

WORK PLAN FOR THE UPPER GREAT LAKES
CONNECTING CHANNEL WORKSHOP

December 4, 1984

Submitted to the Environmental Protection Agency



**WORK PLAN FOR THE UPPER GREAT LAKES
CONNECTING CHANNEL WORKSHOP**

December 4, 1984

Submitted to:

**U. S. Environmental Protection Agency
Office of Water Regulations and Standards
401 M Street, S.W.
Washington, D.C. 20460**

Submitted by:

**JRB Associates
A Company of Science Applications International Corporation
1701 East Woodfield Road, Suite 819
Schaumburg, Illinois 60195**

**EPA Contract No. 68-01-6941, WA #5
JRB Project No. 2-834-07-672-05**

TITLE PAGE

JRB Associates has furnished these data in response to Government Solicitation EPA Contract No. 68-01-6941, WA #34 (JRB Proposal No. 2-834-07-672-05) with the understanding that such data are protected from disclosure under the Freedom of Information Act, the Trade Secrets Act and other applicable law. Accordingly, these data may not be disclosed outside the Government and shall not be duplicated, used, released in whole or in part of any purpose other than by the Government to evaluate this proposal except with the prior written consent of JRB Associates. If a procurement is awarded to JRB Associates as a result of or in connection with submission of this proposal, these data shall continue to be protected by the aforesaid laws from disclosure outside the Government, in whole or in part. These data have been submitted with the understanding that the Government shall notify JRB Associates of requests for duplication, reproduction, use, release, disclosure thereof and shall afford JRB Associates adequate and reasonable opportunity to protect said data therefrom.

December 4, 1984

Ms. Sally Neuber
Office of Analysis and Evaluation
U.S. Environmental Protection Agency
401 M Street, Southwest
Washington, D.C. 20460

RE: EPA Contract No. 68-01-6941
JRB Project No. 2-834-07-672-05

Dear Sally:

Enclosed are two copies of the work plan for Work Assignment No. 5, Upper Great Lakes Connecting Channels Workshop. It includes cost estimates for ESSA and JRB.

If you have any questions, please call me at 821-4619.

Sincerely,



Peter B. Trick
Project Manager

PBT:cmd

Enclosures

cc: Katherine Seikel, EPA Contracts
Paul Bertram, EPA Region V
Larry Lai, JRB Associates
Mary Hamrick, JRB Associates

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APPENDICES

1. INTRODUCTION

The Great Lakes National Program Office of EPA Region V is involved, with nine other U.S. and Canadian Agencies, in the Upper Great Lakes Connecting Channels Study (UGLCC). With the large number of agencies involved in the UGLCC study, the need for coordination and cooperation is evident. The UGLCC Management Committee intends to provide a forum in which Study participants can reach consensus on key issues through Adaptive Environmental Assessment and Management (AEAM). AEAM is a collection of collaborative problem solving methods by which management decisions can be made. In particular, a scientific workshop will be held for the UGLCC participants that is directed toward identifying conceptual uncertainties regarding the organization of the Study, and toward identifying research and monitoring priorities.

Environmental and Social Systems Analysts, Ltd. (ESSA), has extensive experience with AEAM techniques. Government agencies with whom ESSA has previously facilitated the application of AEAM include Environment Canada, EPA, the U.S. Fish and Wildlife Service, the Ontario Ministry of Natural Resources, and the British Columbia Ministry of Forests and Environment. Also, ESSA provided training in the techniques of AEAM to personnel of the Great Lakes Fishery Commission. In addition, ESSA personnel wrote a detailed review of the AEAM process as a product of a workshop by Environment Canada in 1982 (Review & Evaluation of Adaptive Environmental Assessment and Management, prepared for and published by Environment Canada, Vancouver, B.C., 116 Pages). ESSA is also knowledgeable of the UGLCC Study and workshop needs.

Based on this extensive experience, EPA's Great Lakes National Program Office has requested ESSA assistance in conducting the UGLCC Workshop.

2. TECHNICAL APPROACH AND WORK PLAN

2.1 INTRODUCTION

The proposed work will be a three-day workshop for representatives from U.S. and Canadian agencies that are participating in the Upper Great Lakes Connecting Channels Study. The emphasis of the workshop will be the evaluation of existing information about the connecting channels and identification of further research and monitoring activities that are applicable to the Study. The general approach will be to describe impact hypotheses and use these hypotheses to identify uncertainties and to evaluate whether specific research efforts should be initiated, continued, or terminated.

The primary purpose of the workshop is to provide a forum for the UGLCC participants to establish and maintain interdisciplinary and interagency communications, and to facilitate the clear definition of the focus of the Study while developing a framework for research and monitoring coordination and evaluation of existing information. This work plan is designed to meet this purpose. It has five main tasks:

- Preparation
- Workshop planning and scoping
- Conducting the workshop
- Report preparation
- Interpretation of workshop results.

2.2 TASK 1: WORKSHOP PREPARATION

The purpose of this task is to become familiar with the UGLCC activities to date, the background surrounding the Study, the proposed work plans and activities, and the expectations of the UGLCC Management Committee for workshop results. Activities for this task include, but are not limited to, the following:

- a) Reviewing background and briefing materials concerning the UGLCC Study

- b) Reviewing draft work plans or activity proposals for insight into study objectives and particular needs for integration of agency activities
- c) Identifying and consulting with key UGLCC personnel regarding intentions, objectives, expectations, and potential problems involved with the Study in general and the workshop in particular.

2.3 TASK 2: WORKSHOP PLANNING AND SCOPING MEETING

The purpose of this task is to identify the particular needs for a workshop for the UGLCC study, identify the problems to be resolved, select the particular methods of AEAM to apply, select the workshop participants, develop a detailed plan for conducting the workshop, and make all necessary technical arrangements. Activities for this task will include, but are not limited to, the following:

- a) Meeting in a scoping session with the core personnel for the UGLCC Study who are involved with the workshop
- b) Developing the broad strategy and detailed particulars for the workshop
- c) Preparing a short report that includes:
 - Review of discussion groups for workshop
 - List of major issues, actions, and indicators; and
 - A preliminary table of major points of interaction between the Study workgroups.

In addition, a detailed workshop agenda will be developed at the scoping session and delivered at the conclusion of the meeting.

2.4 TASK 3: CONDUCTING THE WORKSHOP

Activities will include, but are not limited to, the facilitation of the following items on the agenda:

- a) Conducting a plenary session to present agencies' past and current programs and/or workgroup-proposed activities

- b) Identifying key issues, actions and indicators, based on the presentations above
- c) Discussing the appropriate spatial and temporal representation to guide the study
- d) Identifying the key linkages between workgroups; i.e., information needs that cross workgroup boundaries (this discussion is critical to the integration of the studies)
- e) Conducting subgroup meetings to develop impact hypotheses
- f) Holding Subgroup presentations in plenary session to communicate results of their deliverations
- g) Conducting a final wrap-up.

2.5 TASK 4: REPORT PREPARATION

The purpose of this task is to provide the UGLCC Management Committee with documentation of the workshop objectives, methodology, results, and recommendations. The report shall be designed to provide the foundation for a separate UGLCC Activity Integration Subcommittee report. Activities will include, but are not limited to, the preparation of a report containing the following items:

- a) Introduction
- b) Methodology
- c) Description of impact hypotheses, including the assessment of existing data related to the hypotheses, and of the need to conduct research to address the questions implicit in the hypotheses
- d) Research recommendations
- e) Conclusions.

2.6 INTERPRETATION OF WORKSHOP RESULTS

The purpose of this task is to coordinate the workshop results with the Activity Integration Subcommittee of the UGLCC Management Committee. Activities will include, but are not limited to, helping the Activities Integration Subcommittee incorporate workshop results into their scheduled report.

3. MANAGEMENT, STAFFING AND SCHEDULE

Peter B. Trick, JRB's Project Manager for the Qualitative Analysis and Evaluation Services Contract will oversee the activities and expenditures of Work Assignment No. 5. Joanne Platt, JRB's Project Administrator, will handle all contractual and financial issues relating to the contract and be responsible for administration of Work Assignment No. 5. As the JRB Work Assignment Manager, Larry Lai will be responsible for all management and technical aspects of the project.









The following personnel of ESSA will perform the tasks for this Work Assignment:

- Robert R. Everitt, President
- Michael L. Jones, Director
- David R. Marmorek, Systems Ecologist
- Gina L. Cunningham, Systems Ecologist.

Robert R. Everitt will act as the ESSA project manager and liaison. Mr. Everitt will be assisted by Michael Jones, David Marmorek, and Gina Cunningham, who will act as workshop facilitators and have reporting and some liaison responsibilities. Resumes of key staff are presented in the appendix.

PROJECT SCHEDULE

1984

TASK	NOVEMBER	DECEMBER	JANUARY
1. Scoping Meeting Preparation			
2. Conduct Workshop			
3. Prepare Draft Report			
4. Revise and Deliver Final Report (anticipated late January)			
5. Interpretation of Workshop Results with the Activity Integration Subcommittee			

△ Reports due to client

4. COST PROPOSAL

CONTRACT PRICING PROPOSAL (RESEARCH AND DEVELOPMENT)				Office of Management and Budget Approval No. 29-RO184	
This form is for use when (i) submission of cost or pricing data (see FPR 1-3.807-3) is required and (ii) substitution for the Optional Form 99 is authorized by the contracting officer.				PAGE NO. 1	NO. OF PAGES 2
NAME OF OFFEROR JRB Associates, A Company of Science Applications International Corp.		SUPPLIES AND/OR SERVICES TO BE FURNISHED Upper Great Lakes Connecting Channels Workshop - Work Assignment 5			
HOME OFFICE ADDRESS 8400 Westpark Drive McLean, Virginia 22102					
DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED 834 - McLean		TOTAL AMOUNT OF PROPOSAL \$ 25,000		GOVT SOLICITATION NO. EPA 68-01-6941	
DETAIL DESCRIPTION OF COST ELEMENTS					
1. DIRECT MATERIAL (Itemize on Exhibit A)			EST COST (\$)	TOTAL EST COST ¹	REFER- ENCE ²
a. PURCHASED PARTS					
b. SUBCONTRACTED ITEMS Environmental & Social Systems Analysts, Ltd			22,766		
c. OTHER—(1) RAW MATERIAL					
(2) YOUR STANDARD COMMERCIAL ITEMS					
(3) INTERDIVISIONAL TRANSFERS (At other than cost)					
TOTAL DIRECT MATERIAL				22,766	
2 MATERIAL OVERHEAD ³ (Rate 1 % X \$ 22,766 base =)				228	
3. DIRECT LABOR (Specify)		ESTIMATED HOURS	RATE/ HOUR	EST COST (\$)	
Project Manager (411S)		3	21.14	63	
Work Assignment Manager (311S)		32	15.19	486	
Project Administrator (210T)		20	10.15	203	
Secretary (60Y)		4	6.63	27	
TOTAL DIRECT LABOR					779
4 LABOR OVERHEAD (Specify Department or Cost Center) ⁴		O. H. RATE	X BASE =	EST COST (\$)	
Overhead		.606	779	472	
Fringe		.362	779	282	
TOTAL LABOR OVERHEAD					754
5 SPECIAL TESTING (Including field work at Government installations)			EST COST (\$)		
TOTAL SPECIAL TESTING					
6 SPECIAL EQUIPMENT (If direct charge) (Itemize on Exhibit A)			EST COST (\$)		
7 TRAVEL (If direct charge) (Give details on attached Schedule)			EST COST (\$)		
a TRANSPORTATION					
b PER DIEM OR SUBSISTENCE					
TOTAL TRAVEL					
8 CONSULTANTS (Identify—purpose—rate)			EST COST (\$)		
TOTAL CONSULTANTS					
9 OTHER DIRECT COSTS (Itemize on Exhibit A)				216	
TOTAL DIRECT COST AND OVERHEAD				24,743	
11 GENERAL AND ADMINISTRATIVE EXPENSE (Rate 13 % of cost element Nos. 2-9)				257	
12 ROYALTIES ⁵					
TOTAL ESTIMATED COST				25,000	
14 FEE OR PROFIT					
TOTAL ESTIMATED COST AND FEE OR PROFIT					

This proposal is submitted for use in connection with and in response to (Describe RFP, etc.)

and reflects our best estimate as of this date, in accordance with the Instructions to Officers and the Footnotes which follow.

NAME OF FIRM	JRB Associates, A Company of Science Applications International Corporation	DATE OF SUBMISSION	12/4/84
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COST EL NO.	ITEM DESCRIPTION (See footnote 3)	EST COST (\$)
4	Overhead rate is based on 2-1/3 months at 60% and 2/3 month at 62.5%; fringe rate is based on 2-1/3 months at 36% and 2/3 month at 37%	
9	General Telephone: 59 hours x 50¢/hr = 30	
	Long Distance: 20 calls x \$5/call = 100	
	Reproduction: 350 copies x 6¢/copy = 21	
	Miscellaneous: postage, express mail, etc. = 65	
	Total Cost Element No. 9	216

☒ YES ☐ NO (If yes, identify below)

11. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS PROPOSED CONTRACT?

☐ YES ☒ NO (If yes, identify on reverse or separate page)

☐ YES ☒ NO (If yes, identify.): ☐ ADVANCE PAYMENTS ☐ PROGRESS PAYMENTS OR ☐ GUARANTEED LOANS

☐ YES ☒ NO (If yes, identify.):

☒ YES ☐ NO (If no, explain on reverse or separate page)

OPTIONAL FORM 60 (10-71)

ENVIRONMENTAL SOCIAL SYSTEMS ANALYSTS, LTD.

COST PROPOSAL

List of Tasks

1. Preparation
2. Planning and Scoping
3. Workshop
4. Report
5. Liaison and Consultation

<u>FEES</u>	<u>Hourly Rate</u>	<u>TASKS</u>					<u>Total</u>
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	
Robert Everitt	\$54.29	30	15	22.5	45	45	157.5
Michael Jones	\$39.82	15	15	22.5	22.5	15	90
David Marmorek	\$39.82	15	--	22.5	22.5	--	60
Gina Cunningham	\$26.54	30	15	22.5	60	15	142.5
Total Hours		90	45	90	150	75	

Fees - Task 1	\$ 3,619.50
Task 2	1,809.75
Task 3	3,610.58
Task 4	5,827.35
Task 5	3,438.45
TOTAL FEES	<u>\$18,305.63</u>

DISBURSEMENTS

Airfare	
Vancouver-Toronto return - 3 trips @ \$400.00/trip	\$1,200.00
Toronto-Windsor return - 4 trips @ \$100.00/trip	400.00
Toronto-Chicago return - 2 trips @ \$200.00/trip	400.00
Per diem - 17 person days @ \$80.00/day	1,360.00
Report Preparation (drafting, reproduction, etc.)	600.00
Miscellaneous (telephone, photocopying, etc.)	<u>500.00</u>
TOTAL DISBURSEMENTS	<u>\$4,460.00</u>

TOTAL FEES	\$18,305.63
TOTAL DISBURSEMENTS	<u>4,460.00</u>
TOTAL COSTS	<u>\$22,765.63</u>

APPENDIX

RESUMES

JRB
RESUMES

PETER B. TRICK

EDUCATION

Rice University, B.A., Political Science (1973)
George Mason University of Law, Juris Doctor with Honors
(completed 1978, Awarded 1980)

WORK SUMMARY

Mr. Trick is a Senior Project Manager who directs the Regulatory Policy Group within the Water Programs Division at JRB. He is an attorney with experience in Federal and State air, water, solid and hazardous waste, toxic substance and land use initiatives. He has been at JRB for three years and has worked almost exclusively on policy issues associated with the development and implementation of EPA Water Regulations and their interrelationships with other environmental programs. Mr. Trick has specialized in the design and performance of quantitative, analytical projects to assess the effectiveness of existing regulations and proposed alternatives. In addition, he has performed evaluations of State and local environmental programs, and has led technical assistance efforts and negotiations with cities and states to improve their programmatic capabilities.

EXPERIENCE

Mr. Trick is currently JRB Project Manager for the Quantitative Policy Analysis contract with the Office of Analysis and Evaluation of EPA's Office of Water Regulations and Standards. Thirty discrete work assignments have been performed on this project over the last three years in such diverse regulatory areas as estuarine protection, pretreatment, sludge management, effluent guidelines and water quality monitoring. Mr. Trick's responsibilities as QPA Project Manager range from project staffing, work assignment management, and provision of analytical guidance to quality assurance, and financial administration. Examples of his work on this project include:

- Management of a major policy study for the Sludge Task Force on alternative regulatory approaches for municipal sludge management;
- Senior Analyst on an assessment of the management of other pollution control sludges generated by utilities, water treatment plants, and industries;
- Senior Analyst on a project to quantify key characteristics of 1700 POTWs required to develop local pretreatment programs;
- Guidance and final reviewer on a work assignment to evaluate the institutional and regulatory approaches of water quality management in the Puget Sound.

Reviewed for accuracy by:

Peter B. Trick

Date 1/23/84

JRB Associates

PETER TRICK

Mr. Trick also serves as Program Manager for the Regulatory and Policy Analysis Group, managing a staff of 15 attorneys, policy analysts, environmental planners, and economists. He has overseen the provision of analytic and evaluative services to EPA, States, and localities to assist in their development and implementation of environmental protection programs. In this capacity, he has directed policy work in the following areas and issues among others:

- Evaluation of the regulatory jurisdiction and coverage of the Dredge and Fill Program
- Analysis of Public Comments to the Organic Chemical Regulations
- Analysis of regulatory requirements for the Ocean Dumping of Utility Fly Ash in the N.Y. Bight and alternative disposal options
- Development and review of compliance strategies for Pretreatment enforcement
- Delineation of the interface between the Superfund Program and the NPDES, Pretreatment and Dredge and Fill programs
- Analysis of the relationship between Hazardous Waste Management and local industrial waste control
- Reviews of State and local pretreatment legal authorities and multi-jurisdictional problems.

In addition to the above management experience, Mr. Trick has played a key role in several important water policy studies. He was the Senior Policy Analyst on the Pretreatment Regulatory Impact Analysis, a study to evaluate the efficacy of the National Pretreatment Program. He was involved in the initial choice of methodologies employed and was responsible for performance of the regulatory analysis. In addition, Mr. Trick co-designed the mass balance model used to forecast the environmental and cost impacts of the existing pretreatment program and several alternative regulatory approaches. Two reports produced as a result of this work were circulated nationally through the Federal Register. He managed the effort to respond to public comments and developed supplemental methodologies to answer additional questions raised by EPA.

Mr. Trick also served as a lead analyst on a study to assess the incremental environmental benefits associated with implementation of BAT toxic water pollution standards. He also worked on two studies to evaluate the technological, environmental, and administrative feasibility of pretreatment trading and alternative, direct discharger, water permitting techniques.

Reviewed for accuracy by:

Peter B. Trick

Date:

1/23/84

PETER TRICK

Page 3 of 5

Mr. Trick was also the Senior Analyst on a joint study for OWRS and OWEP to assess the industrial waste control programs of three large municipalities. This project was a quick response study in support of Agency testimony on potential changes to the National Pretreatment Program. Mr. Trick supervised the legal and programmatic evaluations and was the principal liaison with Los Angeles County Sanitation District, one of the cities assessed. He was responsible for integrating findings from each of the three case studies and participated in briefings to help determine the most appropriate legislative course, in light of the study's findings.

Prior to joining JRB, Mr. Trick worked as a staff attorney and project manager for another environmental consulting firm, Aspen Systems Corporation. Specific activities there included:

- Research and analytical work on a policy study for the President's Task Force on Environmental Data and Monitoring Programs, sponsored by the Council on Environmental Quality. This study examined the interaction of over 70 environmental, resource development and preservation laws in an effort to articulate a cohesive Federal Policy
- Co-editor of a guidance manual on noise enforcement for the Environmental Protection Agency. This work was designed to assist prosecutors in the enforcement of the Noise Control Act of 1972 and the Model Community Noise Control Ordinance
- Principal researcher on a project for the National Oceanic and Atmospheric Administration which examined, digested and analyzed State laws for consistency with the Coastal Zone Management Act
- Project Manager for a study for the Department of Interior on the legal constraints to commercial aquaculture development. It focused on land use, water use, and health and environmental laws and their impacts on an expanding industry. Directories were compiled of constraining laws and regulations of the Federal government and 22 states. A regulatory constraints action plan was prepared which identified major barriers and proposed measures to reduce their importance
- Legal editor for a toxic substances control compliance manual.

From 1975 to 1978, Mr. Trick worked as an environmental specialist with the Office of Coal Analysis, an econometric forecasting office within the Energy Information Administration of the Federal Energy Administration/Department of Energy. He analyzed various legislative and administrative actions to assess their energy, environmental, and economic impacts and assisted in their incorporation into energy modeling efforts. He worked extensively with the Clean Air Act, the Surface Mining Control and Reclamation Act, the Federal Coal Land Leasing Amendments, and the Federal Land Policy and Management Act. He coauthored publications on environmental regulation and coal utilization, short-term coal demand, and the 1977 coal strike.

Reviewed for accuracy by:Peter B. Trick

Date:

1/23/84

JRB Associates

PETER TRICK

Page 4 of 5

While in law school, Mr. Trick was awarded special honors in natural resources and environmental law, and clerked for a Federal Mine Health and Safety Review Commission Judge.

PUBLICATIONS, PAPERS, AND REPORTS

Cahill, L. and Trick, P. "Assessment of the Environmental and Legal Constraints on Coal Utilization," Federal Energy Administration, Washington, D.C., 1975

Cohen, B. and Trick, P. "Econometric Forecast of Short-term Coal Demand," Department of Energy, Washington, D.C., 1976

Childress, P., Gaffen, M., and Trick, P. "Quantitative Analysis of the Impacts of the 1977 Coal Strike", Department of Energy, Washington, D.C., 1977

Cohen, H., Lyon, J. Quarles, P., and Trick, P. "Land and Natural Resources Management: An Analysis of Selected Federal Policies, Programs, and Planning Mechanisms," Council on Environmental Quality, Washington, D.C., 1978

Maloney, S., Trick, P., and Zelner, B. "Guidance Manual for State and Local Noise Prosecutors," U.S. Environmental Protection Agency, Washington, D.C., 1978

Trick, P. "A Literature Review of the Regulatory Constraints on Aquaculture Development," U.S. Fish and Wildlife Services, Washington, D.C., 1980

Trick, P. et. al., "A Directory of Federal and State Regulations Affecting the Development and Operation of Commercial Aquaculture," 3 Volumes; U.S. Fish and Wildlife Services, Washington, D.C., 1980

Saltzberg, E. and Trick, P., et. al., "Assessment of the Impacts of Industrial Discharges on Publicly Owned Treatment Works," Final Report, Contract No. 86-01-5052, DOW 54. U.S. Environmental Protection Agency, Washington, D.C., 1981, 150 pp.

Blankenship, E., Smith, J., and Trick, P. "Effectiveness of BAT in Achieving Water Quality Standards," Final Report, Contract No. 68-01-5838. U.S. Environmental Protection Agency, Washington, D.C., 1982, 75 pp.

Blankenship, E., Sweeney, F., and Trick, P. "Addendum to Assessment of the Impacts of Industrial Discharges on POTWs," Contract No. 68-01-5052. U.S. Environmental Protection Agency, Washington, D.C., 1982, 50 pp.

Sweeney, F., Trick, P., and Wood, D. "Briefing Paper for the Sludge Policy Committee: An Outline of the Key Regulatory Issues Affecting Comprehensive Sludge Management," Contract No. 68-01-6348, DOW 18. U.S. Environmental Protection Agency, Washington, D.C., 1982, 20 pp.

Reviewed for accuracy by:

Peter B. Trick

Date

1/23/84

JRB Associates

PETER TRICK

Page 5 of 5

Sweeney, F., Trick, P., and Wood, D., et. al., "Legal Regulatory and Policy Issues Associated with Municipal Sludge Management," Contract No. 68-01-6348, DOW 18. U.S. Environmental Protection Agency, Washington, D.C., 1983, 219 pp.

Blankenship, E., Hamrick, M., Moore, T., Storch, P., Sweeney, F., Trick, P., and Zieger, W. "Inventory of Air Pollution Control, Industrial Wastewater Treatment, and Water Treatment Sludges," Contract No. 68-01-6348, DOW 17. U.S. Environmental Protection Agency, Washington, D.C., 1983, 106 pp.

Blankenship, E., Kaplan, J., Feiler, H., Dean, D., and Trick, P., et. al., "Assessment of Industrial Waste Control Programs in Three Municipalities," 2 Volumes, Contract No. 68-01-6514, DOW 30. U.S. Environmental Protection Agency, Washington, D.C., 1983, 404 pp.

Blankenship, E., Cunningham, J., Shattuck, A., Storch, P., Trick, P., and Wagner, P. "An Analysis of Industry and Pollutant Suitability for Innovative Permit Designs," Final Report, Contract No. 68-01-6558. U.S. Environmental Protection Agency, Washington, D.C., 1983, 161 pp.

Reviewed for accuracy by:

Peter B. Trick

Date

1/23/94

JRB Associates

LARRY C. LAI

EDUCATION

Illinois Institute of Technology, B. S., (Honors) Biochemistry (1976)
Illinois Institute of Technology, M. S., Environmental Engineering (1979)

EXPERIENCE

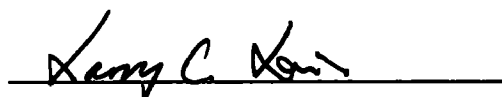
Mr. Lai is a Project Manager with the Water Programs Division of JRB assigned to JRB's Midwest Regional Office in Schaumburg, Illinois. Under Work Assignment #34 of JRB's contract with EPA's Office of Water Enforcement and Permits, JRB is providing a wide range of technical, legal and administrative assistance to EPA Headquarters and Regional Offices in implementing the National Pretreatment Program. Mr. Lai manages all tasks undertaken in providing assistance to EPA Regions V, VII, and VIII.

For EPA Region V, Mr. Lai has performed diagnostic evaluations of sewage treatment plants experiencing chronic violations of their NPDES permits. Final reports provided to EPA included specific recommendations for improving plant operations and achieving permit compliance.

For EPA Region I, Mr. Lai has prepared draft NPDES permits for industrial facilities, based upon Best Conventional Pollutant Control Technology (BCT), Best Practicable Control Technology Currently Available (BPT) and Best Available Control Technology Currently Achievable (BAT) guidelines, as well as EPA Region I policy and Best Professional Judgement (BPJ).

Prior to joining JRB, Mr. Lai was the environmental engineer at Fort Carson, Colorado, where he had responsibility for the Fort's water, wastewater, toxic and hazardous waste programs. His duties included:

- Optimizing operations and process control at the Fort's secondary sewage treatment plant
- Managing the hazardous waste storage facility
- Developing a post regulation for the proper handling and disposal of PCB items
- Instituting a Best Management Practices program for the post's Central Vehicle Wash Facility and industrial wastewater treatment plant.

Verified for accuracy by:Date: 4/19/84

LARRY C. LAI

Page 2 of 2

- Groundwater monitoring at the sanitary landfill
- Reviewing the engineering plans for expansion and improvement to the 1.8 MGD sewage treatment plant

While with the Illinois EPA, Mr. Lai was responsible for NPDES permit reviews, O&M and compliance inspections. Mr. Lai inspected over 50 municipal and industrial facilities. He has extensive experience in responding to oil spills and hazardous material incidents. In this capacity, he acted as the On-Scene Coordinator at a major chemical warehouse fire. Mr. Lai also served on an IEPA committee investigating the feasibility of biomonitoring in NPDES. He was also the Agency spokesman at environmental group meetings held to discuss water pollution problems in Cook County.

SPECIALIZED TRAINING

Pretreatment of Industrial Wastes - Triton College, Illinois - 1980
Workshop on Activated Sludge - Southern Illinois University - 1981
Handling and Transportation of Hazardous Materials - Northwest Consultants, Denver, Colorado - 1982
Manager's Environmental Course - U.S. Army Logistics Management Center - 1982

PUBLICATIONS AND PRESENTATIONS

Storch, P. J., Parker, J. G., Lai, L., "Diagnostic Inspections of POTWs With Chronic NPDES Violations", 38th Annual Virginia Water Pollution Control Association Conference, April 1984.

Storch, P. J., Lai, L. C., Parker, J. G., "An Analysis of Common Causes of NPDES Violations", Triangle Conference on Environmental Technology, Duke University, Durham, N.C., March 6-8, 1984.

Mitsch, W., et al, "Environmental Observations of a Riparian Ecosystem During Flood Season", Water Resources Center UIWRC Research Report No. 142, August 1979.

Lai, L., "The Effects of Advanced Waste Treatment on Mutagenesis in a Municipal Wastewater", Illinois Institute of Technology - Master's Thesis, 1979.

Lai, L., "Phosphorous" in "Alternative Mitigation Processes for the Treatment of Wastewaters", Patterson and Associates Incorporated, Army Corps of Engineers, Contract DA-CA-83-78-C-007.

PROFESSIONAL SOCIETIES

Water Pollution Control Federation
American Chemical Society

Verified for accuracy by:

Larry C. Lai

Date: 4/19/84

JRB Associates

JOANNE J. PLATT

EDUCATION

A.A.S.: Medical Secretarial Procedures, Marymount College of Virginia (1966)
B.A. candidate: Fine Arts, Hood College (1963-1964)
Additional courses in editing and real estate

WORK SUMMARY

Ms. Platt has 16 years of administrative experience in both government and private industry. The multi-faceted nature of her position as Administrative Assistant/Technical Editor with JRB utilizes her abilities in organization, coordination, and scheduling for smooth operation and timely completion of tasks. Technically, Ms. Platt's capabilities include writing, copy editing, proofreading, and publication/report production. She is also skilled in budget development and other financial procedures, such as expenditure tracking, voucher and financial report preparation, and statistical compilation.

PROFESSIONAL EXPERIENCE

JRB Associates, 11/82-Present

Administrative Assistant/Technical Editor - In this position for the Quantitative Analysis Division, Ms. Platt is currently responsible for monitoring contract expenditures, values, and modifications and preparing contract vouchers, progress reports, project performance charts, and work assignment budgets. She provides management support to the division director by coordinating and preparing a monthly management report for the president, aiding in the formulation of sales and staff projections, and tracking overhead expenditures. In addition, she provides division staff with assistance in requisitioning supplies and equipment, travel advances, and expense reimbursements and offers guidance on all JRB procedures and practices.

As technical editor for the division, Ms. Platt reviews reports, project descriptions, resumes, and client deliverables for correctness, continuity, and consistency, as well as drafts memorandums and reports.

Editorial Experts, Inc., 8/81-11/82

For this company specializing in all aspects of publications production, Ms. Platt undertook temporary assignments in several capacities, including editorial proofreading and word processing. Prior to and during this period, she free-lanced as a copy editor and manuscript typist.

Verified for accuracy by:

Joanne J. Platt

Date: April 12, 1983

JOANNE J. PLATT

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PROFESSIONAL EXPERIENCE (Continued)

Development Resources, Inc., 11/79-6/81

Office Manager - As office manager for this real estate development company, Ms. Platt leased and managed executive office space that provided tenants with personalized telephone and secretarial services. She was directly responsible for hiring and supervising secretarial personnel, overseeing the building maintenance, preparing monthly tenant billings, and establishing office procedures, which included compiling a procedures manual for secretaries.

Interaction Research Institute, Inc., 11/77-8/79

Administrative/Research Assistant - Ms. Platt was assistant to the president of this small research firm and was responsible for office management and report production, including copy editing, graphics preparation, and some writing. In addition, her research assignments included analyzing, tabulating, and formatting social-psychological questionnaire data as well as abstracting research articles.

Drug Abuse Council, Inc., 10/71-8/77

Production Editor - For three years, Ms. Platt was responsible for the publication of all reports, books, and pamphlets, averaging 12 to 15 a year, for this private, nonprofit foundation. Her position encompassed all aspects of the publication process, from copy editing manuscripts and corresponding with authors to obtaining cost estimates and scheduling to specifying type. Manuscripts went through several proof stages (from galleys to blue lines), which she either conducted herself or supervised.

Prior to assuming this position, Ms. Platt was an executive secretary to one of the division directors. Among her responsibilities was the preparation of numerous reports submitted by grantees and consultants, including copy editing and proofreading. She also supervised and coordinated the distribution of work among the other division secretaries.

National Coordinating Council on Drug Education, 4/69-10/71

Staff Assistant - In addition to administrative tasks, Ms. Platt was responsible for the production of most publications which entailed manuscript typing, copy editing, proofreading, and negotiating with printers. While at the National Coordinating Council, she assisted on two contracts for the National Institute of Mental Health - the evaluation of drug abuse films and audiovisuals and the evaluation of radio and television public-service spots - by scheduling evaluation sessions with experts in the field, locating and compiling appropriate material, and assembling the final reports.

Verified for accuracy by:

Joanne J. Platt

Date: April 12, 1983

JOANNE J. PLATT

Page 3 of 3

PROFESSIONAL EXPERIENCE (Continued)

Defense Intelligence Agency, 8/66-1/69

Administrative Aide - In providing administrative support to the Soviet Area Office, Ms. Platt prepared reports relating to manhour and budget expenditures; developed, monitored, and updated the Office career development plan; developed operating budgets covering overtime requirements, travel, training, supplies, and equipment; and maintained continuous review of expenditures. In addition, she served as "action officer" on all activities related to training and career development.

Verified for accuracy by:

Joanne J. Platt

Date: April 12, 1983

**ESSA
RESUMES**

NAME: Robert R. Everitt

BIRTHDATE: April 25, 1949

CITIZENSHIP: Canadian

POST-SECONDARY EDUCATION:

B.Comm. University of Alberta, 1973.

M.Sc. (Business Administration), University of British Columbia, 1975. Major: Operations Research (Management Science); Major paper topic: Non-differentiable Optimization.

Doctoral Program, University of British Columbia, 1977 to present. Program of study: Adaptive environmental assessment and management; population dynamics; planning and management of natural resources; economics; multiple objective decision making; social choice; public policy.

WORK EXPERIENCE:

1. 1979 to present: President and Senior Partner of ESSA Environmental and Social Systems Analysts Ltd. Responsibilities and activities have involved negotiation, supervision and participation with a number of international clients (government and private) primarily in the area of environmental resource management and policy.
2. 1979: Participant in Petro-Canada's Summer Professional Program in Environmental and Social Affairs. Design and preliminary development of a Petroleum Resource Environmental Management Information System (PREMIS). A review of Petro-Canada's current methodology for impact assessment with recommendations for improvement.
3. 1977 to 1979: Consultant
A number of environmental assessment and modelling workshops ranging from a river quality assessment of the Truckee-Carson basin in Nevada to the Porcupine Caribou herd in the Canadian North.

WORK EXPERIENCE (cont'd):

4. 1975 to 1979: Sessional Lecturer, Faculty of Commerce & Business Administration, University of British Columbia.
Courses taught: statistics, calculus and quantitative methods.
Nominated for a teaching excellence award by the students 1975-1976, 1977-1978.
5. 1973 to 1975: Research Assistant, Faculty of Commerce & Business Administration, University of British Columbia.
Areas of research: research on providing a general framework for analysis and evaluation of algorithms for the solutions of scheduling problems; development of an algorithm for the solution to the two-period stochastic program with simple resource problems; and application of mathematical programming to the management of a renewable resource system.

PUBLICATIONS & REPORTS:

- Everitt, R.R., 1975. Non-differentiable optimization. Major paper submitted as partial fulfillment of M.Sc. degree, Faculty of Commerce and Business Administration, University of British Columbia.
- Everitt, R.R., N.C. Sonntag, M.L. Puterman, P. Whalen, 1978. A mathematical programming model for the management of a renewable resource system: the Kemano II development project. J. Fish. Res. Board Can. 35: 235-246.
- Everitt, R.R., 1978. Use of interdisciplinary workshops in resource planning. Invited paper at a seminar on Water Resource Planning in the Yukon, December, 1978.
- Everitt, R.R., 1979. Environmental impact information: collection, synthesis, and integration. Petro-Canada, Calgary, Alberta.
- Everitt, R.R. and W.T. Ziemba, 1979. Two-period stochastic programs with simple resource. Operations Research. Vol. 27, No. 3, May - June, 1979, pp. 485-502.

PUBLICATIONS & REPORTS (cont'd):

- Birdsall, D.A., R.R. Everitt, M.L. Jones, N.C. Sonntag, M.J. Staley, 1980. An adaptive environmental assessment approach to the effects of development of the Alberta Oil Sands, 91 pp.
- McNamee, P.J., R.R. Everitt, N.C. Sonntag, M.J. Staley, 1980. Report of a simulation modelling workshop on the Western Spruce Budworm population dynamics, 90 pp.
- Sonntag, N.C., R.R. Everitt, D.R. Marmorek, R. Hilborn, 1980. Report of the Bering Sea Ecological Processes Study Modelling Workshop, 96 pp.
- Sonntag, N.C., R.R. Everitt, P. Bunnell, 1980. A report on the transfer of Adaptive Environmental Assessment and Management (AEAM) Methodology to Thailand's Integration of the Nam Pong Environmental Management Research Project, 424 pp.
- Sonntag, N.C., P. Bunnell, R.R. Everitt, M.J. Staley, D.R. Marmorek, G. Teleki, 1981. A report of the computer modelling workshop on the integration and consolidation of the Ontario Lakeshore Capacity Study.
- McNamee, P.J., M.L. Jones, R.R. Everitt, M.J. Staley, D. Tait, 1981. A report of the Integrated Wildlife-Intensive Forestry Research planning workshop, 139 pp.
- Everitt, R.R., D.A. Birdsall, 1981. Management of Major Environmental Research Programs: A Discussion Paper. For Research Management Division, Alberta Environment.
- Sonntag, N.C., R.R. Everitt, M.J. Staley, 1982. Adaptive Environmental Assessment and Management: An Integrated Approach to Resource Impact Evaluation. In "Land and Water Issues Related to Energy Development" Fourth Annual Meeting of the International Society of Petroleum Industry Biologists, September, 1981. Ann Arbor Science Publishers, Ann Arbor, 469 pp.
- Teleki, G., P. Bunnell, R.R. Everitt, D.R. Marmorek, P.J. McNamee, N.C. Sonntag, M.J. Staley, 1981. Results of two workshops on the development of the Ontario Lakeshore Capacity Study simulation model, 124 pp.
- Everitt, R.R., A. Carruthers, R. Hilborn, 1981. Beaufort Sea production scenario model, 80 pp.

PUBLICATIONS & REPORTS (cont'd.):

- Everitt, R.R., P. Bunnell, A.B. Carruthers, M.L. Jones, N.C. Sonntag, 1982. Liard River Hydroelectric Development: Application of Adaptive Environmental Assessment and Management to Planning of Mackenzie Delta Environmental Studies, 199 pp.
- Everitt, R.R., 1983. EIA - The Relationship Between the Environmental Scientist and the Decision-Maker: A Canadian Perspective. In Environmental Impact Assessment, (ed.) PADC Environmental Impact Assessment and Planning Unit. Martinus Nijhoff Publishers, The Hague.
- Everitt, R.R., 1983. Adaptive Environmental Assessment and Management: Some Current Applications. In Environmental Impact Assessment, (ed.) PADC Environmental Impact Assessment and Planning Unit. Martinus Nijhoff Publishers, The Hague.
- Everitt, R.R., 1983. Susitna Hydroelectric Project. Draft Report, Terrestrial Environmental Mitigation Planning Simulation Model, 243 pp.
- ESSA Ltd., LGL Ltd., and ESL Ltd., 1984. Beaufort Environmental Monitoring Project 1983 - 1984. Report for Department of Indian Affairs and Northern Development and Environment Canada.
- Greig, L.A., G. Cunningham, R.R. Everitt, and M.L. Jones, 1984. Final report of two workshops to consider the environmental effects and monitoring options for the Darlington NGS, for Ontario Hydro, 140 pp.
- McNamee, P.J., R.R. Everitt, N.C. Sonntag, and T.M. Webb, 1984. Description of the Southeast Alaska Multi-Resource Model, Draft Report for the U.S. Forest Service, 154 pp.
- McNamee, P.J., R.R. Everitt, N.C. Sonntag, and T.M. Webb, 1984. Documentation and Analysis of the Southeast Alaska Multi-Resource Model, Final Report, 103 pp.

NAME: Michael L. Jones

BIRTHDATE: May 29, 1955

CITIZENSHIP: Canadian

POST-SECONDARY EDUCATION:

B.Sc. (Honors), University of British Columbia, 1977.

Doctoral Program: University of British Columbia, 1977
to present. Experimental field study of predation
on juvenile salmonids. Supersisor: Dr. Carl J. Walters.

AWARDS:

Fisheries Association of B.C. Scholarship.

Dean's Honor List - Faculty of Science, University of
British Columbia.

National Research Council - Post-Graduate Scholarship.

National Sciences & Engineering Research Council Scholarship.

WORK EXPERIENCE:

1. July, 1983 to present: Director and minor shareholder, ESSA Ltd.
2. January - April, 1983: Principal lecturer in a graduate course on modeling and Adaptive Environmental Assessment and Management at the Institute for Environmental Studies, University of Toronto.
3. September, 1980 to present: Systems Ecologist, ESSA Ltd.
4. 1978 to June, 1980: Consultant
Member of team facilitating a number of Adaptive Environmental Assessment and Management (AEAM) workshops at the Institute of Animal Resource Ecology, U.B.C. Clients included U.S. Fish and Wildlife Service, LGL Environmental Research Associates, and the Canadian Department of Environment.
5. Research Assistant (U.B.C.) for Dr. P.A. Larkin, May & June, 1975, May - September, 1976; for Dr. W.E. Neill, July & August, 1975; for Dr. C.J. Walters, July - December, 1979.
6. Teaching Assistant (U.B.C.) - Biometrics (Biology 300), September - December, 1977; Introductory Ecology (Biology 321/322), September, 1978 - April, 1979.

REPORTS:

- Staley, M.J., R.R. Everitt, M.L. Jones, N.C. Sonntag, D.A. Birdsall, 1979. Report of a simulation modelling workshop on the environmental effects of Alberta Oil Sands development, 73 pp.
- Birdsall, D.A., R.R. Everitt, M.L. Jones, N.C. Sonntag, M.J. Staley, 1980. An adaptive environmental assessment approach to the effects of the Alberta Oil Sands, 91 pp.
- Jones, M.L., R.R. Everitt, N.C. Sonntag, M.J. Staley, 1980. Report of the Liard Hydroelectric Development Mackenzie Delta Modelling Workshop, 99 pp.
- McNamee, P.J., M.L. Jones, R.R. Everitt, M.J. Staley, D. Tait, 1981. A report of the Integrated Wildlife-Forestry research planning workshop, 139 pp.
- Everitt, R.R., P. Bunnell, A. Carruthers, M.L. Jones, N.C. Sonntag, 1982. Report of a modelling workshop on the Mackenzie Delta.
- Marmorek, D.R., P.J. McNamee, M.L. Jones, T. Webb, M.J. Staley, 1982. Report of an adaptive management workshop on fisheries management in the Algonquin region. Ontario Ministry of Natural Resources, 149 pp.
- Jones, M.L., D.R. Marmorek, M.J. Staley, 1982. Acidic precipitation in eastern Canada: An application of adaptive management to the problem of assessing and predicting impacts on an extensive basis, 144 pp.
- Jones, M.L., D.R. Marmorek, P.J. McNamee, 1982. Approaches and strategies for research in the acidic precipitation research program, Ontario Ministry of Natural Resources, 36 pp.
- McNamee, P.J., N.C. Sonntag, T. Webb, M.L. Jones, 1983. Development of a timber/anadromous fisheries/wildlife simulation model for southeast Alaska: Final report, phase 2, 163 pp.
- McNamee, P.J., P. Bunnell, M.L. Jones, D.R. Marmorek, 1983. Report of a project to identify and evaluate important research questions for the gypsy moth life system, 182 pp.

REPORTS:

- Greig, L.A., G.L. Cunningham, R.R. Everitt, and M.L. Jones, 1984. Report of Two Workshops to Consider the Environmental Effects and Monitoring Options for the Darlington NGS, 110 pp.
- Jones, M.L., L.A. Greig, and D.R. Marmorek, 1983. Methods and results of an analysis of chemical and biological data collected by the National Inventory Survey Program. Department of Fisheries and Oceans, 257 pp.
- Marmorek, D.R., G. Cunningham, L.A. Greig, and M.L. Jones, 1984. Mercury release in hydroelectric reservoirs: report on a workshop held April 9 - 11, 1984. Canadian Electrical Association, 60 pp.
- Marmorek, D.R., G. Cunningham, M.L. Jones, P. Bunnell, 1984. Snowmelt effects related to acidic precipitation: a structured review of existing knowledge and current research activities. Environment Canada and Department of Fisheries and Oceans, 80 pp.

NAME: David R. Marmorek

BIRTHDATE: December 6, 1952

CITIZENSHIP: Canadian

POST-SECONDARY EDUCATION:

B.E.S. (Honors), Man-Environment Studies and Mathematics,
University of Waterloo, 1975.

M.Sc. (Zoology): Department of Zoology, University of
British Columbia, 1979 to 1983. Effects of lake
acidification on zooplankton community structure
and phytoplankton-zooplankton interactions: an
experimental approach.

AWARDS:

Natural Science & Engineering Research Council - Post-
Graduate Scholarship (1979).

U.B.C. Graduate Student Scholarship (1980).

Rene Descartes Mathematics Bursary, University of Waterloo.

Ontario Scholarship, York Mills Collegiate, Toronto.

WORK EXPERIENCE:

1. January, 1981 to present: Systems Ecologist, ESSA
Environmental and Social Systems Analysts Ltd.
2. 1979 to 1980: Part-time Consultant, facilitating
AEAM workshops.
3. 1975 to 1978: Applied Ecologist/Urban Planner with
Proctor and Redfern Ltd.
4. 1974: Researcher with Regional Municipality of
Waterloo Planning Department.
5. 1973: Computer Analyst with Minerals Research Branch,
Ontario Ministry of Natural Resources.
6. 1971 and 1972: Computer Programmer with University
of Waterloo Computing Center.

PUBLICATIONS & REPORTS:

- Hilborn, R., M.L. Jones, D.R. Marmorek, M. Staley, 1979. Results of a modelling workshop on the Carnation Creek Experimental Watershed, 49 pp.
- Sonntag, N.C., R.R. Everitt, D.R. Marmorek, R. Hilborn, 1980. Report of the Bering Sea Ecological Processes Study Modelling Workshop, 96 pp.
- Andrews, A.K., R.A. Ellison, D.B. Hamilton, J.E. Roelle, D.R. Marmorek, 1980. Results of a modelling workshop concerning acid precipitation. Western Energy and Land Use Team, Office of Biological Services, U.S. Fish and Wildlife Service, Fort Collins, Colorado, 102 pp.
- Teleki, G., P. Bunnell, R.R. Everitt, D.R. Marmorek, P.J. McNamee, N.C. Sonntag, M.J. Staley, 1981. Results of two workshops on the development of the Ontario lakeshore capacity study simulation model, 124 pp.
- Marmorek, D.R., P.J. McNamee, M.L. Jones, T. Webb, M.J. Staley, 1982. Report of an adaptive management workshop on fisheries management in the Algonquin region. Ontario Ministry of Natural Resources, 149 pp.
- Sonntag, N.C., D.R. Marmorek, P.J. McNamee, T. Webb, J. Truett, 1982. Saval Ranch research design, integration, and synthesis - workshop report. Report to Bureau of Land Management, 161 pp.
- Marmorek, D.R., 1984. Changes in the temporal behavior and size structure of plankton systems in acid lakes. In: Early Biotic Responses to Advancing Lake Acidification. G.R. Hendrey (ed.), Butterworth Publishers, pp. 23-41.
- Auble, G.T., A.K. Andrews, R.A. Ellison, D.B. Hamilton, R.A. Johnson, D.R. Marmorek, J.E. Roelle, 1982. Results of an adaptive environmental assessment modelling workshop concerning potential impacts of drilling muds and cuttings on the marine environment. Western Energy and Land Use Team, Office of Biological Services, U.S. Fish and Wildlife Service, Fort Collins, Colorado, 64 pp.
- Jones, M.L., D.R. Marmorek, P.J. McNamee, 1982. Approaches and strategies for research in the acidic precipitation research program, Ontario Ministry of Natural Resources, 36 pp.

PUBLICATIONS & REPORTS (cont'd.):

- Jones, M.L., D.R. Marmorek, M.J. Staley, 1982. Acidic precipitation in eastern Canada: an application of adaptive management to the problem of assessing and predicting impacts on an extensive basis, 145 pp.
- Marmorek, D.R., 1983. Effects of lake acidification on zooplankton community structure and phytoplankton-zooplankton interactions: an experimental approach. M.Sc. Thesis, University of British Columbia, 397 pp.
- McNamee, P.J., P. Bunnell, M.L. Jones and D.R. Marmorek, 1983. Report of a project to identify and evaluate important research questions for the gypsy moth life system. U.S. Forest Service, 182 pp.
- Marmorek, D.R., P.J. McNamee and N.C. Sonntag, 1983. Fisheries Planning Overview Evaluation Model (FPOEM): User's Manual. Department of Fisheries and Oceans, 78 pp.
- Bunnell, P., P.J. McNamee and D.R. Marmorek, 1983. The assessment of wildlife impacts from energy development in Northwest Colorado: final report of a series of modelling workshops, 131 pp.
- ESSA Ltd., LGL Ltd., ESL Ltd., 1983. Beaufort Environmental Monitoring Project - Interim Report for Dept. of Indian Affairs and Northern Development and Environment Canada, 226 pp.
- Jones, M.L., L.A. Greig, and D.R. Marmorek, 1983. Methods and results of an analysis of chemical and biological data collected by the National Inventory Survey Program. Department of Fisheries and Oceans, 257 pp.
- Marmorek, D.R., P.J. McNamee, and T. Webb, 1984. Report of a modelling workshop on ecological interactions in the riparian zone. U.S. Bureau of Land Management, 69 pp.
- Marmorek, D.R., G. Cunningham, L.A. Greig, and M.L. Jones, 1984. Mercury release in hydroelectric reservoirs: report on a workshop held April 9 - 11, 1984. Canadian Electrical Association, 60 pp.
- Marmorek, D., P. McNamee, T. Webb, L. Greig, N. Sonntag, 1984. Ecological interactions in the riparian zone: a systems analysis, simulation model and research review for the Saval Ranch Research and Evaluation Project. U.S. Bureau of Land Management, 138 pp.

PUBLICATIONS & REPORTS (cont'd.):

Marmorek, D.R., G. Cunningham, M.L. Jones, P. Bunnell, 1984.
Snowmelt effects related to acidic precipitation: a
structured review of existing knowledge and current
research activities. Environment Canada and Department
of Fisheries and Oceans, 80 pp.

Marmorek, D., P. McNamee, N. Sonntag, T. Webb, 1984.
Documentation of three simulation models developed for
the Saval Ranch Research and Evaluation Project. U.S.
Bureau of Land Management.

PREVIOUS PUBLICATIONS & REPORTS:

- Marmorek, D.R., 1979. The importance of algae to crustacean zooplankton in acidifying lakes. M.Sc. thesis proposal 35 pp.
- Butler, I., R. Walker, D.R. Marmorek, S. Dutton, R. Evans, A. Brass, 1978. Sault Ste. Marie Sewerage Study. Proctor and Redfern Ltd., 110 pp.
- Marmorek, D.R., 1978. ADAMS: Aquatic Data Analysis and Management System. Proctor and Redfern Ltd., 200 pp.
- Biback, D., R. Evans, D.R. Marmorek, 1977. Byron Woods Environmental Appraisal. Proctor and Redfern Ltd., 81 pp.
- Holmes, A., D.R. Marmorek, S. Hebel, 1977. Town of Bondhead Development Feasibility Study. Proctor and Redfern Ltd., 60 pp.
- Marmorek, D.R., 1977. Town of Leamington Housing Policy Analysis. Proctor and Redfern Ltd., 50 pp.
- Marmorek, D.R., P. Green, A. Holmes, M. Schlaepfer, 1976. Rehabilitation Feasibility Study: Finding New Uses for Upper Floors of Downtown Commercial Buildings. Proctor and Redfern Ltd., 47 pp.
- Marmorek, D.R., P. Green, D. Jones, 1976. Town of Midland: Economic and Financial Analysis for the Proposed Heritage Drive Annexation Area. Proctor and Redfern Ltd., 60 pp.
- Marmorek, D.R., P. Green, 1975. Town of Hawkesbury Municipal Housing Policy Statement. Proctor and Redfern Ltd., 83 pp.

NAME: Gina L. Cunningham

BIRTHDATE: September 12, 1955

CITIZENSHIP: Canadian

POST-SECONDARY EDUCATION:

B.Sc. (Honors), Fisheries and Wildlife Major, University of Guelph, 1977.

M.Sc. Department of Zoology, University of Toronto, 1983.

WORK EXPERIENCE:

1. November 1983 to present: Systems Ecologist, ESSA Ltd.
2. 1981 to 1982: Teaching Assistant, University of Toronto.
3. 1979 to 1981: Contract Biologist, Great Lakes Fishery Commission.
4. 1979 to 1981: Contract Biologist, Ontario Ministry of Natural Resources.
5. 1977 to 1979: Technician, Ontario Ministry of Natural Resources.
6. 1977: Technician, University of Guelph.

REPORTS:

Cunningham, G., 1979. An aerial survey of the recreational fishery of Lake Huron. MS: 17 pp.

Cunningham, G., 1981. An annotated bibliography of shoreline development effects on the littoral zone. Ontario Ministry of Natural Resources. MS: 131 pp.

Cunningham, G., 1981. The use of plexiglass traps to study the distribution and nesting activity of small fish in Four Mile Lake, Ontario. Ontario Ministry of Natural Resources. MS: 8 pp.

Cunningham, G., 1981. An annotated bibliography on the stock concept in fisheries. Great Lakes Commission: 240 pp.

REPORTS:

- Harker, J. and G. Cunningham, 1981. Alternative methods of sampling fish populations. Ontario Ministry of Natural Resources. MS: 8 pp.
- Cunningham, G., 1983. The effects of lowered pH on the weight and chemical composition of overwintering young-of-the-year smallmouth bass. M.Sc. Thesis, University of Toronto.
- Greig, L.A., G.L. Cunningham, R.R. Everitt, and M.L. Jones, 1984. Report of Two Workshops to Consider the Environmental Effects and Monitoring Options for the Darlington NGS, 110 pp.
- Cunningham, G.L., 1984. A Manual for the Ontario Ministry of Natural Resources Acid Rain Simulation Model, 35 pp.
- Marmorek, D.R., G. Cunningham, L.A. Greig, and M.L. Jones, 1984. Mercury release in hydroelectric reservoirs; report on a workshop held April 9 - 11, 1984. Canadian Electrical Association, 60 pp.
- Marmorek, D.R., G. Cunningham, M.L. Jones, P. Bunnell, 1984. Snowmelt effects related to acidic precipitation: a structured review of existing knowledge and current research activities. Environment Canada and Department of Fisheries and Oceans, 80 pp.