

Curriculum Vitae

David W. Bressler

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EDUCATION

- Master of Education, Curriculum and Instruction (Science Education, Biology), 2016, Pennsylvania State University, University Park, PA
- Master of Environmental Management, Water and Air Resources, 1999, Duke University, Nicholas School of the Environment, Durham, NC
- Bachelor of Arts, Biology and Anthropology, 1997, Franklin and Marshall College, Lancaster, PA

CAREER EXPERIENCE

- 2016-present, Citizen Science, Stroud Water Research Center
- 2014-2016, Lab Manager, Science Education (Research Assistantship), Pennsylvania State University, State College, PA
- 2015, Student Teacher (Biology), Hollidaysburg Area Senior High School, Hollidaysburg, PA
- 2008-2015, Environmental Scientist, Tetra Tech, Inc, Center for Ecological Sciences, 502 W. Cordova Rd, Ste C, Santa Fe, NM 87507
- 1999-2008, Environmental Scientist, Tetra Tech, Inc., Center for Ecological Sciences, 400 Red Brook Blvd, Ste 200, Owings Mills, MD 21117
- 1998-1999, Research Assistant, Duke University, Nicholas School of the Environment, Durham, NC
- 1998, Research Assistant, Henry's Fork Foundation, Ashton, ID
- 1996, Research Assistant (Hackman Scholar), Franklin and Marshall College, Lancaster, PA

APPLICABLE SKILLS/ACCOMPLISHMENTS

- **Research**
 - 16 years experience in working with federal, state, tribal, and county environmental agencies, as well as private industry and non-profit organizations, on projects broadly related to human interaction with and management of aquatic ecosystems.
 - Articulated understanding of ecological concepts and relationships used as foundation for designing and conducting research on environmental assessment projects dealing with water resource monitoring and assessment.
 - Consistent involvement in research analyzing relationships among biological, physical habitat, geomorphological, and chemical aquatic ecosystem components for use in management, protection, and restoration.
 - Published and presented results of studies in the form of peer-reviewed manuscripts, reports, and professional conference and workshop presentations.
 - Consistent involvement in the gathering, organization, and interpretation of literature (books, reports, journal publications) for use in developing studies and for support of research results.

- Broad familiarity with standard computer functions and use of spreadsheets, databases, statistical programs, and Geographic Information System (GIS) technology.
- **Communication**
 - Experienced in public speaking and use of multi-media approaches for describing research findings, as well as for instructional purposes – consistent presentation of research results at state, national, and international level scientific conferences.
 - Consistent dialogue and collaboration with university faculty and staff regarding day-to-day functioning and long-term planning for upkeep and maintenance of science education lab facility.
 - Frequent interaction with the public during environmental surveys across the country regarding: acquiring land and business owner permission to conduct research on private property, public lands, and parks; gaining information on local landscape and water body conditions; clearly communicating key pieces of project information to local community.
- **Logistics**
 - Technical lead on multiple federal and state level biological assessment projects – developing biological indicators of water quality status, assessing relationships of watershed stressors to aquatic communities and physical and chemical characteristics, and investigating basic ecological relationships among biological, physical, and chemical components of aquatic systems.
 - Organized field crew and lab assistant duties, responsibilities, and schedules; monitored individual progress in daily and long-term responsibilities.
 - Organized and lead online seminars and conference calls for various interagency biological monitoring and assessment projects.
 - Redesigned science education laboratory organizational structure and inventory records; lead development of online inventory and tracking system for organization and accounting of laboratory materials; managed laboratory budget and communicated with administrative staff in monitoring progress and changes in budget; developed lab management manual and associated documentation and protocols; currently developing science education departmental webpage.
- **Management**
 - Supervised 5-7 laboratory assistants in maintenance and redesign of university science education lab.
 - Managed research and education projects from data and sample collection efforts to analysis and development of reports, articles, presentations, and science and education products.
 - Consistent role as field crew lead on water resource assessment projects overseeing crews of 3-6 people for collection of biological, chemical, landscape, and habitat samples and data – managed schedules, daily and seasonal sampling activities, data and information transfer, and quality control procedures.

- **Instruction**

- Regular involvement in leading field and classroom training and instructional workshops, and communicating with the public and environmental agencies regarding research and statistical approaches.
- Certified trainer in EPA National Aquatic Resource Survey protocols for streams and rivers, lakes, and wetlands.
- Taught general biology classes with wide variety of students many with special needs and emotional and/or behavioral issues; interviewed students and analyzed student work to develop ways to modify instructional materials to support student engagement in the sciences.
- Developed assessment tool (MEd masters project) for use by teachers in evaluating student biological science skills/capabilities in comprehension, inquiry, and logic – intended for use by teachers to inform development of appropriate class materials and teaching approaches.

SELECTED PUBLICATIONS AND REPORTS

Hamilton, A.T., D. Bressler, S. Stringer, E. Wolowich, S. Zahariuk, and J. Wilson. 2010. Methods for Evaluating Water Monitoring Networks for Climate Change Adaptation (Final Report). Prepared for The Canadian Council of Ministers of the Environment, Water Agenda Development Committee-Water Monitoring and Climate Change Sub-group, Winnipeg, Manitoba.

Bressler, D.W., M.J. Paul, A.H. Purcell, M.T. Barbour, E.T. Rankin, and V.H. Resh, 2009. Assessment Tools for Urban Catchments: Developing Stressor Gradients. *Journal of the American Water Resources Association (JAWRA)* 45(2):291-305.

Purcell, A.H., D.W. Bressler, M.J. Paul, M.T. Barbour, E.T. Rankin, J.L. Carter, and V.H. Resh, 2009. Assessment Tools for Urban Catchments: Developing Biological Indicators Based on Benthic Macroinvertebrates. *Journal of the American Water Resources Association (JAWRA)* 45(2):306-319.

Paul, M.J., D.W. Bressler, A.H. Purcell, M.T. Barbour, E.T. Rankin, and V.H. Resh, 2009. Assessment Tools for Urban Catchments: Defining Observable Biological Potential. *Journal of the American Water Resources Association (JAWRA)* 45(2):320-330.

Bressler, D.W., M.J. Paul, J.B. Stribling, and M.B. Hicks. 2006. Stressor tolerance values for benthic macroinvertebrates in Mississippi. *Hydrobiologia* 573:155-172.

Bressler, D.W., Contributing Author. 2002. Development and Application of the Mississippi Benthic Index of Stream Quality (M-BISQ). Prepared for the Mississippi Department of Environmental Quality, Water Quality Assessment Branch. Jackson, MS.

Diamond, J.M., D.W. Bressler, and V.B. Serveiss. 2002. Assessing relationships between human land uses and the decline of native mussels, fish, and macroinvertebrates in the Clinch and Powell River watershed, USA. *Environ. Toxicol. Chem.*, 21:1147-1155.

Bressler, D.W. and J.S. Gregory. 2000. Influence of stream habitat and land use on macroinvertebrate assemblages of the Henry's Fork Watershed. *Intermountain Journal of Science* 6(3): 178-196.

CV ADDENDUM

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RELEVANT EXPERIENCE

Communication, Instruction, and Training Regular involvement in public presentation of research findings, leading field and classroom training and instructional workshops, and communicating with the public and local agencies regarding research endeavors.

- Experienced in training of state and tribal personnel, contractors, and volunteers across the country to perform physical habitat surveys and biological assessments in streams and rivers, lakes, wetlands, and coastal waters. Served as classroom and field instructor for U.S. EPA National Aquatic Resource Survey (2006-2013) regional training sessions located throughout the country. Provided ecological background, instruction, and demonstration on field methods and procedures for (1) Wadeable Streams Assessment, (2) National Lakes Survey, (3) National Rivers and Streams Assessment, (4) National Wetland Condition Assessment (multiple workshops held nationwide for each project). Duties included preparing classroom presentations and leading classroom and field training sessions, providing instruction on field biological, physical habitat, and water quality sampling techniques, data and sample handling procedures, and quality assurance/quality control protocols. Throughout training process explained key ecological concepts related to the particular types of sampling and measurement protocols being described.
- Organized and led webcasts/webinars and conference calls for various interagency projects.
- Regular communication and interaction with private and public agencies to obtain research permits and access to federal, state, and private lands and parks for conducting data and sample collection efforts for various aquatic resource survey projects. Process involved networking with county and state offices to obtain land ownership and management information, compiling research goals and project information for research permits, and summarizing research findings for permit reports.
- Frequent interaction with the public during environmental surveys across the country regarding: acquiring land and business owner permission to access private property; gaining information on local landscape and water body conditions; clearly communicating key pieces of project information to local community. Also involved on-site communication and planning to conduct research according to the logistical constraints of specific land owners and property managers.
- Lead workshops on ecological underpinnings of sampling and data collection procedures for statewide biological assessment project for Mississippi Department of Environmental Quality. Served as technical lead and trainer for fieldwork conducted in developing a macroinvertebrate index of biotic integrity. Trained state employees on methods for collecting water chemistry, physical habitat, geomorphological, and biological data using rapid bioassessment protocols customized for project goals.

Ecological Sampling and Biomonitoring Consistent involvement in leading field sampling activities throughout the country for federal, state, tribal, and county agencies using a range of sampling and assessment protocols and working with a diversity of individuals. Required knowledge of systemic ecological underpinnings and ability to follow protocols for assessing ecological status of streams and rivers, lakes, estuaries, and wetlands according to quality assurance and quality control guidelines. Selected projects:

- USEPA National Rivers & Streams Assessment, Wadeable Streams Assessment, and Large Rivers Assessment, USEPA (2004-5, 2008-9, 2013). Served as field crew leader for sampling of streams and rivers throughout the U.S. Project designed to estimate the percentage of rivers and streams that are in good, fair, or poor condition. The survey served as a scientific report card on America's flowing waters and examined ecological, water quality, and recreational indicators, and distribution of key stressors (such as nutrients, fish tissue contaminants and bacteria) across the country. Data collected included water chemistry *in situ* and grab samples (to be analyzed for nutrients and toxic compounds), river channel geomorphic measurements, physical habitat assessment of river channel and riparian zones, chlorophyll-a and enterococcus collection and filtration, and

biological sampling and collections including fish counts and tissue samples, multi-habitat benthic samples, periphyton samples from river bottom substrates, and water-column microcystin samples.

- Longitudinal Biological and Chemical Sampling – Rio Pueblo de Taos, NM (2012-2013). Conducted benthic macroinvertebrate and physical habitat sampling for Taos Pueblo, NM. Data used in developing management strategies for stream remediation in association with land use impacts from overgrazing and waste water treatment plant effluent impacts.
- Upper Rio Grande Biological Assessment (2012-2013). Assisted in a collaborative effort to improve the Upper Rio Grande ecosystem and water quality, including: assessment of historic data; collection of hydrologic, water chemistry, habitat, and biological data (benthos, fish and phytoplankton); and modeling and assessment of drivers of altered temperature regimes to support Total Maximum Daily Load (TMDL) planning and restoration efforts.
- Beach and Near-Shore Oil Mat Delineation (2013). Contracted as a state representative for the Louisiana Coastal Protection and Restoration Authority division to oversee and help with a beach oil recovery project in the Gulf of Mexico, working on monitoring and cleanup of the 2010 Deep Water Horizon Oil Spill. Helped with tar ball and mat identification and recovery on the beaches and island near Grand Isle, LA. Locations of contamination were documented and extent of contamination was delineated.
- USEPA National Lakes Assessment, USEPA (2007, 2012). Served as field crew lead for conducting biological (benthic macroinvertebrate, zooplankton, microcystin), sediment (mercury), habitat (visual riparian assessment), and water chemistry (e.g., dissolved oxygen, nutrients, Chlorophyll-a, enterococcus fecal indicator) sampling and assessment of lakes throughout the U.S. Duties included assessment of ecological conditions through extensive quality controlled sampling and measurement protocols, organization of sampling activities and equipment, procurement of vessels used in sampling operations, organization and direction of daily routines, preparation and shipment of samples to laboratories, and documentation of data collected and shipping records.
- USEPA National Wetlands Condition Assessment, USEPA (2011). Project designed as part of EPA National Aquatic Resource Survey to assess the biological, chemical, and physical conditions of wetlands throughout the country. Field crew lead on activities and data collection efforts including delineating soil horizons, evaluating wetland buffer characteristics, and collecting soil, vegetation, algae, and water chemistry samples.
- USEPA National Coastal Condition Assessment, Human Health Fish Tissue Collection, USEPA (2010). Served as lead investigator for collecting and processing fish tissue samples from Lake Michigan, Indian, Michigan, and Wisconsin. Collected fish commonly consumed by humans at a statistically representative group of Great Lakes near shore sampling locations and analyzed fillet tissue for mercury, perfluorinated compounds, polybrominated diphenyl ethers, pharmaceutical compounds, and omega-3 fatty acids to generate fish tissue data related to human health. Duties also included organization of sampling activities and equipment, procurement of vessels used in sampling operations, organization and direction of daily routines, preparation and shipment of samples to laboratories, and documentation of data collected and shipping records.
- USEPA National Coastal Condition Assessment, Gulf of Mexico Enhancement Monitoring, USEPA (2010). Water column and sediment sampling at sites along the Gulf coast as follow-up to the capping of the Deep Horizon oil leak. Involved in collecting and processing water and sediment samples in estuaries and tidally-influenced lakes along the coast of Louisiana. Duties included organizing sampling itinerary, directing proper collection of sterile water and sediment samples (e.g., VOCs, TPH gasoline, SVOCs, PAHs, metals), preservation of samples according to protocol, timely shipping of samples to designated laboratories, and official documentation of all sampling and shipping activities. Performed sampling in bay and near-shore areas in the Gulf of Mexico to determine the location and extent of contamination from the BP Gulf of Mexico oil spill. Tasks included water sampling (bacon bomb sampler), water column profile (ysi probe) and sediment sampling (ponar sampler, van veen).
- Wetland Delineation of Proposed Transmission Line (2008). Delineated wetlands for the purpose of identifying environmentally sensitive areas within the vicinity of transmission line construction activities in central Texas.

Used Trimble GPS track/route and waypoint features for mapping depressions and water conveyance landscape features located within specific transmission line corridor boundaries.

- Biological Index Development, Nevada Division of Environmental Protection, (2004). Conducted benthic macroinvertebrate, chemical and physical habitat sampling efforts on the Truckee River, Nevada for the purpose of developing a biological condition index for the Truckee River benthic macroinvertebrate assemblage.
- Mississippi Department of Environmental Quality, Development of the Mississippi Benthic Index of Stream Quality (2000-2003). Assisted in coordination of field sampling performed by 6 field teams and a total of 535 samples from 475 sites. Served as field crew leading conducting geomorphological and habitat assessments, benthic macroinvertebrate collections, sampling of sediment particle size distribution, and *in situ* water chemistry measurements from 120 sites.
- Baseline Ecological Evaluation of the Chemical Waste Management (CWM) - Newark Facility (2002). Onsite ecological evaluation consisted of a walk-through assessment in which photographs, notes, and drawings were used to document any sensitive areas, potential contaminant migration pathways, and other characteristics of the site useful for addressing the technical regulations required for the baseline evaluation. Offsite evaluation consisted of literature searches of flora and fauna found in the lower Passaic River watershed, and the sensitivity of these to the contaminants identified at the CWM Newark Facility. Evaluation report included description of surrounding flora and fauna that may be potential receptors of concern, as well as a brief discussion of the ways in which the observed contaminants may affect biota.
- Development of County-wide Index of Biological Integrity, Rockdale County, GA (1999-2000). Conducted county-wide stream sampling of benthic macroinvertebrate, water chemistry, and stream physical habitat and geomorphology for the purpose of developing a biological indicator for use in assessing and managing stream health in the county.
- Aquatic Biological Assessment of the Watersheds of Prince Georges County, Maryland (1999-2001). Sampling and assessment of statistically selected sites for county-wide survey; duties included: benthic sampling, fish sampling and habitat assessment. Post sampling tasks included statistical analysis of benthic, fish, and habitat data

Data and Statistical Analysis Broad experience in investigating relationships between biota and the environment particularly with regard to aquatic ecosystems; results used for assessing aquatic health and recommending strategies for pollution prevention and remediation. Regular use of Pearson product moment correlation analyses, analyses of variance (ANOVA), and basic statistical graphing techniques (e.g., box plots, scatterplots) for investigating relationships among water, landscape, habitat, and aquatic communities. Experience in both univariate and multivariate statistical analyses, including both parametric and non-parametric approaches. Contributed to defining biological potential along an urban gradient using quantile regression. Used Loess regression to define change-points used for developing rankings for a human disturbance gradient (HDG). Use of nonmetric multidimensional scaling (NMS) to develop site classes for use in biological index calibration. Applied principal components analysis (PCA) to generate stressor gradients for use in developing benthic macroinvertebrate pollution tolerance values. Involved in assessing various statistical approaches for characterizing biological sampling method accuracy and precision using measures such as root mean square error (RMSE) and relative percent difference (RPD). Experienced in the use of statistical analysis software (Statistica and PC-ORD) to assist in the analysis of biological, physical, geomorphological, and chemical data. Used a variety of approaches in building multivariate predictive bioassessment models for several states. Analytical expertise has also been used in the development of nutrient criteria and nutrient targets for TMDLS, relying on a variety of trend and changepoint analyses. Experienced in the use of ArcGIS (ArcMap) and GoogleEarth for analysis of spatial information and for calculating landscape characteristics such as riparian corridor and watershed land cover, imperviousness, and road and population density. Selected projects:

- Selection of Reference Sites for Use in Developing a Fish Assemblage-Based Index of Biotic Integrity for Rivers and Streams of New Mexico (2012-13). Analysis for initial step in the development of a fish assemblage-based Index of Biotic Integrity (F-IBI); conducted preliminary work to evaluate and select reference sites from New Mexico stream sampling locations represented in fish database. This process included

establishing selection criteria, screening and comparing results among existing sites, summarizing the spatial distribution of potential reference sites, and reviewing both the proposed criteria and the preliminary results with New Mexico Environment Department (NMED).

- Development of an Urban Intensity Index, Watershed Environment Research Foundation (WERF) (2006 – 2009). Involved in the design and analysis for a 32-watershed urban gradient study to examine the chemical, temperature, geomorphological, and ecological community responses to urbanization. Study linked geomorphological alteration and multiple non-point source pollutants from urbanization with community and ecosystem response. Results used to define reference-based, attainable biological condition targets for watersheds based on the level of urban development. Conducted numerous analyses including developing an urban intensity index, assembling biological indicators, and defining the biological potential of urban streams. GIS was used to calculate multiple demographic characteristics for over 2000 watersheds; characteristics included parameters such as housing density, adult/child ratios, and population density, as well as various landcover characteristics such as percent urban land use and percent impervious surface coverage.
- Development of Stressor Tolerance Values for Benthic Macroinvertebrates, Mississippi Department of Environmental Quality (2006). Used principal components analysis to assemble potential stressors (chemical, habitat, and GIS-generated landscape variables) on a linear gradient against which individual benthic macroinvertebrate taxa were plotted. Reciprocal or weighted averaging was used to determine optimal points along the stressor gradient at which individual taxa were most abundant. These values were scaled according to percentile rankings of overall distributions and stressor tolerance values were assigned to each benthic macroinvertebrate taxon. These values were then used in various indices that used benthic assemblages for assessing overall stream conditions.
- Development of Human Disturbance Gradient rankings, USEPA Region 4 (2005 – 2006). Conducted research in project intended to quantify human disturbance along a linear gradient for the purpose of improving water resource assessment techniques. Quantified landscape characteristics (e.g., land use percentages, imperviousness, landscape development intensity index) using GIS software including Spatial Analyst. Developed HDG rankings using Loess regression to define change-points in landscape variables.
- Ecological Risk Assessment for the Clinch/Powell watershed, USEPA (2001-2004). Development of watershed level ecological risk assessments for mussel and fish communities in the Clinch and Powell watersheds of southwestern Virginia. Performed various statistical and GIS routines using watershed, riparian, and instream abiotic and biotic characteristics to identify the primary risks to mussel and fish communities. Also performed statistical analyses describing the effects of riparian urban land use on biota and habitat of the Clinch/Powell watershed.
- Development of the Mississippi Benthic Index of Stream Quality, Mississippi Department of Environmental Quality (2000 – 2005). Developed index of biotic integrity for the state of Mississippi that was used in evaluating the state's 303(d)-listed streams. Assisted in coordinating sampling activities and directing data processing, and used various multivariate statistical techniques in developing the biological index. Delineated riparian corridors and watersheds using GIS and calculated landscape characteristics such as landcover and impervious surface percentages. Evaluated relationships among benthic and abiotic data and performed strength of evidence analyses to identify stressors in impaired streams of Mississippi.

Literature Reviews Conducted literature reviews consisting of comprehensive library and internet searches, literature database preparation, organization, and management.

- Served as lead in developing a comprehensive urban literature database that was used as a basis for much of the research conducted in project to assess biological response in urban watersheds. Used Web of Science to gather literature which was organized in EndNote.
- Performed literature search for EPA's National Center for Environmental Assessment (NCEA) to provide support for conceptual models of hydrology in agriculturally-dominated watersheds and hydrologic management practices for improving stream health. Conducted literature reviews for this project on temperature, sediment and nutrient stressors, and entered data into EPA's Causal Analysis/Diagnosis Decision

Information System Literature Resource online database (CADLit). Developed an EndNotes database with customized field headings to accommodate the specific data extraction goals of this project, and for evaluating the amount of literature available for each stressor combination.

- Performed literature reviews for the Gulf of Mexico Alliance (GOMA) on papers pertaining to nutrient dynamics within major coastal wetland types. Results were part of efforts by GOMA's Nutrient Focus Team to better understand the specifics of wetland nutrient dynamics and how these interact with estuaries.
- Performed extensive literature review using Google Scholar and Web of Science to gather current literature supportive of the selection of response indicators and potential endpoints for model comparisons for Florida estuarine and coastal waters. Citations were entered into an EndNote database, electronic copies were gathered, and summary documents of biological indicators and potential endpoints for targeting nutrient criteria were produced.
- Compiled descriptions of projects lead by individuals from Tetra Tech's Center for Ecological Sciences. Edited to consistently format summaries from multiple years and project managers. Communicated with managers to develop standard layout and presentation of project goals, objectives, results, and conclusions.

ADDITIONAL PROJECT EXPERIENCE

Quality Assurance and Quality Control Acted as quality control field auditor for EPA's National Lakes Assessment and National Rivers and Streams Assessment. Followed QA/QC guidelines for ensuring field crews were collecting data according to documented protocols and recommended strategies for improving field data collection efficiency. Served on project to develop comprehensive process-control approach to isolating and evaluating potential sources of error that could lead to variability of biological assessment results. Procedure entailed specifying measurement quality and performance objectives for sequential phases of biological monitoring, including sampling design; field sampling; laboratory analyses; data entry, management, and analysis; and site and watershed/water body assessments. For State of Mississippi helped in developing comprehensive QA Plan and system of quality control checks and evaluations; assisted in establishing measurement quality objectives; evaluated duplicated data collection and analysis activities for precision, accuracy, bias, and other performance characteristics. Contributed to the development of two different quality control exercises for the Maryland Biological Stream Survey (MBSS): evaluating the precision of taxonomic identifications of benthic samples and the consistency of field sampling activity. In each, compared the relative percent differences and coefficients of variability of results from two independent taxonomists, and from two independent samples taken from the same stream reach.

Stressor Identification Applied the U.S. EPA Stressor Identification (SI) process in multiple watersheds in Mississippi, which allowed comparison of stressor-response relationships among watersheds and added critical information in the strength of evidence analyses for determining causes of waterbody degradation. The identified stressors and sources of pollutants then became the focus of TMDL developments, including 303(d) listing/delisting decision, remediation activities, and issuance of new National Pollution Discharge Elimination System (NPDES) permits. Involved in the development of stressor and multi-stressor causal analysis models for the Mississippi Department of Environmental Quality. These models investigated the impacts of a variety of stressors on biological communities to characterize specific community response patterns that could be used in stressor identification.

Biological Assessment Study Design Involved in the use of the data quality objective (DQO) process, geographic information systems (GIS), and statistical power analysis to design biological monitoring programs. Assisted in project for State of Mississippi, Department of Environmental Quality, in re-developing their biological monitoring program, designing method performance standards and measurement quality objectives (MQO) for field sampling precision, laboratory bias and taxonomic precision, and assessment accuracy. Performed technical analyses related to the design and implementation of biomonitoring programs including spatial (geographic) and temporal (seasonal) issues, network design, identification and development of reference conditions, QA/QC, selection of indicators, field sampling methodology, habitat assessment, laboratory procedures, taxonomic requirements, data analysis, and reporting. Assisted in study design for several counties in Maryland (Prince George's, Howard, and Anne Arundel), Rockdale County (Georgia). For these programs, the designs were based on wadeable streams (generally, 1st through 4th order), rotating sub-basins, and were focused on the assessment of the ecological condition of streams and watersheds, problem identification, and establishment of land use/land cover relationships with ecological condition (related to both point and nonpoint source pollution).

Environmental Flows Involved in study for the Commonwealth of Virginia Department of Environmental Quality (VDEQ) and the U.S. EPA Healthy Watersheds Initiative, to explore relationships between hydrologic alteration and biotic responses, as a critical step in the process of developing an ecological basis for defining limitations on flow alterations and flows that are protective of designated uses, and incorporating these into hydrological criteria. Project used the Ecological Limits of Hydrologic Alteration (ELOHA) approach, and involves compiling and using available biological and hydrologic data to evaluate patterns of flow alteration and associated biological responses, and develop flow-ecology models that relate metrics of flow alteration to ecological indicators of resource impacts based on measures of abundance, single species data, guild data, or overall ecological health metrics. This process includes consideration of stream classification systems based on hydrologic metrics, as well as the feasibility of building curves for less well monitored areas, either by stream class or within sub-basins.

Climate Change Effects on Aquatic Ecosystems Contributed to work conducted with US EPA's Air, Climate, and Energy Program on a national initiative examining climate change effects on ecosystems and ecological indicators. Involved in pilot studies in which macroinvertebrate data from state biomonitoring programs in Maine, North Carolina and Utah were examined for long-term climate-related trends. Tasks included gathering and analyzing hydrological and biological data and reviewing relevant literature.

Tiered Aquatic Life Criteria Evaluation and Development Assisted in providing technical support in project for EPA Office of Science and Technology evaluating aquatic life criteria development for different aquatic life uses. Involved in developing methodologies for translating aquatic life goals based on physical and chemical conditions of aquatic systems into numeric water quality criteria. These methodologies included natural condition approaches such as reference condition benchmarking, conditional probability analyses using data from a wide range of aquatic life conditions, and ecological risk assessment approaches that consider literature-based exposure-effects information for key species of concern.

Nutrient Criteria Development Worked on projects involving nitrogen, phosphorus, and carbon cycling in lakes in Pennsylvania and Wisconsin. For Pennsylvania the analysis supported the development of candidate nutrient endpoints for nutrient criteria development. For the analysis, a variety of analytical methods were used each one resulting in a specific endpoint. Approaches were split into the following methods: frequency distribution analysis, modeled reference expectation, and stressor-response analysis. Wisconsin data (fish, zooplankton, nutrients) from the North Temperate Lakes Long Term Ecological Research project were used to identify patterns in biological response to nutrients and to assess potential nutrient criteria. Family and species-level weighted averages were explored for use as indicators of taxon-specific nutrient tolerances that could be used in developing broader-scale nutrient criteria.

Use Attainability Analysis Contributed to Use Attainability Analysis (UAA) for Usibelli Coal Mine, Inc. (UCM), in Healy Alaska, which evaluated aquatic life, drinking water, and agricultural water supply uses for several metals. Analyzed relevant water quality, geological, and hydrological data collected by several agencies. Assisted in providing technical assistance to EPA Region 7 in development of primary contact recreational UAA protocols for use in Iowa and Missouri. Involved various stream measurements, and documentation of recreational uses in over 300 streams. Activities included field measurements, photographic archiving, tabulation of results in special forms, and providing all necessary back-up information to EPA Region 7 and the States for possible litigation. Assisted in analyses of ecological data for UAA's in California and Alaska involving either waste water discharges or mining-related discharges.

Water Quality Criteria Development Participated in project involving development of natural condition and toxicologically-based water quality criteria for metals including iron, copper, cadmium, aluminum, and zinc of the Chuitna Basin, Alaska. Contributed to developing approaches to calculate criteria based on the natural regime of metals (particularly iron), where toxicological approaches were inappropriate. Analyzed data for development of site-specific iron criteria based on the relationship to periphyton assemblages.

Biological Objectives Contributed in reviewing the proposed Statewide Biological Objectives (bio-objectives) Policy for the City of San Diego. Tasks included compiling, evaluating and analyzing data pertaining to bioassessment and bio-objectives in the San Diego region and southern California xeric coastal streams, evaluating land use and measures of physical habitat and riparian condition, and performing a coarse catchment-level screening of all watersheds in the southern California xeric region.

Critical Elements. Involved in the analysis of critical technical elements for bioassessment for US EPA Office of Water. Analyzed the variability among different monitoring programs in terms of accuracy and precision of different components of the bioassessment process. Intended to establish consistency in terms of biological condition ratings, delineation of impairments, and diagnostic properties. Also, for use by state and tribal program managers and staff responsible for monitoring and assessment of water quality standards programs. Also used by US EPA WQS and Monitoring and Assessment coordinators who conduct review and oversight of State and Tribal programs.

PROFESSIONAL CERTIFICATIONS AND HONORS

U.S. Environmental Protection Agency, National Aquatic Resources Survey. Certified Trainer: National Rivers and Streams Survey (2008-9, 2013), National Lakes Assessment (2007, 2012), National Wetlands Condition Assessment (2011).

U.S. Environmental Protection Agency, National Aquatic Resources Survey. National Survey Monitoring and Assessment Training (2005-2013).

Richard Chinn Environmental Training, Inc. Wetland Delineation Training and Regional Supplement Wetland Delineation Training, San Diego, CA, November 14-17, 2011; Army Corps of Engineers Wetland Delineation / Regional Supplement / Waters of the United States Training.

New Mexico Rapid Assessment Method (NM RAM) Training. Wetland assessment training and workgroup, October 24-26, 2011. NM RAM based on California Rapid Assessment Method.

Maryland Biological Stream Survey certification for spring and summer sampling (2003, 2004). Maryland Department of Natural Resources.

Honors in Biology, Franklin and Marshall College (1997). Senior research project: Macroinvertebrate communities and pollution status of Pequea Creek.

Hackman Scholar, Franklin and Marshall College (1996). Hackman Summer Research Scholarship. Laboratory research with Dr. Ira Feit on the growth and development of slime molds.

PUBLICATIONS, PRESENTATIONS, REPORTS

Hamilton, A.T., S. Stringer, and **D.W. Bressler**. 2012. Selection of Reference Sites for Use in Developing a Fish Assemblage-Based Index of Biotic Integrity for Rivers and Streams of New Mexico - Preliminary Results. Prepared for the New Mexico Environment Department (NMED).

Hamilton, A.T., **D. Bressler**, S. Stringer, E. Wolowich, S. Zahariuk, and J. Wilson. 2010. Methods for Evaluating Water Monitoring Networks for Climate Change Adaptation (Final Report). Prepared for The Canadian Council of Ministers of the Environment, Water Agenda Development Committee-Water Monitoring and Climate Change Subgroup, Winnipeg, Manitoba. Contract No. 0971230100-REP-V0001-02. 40pp.

Hamilton, A.T., A. Roseberry-Lincoln, M.T. Barbour, J. Stamp, E. Leppo, and **D. Bressler**. 2010. White paper on climate change and bioassessments. Prepared for Office of Science and Technology/OW, MC 4304T, Washington DC.

Bressler, D.W., M.J. Paul, A.H. Purcell, M.T. Barbour, E.T. Rankin, and V.H. Resh, 2009. Assessment Tools for Urban Catchments: Developing Stressor Gradients. *Journal of the American Water Resources Association (JAWRA)* 45(2):291-305.

Purcell, A.H., **D.W. Bressler**, M.J. Paul, M.T. Barbour, E.T. Rankin, J.L. Carter, and V.H. Resh, 2009. Assessment Tools for Urban Catchments: Developing Biological Indicators Based on Benthic Macroinvertebrates. *Journal of the American Water Resources Association (JAWRA)* 45(2):306-319.

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