited), Ocean Sciences Meeting, Honolulu, Hawaii, 2006



Relevant Experience

Risk, Impact, and Injury Assessment

Deepwater Horizon, Gulf of Mexico—Retained as expert consultant to provide scientific critique on natural resource damage issues associated with the Deepwater Horizon accident and oil spill; specifically assessing injury to common bottlenose dolphins (*Tursiops truncatus*) and marine birds. Critique of bird mortality estimates was developed as a peer-reviewed manuscript and published in the open scientific literature.

Regional Marine Impacts Associated with Oil Exploration, Arctic Sea—Project manager for designing and performing a metasynthesis of environmental monitoring data collected during and after exploration drilling activities. Under an NPDES general permit, assembled multiple rounds of environmental monitoring data sets for use in the evaluation of potential impacts to the Chukchi Sea regional marine ecosystem. Collected chemical, physical, and toxicological data to address baseline and post-drilling conditions for surface water, sediment, benthic community structure, whole effluent toxicity testing, and marine mammals.

Impacts to Regional Ecosystem Services for Gulf of Thailand Fisheries, Asia—Worked as part of a technical team to complete a human health and ecological risk assessment in support of oil platform decommissioning. The risk assessment incorporated multiple lines of evidence, using more than 20 years of research related to regional atmospheric and riverine contributions, mercury isotopic analysis, mercury and methylmercury geochemistry and biogeochemistry, mechanistic modeling of sediment resuspension during 100-year storm events, and platform and regional market fish data. The assessment separated platform risk relative to regional risk and used ecosystem service loss to the Thai fishery as the common risk metric.

Ecopath Food Web Model, Gulf of Mexico—Developed an Ecopath with Ecosim food web model of a coastal estuary in the Gulf of Mexico to provide broad-based support for natural resource damage assessment activities related to local shellfish populations.

Superfund Remedial Investigation/Feasibility Studies and Cost Allocation

Lower Duwamish Waterway (LDW) CERCLA RI/FS (Confidential Client), Washington—Retained as expert consultant to support site-specific allocation of costs associated with cleanup of the LDW Superfund site. Key issues that were addressed included chemical fingerprinting, loading analyses, the timing of releases, natural resource injury, interpretation and conclusions of environmental investigations, and development of site-specific remediation strategies. This work focused on reconstructing historical scenarios for environmental releases and analyzing existing environmental distributions in the context of current and ongoing sources and transport/fate processes.

Lower Duwamish Waterway CERCLA RI/FS (Confidential Client), Washington—EPA has proposed a partial dredge and capping remedy to address contaminated sediments at a heavy marine contractor's facility contaminated with metals and PCBs, just one of the sites within the LDW Superfund site. Served as technical lead for a comprehensive RI/FS by the owner to allow upgrading and redevelopment of the property. The objective of the project is to expedite the



development while EPA continues working through the multi-year pre-design and design phases of the LDW Superfund cleanup.

Marine Ecosystem and Biogeochemical Modeling

Puget Sound Georgia Basin Model, Washington—Project manager and technical lead for development of a 3-dimensional biogeochemical model of the Salish Sea (model domain included Puget Sound, Strait of Juan de Fuca, Strait of Georgia, and the continental shelf) to determine how marine water quality is impacted by increased urbanization and human activities and how water quality will change as a result of climate change (e.g., changing storm, precipitation patterns, ocean acidification, sea level rise). To support model development, a comprehensive summary of historical, current, and future nutrient loads was developed from both point and non-point sources being delivered to Puget Sound.

South Puget Sound Dissolved Oxygen Model, Washington—Worked as part of a technical team to develop a 3-dimensional biogeochemical model of South Puget Sound, Washington, to better understand factors contributing to low dissolved oxygen concentrations in specific locations. Developed a specialized suite of post-processing tools to streamline model calibration and validation; the tools were later updated to accommodate output from a variety of biogeochemical modeling frameworks.

Deschutes River Total Maximum Daily Load (TMDL), Washington—Worked as part of a technical team to develop a 3-dimensional biogeochemical model of Budd Inlet, Washington, in support of the Deschutes River TMDL study that examined how point and non-point nutrient sources affect local dissolved oxygen concentrations.

Puget Sound Box Model, Washington—Extended an existing hydrodynamic box model of Puget Sound to enable rapid, multi-year simulations. Hydrodynamic results were linked to EPA's Water Quality Analysis Simulation Program to characterize biogeochemical processes in Puget Sound across large time and space scales.

General Biogeochemical Model Development—Utilized models of various types to support specific scientific investigations. Representative examples include a simple nutrient-phytoplankton-zooplankton-detritus model of the northeast Pacific Ocean, a 1-dimensional hydrodynamic model of the North Atlantic Ocean, a 2-dimensional model of Langmuir turbulence in the surface mixed layer, and a 1-dimensional model of biological mixing in deep-sea sediments.

Estuarine Dynamics

Field Sampling and Aerial Surveys, Washington—Conducted aerial photographic surveys of Puget Sound and assisted with conductivity, temperature, depth (CTD) and rosette sampling as part of Washington State Department of Ecology's long-term, ambient monitoring program.

Marine Water Quality Conditions Index, Washington—Helped develop Washington State's Marine Water Conditions Index (MWCI), which is a key indicator used to assess the overall health and recovery status of Puget Sound. Developed software to calculate the MWCI from raw



monitoring data, which enables the index to be easily updated on an annual basis as new information is collected.

Toxicant Effects Modeling

Modeling of Herbicide Effects on Algae Populations, Confidential Location—Project manager and technical lead for ongoing analysis of effects of herbicide exposure in aquatic systems in support of risk assessments and client research and development efforts. Implementing regulatory and industry mechanistic toxicokinetic/toxicodynamic models to simulate exposures and effects on ecological populations. Performing model calibration, validation, testing, and sensitivity analysis. Evaluating multiple species and exposure scenarios at varying levels of environmental realism and complexity. Fitting dose-response laboratory toxicity data. Supporting research on species physiology and environmental conditions.

Phytoplankton Ecology and Photobiology

Marginal Ice Zone Primary Production, Beaufort Sea—Worked with the University of Maine and the Applied Physics Laboratory/University of Washington to assess and reconstruct patterns of water column primary productivity in the seasonal marginal ice zone in the Beaufort Sea using a combination of data from autonomous underwater gliders and ocean color satellites.

Daytime Fluorescence Quenching Assessment Using Variable Fluorescence, Equatorial Pacific Ocean—Participated in multi-institution research cruise from Fiji to Hawaii to examine patterns in daytime fluorescence quenching of chlorophyll-*a* in marine phytoplankton using a newly developed fast-repetition-rate fluorometer developed by the Monterey Bay Research Institute in Moss Landing, California.

*Seaglider Observations of Variability in Daytime Fluorescence Quenching of Chlorophyll *a*, Northeast Pacific Coastal Waters*—Used Seaglider measurements to characterize the influence of daytime fluorescence quenching on near-surface estimates of chlorophyll *a* and phytoplankton biomass. Quenching was observed throughout the region, during all times of the year and to depths greater than 50 m. The degree of quenching was positively correlated with solar radiation, and the patterns observed off the Washington coast were remarkably similar to what has been observed in other areas, suggesting some degree of universality for the underlying relationship.

Seaglider Observations of Blooms and Subsurface Chlorophyll Maxima, Northeast Pacific Coastal Waters—Used Seaglider measurements from 2003 to 2007 to illustrate how the apparent autumn phytoplankton bloom in waters off the Washington coast could be due, in part, to the redistribution of phytoplankton from subsurface maxima to a depth where they could be observed by satellite. This example demonstrated the value of gliders in ocean observing, especially when they are used in combination with other platforms.

Harmful Algal Blooms and the Juan de Fuca Eddy, Northeast Pacific Coastal Waters—Used satellite ocean color data to demonstrate how toxic *Pseudo-nitzschia* spp. associated with the Juan de Fuca eddy could be transported south toward Washington State beaches during specific environmental conditions. Demonstrated that tracking the trajectory of surface waters from the



Juan de Fuca eddy by remote sensing could be used to trigger conditional sampling for domoic acid along the Washington coast.

Satellite Remote Sensing and Autonomous and Lagrangian Platforms and Sensors

Satellite Ocean Color Baseline, Puget Sound, Washington—Retained by Long Live the Kings to develop a time series of satellite-derived ecosystem indicators to help predict the marine survival of salmon and steelhead in Puget Sound and the greater Salish Sea.

Thin Layers Cruise, Gulf of Maine—Assisted with an intensive hydrographic and bio-optical survey in the Gulf of Maine to determine the distribution and persistence of optical thin layers. Helped deploy and recover two optically equipped Slocum gliders during the cruise and developed custom software to post-process and visualize data collected by the gliders in real-time. Obtained, processed, and distributed thermal and ocean color satellite imagery to science personnel during the cruise to help refine the ship-based sampling strategy and interpret optical data being reported by the gliders.

Automatic Feature Detection, Monterey Bay and Northeast Pacific Coastal Waters—Developed an algorithm using 1-dimensional wavelet transforms to automatically detect and characterize layered structures (e.g., optical thin layers) in data collected with the Monterey Bay Aquarium Research Institute’s Dorado autonomous underwater vehicle (AUV). The algorithm was subsequently used with Seaglider measurements to characterize a phytoplankton thin sheet, which was observed off the Washington coast.

Satellite Ocean Color Products for Nearshore Waters, Puget Sound, Washington—Developed an automated data retrieval and processing framework to create high-resolution (250–300 m) ocean color products for Puget Sound using data from the European Space Agency’s MERIS ocean color sensor and NASA’s MODIS-Aqua and MODIS-Terra sensors.

Elwha River Dam Removal and Its Impacts on Nearshore Turbidity, Washington—Worked with USGS to develop an automated data retrieval and processing framework to create custom ocean color products at the mouth of the Elwha River to monitor the impacts of dam removal on near-surface turbidity.

2008 North Atlantic Bloom Experiment (NAB08), North Atlantic Ocean—Developed an automated data retrieval and processing framework to deliver custom ocean color products to science personnel during the deployment of two mixed-layer floats and four gliders in the North Atlantic. Satellite products provided valuable contextual information during processes cruises and helped refine the ship-based sampling strategy and interpret optical data being reported by the drifters and gliders. Ultimately, all available ocean color data from the European Space Agency’s MERIS ocean color sensor and NASA’s MODIS-Aqua was processed for 2008 in the region of interest to develop a seasonal characterization of phytoplankton in the North Atlantic and a statistical description of small-scale patchiness.



Seasonal and Inter-annual Variability in Satellite Ocean Color, Northeast Pacific Coastal Waters—Developed an automated data retrieval and processing framework to create custom ocean color products from NASA’s SeaWiFS ocean color sensor (the same framework was later expanded to accommodate data from NASA’s MODIS-Aqua ocean color sensor). Data were analyzed to examine seasonal and inter-annual variability in satellite-derived estimates of near-surface chlorophyll *a* and primary production off the Washington and Vancouver Island coasts from 1998 to 2002.

Environmental Data Collection, Analysis, Visualization, and Database Management

Standardized and Cost-Effective Benthic Habitat Mapping Tools for Marine and Hydrokinetic Site Environmental Assessments—Under a contract with the U.S. Department of Energy, serving as technical lead for a 3-year study to standardize and automate seafloor survey technologies for rapidly characterizing benthic habitat conditions across a range of environments. The concept is to integrate sediment profile and plan view imaging (SPI/PV) technology with well-established geophysical mapping techniques (e.g., multibeam bathymetry and acoustic backscatter) to develop effective and low-cost benthic habitat mapping protocols. A primary objective is the development and refinement of automated interpretation software that will identify and measure key physical and biological indicators in the SPI/PV images and link them to geophysical maps so that habitat distinctions can be rapidly identified and delineated.

Ferry-Based Data Collection, Washington—Initiated a partnership with the *Victoria Clipper* passenger ferry to develop a ferry-based monitoring program in Puget Sound, Washington. Spearheaded an expansion of the program that allowed sensors to be installed on select Washington State ferries. Data collected as part of this program are made available in near-real-time and summarized monthly as part of the Washington State Department of Ecology’s ongoing scientific outreach publication titled “Eyes Over Puget Sound.” Monthly contributions include high-resolution satellite data products for Puget Sound and coincident *Victoria Clipper* ferry data.

Continuous Nitrate Monitoring, Washington—Deployed a continuous nitrate sensor on the Deschutes River in Tumwater, Washington, to determine how nitrate concentrations and other measured water quality parameters behave throughout the year, with special attention being paid to patterns observed during winter storm events. Data were collected, processed, and posted to the internet in real-time. The nitrate sensor was later transitioned to a marine sampling platform to help quantify and constrain the marine nitrogen budget in Puget Sound.

Continuous Optical Data Collection, Damariscotta, Maine—Deployed optical sensors in the Damariscotta River to provide high-resolution measurements of fluorescence and near-surface turbidity. Data were collected, processed, and posted to the internet in real-time.

4-Dimensional Data Visualization, North Atlantic Ocean—Beta-tested Myriax’s Eonfusion®, which is a software package for analyzing and visualizing complex 4-dimensional data sets. Worked with Myriax software engineers to create customizable curtain plots (interpolated time-



depth surfaces that vary in space) that were useful for visualizing data collected from gliders, AUVs, and other observing platform.

Environmental Assessment Program's Marine Water Data Management System (EAPMW), Puget Sound, Washington—Worked with a team to develop a comprehensive marine waters data management system to streamline and automate the workflow surrounding Washington State Department of Ecology's marine data collection efforts in Puget Sound. Responsible for the conceptual design of the system and helped design and implement the back-end SQL Server database infrastructure. Supervised the MATLAB® programmer hired to automate CTD data processing, quality assurance and quality control, and web-posting. Maintained all MATLAB® components of the system and was responsible for overall system integrity.

Automated Bio-optical Data Processing System, Maine—Designed and implemented a data management system to automatically integrate and post-process high-resolution bio-optical data collected from disparate sensor packages used during ship-based surveys.

Publications

Chang, G., T. Martin, F. Spada, B. Sackmann, C. Jones, and K. Whitehead. 2018. OPTically-based In-situ Characterization System (OPTICS) to quantify concentrations and mass fluxes of mercury and methylmercury in South River, Virginia, USA. *River Research and Applications* 34(9):1132–1141.

Khangaonkar, T., W. Long, B.S. Sackmann, T. Mohamedali, and A. Hamlet. 2016. Sensitivity of circulation in the Skagit River estuary to sea level rise and future flows. *Northwest Science* 90(1):94–118.

Sackmann, B., and S. Becker. 2015. Bird mortality due to the Deepwater Horizon oil spill: Comment on Haney et al. (2014a,b). *Mar. Ecol. Prog. Ser.* 534:273–277.

Krembs, C., and B.S. Sackmann. 2015. Strategies to increase the impact and effectiveness of long-term marine monitoring programs. In: *Coastal ecosystems: Experiences and recommendations for environmental monitoring programs*. M.T. Sebastiá (ed) Nova Science Publishers. ISBN: 978-1-63482-189-6.

Roberts, M., T. Mohamedali, B.S. Sackmann, T. Khangaonkar, and W. Long. 2014. Puget Sound and the straits dissolved oxygen assessment: Impacts of current and future nitrogen sources and climate change through 2070. Washington State Department of Ecology, 14-03-007, Olympia, WA. 147 pp. Available at: <https://fortress.wa.gov/ecy/publications/SummaryPages/1403007.html>.

Khangaonkar, T., W. Long, B.S. Sackmann, T. Mohamedali, and M. Roberts. 2012. Puget Sound dissolved oxygen modeling study: Development of an intermediate scale water quality model. Washington State Department of Ecology, 12-03-049, Richland, WA. 166 pp. Available at: <https://fortress.wa.gov/ecy/publications/SummaryPages/1203049.html>.



Khangaonkar, T., B.S. Sackmann, W. Long, T. Mohamedali, and M. Roberts. 2012. Simulation of annual biogeochemical cycles of nutrient balance, phytoplankton bloom(s), and DO in Puget Sound using an unstructured grid model. *Ocean Dynamics* 62(9):1353–1379.

Sackmann, B.S. 2011. Deschutes River continuous nitrate monitoring. Washington State Department of Ecology, 11-03-030, <https://fortress.wa.gov/ecy/publications/SummaryPages/1103030.html>.

Mohamedali, T., M. Roberts, B.S. Sackmann, and A. Kolosseus. 2011. Puget Sound dissolved oxygen model nutrient load summary for 1999-2008. Washington State Department of Ecology, 11-03-057, <https://fortress.wa.gov/ecy/publications/SummaryPages/1103057.html>.

Mohamedali, T., M. Roberts, B.S. Sackmann, A. Whiley, and A. Kolosseus. 2011. South Puget Sound dissolved oxygen study: Interim nutrient load summary. Washington State Department of Ecology, 11-03-001, <https://fortress.wa.gov/ecy/publications/SummaryPages/1103001.html>.

Perry, M.J., B.S. Sackmann, C.C. Eriksen, and C.M. Lee. 2008. Seaglider observations of blooms and subsurface chlorophyll maxima off the Washington coast. *Limnology and Oceanography* 53(6):2169–2179.

Sackmann, B.S., M.J. Perry, and C.C. Eriksen. 2008. Seaglider observations of variability in daytime fluorescence quenching of chlorophyll *a* in Northeastern Pacific coastal waters. *Biogeosciences Discussions* 5:2839–2865.

Sackmann, B.S. 2007. Remote assessment of 4-D phytoplankton distributions off the Washington coast. Ph.D. dissertation, University of Maine, USA, 221 pp.

Sackmann, B.S., and M.J. Perry. 2006. Ocean color observations of a surface water transport event: Implications for *Pseudo-nitzschia* on the Washington coast. *Harmful Algae* 5:608–619.

Sackmann, B.S., L. Mack., M.G. Logsdon, and M.J. Perry. 2004. Seasonal and inter-annual variability of SeaWiFS-derived chlorophyll *a* concentrations in waters off the Washington and Vancouver Island coasts, 1998–2002. *Deep Sea Research II* 51:945–965.

Invited Presentations/Panels/Peer Reviews

Invited participant and presenter. Autonomous and Lagrangian Platforms and Sensors Workshop (ALPS II). November 2005.

Presentation titled “The Ocean Carbon System: Recent Advances and Future Opportunities.” Ocean Carbon and Climate Change Workshop, Woods Hole Oceanographic Institution. August 2005.

Session titled “Phytoplankton.” Session chair. American Society of Limnology and Oceanography annual meeting. June 2005.



Invited participant and presenter. MODIS Ocean Data Products Workshop, University of New Hampshire. February 2003.

Presentation titled "Oceanography: The Making of a Science." Invited participant. Heinz Center Colloquia, University of Washington. January 2000.

Provided peer review for publications in *Deep-Sea Research Part I*, *IEEE Transactions on Geoscience and Remote Sensing*, *Geophysical Research Letters*, *Progress in Oceanography*, *Marine Ecology Progress Series*, and *Estuarine, Coastal, and Shelf Science*.

Proceedings/Presentations/Posters

Preziosi, D., B. Sackmann, Y. Atalay, R. Pastorok, J. Davies, and N. Galic. 2019. Multi-model framework for assessing pesticide risk across ecological hierarchies. Poster presentation at SETAC Europe Annual Meeting, Helsinki, Finland. May 26–30.

Revelas, E., B. Sackmann, and C. Jones. 2019. A streamlined and standardized benthic habitat mapping approach for marine and hydrokinetic site environmental assessments. Poster presentation at 6th Annual Marine Energy Technology Symposium. Washington, DC. April 1–3.

Sackmann, B.S., E. Revelas, K. Whitehead, D. Nielsen, C. Jones, and J. Durda. 2019. Using artificial intelligence and computer vision for cost-effective environmental monitoring and site characterization. Poster presentation at Tenth International Conference on the Remediation and Management of Contaminated Sediments, New Orleans, LA. February 11–14.

Leonard, B., N. Shonka, and B. Sackmann. 2018. Satellite-derived ecosystem indicators: a retrospective analysis of high resolution ocean color products in the Salish Sea. Poster presented at the 2018 Salish Sea Ecosystem Conference, Seattle, WA. April.

Preziosi, D., B. Sackmann, E. Mendelsohn, and R. Pastorok. 2018. Beyond population modeling for endangered species risk assessment. Poster presented at 39th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Sacramento, CA. November 4–7.

Revelas, E.C., B. Sackmann, A. Thurlow, and C. Jones. 2018. Mapping benthic habitat conditions and seafloor deposits using sediment profile imaging and a semi-automated image processing system. Poster presentation. Oral presentation and extended abstract. Offshore Technology Conference. Houston, TX. May.

Revelas, E.C., B. Sackmann, I. Stupakoff, and C. Jones. 2018. Standardized and cost-effective benthic habitat mapping tools for marine and hydrokinetic site environmental assessments. Oral presentation. Marine Geological and Biological Habitat Mapping (GeoHab) Conference. Santa Barbara, CA. May.



Sackmann, B., S. Dyer, J. Needoba, and K. Whitehead. 2018. Species-specific, continuous, cost-effective—a novel platform for in situ monitoring of cyanobacteria using hyperspectral and nephelometric methods. Society of Environmental Toxicology and Chemistry North America 39th Annual Meeting. Sacramento, CA. November.

Sackmann, B., E. Revelas, and C. Jones. 2018. Standardized and cost-effective benthic habitat mapping tools for marine and hydrokinetic site environmental assessments. Poster presented at 6th Annual Marine Energy Technology Symposium. Washington, DC. April.

Guerra Paris, M., J. Thomson, C. Maloy, C. Krembs, and B.S. Sackmann. 2017. Ferry-based velocity measurements through Admiralty Inlet, Puget Sound, Washington. Oral presentation. 15th Symposium on the Coastal Environment. Seattle, WA. January.

Revelas, E., B.S. Sackmann, and I. Stupakoff. 2017. Mapping disposed dredged material and a sand cap for the Douglas Harbor dredging project (Juneau, Alaska) using sediment profile imaging and a semi-automated image processing system. Poster presentation. Ninth International Conference on Remediation of Contaminated Sediments, New Orleans, LA. January.

Sackmann, B.S., E. Revelas, and I. Stupakoff. 2017. Advancements in automated image processing and standardization for sediment profile imaging. Poster presentation. Ninth International Conference on Remediation of Contaminated Sediments, New Orleans, LA. January.

Perry, M.J., C.M. Lee, L. Rainville, I. Cetinic, E.J. Yang, S. Kang, and B.S. Sackmann. 2016. Modeling primary productivity during the MIZ experiment from gliders. Poster presentations. Ocean Optics XXIII. October. Victoria, BC, Canada; 22nd International Symposium on Polar Sciences, Songdo, Incheon, Korea. May.

Sackmann, B.S., C. Krembs, S. Pool, and J. Bos. 2016. Ferries for science: Using optics to monitor and understand the role of *Noctiluca* in the Puget Sound food web. Poster presentation. Ocean Optics XXIII, Victoria, BC, Canada. October.

Sackmann, B.S., E.C. Revelas, and I. Stupakoff. 2016. Sediment profile imaging (SPI): Advancements in computer-automated image processing and standardization of key measurements. Poster presentation. 25th Annual Pacific Northwest Chapter Meeting of SETAC, Bellingham, WA. June.

Bos, J., C. Krembs, S. Pool, B.S. Sackmann, S. Albertson, and C. Maloy. 2015. Identifying annual geo-reference ecosystem thresholds using continuous surface measurements collected via high-speed ferry transects. Poster presentation. 23rd Biennial Conference of the Coastal and Estuarine Research Federation., Portland, OR. November.

Pool, S., C. Krembs, J. Bos, and B.S. Sackmann. 2015. Physical, chemical, and biological conditions during *Noctiluca* blooms in an urban fjord, Puget Sound. Poster presentation. 23rd Biennial Conference of the Coastal and Estuarine Research Federation, Portland, OR. November.



Nielsen, D., K. Whitehead, B.S. Sackmann, and G. Revelas. 2014. Determination of community impairment due to multiple stressors using likelihood ratios to integral lines of evidence. Oral presentation. Joint Aquatic Sciences Meeting, Portland, OR. May.

Khangaonkar, T.W. Long, M. Roberts, B.S. Sackmann, T. Mohamedali, and A. Hamlet. 2014. Sensitivity of circulation and biogeochemical response in Puget Sound to sea level rise and future climate loads. Oral presentation. Salish Sea Ecosystem Conference, Seattle, WA. May.

Khangaonkar, T.W. Long, B.S. Sackmann, T. Mohamedali, and A. Hamlet. 2014. Predicting the effects of sea level rise and future hydrology on salinity intrusion and freshwater export from the Skagit River estuary. Oral and poster presentations. Ocean Sciences Meeting, Honolulu, HI; Salish Sea Ecosystem Conference, Seattle, WA. May.

Krembs, C., S. Albertson, J. Bos, C. Maloy, M. Keyzers, B.S. Sackmann, L. Hermanson, and M. Dutch. 2014. Can long-term nitrogen increases affect pelagic food web processes and the vertical structure of biogeochemical processes in Puget Sound? Oral presentation. Salish Sea Ecosystem Conference, Seattle, WA. May.

Krembs, C., M. Dutch, V. Partridge, S. Weakland, J. Bos, S. Albertson, B.S. Sackmann, M. Keyzers, L. Hermanson, and C.F. Maloy. 2014. Changes in nutrient ratios drive changes in pelagic and benthic assemblages, and benthic-pelagic coupling in Puget Sound: A compelling hypothesis linking water quality and the benthos. Poster presentation. Salish Sea Ecosystem Conference, Seattle, WA. May.

Maloy, C.F., C. Krembs, S. Pool, J. Bos, L. Hermanson, S. Helgath, J. Thomson, W. Deppe, and B.S. Sackmann. 2014. Using ferries for marine water quality monitoring in the Salish Sea. Poster presentations. Salish Sea Ecosystem Conference, Seattle, WA; Pacific Estuarine Research Society Conference, Newport, OR. April.

Mohamedali, T., M. Roberts, and B.S. Sackmann. 2014. Future nitrogen loading to the Salish Sea: Population growth, land sea change, and climate change. Oral presentation. Salish Sea Ecosystem Conference, Seattle, WA. May.

Roberts, M.L., T. Mohamedali, T. Khangaonkar, W. Long, B. Cope, and B.S. Sackmann. 2014. Human activities, climate change, and Pacific Ocean trends influence oxygen in Puget Sound and the Salish Sea. Oral presentation. Joint Aquatic Sciences Meeting, Portland, OR. May.

Roberts, M., T. Mohamedali, B.S. Sackmann, T. Khangaonkar, W. Long, and A. Hamlet. 2014. Relative influences of human nutrient sources, the Pacific Ocean, and climate change on Salish Sea dissolved oxygen through 2070. Oral presentation. Salish Sea Ecosystem Conference, Seattle, WA. May.

Sackmann, B.S. 2014. Optics from ferries as ground truth for satellite ocean color products in Puget Sound. Poster presentation and extended abstract. Ocean Optics XXII, Portland, ME. October.



Sackmann, B.S., T. Khangaonkar, and C. Krembs. 2014. Developing hi-resolution satellite products to support marine aquaculture: Bringing far-scale applications into focus. Oral presentation. World Aquaculture Society—Aquaculture America, Seattle, WA. February.

Sackmann, B.S., C. Krembs, S. Pool, J. Bos, and T. Khangaonkar. 2014. Eyes over Puget Sound: Producing validated satellite products to support rapid water quality assessments in Puget Sound. Poster and oral presentations. Ocean Sciences Meeting, Honolulu, HI; Salish Sea Ecosystem Conference, Seattle, WA. May.

Krembs, C., B.S. Sackmann, S. Albertson, J. Bos, M. Keyzers, L. Friedenber, D. Mora, S. Pool, and C. Maloy. 2013. Eyes over Puget Sound. Presentation and hands-on demonstration. Stream Team Seminar Series, Olympia, WA. February.

Keyzers, M., J. Bos, C. Krembs, L. Friedenber, S. Albertson, B.S. Sackmann, D. Mora, S. Pool, and C. Maloy. 2012. Eyes over Puget Sound: Integrating multiple observations to report current conditions of water quality in Puget Sound and the Strait of Juan de Fuca. Poster presentation. Pacific Estuarine Research Society Conference, Anacortes, WA. April.

Krembs, C., J. Bos, S. Albertson, M. Keyzers, L. Friedenber, J. Ruffner, B.S. Sackmann, and C. Maloy. 2012. South Puget Sound 2011 and 2012 in review: Aerial and water column observations from Ecology's long-term monitoring program. Poster presentations. South Puget Sound Science Symposium, Shelton, WA. October; Salish Sea Marine Survival Workshop, Bellingham, WA. November.

Bos, J., C. Krembs, S. Albertson, B.S. Sackmann, M. Keyzers, L. Friedenber, and C. Maloy. 2011. The Puget Sound dissolved oxygen deficit—a tool to track sources and sinks in a water quality budget. Oral presentation. 21st Biennial Conference of the Coastal and Estuarine Research Federation, Daytona Beach, FL. November.

Khangaonkar, T., T. Kim, Z. Yang, B.S. Sackmann, M. Roberts, and B. Cope. 2011. Development of a biogeochemical model of the Salish Sea, simulations of nutrient balance, algae, and DO. Oral presentation. Salish Sea Ecosystem Conference, Vancouver, BC. October.

Krembs, C., J. Bos, S. Albertson, B.S. Sackmann, M. Keyzers, L. Friedenber, and C. Maloy. 2011. Are eutrophication and dissolved oxygen trends in Puget Sound always coupled? Oral presentation. Salish Sea Ecosystem Conference, Vancouver, BC. October.

Mohamedali, T., B.S. Sackmann, and M. Roberts. 2011. Puget Sound nutrient loading: Sources and magnitudes. Oral presentation. Salish Sea Ecosystem Conference, Vancouver, BC. October.

Pelletier, G., A. Ahmed, B.S. Sackmann, M. Roberts, and B. Ambrose. 2011. Calibration of a three-dimensional model of water quality in South Puget Sound. Poster presentation. Salish Sea Ecosystem Conference, Vancouver, BC. October.



Roberts, M., A. Kolosseus, B.S. Sackmann, and G. Pelletier. 2011. Are human contributions decreasing dissolved oxygen in the Salish Sea? Oral presentation. Salish Sea Ecosystem Conference, Vancouver, BC. October.

Sackmann, B.S. 2011. Matryoshka-based monitoring of Puget Sound: Characterizing water quality at multiple scales. Oral presentation. Salish Sea Ecosystem Conference, Vancouver, BC. October.

Sackmann, B.S., C. Krembs, and T. Khangaonkar. 2011. Detecting patterns of water quality at multiple scales: A Matryoshka-based monitoring approach for Puget Sound. Oral presentation. 21st Biennial Conference of the Coastal and Estuarine Research Federation, Daytona Beach, FL. November.

Albertson, S., C. Krembs, B.S. Sackmann, C. Maloy, D. Mora, A. Carle, J. Bos, and M. Jones. 2010. Subtidal to tidal scales of variability for telemetered moorings in Puget Sound. Oral presentation. MTS/IEEE Oceans 2010 Meeting, Seattle, WA. September.

D'Asaro, E.A., C.M. Lee, M.J. Perry, K. Fennel, W. Bagniewski, N. Briggs, I. Cetinic, D. Checkley, Giorgio Dall'Olmo, A. Gray, K. Gudmundsson, E. Kallin, R.S. Lampitt, A. Mahadevan, P. Martin, N. Poulton, E. Rehm, K. Richardson, R. Rykaczewski, T. Rynearson, B.S. Sackmann, M. Sauer, M. Sieracki, and T. Westberry. 2010. Influence of meso- and submesoscale ocean dynamics on the global carbon cycle and marine ecosystems. Oral presentation. The 2008 North Atlantic Bloom Experiment: Physics, Chemistry and Biology of a Bloom and a Patch, Aber Wrac'h, Brittany, France. June.

Gray, A. C.M. Lee, E.A. D'Asaro, M.J. Perry, N. Briggs, I. Cetinic, E. Kallin, N. Poulton, E. Rehm, B.S. Sackmann, M. Sieracki, and B. Thompson. 2010. The 2008 North Atlantic Spring Bloom Experiment: Autonomous platform observations of an anticyclonic eddy and the development of an associated 10-km patch of phytoplankton. Poster presentation. Ocean Sciences Meeting, Portland, OR. February.

Krembs, C., B.S. Sackmann, C. Maloy, S. Albertson, J. Bos, M. Keyzers, and S. Hoffer. 2010. Significant changes in macronutrient composition along the urban corridor of Puget Sound from 1998-2008. Poster presentation. Ocean Sciences Meeting, Portland, OR. February.

Lee, C.M., E.A. D'Asaro, M.J. Perry, K. Fennel, N. Briggs, I. Cetinic, A. Gray, K. Gudmundsson, E. Kallin, R.S. Lampitt, P. Martin, N. Poulton, E. Rehm, T. Rynearson, B.S. Sackmann, M. Sieracki, and W.J. Bagniewski. 2010. Autonomous Lagrangian Platforms and Sensors (ALPS): A new approach to study ocean biogeochemical cycles. Oral presentation. Ocean Sciences Meeting, Portland, OR. February.

Mohamedali, T., M. Roberts, and B.S. Sackmann. 2010. South Puget Sound nutrient loading: Magnitude and sources. Poster presentation. 2010 South Sound Science Symposium, Shelton, WA. October.



Perry, M.J., E.A. D'Asaro, C.M. Lee, N. Briggs, I. Cetinic, B.S. Sackmann, M. Sieracki, K. Gudmundsson, A. Gray, E. Kallin, and E. Rehm. 2010. Coupling phytoplankton carbon flux at submeso- and meso-scales during the subpolar North Atlantic spring bloom. Oral presentation. Ocean Sciences Meeting, Portland, OR. February.

Perry, M.J., B.S. Sackmann, R.L. Lampitt, C.M. Lee, P. Martin, N. Briggs, E.A. D'Asaro, T. Rynearson, and M. Sieracki. 2010. Phytoplankton carbon flux following the Subpolar North Atlantic spring bloom: measurements from satellites, autonomous gliders, and sediment traps. Oral presentation. Combining Water Column Data with Sediment Trap and Satellite Observations for Improved Marine Carbon Export Estimates Workshop, Bergen, Norway. June.

Sackmann, B.S., and C. Krembs. 2010. Eyes on Puget Sound: Developing a multi-scale perspective on marine surface water. Invited oral presentation. University of Washington Oceans and Human Health Seminar Series, Seattle, WA. November.

Sackmann, B.S., M.J. Perry, E.A. D'Asaro, and C.M. Lee. 2010. Tools and methods for integrating data: Combining disparate datasets to visualize the North Atlantic spring bloom. Oral presentation. Ocean Sciences Meeting, Portland, OR. February.

Sackmann, B.S. 2010. Deschutes River continuous nitrate monitoring. Oral presentation. Meeting of Northwest Water Quality Modelers (NWMOD), Olympia, WA. May.

Sackmann, B.S. 2010. Puget Sound matryoshka-based marine monitoring (PSM-3). Oral presentation. Washington State Department of Ecology Environmental Assessment Program Seminar Series, Olympia, WA. June.

Ahmed, A., S. Albertson, B. Bahng, B. Cope, M. Kawase, T. Khangaonkar, G. Pelletier, M. Roberts, B.S. Sackmann, Z. Yang, and other collaborators within the Puget Sound Marine Environmental Modeling Consortium. 2009. Using models to compare and prioritize actions in Puget Sound—Who's modeling what and why bother? Poster presentation. Puget Sound Georgia Basin Ecosystem Conference, Seattle, WA. February.

Bos, J., S. Hoffer, C. Krembs, S. Albertson, B.S. Sackmann, J. Newton, and D. Duggins. 2009. A decade on the edge: Examining boundary stations in the Strait of Juan de Fuca. Poster presentation. Puget Sound Georgia Basin Ecosystem Conference, Seattle, WA. February.

Bos, J., C. Krembs, S. Albertson, B.S. Sackmann, and V. Partridge. 2009. Using in-situ calibrated dissolved oxygen as an index component to assess and communicate long-term trends in Puget Sound water quality. Poster presentation. Coastal and Estuarine Research Federation 20th Biennial Conference, Portland, OR. November.

Krembs, C., J. Bos, S. Hoffer, B.S. Sackmann, C. Maloy, and M. Keyzers. 2009. A decade of nutrient and oxygen concentrations in Puget Sound: A tool for long-term analysis of eutrophication. Oral presentation. Puget Sound Georgia Basin Ecosystem Conference, Seattle, WA. February.



Krembs, C., J. Bos, S. Albertson, M. Jones, M. Keyzers, S. Hoffer, B.S. Sackmann, and C. Maloy. 2009. Modular indices improve causality and communications between experts and managers. Oral presentation. Coastal and Estuarine Research Federation 20th Biennial Conference, Portland, OR. November.

Perry, M.J., H. Claustre, K. Johnson, C. Lee, E. D'Asaro, E. Boss, and B.S. Sackmann. 2009. The ocean below: Reducing uncertainty in satellite ocean color products with measurements made from gliders and floats. Oral presentation. NASA Ocean Color Research Team Meeting, New York, NY. May.

Sackmann, B.S., B. Cope, G. Pelletier, and M. Roberts. 2009. Puget Sound box model—a simple, yet powerful tool. Poster presentation. Puget Sound Georgia Basin Ecosystem Conference, Seattle, WA. February.

Sackmann, B.S. 2009. 4D remote sensing of the North Atlantic spring bloom. Poster presentation. NASA Ocean Color Research Team Meeting, New York, NY. May.

Sackmann, B.S. 2009. The model results are in! Now what? Techniques for visualizing and animating model results to communicate with general audiences. Poster presentation. Puget Sound Modeling Open House, Seattle, WA. June.

D'Asaro, E.A., C.M. Lee, M.J. Perry, K. Fennel, E. Rehm, A.M. Gray, N. Briggs, K. Gudmundsson, and B.S. Sackmann. 2008. The 2008 North Atlantic Spring Bloom Experiment I: Overview and Strategy. Oral presentation. American Geophysical Union Fall Meeting, San Francisco, CA. December.

Gray, A.M., E.A. D'Asaro, C.M. Lee, M.J. Perry, K. Fennel, N. Briggs, E. Rehm, B.S. Sackmann, and K. Gudmundsson. 2008. The North Atlantic Spring Bloom Experiment 2008: Observing carbon fluxes with autonomous platforms. Poster presentation. University of Washington's Program on Climate Change, Friday Harbor Laboratories, San Jan Island, WA. September.

Gray, A.M., C.M. Lee, E.A. D'Asaro, M.J. Perry, K. Fennel, N. Briggs, E. Rehm, B.S. Sackmann, M.E. Sieracki, N. Poulton, and K. Gudmundsson. 2008. The 2008 North Atlantic Spring Bloom Experiment: Observations of a stationary eddy on the eastern flank of the Reykjanes Ridge. Poster presentation. American Geophysical Union Fall Meeting, San Francisco, CA. December.

Lee, C.M., E.A. D'Asaro, M.J. Perry, A.M. Gray, E. Rehm, N. Briggs, B.S. Sackmann, and K. Gudmundsson. 2008. The 2008 North Atlantic Spring Bloom Experiment II: Autonomous platforms and mixed layer evolution. Poster presentation. American Geophysical Union Fall Meeting, San Francisco, CA. December.

Perry, M.J., B.S. Sackmann, C.C. Eriksen, and C.M. Lee. 2008. Multiyear Seaglider observations of northern California Current ecosystem: variability in phytoplankton annual cycle in deep waters off the Washington slope. Oral presentation. Ocean Sciences Meeting, Orlando, FL. March.



Perry, M.J., E.A. D'Asaro, C.M. Lee, K. Fennel, N. Briggs, A.M. Gray, E. Kallin, E. Rehm, W. Bagniewski, D. Checkley, G. Dall'Olmo, K. Gudmundsson, R. Lampitt, P. Martin, N. Poulton, R. Rykaczewski, K. Richardson, T. Rynearson, M. Sauer, M. Sieracki, B.S. Sackmann, and T. Westberry. 2008. Autonomous measurements of the North Atlantic spring bloom (~61°N, 25°W): Early results from the NAB08 experiment. Poster presentation. Ocean Carbon and Biogeochemistry Workshop, Woods Hole, MA. July.

Rienecker, E.V., J.P. Ryan, and B.S. Sackmann. 2008. Intermediate nepheloid layers in the central California coastal zone. Oral presentation. Eastern Boundary Upwelling Ecosystems Symposium, Las Palmas, Gran Canaria, Spain. June.

Ryan, J.P., B.S. Sackmann, and E.V. Rienecker. 2008. Scales and processes of phytoplankton thin layer patchiness in a coastal upwelling system, from synoptic multidisciplinary mapping by AUV. Oral presentation. Ocean Sciences Meeting, Orlando, FL. March.

Sackmann, B.S. and J.P. Ryan. 2008. Automated characterization of layered structure using wavelets. Poster presentation. Ocean Sciences Meeting, Orlando, FL. March.

Sackmann, B.S. 2008. Autonomous oceanography: Merging data from satellites and gliders to visualize phytoplankton distributions off the Washington coast. Invited oral presentation. Millersville University, Millersville, PA. February.

Sackmann, B.S. 2008. Remote biological monitoring of waters off the Washington coast: Merging bio-optical measurements from satellites and autonomous underwater gliders. Invited oral presentation. Washington State Department of Ecology, Lacey, WA. May.

Sackmann, B.S. 2008. Temporal evolution of mesoscale bio-optical variability during the 2008 North Atlantic Bloom Experiment: A satellite-based perspective. Poster presentation. American Geophysical Union Fall Meeting, San Francisco, CA. December.

Sackmann, B.S., M.J. Perry, C.C. Eriksen, and C.M. Lee. 2007. Annual evolution and demise of the subsurface chlorophyll maximum layer off Washington, USA: Results from the Seaglider field campaign, 2003—present. Oral presentation. Eastern Pacific Ocean Conference, Leavenworth, WA. September.

Sackmann, B.S. 2007. Using autonomous optical measurements from the Dorado AUV to study bio-physical interactions in Monterey Bay. Oral presentation. Monterey Bay Aquarium Research Institute Project Update, Moss Landing, CA. July.

Perry, M.J., B.S. Sackmann, C.C. Eriksen, and C.M. Lee. 2006. Seaglider observations of a phytoplankton thin sheet in waters off the Washington coast. Oral presentation. Ocean Sciences Meeting, Honolulu, HI. February.



Sackmann, B.S., M.J. Perry, and C.C. Eriksen. 2006. Langmuir turbulence in waters off the coast of Washington revealed using Seaglider fluorescence measurements. Poster presentation. Seventh Annual School of Marine Sciences Graduate Symposium, Walpole, ME. May.

Sackmann, B.S., M.J. Perry, C.C. Eriksen and C.M. Lee. 2006. Analysis of a cyclonic eddy off the Washington coast using merged Seaglider optical data and ocean color satellite imagery. Invited oral presentation. Ocean Sciences Meeting, Honolulu, HI. February.

Perry, M.J., C.C. Eriksen, and B.S. Sackmann. 2005. Seaglider observations of the subsurface chlorophyll maximum layer. Poster presentation. International Ocean Research Conference, Paris, France. June.

Sackmann, B.S., M.J. Perry, and C.C. Eriksen. 2005. Developing integrated data products for coastal carbon research: Merging Seaglider data with ocean color. Poster presentation. Ocean Carbon and Climate Change Workshop, Woods Hole, MA. August.

Sackmann, B.S., M.J. Perry, and C.C. Eriksen. 2005. 4-D phytoplankton distributions off the Washington coast, USA: Merging satellite ocean color imagery with *in situ* optical measurements from an autonomous underwater glider. Oral presentation. American Society of Limnology and Oceanography Meeting, Santiago de Compostela, Spain. June.

Sackmann, B.S., M.J. Perry, and C.C. Eriksen. 2005. Vertical structure: Autonomous Seagliders supply the missing dimension. Poster presentations. NASA Ocean Color Research Team Meeting, Portland, OR. April; Sixth Annual School of Marine Sciences Graduate Symposium, Walpole, ME. May.

Wentworth, S.E., and B.S. Sackmann. 2005. Water quality assessment as a means of enhancing middle school science education. Poster presentation. American Society of Limnology and Oceanography Meeting, Santiago de Compostela, Spain. June.

Perry, M.J., B.S. Sackmann, and E. Boss. 2004. C4D-SEE ocean CARBON in the SEA in FOUR DIMENSIONS. Poster presentation. NASA Ocean Color Research Team Meeting, Washington, DC. April.

Sackmann, B.S., M.J. Perry, and C.C. Eriksen. 2004. Optical measurements collected with an autonomous underwater glider off the Washington coast in spring 2002 and their relationship to satellite ocean color. Oral and poster presentations. American Society of Limnology and Oceanography Meeting, Honolulu, HI. February; Sixth Annual University of Maine Graduate Research Expo, Orono, ME. April; NASA Ocean Color Research Team Meeting, Washington, DC. April; Fifth Annual School of Marine Sciences Graduate Symposium, Walpole, ME. May.

Perry, M.J., B.S. Sackmann, and C.C. Eriksen. 2003. Use of optical measurements collected by autonomous platforms to provide a vertical dimension to satellite ocean color imagery. Oral presentation. Conference on Maritime Reconnaissance for NATO's Recognized Environmental Picture, La Spezia, Italy. May.



Perry, M.J., C.C. Eriksen, and B.S. Sackmann. 2003. Seaglider autonomous observations of phytoplankton abundance in waters off the Washington coast, USA, in spring 2002. Oral presentation. American Society of Limnology and Oceanography Meeting, Salt Lake City, UT. February.

Sackmann, B.S. 2003. Ocean color observations of surface water transport from the Juan de Fuca Eddy onto the Washington shelf. Oral presentations. Fifth Annual University of Maine Graduate Research Expo. April. Orono, ME. Fourth Annual School of Marine Sciences Graduate Symposium, Walpole, ME. May.

Sackmann, B.S., and M.J. Perry. 2003. Cluster analysis of remote sensing reflectance off the Washington coast, USA: Developing spectral signatures to aid feature extraction and tracking. Oral presentation. American Society of Limnology and Oceanography Meeting, Salt Lake City, UT. February.

Carney, M.A., C.S. Roesler, E. Boss, R.M. Letelier, W.S. Pegau, and B.S. Sackmann. 2002. Constraint of a reflectance inversion model to derive particulate absorption and backscattering spectra. Poster presentation. Ocean Sciences Meeting, Honolulu, HI. February.

Sackmann, B.S. 2002. Seasonal and inter-annual variability of SeaWiFS-derived chlorophyll *a* concentrations in waters off the Washington coast, 1998-2001. Oral presentation. Third Annual School of Marine Sciences Graduate Symposium, Walpole, ME. May.

Sackmann, B.S., M.J. Perry, and M.G. Logsdon. 2001. Using SeaWiFS to evaluate inter-annual variability in phytoplankton biomass distribution off the Washington coast. Poster presentation. American Society of Limnology and Oceanography Meeting, Albuquerque, NM. February.

Sawyer, R.C., and B.S. Sackmann. 2001. Variability in *Calanus pacificus* reproductive fitness in response to changes in phytoplankton food quality. Poster presentation. American Society of Limnology and Oceanography Meeting, Albuquerque, NM. February.

Sackmann, B.S. 2000. Variability in egg production of natural population of *Calanus pacificus* from Puget Sound, Washington. Oral presentation. Pacific Estuarine Research Society Meeting, Sidney, BC. May.

Sackmann, B.S., M.J. Perry, and M.G. Logsdon. 2000. Use of SeaWiFS imagery to observe persistent patches of optically active material off the west coast of Vancouver Island, Canada. Poster presentation. American Society of Limnology and Oceanography Meeting, Copenhagen, Denmark. June.

Sackmann, B.S. 1999. Determining chlorophyll *a* concentrations from satellite ocean color data. Oral and poster presentation. NASA OUR Earth Symposium, Seattle, WA. September.

Sackmann, B.S. 1999. Spatial distribution of chlorophyll *a* in Puget Sound, Washington. Poster presentation. Pacific Estuarine Research Society Meeting, Newport, OR. April.

