

**ASA ANALYSIS & COMMUNICATION, INC.
CORPORATE QUALIFICATIONS**

January 2003

CORPORATE OVERVIEW

ASA Analysis & Communication, Inc. (ASA) provides environmental consulting services to a wide variety of potential clients in industry and the government. Principal scientists in this firm are Steven M. Jinks, Ph.D., William P. Dey, MS, John R. Young, Ph.D. and James B. McLaren, Ph.D. Together, these four individuals have more than 100 years of experience in the design and conduct of environmental management studies and assessments. These three individuals have worked together for more than 20 years and are committed to providing the highest quality consulting services to clients in order to resolve environmental management issues through a combination of sound science and effective communication. In addition to this core team, ASA has assembled a group of associates available and committed to supporting ASA and its business philosophy. These associates average more than 20 years of experience each in their respective technical disciplines. Resumes of selected ASA technical staff are included in the attached materials.

Business Philosophy

ASA's business philosophy is to provide the highest quality technical support to our clients at a highly competitive cost. We are committed to maintaining a low overhead structure to provide services at costs that are below industry average through:

- Private ownership and management by working professionals only, so as to eliminate the administrative burden typical of many environmental consultants, and assure an organizational focus on maintaining client, not stockholder, relations;
- Development and use of an association of experienced professionals connected by telecommunications to provide project teams with the most appropriate experience the job—while at the same time not burdening our clients with the cost of maintaining large groups of support staff; and
- Restricting overhead investments to those that are client-centered, such as choosing communications technology over spacious office facilities and client workshops over internal management meetings.

We at ASA are focusing our services on specific segments of the environmental marketplace to assure successful integration of technical expertise and cost-effectiveness to provide high quality service. Each of the ASA senior staff has nationally recognized expertise and experience in the areas of ecological risk/impact and water quality assessments. In addition, all ASA team members are committed to the use of scientific analysis to support technical and strategic approaches to meet our clients' environmental management and compliance needs. Such strategic approaches often include a rigorous evaluation of all assumptions and the scientific basis for regulatory requirements.

Technical Services

ASA specializes in the aquatic sciences with particular emphasis on quantitative evaluations related to water quality and aquatic ecology. ASA provides the full range of services needed to complete environmental studies and assessments including, study design, implementation, data management and analysis, report writing and preparation, as well as hearings and/or litigation support. Specific areas of technical expertise provided by ASA include:

- Biotic Surveys and Assessments
- Habitat Assessments
- Ecological Risk and Impact Assessments
- Clean Water Act Section 316(a) and (b) Assessments
- Natural Resource Damage Assessments
- Limnological/Water Quality Surveys and Assessments
- Water Quality and Population Modeling
- Watershed and Natural Resource Management Planning
- Water Quality and Ecological Sampling Design and Implementation
- Database Design and Analysis
- Permit Support and Compliance Assessments
- Third-Party Technical Reviews
- Report Writing and Editing

PROJECT AND STAFF EXPERIENCE

The quality and cost-effectiveness of ASA's services have been well received by major organizations throughout the country. Many of our assignments to date have been awarded based primarily on our relevant experience and client satisfaction with prior work. In addition we have shown our ability to be cost-competitive, having been selected as the most competitive company on the majority of our competitive bid submittals.

ASA Clients and Projects

Clients for whom we have recently completed assignments include major companies in the electric and petrochemical industries, leading A&E firms, and a major municipality:

- Atlantic States Marine Fisheries Commission
- Central Hudson Gas & Electric Corporation
- City of Newport News
- Consolidated Edison Company of New York
- Dynegy New York
- EA Engineering Science and Technology
- Electric Power Research Institute
- Keyspan Energy
- Malcolm Pirnie Associates
- Mirant
- Mobil Oil Corporation
- New York City Department of Environmental Protection
- New York Power Authority
- Orange & Rockland Utilities
- Pacific Gas and Electric Company
- Public Service Electric and Gas Company
- San Diego Gas and Electric
- St. Lawrence Cement
- Utility Water Act Group

Ongoing or recently completed projects for which ASA principals served as lead scientist include biological and water quality data collection, ecological risk assessment, water and wastewater planning and permitting support:

- Multi-year ecological risk assessment of petroleum-contaminated groundwater inputs to a small coastal river in Rhode Island.
- Assessment of the impacts from cooling water withdrawals on the aquatic populations of the Southern California Bight.
- Development of a nation-wide guidance manual for the ecological risk assessment of the effects of power plant operation on aquatic populations and communities.
- Assessment of the impacts from a waste heat discharge on aquatic communities along the central California coast.
- Development of a detailed technical work plan for establishing an appropriate water quality objective for dissolved oxygen in south San Diego Bay.
- Effects of potential large-scale drinking water withdrawals on the aquatic ecosystem of the Hudson River estuary, and analysis of the benefits of various design alternatives for reducing those effects.
- Collection and transport of fish among reservoirs as part of a dewatering and dam rehabilitation project.
- Analysis of the scientific basis and appropriateness of proposed NPDES permit limits for a chlorine discharge to San Diego Bay.
- Analysis of long-term trends in water quality and the benthic macroinvertebrate community in south San Diego Bay.
- Assessment of the impacts of waste heat discharges from a large nuclear generating facility on the biological communities of the Delaware Estuary.
- Multi-year long study of the upper tidal Delaware River to determine potential for adverse impacts of power plant operation on aquatic communities.
- Electrofishing and macroinvertebrate sampling tributaries to the Delaware Estuary as part of a thermal effects impact assessment.
- Preparation of a Conservation Plan and associated Environmental Assessment for the incidental take of an endangered species from the Hudson River Estuary.

- Development of a narrative dissolved oxygen water quality objective for south San Diego Bay.
- Development of a methodology for assessing the potential effects of large-scale cooling water withdrawals.
- Evaluation of intake technology alternatives to reduce the impacts of cooling water withdrawals in the greater New York Harbor complex.
- Ichthyoplankton sampling for the assessment of a specific intake alternative at a power plant on the lower Hudson River estuary.
- Preparation of a report on biological factors associated with the potential for adverse environmental impact from water withdrawals for cooling purposes.
- Preparation of a multi-disciplinary Draft Environmental Impact Statement for renewal of discharge permits at four large electric generating stations on the Hudson River.
- Fisheries and macroinvertebrate sampling of the Hoosic River in upstate New York related to the effects of a large accidental release of copper sulfate.
- Year-long fisheries sampling at 6 steam-electric generating stations on Long Island, New York.
- Multi-year fisheries sampling at two steam-electric generating stations located in the mid-Hudson River estuary.
- Multi-year ichthyoplankton sampling at a steam-electric generating station located on the lower Hudson River estuary.

ATTACHMENT A

RESUMES

- Nancy Decker
- William Dey
- Steven Jinks
- James McLaren
- James Reichle
- Betty Tabor
- John Young

Nancy Decker
Environmental Scientist

Ms. Decker is an environmental scientist with more than 20 years of experience in environmental monitoring and assessment projects, mostly for State Pollutant Discharge Elimination System permits at electric power generating stations and also including risk assessments for Department of Defense projects. Her major responsibilities include database development, data analysis, and report writing for all aspects of monitoring programs. Ms. Decker is also experienced in sample collection techniques for water quality, fisheries, benthos, and plankton monitoring and in the related laboratory work. She has supervised crews in both field and laboratory sample and data collection and processing.

Education:

B.A.; Mount Holyoke College; Biochemistry; 1976

Training:

OSHA 40-hour Hazardous Waste Operations Safety and Health Training
EPA Model Lead Inspector Training
SAS Basic Programming Training

Experience:

Computer Services—Using SAS, and various spreadsheet and graphics software, produced report tables and figures for aquatic ecology monitoring programs at major electric power generating stations in New York and for an estuary-wide fisheries monitoring program on the Hudson River. Managed data processing in SAS from entry to summary tables for a major aquatic monitoring program on Long Island Sound; including the writing of SAS data entry and analysis programs and coordination of data quality control. Using AutoCAD, produced report figures for closures of underground structures at a major petroleum company's service stations, and for remedial investigation/feasibility study reports. Using Windows-based Excel and Access, produced inspection schedules, coordinated database compilation and edits, and produced report tables for an investigation of paint deterioration in military housing.

Site and Laboratory Management—Supervised field and laboratory personnel in the collection and analysis of biological samples; responsible for training, scheduling, and assuring sample completion and quality control adherence. Supervised crew operations for tagging of hatchery-reared striped bass. Supervised personnel during an intensive overseas investigation of military housing; responsible for scheduling of field efforts and completion of work.

Aquatic Biology—Participated in nearfield and in-plant aquatic ecology monitoring programs for major electric power generating stations in New York and New Jersey; experienced with a large variety of sampling gear, such as otter trawl, try trawl, gill net, fyke net, beach seine, haul seine, plankton net, net and barrel samplers, epibenthic sled, benthic grab, macroinvertebrate pots, and impingement and entrainment sampling equipment. Crew leader for small boat sampling procedures. Responsible for water quality instrument calibration, maintenance, and data collection. Supervised and participated in laboratory analysis of plankton samples. Supervised field sample collections for radiological monitoring programs. Conducted mark/recapture program for estuarine and marine invertebrates and fish. Participated in rearing and tagging operations for juvenile hatchery-reared striped bass. Conducted field survival studies with caged river herring to assess lethal zone for submerged blasting operations; tasks included collection, holding, handling, and exposure of river herring under reconnaissance of regulatory and resource agency observers. Conducted a survey of recreational fishing on a New York State lake; survey design consisted of both roving creel and access point assessments of level of angling activity,

demographics of angler population, and angler awareness of pollution sources and fish consumption advisories.

Data Reduction—Summarized 19 years of Hudson River data that were used to evaluate potential impacts associated with a large municipal water withdrawal facility. Summarized 14 years of biological monitoring data from kelp beds near an electric power generating station in California.

Technical Report Production—Authored and oversaw production of annual reports for aquatic ecology monitoring programs at major electric power generating stations in New York and for an estuary-wide fisheries monitoring program on the Hudson River. Developed procedures manual for a RCRA Corrective Action Study at an U.S. military academy skeet and trap range.

List of Skills:

- SAS Programming, knowledge of Excel, Access, QuattroPro, Word, WordPerfect, AutoCAD
- Data analysis .
- Graphics .
- Report production
- Ichthyoplankton/benthos laboratory supervisor
- Field supervisor
- Small boat handling and seamanship
- Use of otter trawl, try trawl, gill net, fyke net, beach seine, haul seine, plankton net, net and barrel samplers, epibenthic sled, benthic grab, macroinvertebrate pots, and impingement and entrainment sampling equipment
- Identification of fish and macroinvertebrates
- *In situ* caged fish survival studies
- Water quality testing and analysis
- Quality assurance
- 316 studies
- Literary searches

William P. Dey
Senior Scientist/Associate

Mr. Dey has more than 25 years of experience conducting ecological risk, damage, and impact assessments and studies in marine, estuarine, and freshwater aquatic habitats. He has extensive experience in the management, design, data analysis, and technical direction of studies on the potential environmental effects of power plant operation, toxic chemicals, dredging, and ocean dumping.

Education

M.S.; University of Connecticut; Zoology; 1974
B.A.; Lehigh University; Natural Resources; 1972

Professional Affiliations

American Fisheries Society • Estuarine Research Federation • Hudson River Ecological Society
• Society of Environmental Toxicologists and Chemists

Certified Professional Fisheries Scientist – American Fisheries Society

President – Hudson River Environmental Society

Experience

Ecological Risk and Impact Assessment—Project manager and senior staff member on comprehensive, multiyear, multiplant impact studies on the effects of power plant operation on fish populations in the Hudson and Delaware River estuaries, Chesapeake Bay and the Southern California Bight under Sections 316(a) and 316(b) of the Clean Water Act. Assessments included population modeling to determine the effects of both thermal pollution and water withdrawals on the early life stages of selected fish species. Served as project manager and principal scientist for an ecological investigation of the effects and independent review of natural resource damage claims of a chemical spill into a high quality trout stream in New York State. Served as a key technical staff member on an independent review of a large CERCLA Type B natural resource claim resulting from sewage treatment effluent, stormwater runoff, and industrial discharges in the Northwest. Served as lead scientist on a study investigating damages due to leachate from a large municipal landfill to the natural resources of Jamaica Bay and adjacent waters of the New York Bight. Project manager and technical director for a research effort to develop a methodology to rank suspected hazardous waste sites according to potential risks to local fish and wildlife resources at suspected hazardous waste sites in New York State. Project manager and lead scientist for a study to assess the ecological risks of chemical treatments to 5 large reservoirs in the New York City Water Supply system.

Aquatic Ecology—Directed a group of research scientists investigating the dynamics of larval and early juvenile fish populations to determine the effects of natural and human-induced stresses on factors such as mortality and growth rates, and subsequent year-class success. Manager and technical director for several large data analysis and report writing projects relating to the spatial and temporal distribution patterns, growth and abundance trends, and relationships with water quality trends for the early life stages of key fish species within the Hudson River Estuary. Assessed spatial and temporal patterns in abundance and long-term trends in abundance for fish in the Delaware Estuary and for fish and benthic invertebrates in the Arthur Kill and Hackensack River. Assessed trends over a 17-year period in the benthic communities of San Diego Bay. Prepared work plans for field and laboratory studies for the assessment of long-term consequences of power plant operation on Delaware Bay and the Southern California Bight. Assessed long-term trends in the composition and abundance of the fish community in the Hudson River estuary.

Aquatic Toxicology—Served as principal investigator on a research grant studying the incidence of liver cancer in the natural population of Atlantic tomcod from the Hudson River Estuary. Study included extensive histological, ultrastructural, and chemical examinations of this fish in an effort to relate the high incidence of cancer to factors such as fish age and growth as well as exposure to toxic chemicals and other environmental stressors. Principal investigator on U.S. Fish and Wildlife Service research grant to study the effects of water quality on the growth, development, and survival of striped bass larvae. Directed bioassay studies on effects of ammonia and high pH discharges on stream fish communities.

Modeling and Biometrics—Participated in the development and implementation of fully stochastic single- and multi-age structural models for the quantitative assessment of the effects of power plant entrainment and impingement on fish populations. Evaluated density-dependent and stock recruitment functions for the assessment of long-term power plant impact. Developed and implemented empirical models to estimate entrainment and impingement losses associated with water withdrawals in the Arthur Kill and Hackensack and Nanticoke rivers. Developed computer-based models to assess the assimilative capacity of streams to oxygen-consuming and ammonia-producing discharges.

Water Quality Assessments—Participated in the assessment of the assimilative capacity of streams in southern New York to receive additional discharges from existing and proposed wastewater treatment facilities. Evaluated impacts of ammonia discharges on stream water quality. Evaluated long-term trends in dissolved oxygen levels within highly impacted areas of the Arthur Kill and Hackensack River as affected by changes in the quality and quantity of effluent from municipal sewage treatment plant. Assessed contaminant concentrations in surface water discharges at 13 facilities owned by a major utility in New Jersey. Provided recommendations for operational changes and modifications to ensure future permit compliance. Project manager and lead scientist for the development of a work plan for establishing a site-specific water quality criteria for dissolved oxygen in South San Diego Bay.

Regulatory Requirements—Experienced in various regulatory environmental exhibits such as 316(a) and (b) demonstrations, FERC exhibits, and natural resource damage assessments. Provided expert testimony at public licensing hearing for siting of a new power plant (CPCN) and for an incidental take permit under the Endangered Species Act. Developed and reviewed testimony and cross-examination questions for major impact assessment cases. Participated in several technical negotiation sessions with regulatory agencies. Provided technical support for operational and mitigative options which could be offered as part of a out-of-court settlement.

Selected Publications and Presentations

Dey, W.P. 2002. Use of equivalent loss models under Section 316(b) of the Clean Water Act. *The Scientific World*. 2(S1): 254-270.

Young, J. R. and W. P. Dey. 2002. Uncertainty and Conservatism in Assessing Environmental Impact under §316(b): Lessons from the Hudson River Case. *The Scientific World Journal*, 2(S1):30-40.

Waldman, J.R. and W.P Dey. 2002. Response by fishes to cleaner waters. Presented at Celebrating the 30th Anniversary of the Clean Water Act. Hudson River Environmental Society, New York City.

Dey, W.P, S. Jinks, and N. Decker. 2002. Changes in the fish community in the Hudson River estuary over the past 30 years. Presented at the American Fisheries Society Annual Meeting, Baltimore, MD. August.

Dey, W.P., S. Jinks., and G. Lauer. 2000. The 316(b) assessment process: evolution towards a risk-based approach. p. S15-S24. In: *Power Plants & Aquatic Resources: Issues and Assessment*. Environmental Science and Policy. Vol. 3 Supplement 1.

Dey, W.P., S. Jinks., and G. Lauer. 1997. The Section 316(b) Assessment Process: Past, Present, and

Future. Presented at the International Water Conference, Baltimore, Maryland.

Friedman, B.R., W.P. Dey, and S.M. Jinks. 1995. Use of oleophilic pads to achieve high swimbladder inflation percentages among intensively-cultured striped bass, *Morone saxatilis*. Presented at Aquaculture '95. San Diego, CA. 1-4 February.

Dey, W.P., T.H. Peck, C.E. Smith, and G.L. Kreamer. 1993. Epizootology of hepatic lesions in Atlantic tomcod from the Hudson River estuary. *Can. J. Fish. Aquat. Sci.* 50:1897-1907.

Lauer, G.J., M.V. Bastian, W.P. Dey, R.R. Garton, D.J. Lauren, and A. Pamperl. 1992. Natural Resources Damage Claims. Added new dimensions to "How Clean is Clean?" Presented at DRI Annual Symposium on Environmental, Hazardous Waste, and Toxic Tort Litigation. New Orleans, Louisiana.

Cormier, S.M., R.N. Racine, C.E. Smith, W.P. Dey, and T.H. Peck. 1989. Hepatocellular carcinoma and fatty infiltration in the Atlantic tomcod, *Microgadus tomcod* (Walbaum). *Journal of Fish Diseases* 12:105-116.

Klauda, R.J., J.B McLaren, R.E. Schmidt and W. P. Dey. 1988. Life history of white perch in the Hudson River Estuary. *American Fisheries Society Monograph* 4: 89-101.

Young, J. R., R. J. Klauda, and W. P. Dey. 1988. Population estimates for juvenile striped bass and white perch in the Hudson River Estuary. *American Fisheries Society Monograph* 4: 89-101.

McLaren, J.B, T.H Peck, W. P. Dey and M. Gardinier. 1988. Biology of Atlantic tomcod in the Hudson River Estuary. *American Fisheries Society Monograph* 4: 102-113.

Young, J. R., T. B. Hoff, W. P. Dey, and J. G. Hoff. 1988. Management recommendations for a Hudson River Atlantic sturgeon fishery based on an age-structured population model. Pages 353-365. In Smith, C. L. (ed.) *Fisheries Research in the Hudson River*. State University of New York Press, Albany.

Dey, W.P. 1981. Mortality and growth of young-of-the-year striped bass in the Hudson River estuary. *Transactions of the American Fisheries Society* 110:151-157.

Steven M. Jinks
Senior Scientist/Associate

Dr. Jinks is a senior scientist with more than 25 years of experience supervising and conducting environmental research, field investigations, literature reviews, regulatory analysis, preparation of environmental impact statements and reports, litigation support and expert testimony, and other client services.

Education

Ph.D.; New York University; Environmental Health; 1975
M.S.; New York University; Health Physics; 1970
B.A.; Rutgers University; Biology; 1968

Professional Affiliations

Hudson River Environmental Society • Ecological Society of America • Health Physics Society
• Society of the Sigma XI • National Science Teachers Association

Awards and Honors

Phi Beta Kappa • U.S. A.E.C. Health Physics Fellow

Experience

Ecological Risk/Impact Assessment—Managed and conducted studies on the aquatic impacts of industrial and municipal water use and supported findings as an expert witness. Project manager and lead scientist for assessing the ecological risks and environmental alternatives for the operation of high-volume cooling water intakes at numerous fossil-fueled and nuclear steam electric power plants located on freshwater, estuarine, and marine ecosystems. Designed and supervised a research program to develop equipment and methods for assessing entrainment abundance and survival of early life stages of fish for the Empire State Electric Energy Research Corporation. Developed and assessed strategies for reducing the ecological risks from human activities, including evaluations of alternative cooling system technologies, and the use of habitat restoration and aquaculture/stocking programs to reduce ecological effects. Assessed the ecological risks from point source discharges of waste heat and toxic chemicals from electric power plants and petroleum refineries. Researched the ecological transport and bioaccumulation of trace metals and radio-nuclides in aquatic systems and developed empirical models to predict environmental fate of point-source and nonpoint-source discharges. Supervised and conducted laboratory bioassay studies to determine bioaccumulation, toxicity, and behavioral effects of thermal and chemical discharges for the utility and petrochemical industries. Managed and conducted assessments of the impacts to aquatic populations in the Hudson River estuary resulting from its use as an alternative water supply for the City of New York, and developed the conceptual design of the intake structure for expanding the water supply facilities.

Water Quality/NPDES Permit Support—Prepared the conceptual model and study designs for research to establish appropriate dissolved oxygen water quality objectives for San Diego Bay. Developed the technical foundation and regulatory submissions for alternative permit limits for chlorine, metal, and dissolved oxygen for an industrial discharge into a marine bay. Prepared demonstration documents to obtain variances from thermal effluent limitations for several electric power plants pursuant to Section 316(a) of the Clean Water Act. Participated in the development of a 5-year environmental plan for NPDES compliance for a major utility company. Managed an assessment of the ecological significance of chemical treatment alternatives for municipal water supplies. Assessed the potential for biofouling and the effectiveness and risks associated with biofouling control alternatives at industrial and municipal water

intakes. Designed and supported baseline biological and water quality studies for the protection of water quality in over 2,000 lakes and ponded waters in the Adirondack Mountain and Catskill Mountain watersheds. Managed water quality studies of lakes in NY and NJ under the federal Clean Lakes Program.

Radiological and Occupational Health— Performed critical pathway analysis and human health risk assessment for operational discharges from a nuclear power plant on the Hudson River estuary, evaluated the health consequences of hypothesized reactor accidents at proposed offshore nuclear power plants for comparison to land-based alternatives, and conducted occupational health screening for radioactive contamination of nuclear industry workers. Reviewed and critiqued environmental radiological sampling program in the vicinity of a Department of Energy facility. Reviewed environmental radiological surveillance data from a Department of Energy fuel reprocessing plant and advised legal counsel on the radiological health and regulatory implications of reported levels of radionuclides.

Regulatory Compliance/Reviews—Performed technical review of proposed PCB regulations and provided technical support for administrative law hearings for the Electronic Industries Association. Directed and participated in critiques of the technical validity of numerous proposed 316(a) guidelines documents, RCRA regulations, water quality criteria, and state water quality standards. Prepared environmental impact sections for a power plant licensing application in the State of Maryland.

Hazardous Waste Site Investigations—Supervised technical staff in Phase I and Phase II investigations of inactive hazardous waste sites pursuant to state and federal Superfund regulations. Studies included literature review, site reconnaissance, and non-intrusive and intrusive field investigations to determine the potential human health risk and lay the foundation for future RI/FS work.

Selected Publications and Presentations

Dey, W.P., S. Jinks, and N. Decker. 2002. Changes in the fish community in the Hudson River estuary over the past 30 years. Presented at the American Fisheries Society Annual Meeting, Baltimore, MD. August.

Dey, W.P., S. Jinks., and G. Lauer. 2000. The 316(b) assessment process: evolution towards a risk-based approach. p. S15-S24. In: Power Plants & Aquatic Resources: Issues and Assessment. Environmental Science and Policy. Vol. 3 Supplement 1.

Dey, W.P., S. Jinks., and G. Lauer. 1997. The Section 316(b) Assessment Process: Past, Present, and Future. Presented at the International Water Conference, Baltimore, Maryland.

Jinks, S.M. 1992. The Environmental Professional: A Hudson River Case Study. Keynote address for the annual meeting of the Tri-Beta Honor Society, Mount Saint Mary College, Newburgh, New York.

Jinks, S.M., G. Lauer, M. Loftus. 1981. Advances in techniques for assessment of ichthyoplankton entrainment survival, *in* Proceedings of the Fifth National Workshop on Entrainment and Impingement (L.D. Jensen, ed.), pp. 91-110. EA Communications, Sparks, Maryland.

Kellogg, R.L., R. Ligotino, and S. Jinks. 1984. Thermal Mortality Prediction Equations for Entrainable Striped Bass. *Trans. Amer. Fish. Soc.* 113:794-802.

Muessig, P., C. Beisser, J. DelPup, E. Cowell, and S. Jinks. 1981. A comparison of intraspecies variation in response to a standard toxicant among six populations of fathead minnows. Presented at the annual meeting of the Society for Petroleum Industry Biologists. September.

Occhiogrosso, T., L.R. King, B. Muchmore, D. Belcher, B. Smith, and S.M. Jinks. 1981. A portable automated plankton abundance sampling system, *in* Proceedings of the Fifth National Workshop on

Entrainment and Impingement (L.D. Jensen, ed.), pp. 277-280. EA Communications, Sparks, Maryland.

Cannon, T.C., S.M. Jinks, L.R. King, and G.J. Lauer. 1978. Survival of entrained ichthyoplankton and macroinvertebrates at Hudson River power plants, in Proceedings of the Fourth National Workshop on Entrainment and Impingement (L.D. Jensen, ed.). pp. 71-90. Melville, New York.

**James B. McLaren
Senior Scientist**

Dr. McLaren has 30 years of consulting experience in the aquatic sciences. His clients have included the electric utility, oil and gas, and chemical industries, as well as international shipping, municipalities and state and federal regulatory agencies. He has served as a principal, office manager, technical director, project manager, and expert witness. He has been responsible for study design, data analysis, report preparation, and management of analytical and field staff.

Education

Ph.D.; Penn State University; Zoology; 1979
M.S.; Penn State University; Zoology; 1970
B.S.; Cornell University; Fisheries Science; 1968

Professional Affiliations

American Fisheries Society • International Association for Great Lakes Research • Society of Environmental Toxicology and Chemistry

Experience

Impact Assessment – Technical director, project manager or senior staff member on several comprehensive fish entrainment and impingement impact studies under §316(a) or §316(b) of the Clean Water Act for power plants located on the Great Lakes, the Finger Lakes, rivers of New York State and New Jersey, the Hudson River estuary, and the Delaware River estuary. The studies involved innovative approaches to short-term and long-term impact assessment, three-dimensional modeling of the ecological effects from thermal discharges in a tidal estuary, and preparation of §316(a) and (b) Demonstrations. Served as technical advisor to the New York District of the Army Corps of Engineers on potential aquatic resource impacts from the construction of the proposed Westside Highway Project in Lower Manhattan under §404. Designed and directed studies on the impacts of turbine entrainment and fish mortality at hydroelectric developments on the Raquette and Genesee rivers, New York utilizing intake and tailrace netting and fixed location hydroacoustics. Assessed riverine impacts resulting from the operation of numerous hydroelectric developments in the Northeast and Pacific Northwest, involving water and habitat quality, flow routing and impoundment level fluctuations.

Aquatic Ecology and Resource Management – Designed and supervised several extensive aquatic surveys of water bodies such as the 140-mile Hudson River estuary, the New York Harbor and Long Island marine waters, the southwestern shoreline of Lake Ontario, and riverine systems of New York State. Conducted a two-year seasonal survey of the distribution, abundance and biological characteristics of yellow perch in southern Lake Michigan to investigate the needs for closure of the commercial fishery by the Illinois Department of Natural Resources. Managed studies on the downstream migration of adult American eels in the vicinity of the St. Lawrence-FDR Hydroelectric Project. Conducted fish habitat assessments using Instream Flow Incremental Methodology (IFIM) and innovative habitat enhancement techniques.

Regulatory Requirements — Knowledgeable of the requirements and experienced in the procedures of license and permit applications and renewals under a wide range of federal, state and local environmental regulations. Prepared evaluations of alternative intake designs, technologies, and operations of cooling water intakes located at facilities on Lake Erie, the Hackensack River and the

Delaware River for NPDES permit renewals. Evaluated alternative intake screen technologies, such as fine-mesh Ristroph traveling screens or dual-flow Beaudrey-type traveling screens and fish return systems at power plants on Lake Ontario and Lake Erie, by testing impinged fish recovery and survival. Prepared Initial Consultation Documents, Exhibit E's and other portions of FERC license application renewals for hydroelectric facilities in the Northeast and Pacific Northwest. Assisted in the preparation of a FERC third-party EIS for a proposed 275-mile natural gas pipeline to be routed through West Virginia, Virginia and North Carolina. Task Leader for an investigation and review of current organizational structure and practice of state regulatory agencies for water quality monitoring and watershed management in the US on behalf of the Ontario Ministry of the Environment.

Natural Resource Damage Assessment – Served as consultant to the International Tanker Owner Pollution Federation (ITOPF), the shipping industry and their insurers, and oil and railway companies to manage the Natural Resource Damage Assessment process and to coordinate with state and federal natural resource trustees for approximately 20 accidental hazardous materials spills or ship groundings throughout the East and Gulf Coasts, central U.S. and its territories. Negotiated settlements for natural resource damages occurring from numerous marine oil or chemical spills and land-based oil pipeline ruptures, frequently relying on the application of habitat restoration techniques to offset the losses of natural resource services.

Aquatic Toxicology -- Laboratory Director and Project Manager for quarterly and annual toxicity monitoring of municipal and industrial wastewater treatment effluents under SPDES permit requirements, involving EPA and New York State Bioassay Monitoring guidelines. Monitored and evaluated impacts from emergency pumping of water from a collapsed western New York salt mine into the Genesee River, involving water quality and biological sampling, and intensive toxicity testing. Designed and implemented an investigation of sediment contamination of a stream that received fly ash and bottom ash from a coal-fired steam electric generating plant, using the TRIAD approach, which simultaneously analyzed sediment chemistry, toxicology, and macroinvertebrate community effects. Conducted an investigation of the cause of a fish kill in a water storage pond at a gypsum facility, as related to surface water runoff and application of herbicides in adjoining agricultural fields.

Selected Publications and Presentations

McLaren, James B. and L. Ray Tuttle, Jr. 2000. Fish survival on fine mesh traveling screens. *Environmental Science and Policy* 3 (2000): S369-S376.

McLaren, James B., Thomas H. Peck, William P. Dey, and Marcia Gardinier, 1988. Biology of Atlantic tomcod in the Hudson River estuary. In: Barnthouse, L.W., R.J. Klauda, D.S. Vaughn, and R.C. Kendall (eds.) *Science, Law, and the Hudson River Power Plants: A Case Study in Environmental Impact Assessment*. American Fisheries Society Monograph 4.

Hoff, Thomas B., James B. McLaren, and Jon C. Cooper 1988. Stock characteristics of Hudson River striped bass. In: Barnthouse, L.W., R.J. Klauda, D.S. Vaughn, and R.L. Kendall (eds.) *Science, Law, and the Hudson River Power Plants: A Case Study in Environmental Impact Assessment*. American Fisheries Society Monograph 4.

Klauda, Ronald J., James B. McLaren, Robert E. Schmidt, and William P. Dey, 1988. Life history of the white perch in the Hudson River, New York. In: Barnthouse, L.W., R.J. Klauda, D.S. Vaughn, and R.L. Kendall (eds.) *Science, Law, and the Hudson River Power Plants: A Case Study in Environmental Impact Assessment*. American Fisheries Society Monograph 4.

McLaren, James B., John R. Young, Thomas B. Hoff, Irvin R. Savidge, and William L. Kirk 1988. Feasibility of supplemental stocking of age-0 striped bass in the Hudson River. In: Barnthouse, L.W.,

R.J. Klauda, D.S. Vaughn, and R.L. Kendall (eds.) Science, Law, and the Hudson River Power Plants: A Case Study in Environmental Impact Assessment. American Fisheries Society Monograph 4.

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Klauda, Ronald J., William P. Dey, Thomas B. Hoff, James B. McLaren, and Q.E. Ross. 1980. Biology of Hudson River juvenile striped bass. In: Proceedings of the Fifth Annual Marine Recreation Fisheries Symposium. Henry Clepper (ed.) Boston, Massachusetts, March 27-28, 1980.

Smith, C.E., T.H. Peck, Ronald J. Klauda, and James B. McLaren. 1979. Hepatomas in Atlantic tomcod Microgadus tomcod (Walbaum) collected in the Hudson River estuary in New York. J. Fish Disease. 2(4): 313-319.

McLaren, James B. 1979. Comparative behavior of hatchery-reared and wild brown trout and its relation to intergroup competition in a stream. Ph.D. Dissertation. Pennsylvania State University. 163pp.

Campbell, K.P., Irvin R. Savidge, William P. Dey, and James B. McLaren. 1977. Recent power plant impacts on the Hudson River striped bass (Morone saxatilis) population. Proceedings of the Conference on Assessing the Effects of Power Plant Induced Mortality on Fish Populations. Presented at symposium, Gatlinburg, Tennessee.

Raleigh, R.F., James B. McLaren, and D.R. Graff. 1973. Effects of topical location, branding techniques and changes in hue on recognition of cold brands in centrarchid and salmonid fish. Trans. American Fisheries Society 102 (3): 637-641.

James Reichle
Field Operations Coordinator

Mr. Reichle is a senior environmental technician and overall coordinator for ASA field sampling activities. His major responsibilities include the design, mobilization, and supervision of all aspects of environmental monitoring programs. Mr. Reichle has more than 25 year's experience in all phases of environmental monitoring including field sampling, laboratory processing, and quality assurance/quality control.

Education:

A.A.S.; SUNY Agricultural and Technical College; Animal Science; 1973

Training:

Supervisor Training by Texas Instruments
Red Cross First Aid Instructor
PADI Certified Diver (International)

Experience:

Water Intake Monitoring—Field supervisor or crew leader for impingement monitoring programs more than a dozen electric generating facilities in New York, New Jersey, and Connecticut. Field supervisor or crew leader for entrainment monitoring programs at more than 10 electric generating facilities in New York and New Jersey. Conducted zebra monitoring at the Indian Point, Roseton, and Danskammer Generating Stations on the Hudson River. Participated in the design and supervised field testing of acoustic fish deterrence systems at the Arthur Kill, Bowline, J.A. Fitzpatrick, and Indian Point Generating Stations in New York. Participated in the design and flume testing of a prototype modified Ristroph impingement screen at the screen manufacturer's test facility in Wisconsin. Field supervisor or crew leader of full-scale testing of dual-flow and Ristroph-type intake screens at the Arthurkill, Dunkirk, Roseton, Danskammer, and Indian Point Generating Stations in New York. Field supervisor or crew leader on fish bypass/survival studies at the Grand Rapids Hydro Dam (WI), the Lowell Dam (MA), and the Charles River Dam (MA).

Biological Surveys—Served as field supervisor or crew leader on extensive fisheries surveys of the Hudson River estuary using otter trawls, Scottish fly seines, beach seines, box traps, beam trawls, Tucker trawls and epibenthic sleds. Conducted fish collections for radiological monitoring in Georgia and New York using fyke nets and trap nets. Field supervisor and crew leader on large-scale electrofishing surveys of the Hudson and Delaware River estuaries, the Hoosic River in New York and several rivers in Wisconsin. Conducted turtle sampling for chemical analyses in New Jersey. Directed gill and trammel net surveys in Lake Ontario, Hudson River and Florida. Experienced in the use of kick nets and benthic dredges for sampling of benthic invertebrates and clam dredges, crab traps, and lobster pots for sampling of benthic megafauna.

Aquaculture/Fish Transport—Helped to design, setup, and supervise for 6 years a prototype striped bass hatchery conducted by Consolidated Edison Company on the Hudson River. Provided direct supervision of hatchery technicians related to brood stock collection, spawning, hatching, fry rearing, tagging, and stocking of striped bass fingerlings under intensive culture conditions. Directed the collection and transport of fish among several reservoirs in New York. Designed and conducted successful collection and transport of wild collected fish from the East Coast to Wisconsin for intake screen testing.

Emergency response—Provided on-site emergency response related to a fish kill and potential natural resource damage assessment related to an accidental oil spill in western Pennsylvania and an accidental release sulfate of copper to the Hoosic River in upstate New York.

List of Skills:

- Boat handling and seamanship
- Use of otter trawls, beach seines, gill nets, plankton nets, benthic grabs, fyke nets, and try trawls
- Identification of aquatic fish and macroinvertebrates
- Fish survival studies
- Water quality testing and analysis
- Ichthyoplankton/benthos laboratory supervisor
- Field supervisor
- Quality assurance
- Marine biology
- Estuarine ecology
- 316 studies

Selected Publications and Presentations

Dunning, D.J., Q.E. Ross, P. Geoghegan, J.J. Reichle, J.K. Menezes, and J.W. Watson. 1992. Alewives avoid high frequency sound. *N. Amer. J. Fish. Manag.* 12:407-416.

Geoghegan, P., M.T. Mattson, J.J. Reichle, and R.G. Keppel. 1992. Influence of salt front position on the occurrence of uncommon marine fishes in the Hudson River Estuary. *Estuaries.* 15:251-254.

Humphreys, M., R.E. Parks, J.J. Reichle, M.T. Mattson, D.J. Dunning and Q.E. Ross. 1990. Stocking checks on scales as marks for identifying hatchery striped bass in the Hudson River. *Am. Fish. Soc. Symp.* 7:787-83.

Betty Tabor
Biological Laboratory Coordinator

Ms. Tabor is a senior environmental technician and overall coordinator for ASA biological laboratory operations. Her major responsibilities include the mobilization, coordination, and management of all aspects of biological laboratory processing in support of environmental monitoring programs. Ms. Tabor has more than 20 year's experience in all phases of environmental monitoring including field sampling, laboratory processing, and quality assurance/quality control.

Education:

A.A.S.; Dutchess Community College; Natural Resource Conservation; 1974
Dutchess Community College; Chemistry; 1982 - 1983
Texas Instruments, Inc.; Supervisory Training (Phases 1 and 2)

Certifications:

EPA AHERA Asbestos Building Inspector
OSHA 40-Hour Hazardous Waste Operations Safety Training
Multimedia CPR and First Aid Training
Certified Lead-Based Paint Inspector

Experience:

Aquatic Biology—Served as laboratory coordinator and principal taxonomist for a variety of entrainment monitoring programs and field ichthyoplankton surveys conducted throughout the Northeast, including the Hudson River estuary, New York/New Jersey Harbor complex, and Lake Ontario. Conducted field sampling and laboratory processing of zebra mussel veliger and plate samples. Responsibilities included hiring and training of personnel, scheduling, management of data flow, and quality control. Experienced in the aging, sex identification, and determination of state of maturity and fecundity of fish. Also participated as crew leader on a wide variety of field sampling programs conducted throughout the Hudson River estuary.

Aquaculture—Served a shift supervisor for the Hudson River striped bass hatchery. Responsible for the supervision of hatchery personnel, feeding, treatment, grading, water quality monitoring, and maintenance of pumps and other hatchery equipment. Participated in the coded-wire tagging of fingerling striped bass and retrieved and read binary tags from recaptured individuals.

Hazardous Materials Assessments—Participated in the inspection, sampling, and assessment of lead-based paint in housing and other high priority areas at Incirlik Air Base in Turkey and other bases in the United States for the U.S. Airforce. Participated in surveys and sampling of potential asbestos materials at both industrial and housing units for the Department of Defense. Conducted sensitive receptor survey for 5 service stations in New York and conducted hazardous material inspection of storm debris. Participated in pumping tests, well development, sampling of groundwater monitoring wells and free product recovery. Conducted sampling of sewage sludge and recovery of lead shot from soil samples, and participated stormwater permit sampling.

List of Skills:

- Identification of aquatic fish and macroinvertebrates
- Biological laboratory supervisor
- Boat handling and seamanship
- Use of otter trawls, beach seines, gill nets, plankton nets, benthic grabs, fyke nets, and trawls
- Water quality testing and analysis
- Biological laboratory supervisor
- Field supervisor
- Quality assurance
- Lead-based paint and asbestos surveys
- Groundwater monitoring
- Aquatic biology

John R. Young
Senior Scientist/Associate

Dr. Young has more than 25 years of experience in aquatic impact assessments and ecological studies in marine, estuarine, and freshwater aquatic habitats. He has worked both as a consultant and within the utility industry. He recently coordinated a Draft Environmental Impact Statement for renewal of discharge permits at four power plants located on a tidal estuary in the Northeast. He has also served as issue manager for human health effects of electromagnetic fields and dredge project permitting.

Education

Ph.D.; City University of New York; Biology (Ecology, Evolution & Behavior Subprogram); 1999
M.S.; Union College; Applied Statistics & Operations Research; 1988
M.S.; Pennsylvania State University; Ecology; 1979
A.B.; Washington University; Biology; 1973

Professional Affiliations

American Fisheries Society • Ecological Society of America • Hudson River Environmental Society

Associate editor for the North American Journal of Fisheries Management

Experience

Ecological Risk and Impact Assessment— Participated in long-term study of effects of power generation on fish populations of the Hudson River estuary in various capacities while employed as consultant and as a utility scientist. Directed mark-recapture studies to estimate population sizes and movement patterns for anadromous and estuarine species. Supervised technical staff in completion of interpretive reports on multi-year multi-plant impacts. Project manager for studies of entrainment abundance and through-plant survival using state-of-the-art equipment and study designs. As a utility scientist, provided technical direction for all aspects of the long-term (25+ years) monitoring program. Coordinated multi-plant, multi-company environmental impact statement for renewal of discharge permits. Participated in discharge permit renewals for power plants located on Delaware Bay.

Aquatic Ecology—Technical and management oversight of estuary-wide study of the dynamics of larval and early juvenile fish populations to determine the effects of natural and human-induced stresses on factors such as mortality and growth rates, and subsequent year-class success. Directed ecological study of aquatic ecology of Long Island Sound in the vicinity of a nuclear power station. Used data from ecological studies to assess fish life history characteristics.

Aquatic Toxicology—As part of doctoral research, developed new statistical techniques for analysis of fluctuating asymmetry, a method of detecting population stress from contaminants. Used the new techniques to reassess past studies of fluctuating asymmetry in fish populations with respect to sample sizes, metrics, and data quality. Examined multi-year trends in fluctuating asymmetry in east coast striped bass populations. Participated in analysis of effects of PCB contamination on Hudson River striped bass population using long-term monitoring program data.

Modeling and Biometrics- Participated in the development and implementation of stochastic single- and multi-age structural models for the quantitative assessment of the effects of power plant entrainment and

impingement on fish populations. Evaluated density-dependent and stock recruitment functions for the assessment of long-term power plant impact. Examined alternative management options for Atlantic sturgeon and sandbar sharks using age-structured models. Participated in development of individual-based models for striped bass and bay anchovy with Oak Ridge National Laboratory scientists. Used operations research techniques to develop a model for optimizing entrainment mitigation measures at 6 generating units. Developed stochastic simulation model to evaluate mark-recapture estimators for migratory fish populations. Taught SAS programming for data analysis in graduate level biometrics course.

Water Quality Assessments—Analyzed long-term trends in water temperature and freshwater inflow in the Hudson River in relation to fish life history characteristics. Coordinated modelling of thermal plume compliance with water quality regulations. Assessed regulatory compliance of nuclear reactor upgrades with discharge temperature limits.

Regulatory Requirements—Experienced in various regulatory environmental exhibits such as 316(a) and (b) demonstrations, FERC exhibits, natural resource damage assessments, wetlands permits, dredging permits, and pesticide use. Participated in utility industry efforts to assist EPA with development of 316(b) regulations. Provided advice and taught in-house course on compliance with pesticide, fish & wildlife, regulations, marine construction permitting, and dredging.

Data Management and Analysis—Directed in-house staff and consultants involved in data management and analysis activities. Proficient in use of wide variety of computer data management, analysis and graphics software including SAS, Lotus 1-2-3, APL, Freelance, Excel, Word, WordPerfect.

Selected Publications and Presentations

Barnthouse, L. W., D. Glaser, and J. Young. 2003. Effects of historic PCB exposures on the reproductive success of the Hudson River striped bass population. *Environmental Science & Technology* 37:223-228.

Young, J. R. and M. Mattson. 2002. Status of American shad and river herrings in the Hudson River estuary. Presented at the American Fisheries Society Annual Meeting, Baltimore, MD. August.

Young, J. R. and W. P. Dey. 2002. Uncertainty and Conservatism in Assessing Environmental Impact under §316(b): Lessons from the Hudson River Case. *The Scientific World Journal*, 2(S1):30-40.

Cowan, J. H. Jr., K. A. Rose, E. D. Houde, S. Wang, and J. Young. 1999. Modeling effects of increased larval mortality on bay anchovy population dynamics in the mesohaline Chesapeake Bay: Evidence for compensatory reserve. *Marine Ecology Progress Series* 185:133-146.

Waldman, J. R., J. R. Young, B. P. Lindsay, R. E. Schmidt, and H. Andreyko. 1999. A comparison of alternative approaches to discriminate larvae of striped bass and white perch. *North American Journal of Fisheries Management* 19:470-481.

Young, J. R. 1999. Development of a Three-parameter model for Assessing Fluctuating Asymmetry of Meristic Characters. Ph. D. Dissertation. City University of New York.

Young, J. R., R. G. Keppel, and R. J. Klauda. 1992. Quality assurance and quality control aspects of the Hudson River ecological study. In Smith, C. L. (ed.) *Estuarine Research in the 1980's: Proceedings of the Seventh Symposium of the Hudson River Environmental Society*.

Wells, A. W. and J. R. Young. 1992. Long-term variability and predictability of Hudson River physical and chemical characteristics. In Smith, C. L. (ed.) *Estuarine Research in the 1980's: Proceedings of the Seventh Symposium of the Hudson River Environmental Society*.

Heimbuch, D. G., D. J. Dunning, and J. R. Young. 1992 Post yolk-sac larvae abundance as an index of year class strength of striped bass in the Hudson River. In Smith, C. L. (ed.) *Estuarine Research in the 1980's: Proceedings of the Seventh Symposium of the Hudson River Environmental Society*.

Wells, A. W., D. M. Randall, D. J. Dunning, and J. R. Young. 1991. Dispersal of young-of-the-year hatchery striped bass in the Hudson River. *North American Journal of Fisheries Management* 11:381-392.

Young, J. R. and W. L. Kirk. 1989. Optimal entrainment mitigation strategies for several Hudson River power plants using dynamic programming. Presented at Edison Electric Institute Biologist's Task Force Annual Meeting. Chicago, IL.

Young, J. R., R. J. Klauda, and W. P. Dey. 1988. Population estimates for juvenile striped bass and white perch in the Hudson River Estuary. *American Fisheries Society Monograph* 4: 89-101.

Muessig, P. H., J. R. Young, D. S. Vaughan, and B. A. Smith. 1988. Advances in field and analytical methods for estimating entrainment mortality factors. *American Fisheries Society Monograph* 4:124-132.

Young, J. R., T. B. Hoff, W. P. Dey, and J. G. Hoff. 1988. Management recommendations for a Hudson River Atlantic sturgeon fishery based on an age-structured population model. Pages 353-365. In Smith, C. L. (ed.) *Fisheries Research in the Hudson River*. State University of New York Press, Albany.

Lauer, G. L., J. R. Young, and J. S. Suffern. 1981. The best way to assess environmental impacts is through the use of generic and site-specific data. Pages 21-33 In Jensen, L. D. (ed.) *Issues associated with impact assessment*. EA Communications. Sparks, MD