

Detecting and Understanding Marine-Terrestrial Linkages in a Developing Watershed: Nutrient Cycling in the Kenai River Watershed

Project Number: 02612

Restoration Category: Research

Proposer: William J. Hauser
Alaska Department of Fish and Game

Lead Trustee Agency: ADF&G

Cooperating Agencies:

Alaska SeaLife Center: no

Duration: October 1, 2001 to September 30, 2002.

Cost FY 02: \$44.6

Geographic Area: Kenai River watershed

Injured Resource/Service: sockeye salmon, Commercial fishing, Subsistence, Recreation

ABSTRACT:

This proposal will provide matching funding for a coordinator to serve a multidisciplinary team of agency-supported scientists that is designing a study of marine and terrestrial nutrient cycling in a watershed that was impacted by the *Exxon Valdez* Oil Spill (EVOS). The coordinator is a planner/writer who conducts public meetings, performs a literature review and develops, in cooperation with the team, a research plan to identify and measure nutrient sources, cycling, and pathways within the Kenai River watershed.

The Kenai River watershed provides a unique opportunity for research on a highly productive system that is comparatively small, largely accessible, and still reasonably undisturbed. The EVOS curtailed commercial fishing in 1989, causing changes in productivities of sockeye salmon and other species, in addition to allowing a massive input of marine nutrients born by the unharvested salmon. As a world-renowned fishing destination, the watershed is also at some risk from anthropogenic activities including habitat degradation, increased utilization and invasive species. Other studies concerning the contribution of marine nutrients to the ecosystem have examined watersheds of the Pacific Northwest that are now at lower than historic levels of salmon escapement. They suggest that there may be cascading impacts when marine derived nutrients normally supplied by salmon carcasses are diverted from an ecosystem. Terrestrial and aquatic insects and riparian vegetation also depend on nutrients derived from salmon. When nutrients normally supplied by salmon are withdrawn, productivity of the entire watershed is expected to be diminished.

INTRODUCTION

The Kenai River watershed is a rich, diverse ecosystem supporting a variety of fisheries and wildlife resources, which are important to the economy of the state and particularly the communities of the Kenai Peninsula. Nutrient pathways that sustain this rich ecosystem are complex and do not fit classic “River Continuum” models (Vannote et al. 1980). Nutrients such as nitrates, phosphates and reduced iron enter the watershed from a variety of marine, terrestrial and atmospheric sources. From the top of the watershed, inorganic materials enter the system from glacial meltwater (Koenings et al. 1986). Riparian habitats introduce organic nutrients, which are augmented with in river production of algal growth. The large lakes in the system (Kenai and Skilak Lakes) function as nutrient reservoirs from these sources, further modifying nutrient composition. Lower in the drainage, slow moving waters derived from wetland bogs bring in organic materials, offering a diversity to the upper glacial lake system. The hydrology of the system provides only one dimension of the nutrient pathways. Aquatic plants and microorganisms retain and process nutrients within the system. Resident and anadromous fish species in the ecosystem transport and redistribute nutrients. Nearly a million sockeye salmon enter the system annually to spawn and die, transporting marine derived nutrients up into the lakes and high reaches of the river system. Coho and chinook salmon transport marine nutrients in to the highest tributaries on their terminal spawning migrations. Pink salmon, smelt, lampreys are among other important anadromous species that contribute to additional marine nutrient loading and nutrient pathways.

The Kenai River watershed provides a unique opportunity for research on a highly productive system that is comparatively small, largely accessible and still reasonably undisturbed. However, it is also at some risk from anthropogenic activities including habitat degradation, increased utilization and invasive species. Cederholm et al. (2000) suggested that, in the Pacific Northwest, there are cascading impacts when marine derived nutrients normally supplied by salmon carcasses are diverted from an ecosystem. A total of 137 species of vertebrates depended on salmon for nutrients. Terrestrial and aquatic insects and riparian vegetation also depend on marine nutrients derived from salmon (Piorkowski 1995, Kline et al. 1993, Bilby et al. 1996, Wipfli et al. 1998, 1999). When nutrients normally supplied by salmon are withdrawn, productivity of the entire watershed may decline (Hyatt and Stockner 1985, Stockner 1987, Koenings and Burkett 1987, Mathisen 1972, Schmidt et al. 1998). However, this decline in productivity may be confounded with other ecosystem effects such as overfishing (Pauly et al. 1998), fisheries interceptions or marine climatic effects (Beamish and Bouillon 1993, Francis and Hare 1994, Mantua et al. 1997, Hare et al. 1999, Finney et al. 2000). However, there is a large body of experimental evidence that suggesting that the impact of nutrients from fertilization (or fish carcasses) is highly dependent on the density of fry and food web structure (Mazumder et al. 1988, Leibold 1992, Sarnelle 1992, Power 1992, Mazumder et al. 1990, Mazumder and Lean 1994, Mazumder and Edmundson 2001)

In the Kenai River, escapements of most chinook and sockeye salmon are heavily regulated and maintained at optimal levels above the Maximum Sustained Yield (MSY) (Fox et al. 2000) to maintain “high sustained yields” (Tarbox et al. 1999). Over the past two decades, studies of

Alaskan lake and riverine physics (Koenings and Edmundson 1991, LaPerriere and Edmundson 2000, Edmundson and Mazumder 2001), water chemistry and nutrients (Edmundson and Koenings 1986, Litchfield and Kyle 1991, Edmundson and Carlson 1998), plankton (Edmundson and Koenings 1986, Koenings et al. 1990, Edmundson and Carlson 1998), and trophic interactions relative to salmon production (Koenings et al. 1986, Koenings and Burkett 1987, Kyle et al. 1988, Kyle 1994ab, Kyle et al. 1997, Edmundson et al. 1997, Schmidt et al. 1998, Edmundson and Mazumder 2001) have been ongoing by Alaska Department of Fish and Game. Evidence of broodyear interaction and density dependence has been observed in Skilak Lake (Schmidt et al. 1995) suggesting that consecutive years of high escapements may depress production of sockeye salmon. Kyle et al. (1998) showed that fry recruitment from consecutive large escapements overgrazed the forage base in Frazer Lake (Alaska) and led to decreased survival of sockeye juveniles in subsequent generations. A brood-year interaction model for Kenai River sockeye salmon explained about 70% of the variation in adult return-per-spawner (Carlson et al. 1998).

NEED FOR THE PROJECT

A. Statement of the Problem

Increasing human use throughout the Kenai River watershed holds the potential to shift the balance of this rich and diverse ecosystem. The fisheries resources of the watershed contribute to commercial, sport and personal use fisheries that are the vital to the economy of this area. These fisheries are and need to continue to be managed in a responsible and sustainable manner. Increasing land use and the use of the waterways, the risk of pollutants and loss of habitat all pose future threats to this system. The importance of marine nutrient relationships and implications on an ecosystem scale has been suggested (Cederholm et al. 2000, Mathisen 1972 Larkin and Slaney 1997, Gresh, et al. 2000). The Alaska Sustainable Fisheries Policy mandates that wild stocks and habitats should be maintained at levels of productivity to assure sustained yields (Alaska Administrative Code, Title 5, Chapter 39.222), but not all contributions to the productivity of Alaskan watersheds are fully understood.

A small group of individuals representing agencies and organizations with interest in the Kenai River watershed met to discuss these issues on March 21, 2001. Attendees included: ADF&G Sport Fish, Habitat and Restoration, and Commercial Fish Divisions, EPA, EVOS TC, Prince William Sound Science Center, The Nature Conservancy, Kenai Watershed Forum, Kenai River Sport Fishing Association, Kenai Peninsula Community College, and the Kenai Peninsula Borough. The group developed the following problem statement:

“We need to understand food-web dynamics in the watershed and the role of marine derived nutrients in the ecosystem so we can develop better information for managing harvest, land use planning, watershed development, and resource use.”

This group lacks the resources to independently start such a research initiative, but proposed to facilitate drafting of a research plan that might then be used to seek large scale funding for a multi-year, multi-agency ecosystem research initiative. The study of nutrients from marine and terrestrial sources will be the primary focus, but it is important to continue to recognize that

other factors affect productivity of the watershed as well.

The funding requested in this proposal would provide matching funds to hire a coordinator (planner/writer) to facilitate the planning process, complete a literature review, and to draft and develop the research plan and seek funding sources.

B. Rationale/Link to Restoration

Knowledge gained through work of this research initiative program will add to the understanding of factors that may limit recovery of injured resources and services and marine and terrestrial ecosystem linkages. In addition, it will create a model with subcomponents that will serve as models for many other drainages in the Gulf of Alaska.

After the *Exxon Valdez* Oil Spill, there was evidence of overescapement of sockeye salmon into the Kenai River (Schmidt, et al. 1995, Schmidt, et al. 1996). Research associated with this proposal will help to understand ecosystem effects of marine nutrients brought into the Kenai River from sockeye and other salmon escapements.

This project is also related to the Gulf Ecosystem Monitoring (GEM) program. The mission of the GEM program is "to sustain a healthy and biologically diverse marine ecosystem in the northern GOA and the human use of the marine resources in that ecosystem through greater understanding of how its productivity is influenced by natural changes and human activities." The goal of this project is to better understand the dynamics of nutrients in the Kenai River watershed ecosystem so that better land use and resource management decisions can be made in the future. Salmon provide a direct linkage between the Kenai River watershed and the GOA.

C. Location

Kenai River Watershed. The Kenai River Watershed provides a unique opportunity to provide insight into the recovery of salmon in rivers all along the west coast of North America. There are two primary reasons for this. The first is that in one system, the Kenai River Watershed, researchers can investigate nutrient dynamics in virtually all the settings that occur separately in other west coast systems. Glacial inputs, clear headwater streams, large and small lake settings, wetland derived brown water systems, a high order stream and large inputs of marine derived nutrients all occur in this one watershed. Secondly, and perhaps most important, the Kenai River system is relatively intact. Watershed processes are occurring relatively undisturbed and salmon runs are similar to what they have been over the ages. Yet most of the system is road accessible. Research can be conducted in a setting that reflects the state that models the recovery goals of other west coast rivers.

COMMUNITY INVOLVEMENT

Agencies and community organization and groups would participate in the development of the

research plan through open public meetings.

PROJECT DESIGN

A. Objectives

Specific project objective is:

- Develop a plan for a multi-agency, multi-year study of the nutrient pathways in the Kenai River watershed.

B. Methods

Development of the plan will be guided by a steering committee composed of involved agencies, user groups and organizations. Facilitated planning meetings of a scientific technical team would develop and refine the elements of the plan. The literature review will consolidate and provide annotated summaries of published reports. Plan drafts would be presented to the public for periodic public review and comment to gain broad public support and acceptance.

C. Cooperating Agencies, Contracts and Other Agency Assistance

The following is a list of agencies that would be invited to participate:

Alaska Department of Fish and Game, Habitat and Restoration Division, Sport Fish Division, Commercial Fisheries Management Division, and Central Region Limnology Laboratory, Alaska Department of Environmental Conservation, US Environmental Protection Agency, US Forest Service, Alaska Department of Natural Resources, US Geological Survey, US Fish and Wildlife Service, and Kenai Peninsula Borough

Other organizations will include:

Kenai Watershed Forum, Kenai River Sport Fishing Association, The Nature Conservancy, Cook Inlet Aquaculture Association, Kenai Peninsula Fisherman's Association, Upper Cook Inlet Fisherman's Association, Gulf Ecosystem Monitoring Program (GEM), and North Pacific Research Board.

Other Matching Financial Contributions:

- | | |
|--------------------------------------|----------|
| - The Nature Conservancy: | \$2,500 |
| - Kenai River Sport Fish Association | \$15,000 |
| - Cook Inlet Aquaculture Association | \$500 |

SCHEDULE

A. Measurable project tasks for FY01 (October 1, 2001 - September 30, 2002)

- Organize steering committee
- Hold organizational and planning meetings
- Hold public involvement meetings
- Complete literature review
- Develop Draft Research Plan
- Finalize Research Plan

B. Project milestones and endpoints

September, 2001 - Form agency and technical science teams, Initiate planning meetings, start public and team meetings

Feb, 2002 – Draft Plan distributed for public comment and review

April, 2002 – Finalize Plan

May – Sept, 2002 – Investigate funding sources

C. Completion Date

30 September, 2002

PUBLICATIONS AND REPORTS

The Final Research Plan will be submitted as a Draft Final Report.

PROFESSIONAL CONFERENCES

None.

NORMAL AGENCY MANAGEMENT

This proposed project is beyond the scope of normal agency management responsibilities. Never the less, information gained through a study of this nature would greatly enhance land use planning and resource management-related decisions.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Several Trustee Council agencies will be cooperators with this project.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

NA

PROPOSED PRINCIPAL INVESTIGATOR

Bill Hauser will serve as the PI of project 02612.

PRINCIPAL INVESTIGATORS

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Other Key Personnel

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LITERATURE CITED

Alaska Administrative Code, Title 5, Chapter 39.222. 2000. Sustainable Salmon Fisheries Policy for the State of Alaska. Alaska Department of Fish and Game and the Alaska Board of Fisheries. 13p.

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Bilby, R. E., B. R. Fransen, and P. A. Bisson. 1996. Incorporation of nitrogen and carbon from spawning coho salmon into the trophic system of small streams: evidence from stable isotopes. *Canadian Journal of Fisheries and Aquatic Sciences* 53: 164-173.

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Edmundson, J. A. and A. Mazumder. 2001. A regional and hierarchical perspective of thermal regimes in subarctic, Alaskan lakes. *Freshwater Biology*. (In press).

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Kline Jr., T. C., J. J. Goering, O. A. Mathisen, P. H. Poe, P. L. Parker, and R. S. Scalan. 1993. Recycling of elements transported upstream by runs of Pacific salmon: II. ^{15}N and ^{13}C evidence in the Kvichak River watershed, Bristol Bay, Southwestern Alaska. *Canadian Journal of Fisheries and Aquatic Sciences* 50: 2350-2365.

Koenings, J. P. and J. A. Edmundson. 1991. Secchi disk and photometer estimates of light regimes in Alaskan lakes: effects of yellow color and turbidity. *Limnol. Oceanogr.* 36:91-105.

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Koenings, J. and R. Burkett. 1987. Population Characteristics of Sockeye Salmon (*Oncorhynchus nerka*) smolts relative to Temperature Regimes, euphotic Volume, Fry Density, and Forage Base within Alaskan Lakes. In *Sockeye salmon (Oncorhynchus nerka) population biology and future management*. Edited by H. D. Smith, L. Margolis, and C. C. Wood. *Canadian Special Publications in Fisheries and Aquatic Science*. 96. pp. 216 - 234.

Kyle, G. B. 1994a. Nutrient treatment of three coastal Alaskan lakes: trophic level responses and sockeye salmon production trends. Alaska Department of Fish and Game. Alaska Fishery Research Bulletin 1(2):153-167

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Education:

- Bachelor of Science in Zoology, 1965
University of Wisconsin, Madison
- Master of Science in Fish and Wildlife Management, 1968
Montana State University, Bozeman, Montana
Thesis: "Life History of the Mountain Sucker, Catostomus platyrhynchus,
in Montana"
- Doctor of Philosophy in Zoology, 1973
University of Maine, Orono, Maine
Dissertation: "Larval Fish Ecology of the Sheepscot River-
Montsweag Bay Estuary, Maine"

Professional Societies:

- American Fisheries Society
- President of the Alaska Chapter of the American Fisheries Society, 1992-1993
- American Association for the Advancement of Science
- American Institute of Fishery Research Biologists

Honorary Society: Sigma Xi

Professional Certification: Fisheries Scientist, American Fishery Soc., 1975

Present Position: Fishery Biologist IV. Alaska Department of Fish and Game. Habitat and Restoration Division. 1994 to present.

Project Manager for Exxon Valdez Oil Spill (EVOS) Restoration projects which entail 30 - 40 projects annually with a combined value of \$2 to 4million. Communicate among the State and Federal Agencies, the Exxon Valdez Trustee Council and the Principal Investigators from state, federal, university and private organizations.

Responsible for:

- Represent ADF&G in multi-agency meetings for matters about the Exxon Valdez oil spill fisheries restoration program; e.g., with the EVOS Executive Director and with the EVOS Chief Scientist
- Administer Reimbursable Services Agreements within the State government, Requests for Alternate Procurement, contracts with individuals, organizations and universities and budgets for EVOS projects
- Administer, review, amend and defend project proposals, budgets and contracts that range from \$50K to \$400K to \$1M (+)

- Lead ADF&G scientist to coordinate all reviews and compliance for ADF&G EVOS projects for National Environmental Protection Act (NEPA); represent ADF&G with federal agencies for NEPA review and compliance for fish habitat impact assessments
- Provide field data collection support and assistance when necessary
- Assist with design, organization, and implementation of technical workshop to review EVOS projects for fish habitat and ecological assessments
- Project Manager to monitor and assist with the multi-agency, multi-disciplinary ecosystem-based Prince William Sound Ecosystem Assessment (SEA) fisheries oceanographic Research Program
- Provide technical assistance for subsistence enhancement projects in Nanwalek, Port Graham and Perryville
- Provide technical assistance to Principal Investigators for proposals or projects that include any actions or impacts that may alter or affect fish habitat
- Other Special Assignments have included:
 - 1) Research project Team Leader for to assess streambank fish habitat, effectiveness of streambank restoration projects and fish use of streambank structures. Primary author of final report and Annotated Bibliography of salmonid habitat.
 - 2) Literature Review and author of on-bottom clam mariculture practices in Kachemak Bay and Annotated bibliography of clam ecology.
 - 3) Primary author of "Landowners Guide to Fish Habitat Conservation and Restoration Practices"

Previous Positions: Fishery Biologist IV. Alaska Department of Fish and Game. Commercial Fisheries Division and Division of Fisheries Restoration, Enhancement and Development. 1980 – 1994.

Responsible for:

- Supervise: Area Biologists , Stream Rehabilitation Biologist, Data Coordinator, Biometrician
- Participate in Regional Planning Teams that include members from ADF&G, communities, fishermen's groups, and federal agencies
- Review Fish Transport Permits to assure compliance with State of Alaska policies
- Design and implement fisheries restoration and enhancement projects; assist, coordinate and direct Area Biologists with restoration and enhancement projects
- Establish and coordinate standards of timing, location, priorities and planning assumptions for fisheries rehabilitation and enhancement projects
- Coordinate and communicate fisheries development planning among state, private, native and federal agencies
- Organize, Supervise and review projects to evaluate fisheries enhancement and restoration program in Prince William Sound, Cook Inlet, Kodiak and Arctic-Yukon-Kuskokwim
- Special assignments included:
 - a. Toklat River chum salmon spawning habitat evaluation project
 - b. Staff writer for Exxon Valdez oil spill Environmental Impact Statement (EIS)
 - c. Organize, coordinate and operate a series of five annual inter-agency, multi-disciplinary Fish Habitat Improvement Workshops. Topics included: restoration of logged areas, restoration of

placer mining areas, fish habitat restoration for urban impacts, coho salmon rearing habitat restoration and enhancement, chum salmon habitat restoration and development

d. Co-organize, coordinate and host the “Symposium on Aquatic Habitat Restoration in Northern Ecosystems”; Proceedings are in preparation.

e. Project Biologist for the multi-year Campbell Creek Fish Habitat Restoration Project; including: permitting, design, review, pre-operational evaluation and assessment, operational planning, installation, monitoring and reporting.

Recent Publications:

Hauser, W. J., M. J. Fink, D. W. Hughes, P. A. Hansen and R. A. Clark. 2000. Kenai River Rehabilitation and Protection Program: Assessment of Streambank Habitat Treatments. Alaska Department of Fish and Game. Habitat and Restoration Division Technical Report No. 01-1.

Hauser, W. J. 2000. Annotated bibliography of juvenile salmon rearing habitat: selected references. Alaska Department of Fish and Game. Habitat and Restoration Division.

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Hauser, W. J. 2000. Ecological Considerations for On-Bottom Aquaculture of Littleneck Clams (*Protothaca staminea*) in Kachemak Bay, Alaska: A Literature Review – Bibliography with Annotations. Alaska Department of Fish and Game. Habitat and Restoration Division.

Hauser, W. J. and E. W. Weiss. 2001. Landowners Guide to Fish Habitat Conservation and Restoration Practices. Alaska Department of Fish and Game. Habitat and Restoration Division. Technical Report No. 01-3.

Other Publications:

Author (as a volunteer) a monthly column entitled “FISH TALK” in Alaska Fly Fisher newsletter to discuss fish habitat requirements and fish biology in a “lay language”. Ten years. Articles were also published in Federation of Fly Fishers National magazine.

Other Related Skills:

- Meeting Organizer – Lead or assist role to organize and plan meetings for as many as 1000 participants (e.g., Local Arrangements Chair for joint meeting of the Wakefield Symposium, Western Divisions of the American Fisheries Society, and Alaska Chapter of the American Fisheries Society; Habitat Restoration Workshops and Symposium; Annual Meeting of the Alaska Chapter of the American Fisheries Society)
- Organize and lead interdivisional and multi-agency work groups (e.g., Kenai River Habitat research team, Habitat Restoration Workshops)
- Microsoft Word, Excel, and PowerPoint

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EDUCATION 2000 – Present *University of Victoria* *Victoria, BC Canada*

- Ph.D. Candidate (Biology)
- Sockeye salmon ecology

1995 – 1997 *University of Alaska Fairbanks* *Fairbanks, Alaska USA*

- Master of Science (Fisheries)
- Thesis: Growth patterns of juvenile sockeye salmon in different thermal environments of Alaskan lakes
- Grade Point Average of 4/4

1973 – 1977 *University of Vermont* Burlington, Vermont USA

- Bachelor of Science (Biology)
- Emphasis on invertebrate zoology

EXPERIENCE 2000 - Present *Alaska Department of Fish and Game* *Soldotna, Alaska* *Fishery Research Biologist III*

- Examination of mechanisms for sockeye salmon cycles
- Demonstration of trophic linkages in freshwater ecosystems
- Quantifying lake typology influences on productivity
- Integration of limnological data with fisheries stock and recruitment data
- Director of Central Region Limnology Program

1988 - 1999 Alaska Department of Fish and Game Soldotna, Alaska

Project Limnologist

- Manager of statewide limnology laboratory
- Evaluation of statewide nutrient enrichment and salmon stocking programs
- Investigations of sockeye salmon over-escapement effects resulting from the *Exxon Valdez* oil spill

1984 - 1988 Alaska Department of Fish and Game Soldotna,
Alaska

- 1989 Public Service Award

Fishery Research Biologist II

- Manager of statewide limnology laboratory
- Studies of glacial silt effects on lake productivity
- Phosphorus fractionation studies
- 1985 Technical Achievement Award

COLLABORATIONS

Dr. Jacqueline D. LaPerriere (Deceased)

U. S. Geological Survey, Biological Resources Division
Alaska Cooperative Fish and Wildlife Research Unit
University of Alaska Fairbanks
Fairbanks, Alaska.

- Assessment of factors influencing thermal regimes in subarctic, Alaskan lakes; quantifying the effect of habitat temperature on the growth of juvenile sockeye salmon in Alaskan lakes; limnological investigations of lakes of two river systems of Katmai National Park and Preserve, Alaska; Becharof Lake ecosystem studies.

Dr. Daniel E. Schindler

Department of Zoology
University of Washington
Seattle, Washington

- Retrospective analyses of limnological and fisheries data relative to cycles of abundance of Kvichak River sockeye salmon.

Dr. Bruce P. Finney

Institute of Marine Science
University of Alaska Fairbanks
Fairbanks, Alaska

- Reconstruction of salmon escapement in Lake Iliamna using measurements of δ^{15} nitrogen in lake sediments.

Dr. Asit Mazumder

Department of Biology
University of Victoria
British Columbia, Canada

- Nutrient-foodweb dynamics, structure and function of salmon nursery lakes and their importance to juvenile sockeye production.

Dr. Dana C. Schmidt

R&L Consultants
Castlegar, BC Canada

- Lake fertilization
- Effects of sockeye salmon overescapement

PROFESSIONAL MEMBERSHIPS

- American Fisheries Society
- American Society of Limnology and Oceanography
- North American Lake Management Society

AWARDS

1985

- Alaska Department of Fish and Game, Fisheries Rehabilitation, Enhancement and Development Division, Technical Achievement Award – Limnology Laboratory

1989

- Alaska Department of Fish and Game, Fisheries Rehabilitation, Enhancement and Development Division, Public Service Award in response to the *Exxon Valdez* Oil Spill – Limnology Laboratory

2000

- Maritime Awards Society of Canada Fellowship, University of Victoria

PUBLICATIONS

Edmundson, J. A. 1997. Growth patterns of juvenile sockeye salmon in different thermal environments of Alaskan lakes. Master's thesis. University of Alaska Fairbanks.

Edmundson, J. A. and S. R. Carlson. 1998. Lake typology influences on the phosphorus-chlorophyll relationship in subarctic, Alaskan lakes. *Lake and Reservoir Management* 14:440-450.

Edmundson, J. A. and J. P. Koenings. 1985. The effects of glacial silt on primary production, through altered light regimes, and phosphorus levels, in Alaska lakes. pages 3-19, *in* L.P. Dwight [chairman] Proceedings, Resolving Alaska's Water Resources Conflicts. Report IWR-108. *University of Alaska-Fairbanks, USA.*

Edmundson, J. A. and J. P. Koenings. 1986. The effects of glacial silt on primary production, through altered light regimes, and phosphorus levels, in Alaska lakes. Ak. Dept. Fish and Game, FRED Division Report Series 68:29p.

Edmundson, J. A. and A. Mazumder. 2001. A regional and hierarchical perspective of thermal

- regimes in subarctic, Alaskan lakes. *Freshwater Biology*. (In press).
- Edmundson, J. A. and A. Mazumder. 2001. Linking growth of juvenile sockeye salmon to temperature in Alaskan lakes. *Transactions of the American Fisheries Society*. (In press).
- Edmundson, J. A. and G. L. Todd. 2000. Limnological perspectives on stock and recruitment for Egegik and Ugashik River sockeye salmon. Ak. Dept. Fish and Game, Regional Information Report No. 2A00-33:90p.
- Edmundson, J. A., M. S. Dickson, and W. A. Bucher. 2000. Limnological and fishery investigations concerning sockeye salmon production in Delight and Desire Lakes, *Exxon Valdez* Oil Spill restoration Project Final report (Restoration Project 98254), Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Soldotna, Alaska.
- Edmundson, J. A., M. S. Dickson, and W. A. Bucher. 1998. Limnological and fishery investigations concerning sockeye salmon production in Delight and Desire Lakes. Ak. Dept. Fish and Game, Regional Information Report No. 2A98-15:57p.
- Edmundson, J. A., S. G. Honnold, and G. B. Kyle. 1994. Trophic responses to juvenile salmon stocking and nutrient enrichment in barren Little Waterfall Lake. Ak. Dept. Fish and Game, Regional Information Report No. 5J94-13:33p.
- Edmundson, J. A., J. P. Koenings, and T. C. Wilson. 1989. Finger Lake water quality: August 1988: Ak. Dept. Fish and Game, FRED Division Report Series 92:31p.
- Edmundson, J. A., G. B. Kyle, and T. Balland. 1992. Rearing capacity, escapement level, and potential for sockeye salmon (*Oncorhynchus nerka*) enhancement in English Bay lakes. Ak. Dept. Fish and Game, FRED Division Report Series 120:33p.
- Edmundson, J. A., G. B. Kyle, and S. R. Carlson. 1995. Restoration of Coghill Lake sockeye salmon: 1994 annual report on nutrient enrichment. Ak. Dept. Fish and Game. Annual report for project 94295 to *Exxon Valdez* Oil Spill Trustee Council. 45p.
- Edmundson, J. A., G. B. Kyle, and M. Willette. 1992. Limnological and fisheries assessment of Coghill Lake relative to sockeye salmon (*Oncorhynchus nerka*) production and lake fertilization. Ak. Dept. Fish and Game, FRED Division Report Series 118:41p.
- Edmundson, J. A., G. B. Kyle, S. R. Carlson, and P. A. Shields. 1997. Trophic-level responses to nutrient treatment of meromictic and glacially-influenced Coghill Lake. *Alaska Fisheries Research Bulletin* 4(2):136-153.
- Edmundson, J. A., V. P. Litchfield, and D. M. Cialek. 2000. An assessment of trophic status of 25 lakes in the Matanuska-Susitna Borough, Alaska. Ak. Dept. Fish and Game, Regional Information Report No. 2A00-26:41p.

Edmundson, J. A., V. P. Litchfield, G. L. Todd, J. M. Edmundson, and L. Brannian. 2000. Central Region Limnology 2000 annual report of progress. Ak. Dept. Fish. and Game, Regional Information Report No. 2A00-27:25p.

Edmundson, J. A., D. C. Schmidt, S. R. Carlson, and G. B. Kyle. 1999. Alaska lake fertilization program: restoration and enhancement of sockeye salmon. Pages 49-82, in *Proceedings by J. G. Stockner and G. Milbrink [editors] Restoration of Fisheries by Enrichment of Aquatic Ecosystems*. International Workshop, Uppsala University. Uppsala, Sweden.

Edmundson, J. A., L. E. White, S. G. Honnold, and G. B. Kyle. 1994. Assessment of sockeye salmon production in Akalura Lake. Ak. Dept. Fish and Game, Regional Information Report No. 5J94-14:41p.

Edmundson, J. A., T. P. Zadina, and M. H. Haddix. 1991. The development of a natural sockeye salmon run into Virginia Lake, southeast Alaska. Ak. Dept. Fish and Game, FRED Division Report Series 113:25p.

Publications (as co-author)

Honnold, S. G. and **J. A. Edmundson**. 1993. Limnological and fisheries assessment of sockeye salmon (*Oncorhynchus nerka*) Production in the Laura Lake system. Ak. Dept. Fish and Game, FRED Division Report Series 130:55p.

Honnold, S. G., **J. A. Edmundson**, and S. Schrof. 1996. Limnological and fishery assessment of 23 Alaska Peninsula and Aleutian area lakes, 1993-1995: an evaluation of potential sockeye and coho production. Ak. Dept. Fish and Game, Regional Information Report No. 4K96-52:164p.

Koenings, J. P. and **J. A. Edmundson**. 1991. Secchi disk and photometer estimates of light regimes in Alaskan lakes: effects of yellow color and turbidity. *Limnology and Oceanography* 36:91-105.

Koenings, J. P., **J. A. Edmundson**, and D. L. Barto. 1989. Glacial silt – help or hindrance to lake productivity. Ak. Dept. Fish and Game, FRED Division Report Series 93:28p.

Koenings, J. P., R. D. Burkett, G. B. Kyle, **J. A. Edmundson**, and J. M. Edmundson. 1986. Trophic level responses to glacial meltwater intrusion in Alaskan lakes, pages 179-194 in D. L. Kane [ed.], *Proceedings: Cold Regions Hydrology Symposium*. American Water Resources Association. Bethesda, MD.

Koenings, J. P., **J. A. Edmundson**, J. M. Edmundson, and G. B. Kyle. 1987. Limnology field and laboratory manual: methods for assessing aquatic production. Ak. Dept. Fish and Game, FRED Division Report Series 71:212p.

Kyle, G. B., **J. A. Edmundson**, and V. P. Litchfield. 1993. Limnological and fisheries investigations for sockeye salmon (*Oncorhynchus nerka*) enhancement in five Alaskan

- peninsula lakes: 1991-1992 progress report. Ak. Dept. Fish and Game, FRED Division Report Series 126:32p.
- Kyle, G. B., **J. A. Edmundson**, S. R. Carlson, and P. A. Shields. 1996. Restoration of Coghill Lake sockeye salmon: 1995 annual report on nutrient enrichment, *Exxon Valdez Oil Spill Restoration Project Annual Report* (Restoration Project 95259), Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Soldotna.
- Kyle, G. B., B. E. King, L. R. Peltz, and **J. A. Edmundson**. 1994. Susitna drainage sockeye salmon investigations: 1993 annual report on fish and limnological surveys. Ak. Dept. Fish and Game, Regional Information Report 5J94-14:41p.
- Kyle, G. B., J. P. Koenings, and **J. A. Edmundson**. 1997. An overview of Alaska lake-rearing salmon enhancement strategy: nutrient enrichment and juvenile stocking, pages 205-227 *in* A, Milner and M. Oswood [ed.]. *Freshwaters of Alaska – ecological synthesis*. Ecological Studies, Volume 119. *Springer-Verlag*, New York.
- LaPerriere, J. D. and **J. A. Edmundson**. 2000. Limnology of two lake systems of Katmai National Park and Preserve, Alaska: part II. Light penetration and Secchi depth. *Hydrobiologia* 418:209-216.
- Mazumder, A. and **J. A. Edmundson**. 2001. Impacts of fertilization and stocking on trophic interactions and growth of juvenile sockeye salmon in Packers Lake, Alaska. *Ecology* (In revision).
- Mazumder, A., **J. A. Edmundson**, and M. Proulx. 2001. Biodiversity in extreme environments: glacial versus non-glacial lakes. *Limnology and Oceanography* (In revision).
- Schmidt, D. C., K. E. Tarbox, B. M. Barrett, L. K. Brannian, S. R. Carlson, **J. A. Edmundson**, J. M. Edmundson, S. G. Honnold, B. E. King, G. B. Kyle, P. A. Roche, P. Shields, and C. O. Swanton. 1993. Sockeye salmon overescapement, *Exxon Valdez Oil Spill State/Federal Natural Resource Damage Assessment Final Report* (Fish/Shellfish Study Number 27), Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Soldotna, Alaska.
- Simpson, E. M. **J. A. Edmundson**, and K. Tarbox. 1999. Hidden Lake sockeye enhancement project technical review. Ak. Dept. Fish and Game, Regional Information Report No. 2A99-16:22p.
- Spafard, M. A. and **J. A. Edmundson**. 2000. A morphometric atlas of Alaskan lakes: Cook Inlet, Prince William Sound, and Bristol Bay areas. Ak. Dept. Fish and Game, Regional Information Report No. 2A00-23, 13p. + 82 maps.
- White, L. E. and **J. A. Edmundson**. 1993. Potential for sockeye salmon (*Oncorhynchus nerka*) enhancement of Portage Lake, Afognak Island. Ak. Dept. Fish and Game, FRED

Division Report Series 129:33p.

Zadina, T. P., M. H. Haddix, and *J. A. Edmundson*. 1992. Summary of the limnological and fisheries investigations of Big Lake, Ratz Harbor, Prince of Wales Island, Alaska, 1989-1991. Ak. Dept. Fish and Game FRED Division Report Series 124:26p.

PROFESSIONAL SYMPOSIA and TECHNICAL PRESENTATIONS

Edmundson, J. A. and J. P. Koenings. Glacial silt: its form contribution, and significance to the phosphorus cycle in turbid lakes. *Alaska Chapter of the American Fisheries Society Annual Meeting*. Juneau, Ak. November 1985.

Edmundson, J. A. and J. P. Koenings. The effects of glacial silt on primary production, through altered light regimes, and phosphorus levels, in Alaska lakes. *Alaska Section of the American Water Resources Association*. Fairbanks, Ak. November 1985.

Edmundson, J. A. and J. P. Koenings. The importance of temperature to juvenile salmon growth in Alaskan lakes. *Alaska Chapter of the American Fisheries Society Annual Meeting*. Anchorage, Ak. November 1986.

Edmundson, J. A. and J. P. Koenings. Trophic level responses to sockeye fry density and nutrient enrichment in Leisure Lake, Alaska. *Alaska Chapter of the American Fisheries Society Annual Meeting*. Anchorage, Ak. November 1988.

Edmundson, J. A. and J. P. Koenings. Trophic level responses to sockeye fry density and nutrient enrichment in Leisure Lake, Alaska. *Western Region of the American Fisheries Society Annual Meeting*. Anchorage, Ak. September 4-8, 1989.

Edmundson, J. A. and J. P. Koenings. Trophic level responses to sockeye fry density and nutrient enrichment in Leisure Lake, Alaska. *American Society of Limnology and Oceanography Summer Meeting*. Fairbanks, Ak. June 20-23, 1989.

Edmundson, J. A. and J. P. Koenings. Quality assurance within the Alaskan limnology program through statewide standardization of field and laboratory methodologies. 32nd Annual *Rocky Mountain Conference on Analytical Chemistry*. Denver, Co. July 29-August 3, 1990.

Edmundson, J. A. and G. B. Kyle. Zooplankton responses to juvenile sockeye salmon foraging in fertilized lakes of Alaska. Sockeye-Kokanee Workshop *North Pacific International Chapter American Fisheries Society*. Vancouver, B.C. March 15-16, 1993.

Edmundson, J. A. An overview of the Alaska limnology program. *Southwest Interagency Fisheries Meeting*. Dillingham, Ak. February, 1996.

Edmundson, J. A. Factors influencing thermal structure in Alaskan lakes. Annual Research Program Review, Alaska Cooperative Fish and Wildlife Research Unit, *University of Alaska Fairbanks*, Fairbanks, Ak. March 6-7, 1996.

- Edmundson, J. A. Juvenile sockeye growth patterns under different thermal environments in Alaskan lakes. Annual Research Program Review, Alaska Cooperative Fish and Wildlife Research Unit, *University of Alaska Fairbanks*, Fairbanks, Ak. March 5-6, 1997.
- Edmundson, J. A. Before the sea: a limnological approach to sockeye salmon management and development. *Watersheds 97: The Cook Inlet Symposium*. Anchorage, Ak. October 29-31, 1997.
- Edmundson, J. A. Growth patterns of juvenile sockeye salmon in different thermal environments of Alaskan lakes. *Alaska Chapter of the American Fisheries Society Annual Meeting*. Juneau, Ak. November 18-20, 1997.
- Edmundson, J. A., D. Schmidt, S. R. Carlson, and G. B. Kyle. Alaska lake fertilization program: restoration and enhancement of sockeye salmon. 1st International Lake Enrichment Workshop, *Uppsala University-Limnology Institute*, Uppsala, Sweden. March 29-April 01, 1998.
- Edmundson, J. A., G. B. Kyle, S. R. Carlson, and P. A. Shields. Trophic-level responses to nutrient treatment of meromictic and glacially-influenced Coghill Lake. *American Fisheries Society Western Division, Alaska Chapter, and North Pacific International Chapter*. Anchorage, Ak. September 29-October 3, 1998.
- Edmundson, J. A. and S. R. Carlson. Integrating limnological data into sockeye salmon production models. *Alaska Department of Fish and Game, 6th Alaska Salmon Workshop, Ocean-Climate Change and Variability in Fish Recruitment*. Girdwood, Ak. March 10-12, 1999.
- Edmundson, J. A. and A. Mazumder. Linking growth of juvenile sockeye salmon to habitat temperature in Alaskan lakes. 13th Annual Graduate Research Symposium. Department of Biology, *University of Victoria*, Victoria BC, February 23-25, 2001.
-

UNIVERSITY OF VICTORIA

FACULTY CURRICULUM VITAE

Last update: March 8, 2001

NAME MAZUMDER ASIT
Surname Given Names

FACULTY OR SCHOOL Science

DEPARTMENT Biology

1. **DEGREES AND DIPLOMAS**

Degree or Granted Diploma	Field	Institution	Year
B.Sc. 1978	Zoology	University of Chittagong, Bangladesh	
M.Sc.	Limnology	University of Chittagong, Bangladesh	1980
M.Sc.	Limnology	Brock University, Ontario, Canada	1983
Ph.D.	Limnology	University of Waterloo, Ontario, Canada	1989

Title of Thesis or Dissertation

M.Sc. Thesis 1978. Physical, chemical and biological limnology of Lake Kaptai, Bangladesh

M.Sc. Thesis 1983. Factors affecting the spatial and temporal distribution of photosynthetic bacteria in a meromictic lake, Ontario

Ph.D. Dissertation 1989. Impact of nutrients and predation on plankton size-distribution and trophic interactions in experimental enclosures.

2. **POSITIONS HELD PRIOR TO APPOINTMENT AT UNIVERSITY OF VICTORIA**

Academic and other; list inclusive dates, title, and institution. Add sheet if insufficient space..

1997-1998	Visiting Professor	University of Victoria
1995-1999	Associate Professor	Université de Montréal
1995-1998	Director, Station de Biologie	Université de Montréal
1991-1994	Assistant Professor	Université de Montréal
1989	Research Professional Environment Canada.	NWRI, Burlington, Ontario
1980	Lecturer in Zoology	University of Chittagong

3. **MAJOR FIELDS. OF SCHOLARLY OR PROFESSIONAL INTEREST**

- Nutrient-Trophic interactions of lakes, reservoirs and streams
- Ecosystem- and watershed-level ecology of drinking water sources
- Foodweb and nutritional ecology of Pacific and Atlantic salmon
- Factors and processes regulating plant biodiversity
- Application of foodweb and nutritional ecology in aquaculture of tropical invertebrates
- Comparative ecology of temperate, subtropical and tropical ecosystems

- g. Transport and pathways of organic contaminants.
 h. Isotope biogeochemistry of aquatic foodwebs.

4. **MEMBERSHIPS AND OFFICES HELD IN LEARNED AND PROFESSIONAL SOCIETIES**

Include dates of offices.

1997-2000	Secretary	Am. Soc. Limnology & Oceanography
1985- present	Member	American Soc. of Limnology & Oceanography
1983- present	Member	Canadian Society of Limnology
1988- present	Member	Int. Soc. of Great Lakes Research
1996- present	Member	North Am. Lake Management Society
1999-present	Invited Expert to the Board of Directors for Drinking Water in BC	BC Government
2000	Selection Committee Member	Chandler-Misener Award
1999-present	Chair of Meeting Committee	American Soc. of Limnology & Oceanography

5. **SCHOLARSHIPS, FELLOWSHIPS, HONOURS, AND AWARDS** Include dates.

1990	NSERC Postdoctoral Fellowship	Trent University, Ontario
1992	Chandler-Misener Award for the best scientific article in international journals on the Great Lakes.	International Association of Great Lakes Research
1996	Sabbatical Fellowship, Swiss Fed. Government US\$ 63,000 per year; Declined..	EAWAG, Dubendorf, Switzerland
1999	NSERC Industrial Research Chair	University of Victoria

List Research Grants Awarded:

<i>Years</i>	<i>Type of Grants</i>	<i>Amount per year \$.</i>
1991-1994	FCAR Operating.	15,000*
1991-1992	FCAR Equipment.	22,000*
1991-1994	NSERC Research Grant.	30,000*
1992-1995	NSERC Strategic.	49,500*
1992-1993	NSERC Equipment.	59,700*
1992-1995	NSERC MFA.	35,000*
1994-1996	FCAR International.	34,000 [#]
1993-1996	FCAR Ecology Group Research Grant.	87,000 [#]
1992-1995	FCAR Interuniversity Center Grant.	197,000 [#]
1994-1995	NSERC Equipment.	49,571*
1994-1998	NSERC Research Grant.	35,000*
1995-1996	FCAR Group Equipment.	25,000*
1995-1996	NSERC-CSPG Atlantic Salmon Center.	59,000 [#]
1995-1996	Several Industrial & Govt. sources to establish the Atlantic Salmon Research Center.	750,000 [#]
1996-1998	NSERC-CSPG Atlantic Salmon Center.	275,000 [#]
1995-1997	NSERC Equipment.	67,000 [#]
1996-1997	NSERC Equipment.	50,000 [#]
1996-1997	NSERC Equipment.	9,000*
1996-1999	FCAR Ecology Group Research Grant.	82,000 [#]
1996-1999	FCAR Inter-University Center Grant.	207,000 [#]
1997-2001	NSERC Strategic.	167,000 [#]
1998-2002	NSERC Research Grant.	40,450*
1999-2003	NSERC Industrial Research Chair.	254,500**

1999-2003	Industrial contributions to NSERC-IRC	272,500**
2001-2006	FRBC Research Grant	256,500*
2001-2006	NSERC Hg Research Network Grant.	145,000*
2001-2006	NCE Reseau-Waternet applied as the theme leader.	300,000*

* Principal Investigator in individual or Group Grants

Co-Principal Investigator in Group Grants

** Institutional Principal Investigator

6. *APPOINTMENTS AT UNIVERSITY OF VICTORIA*

a. Academic:

Inclusive Years	Rank	Department
2000-present	NSERC-IRC/Professor	Biology
1999-2000	NSERC Senior Chair/Associate Professor	Biology
1999-present Montreal.	Adjunct Professor	Sc. Biol U. de

7. *SCHOLARLY AND PROFESSIONAL ACHIEVEMENTS*

a. *Articles Published in Refereed Journals*

- AM-1 Mazumder, A., D.J. McQueen, W.D. Taylor, and D.R.S. Lean, 1988. Effects of fertilization and planktivorous fish predation on size-distribution of particulate phosphorus and assimilated phosphate: *Limnology and Oceanography* 33:430-437.
- AM-2 Mazumder, A., W.D. Taylor, D.J. McQueen, and D.R.S. Lean, 1989. Effects of fertilization and planktivorous fish predation on epilimnetic total phosphorus and phosphorus sedimentation: large enclosure experiments. *Can. J. Fish. Aquat. Sci.* 46: 1735-1742.
- AM-3 Mazumder, A., W.D. Taylor, D.J. McQueen, and D. R. Lean, 1989. Effects of nutrients and grazers on periphyton phosphorus. *Freshwater Biology* 22: 405-415.
- AM-4 Mazumder, A., and M.D. Dickman, 1989. Factors affecting temporal and spatial distribution of phototrophic sulfur bacteria. *Archiv für Hydrobiologie* 116: 209-226
- AM-5 Mazumder, A., 1990. Ripple Effects: How lake dwellers control the temperature and clarity of their habitat. *The Sciences* The New York Academy of Sciences. 306.: 38-42.
- AM-6 Mazumder, A., W.D. Taylor, and D.J. McQueen, and D.R.S. Lean, 1990. Effects of fish and plankton on lake temperature and mixing depth. *Science* 247: 312-315.
- AM-7 Mazumder, A., W.D. Taylor, D.J. McQueen, D.R.S. Lean and N.R. Lafontaine, 1990. A comparison of lakes and lake enclosures with contrasting abundance of planktivorous fish. *J. Plankton Research* 12: 109-124.
- AM-8 Mazumder, A., D.J. McQueen, W.D. Taylor, and D.R.S. Lean, 1990. Micro- and mesozooplankton grazing on natural pico- and nanoplankton in contrasting plankton communities produced by planktivore manipulation and fertilization. *Archiv. für Hydrobiologie.* 118: 257-282.
- AM-9 Mazumder, A., D.J. McQueen, W.D. Taylor, and D.R.S. Lean, 1990. Pelagic food web interactions and hypolimnetic oxygen depletion: results from experimental enclosures and lakes. *Aquatic Sciences* 52: 144-155.
- AM-10 Lean, D.R.S., M.A. Nelson, R.R.J. Stevens, and A. Mazumder, 1990. Response of Lake Ontario to reduced phosphorus loading. *Verh. Internat. Verein. Limnol.* 24: 420-425.
- AM-11 Mazumder, A., 1991. Asit Mazumder replies to James Lovelock's comment " Making Waves". *The Sciences* 311.: 5.
- AM-12 Mazumder, A., W.D. Taylor, D.R.S. Lean, and D.J. McQueen, 1992. Partitioning and flux of phosphorus: Mechanisms regulating plankton communities. *Archiv für Hydrobiologie, Ergebnisse der Limnologie* 35: 121-143.
- AM-13 Mazumder, A., D.R.S. Lean, and W.D. Taylor, 1992. Importance of microzooplankton in the energy transfer efficiency of Lake Ontario. *J. Great Lakes Res.* 18: 456-466. *Received Chandler-Misener Award for the most important scientific article on Great Lakes.*
- AM-14 Proulx, M., F. R. Pick and A. Mazumder, 1993. Effects of planktivorous fish on phytoplankton biomass and

- community structure. *Verh. Internat. Verein. Limnol.* 25: 331-334.
- AM-15 Mazumder, A. and D. R. S. Lean, 1994. Consumer-dependent responses of lake ecosystems to nutrient loading. *Journal of Plankton Research* 11: 1567-1580.
- AM-16 Mazumder, A., 1994. Phosphorus-chlorophyll relationships under contrasting herbivory and thermal stratification: Patterns and Predictions. *Can. J. Fish. Aquat. Sci.* 51: 390-400.
- AM-17 Mazumder, A., 1994. Phosphorus-chlorophyll relationships under contrasting zooplankton community structure: Potential mechanisms. *Can. J. Fish. Aquat. Sci.* 51: 401-407.
- AM-18 Mazumder, A., 1994. Patterns of algal biomass in dominant odd- versus even-link lake ecosystems. *Ecology* 75: 1141-1149.
- AM-19 Mazumder, A., and W.D. Taylor, 1994. Thermal structure of lakes varying in size and water clarity. *Limnol. Oceanogr.* 39: 468-476.
- AM-20 Larocque, I. A. Mazumder, M. Proulx, D. Lean & F.R. Pick, 1996. Sedimentation of algae: I. Relationships with biomass and algae size-distribution. *Can. J. Fish. Aquat. Sci.* 53: 1133-1142.
- AM-21 Perin, S., P. Pick., A. Mazumder, and D. R. S. Lean, 1996. The effects of nutrients and fish predation on primary production in shallow versus deep ecosystems. *Can. J. Fish. Aquat. Sci.* 53: 1125-1132.
- AM-22 Proulx, M., F. Pick, A. Mazumder, P. Hamilton, and D. R. S. Lean, 1996. Experimental evidence for interactive impacts of nutrients and herbivores on algal diversity. *Oikos* 76: 191-195.
- AM-23 Proulx, M., F. Pick, A. Mazumder, P. Hamilton, and D. R. S. Lean, 1996. Lean. Effects of nutrients and fish predation on algal communities under contrasting thermal regimes. *Ecology* 77: 1556-1572.
- AM-24 Marchessault, P. and A. Mazumder, 1997. Effects of nutrients and grazers on ciliate communities. *Limnol. Oceanogr.* 42: 893-900.
- AM-25 Ridal, J. M.E. Fox, C. A. Sullivan, R.J. Maguire, A. Mazumder, and D.R.S. Lean, 1997. Automated extraction of organic contaminants from freshwater. *Analytical Chemistry* 69:711-717.
- AM-26 Mookerji, N., A. Mazumder, Z. Weng, M.A. Rodriguez, and J. Rasmussen, 1998. Interspecific Interactions between salmonids: Implications for nutrient enrichments. *J. Am. Fish. Soc.* 38: 7-11.
- AM-27 Pinel-Alloul, B, A. Mazumder, G. Lacroix and X. Lazzaro, 1998. Réseaux trophiques lacustres: structure, fonctionnement, interactions et variations spatio-temporelles. *Rev. Sci. de L'eau.* 1998: 163-197.
- AM-29 Mazumder, A., and K.E. Havens, 1998. Nutrient-algae relationships in temperate and tropical lakes. *Can. J. Fish. Aquat. Sci.* 55: 1652-1662.
- AM-30 Drenner, R. & A. Mazumder, 1998. Role of microcosm experiments in aquatic ecology. *Ecology* 80: 1081-1085.
- AM-31 Proulx, M. and A. Mazumder, 1998. Grazer reversal of plant species richness under contrasting nutrient richness. *Ecology* 79: 2581-2592 *published as a concepts article*..
- AM-32 Choi, J., A. Mazumder, and J. Hansell, 1999. Measuring perturbation in a complication thermodynamic world. *Ecological Modeling* 117: 143-158.
- AM-33 Tzaras, A., F.R. Pick, A. Mazumder and D.R.S. Lean, 1999. Impacts of nutrients, fish and water depth on heterotrophic pico and nanoplankton. *Aquatic Microbial Ecology* 19: 67-80.
- AM-34 Branstrator, D., G. Cabana, A. Mazumder, J. Rasmussen, 2000. Measuring life-history omnivory in the opossum shrimp, *Mysis relicta*, with stable nitrogen isotopes. *Limnol. Oceanogr.* 45: 463-467.
- AM-35 Edmundson, J. and A. Mazumder 2001. Environmental variables related to the production of sockeye salmon smolts in Alaska. *Trans. Amer. Fish. Soc.* (In Press).
- AM-36 Ridal, J., A. Mazumder and D. Lean 2001. Effects of nutrient loading and planktivory on the accumulation of pesticides in aquatic foodchains. *Environmental Toxicology and Chemistry* (In Press).
- AM-37 Mookerjee, N., A. Mazumder and Z. Weng 2001. Anadromy in brook trout: Relation to diet partitioning with coexisting Atlantic salmon. *Journal of Fish Biology* (In Press).
- AM-38 Edmundson, J. and A. Mazumder, 2001. Climatological and limnological perspectives for sockeye salmon management in Alaska. *Freshwater Biology* (Accepted).
- AM-39 Weng, Z., N. Mookerji and A. Mazumder, 2001. Nutrient-dependent recovery of Atlantis salmon streams from catastrophic flood. *Can. J. Fish. And Aquat. Sci.* (accepted with minor revision).

7. SCHOLARLY AND PROFESSIONAL ACHIEVEMENTS

d. Papers, Lectures and Addresses List date, title, and occasion.

1. Invited and Plenary Lectures

- Mazumder, A., **1988**. Experimental manipulations in large enclosures and their comparison with lakes: new perspectives for lake management. Invited speaker at the Limnology Research Center, **McGill University**, Montréal, Canada. October, 1988.
- Mazumder, A., **1988**. Mechanisms controlling photosynthetic bacteria in meromictic lakes. Invited guest speaker at the **Halton Area Conservation Authority**, Crawford Lake, Ontario. 17 June, 1988.
- Mazumder, A., W. D. Taylor, D. J. McQueen, and D. R. S. Lean, **1989**. Processes regulating epilimnetic total phosphorus of aquatic systems: Results from experimental enclosures. Invited speaker at the **International Association for Great Lakes Research Conference**, Madison.
- Mazumder, A., W.D. Taylor, D.J. McQueen, D.R.S. Lean, **1989**. Can biotic community structure of a lake influence its physical nature? Invited speaker for the Symposium on Community Structure: the black box. **University of Toronto** March, 1989..
- Mazumder, A., W.D. Taylor, D.R.S. Lean and D.J. McQueen, **1990**. Partitioning and fluxes of phosphorus: mechanisms regulating size-distribution and biomass of plankton. Invited as an invited speaker at the **Vth International Congress of Ecology**, Yokohama, Japan August, 1990..
- Mazumder, A., W. D. Taylor, D.R.S. Lean, and D.J. McQueen, **1990**. Plankton size-distribution and its relationships with lake processes. Presented as an invited speaker at the **NATO Advanced Study Institute Workshop - Individual Cell and Particle Analysis**. Acquafredda di Maratea, Italy Oct. 99..
- Mazumder, A., **1990**. Size-distribution and biomass of plankton as determinants of the fate and transport of nutrients and lipophilic contaminants. Invited guest speaker at **Dow Chemicals**, Midland, Michigan.
- Mazumder, A., **1991**. Organized and chaired special symposium on water column processes in marine and freshwater ecosystems. **American Society of Limnology and Oceanography** Dalhousie University, Halifax.
- Mazumder, A., **1991**. Size-distribution and biomass of plankton and relationships with processes in lakes. **Canadian Society of Limnologists**, University of Guelph, Ontario.
- Mazumder, A., **1993**. Structure and function of lake ecosystems: processes, mechanisms, models, predictions and patterns. Invited guest speaker in the Department of Biology at **Queen's University**.
- Mazumder, A., **1993**. Thermal structure of lakes: interactions of biological and physical processes. Invited guest speaker in the Department of Biology at **McGill University**.
- Mazumder, A., **1993**. Predictive modeling in Limnology: Need for more mechanisms. Presented as an Invited speaker at the **American Society of Limnology and Oceanography**, University of Alberta.
- Mazumder, A., **1993**. Patterns of algal responses to phosphorus under contrasting herbivory and thermal stratification. Invited speaker at **Canadian Society of Limnologists**, Trent University.
- Mazumder, A., **1993**. Structure and function of lake ecosystems: processes, mechanisms, models, predictions and patterns. Invited by Dr. Gene Likens to present this lecture at the **Institute of Ecosystem Studies**, Millbrook, NY.
- Mazumder, A. **1994**. Historical trends in Canadian research in fisheries and limnological research. Invited plenary speaker at the **Canadian Society of Limnologists** Conference, Saskatoon Jan. 1994..
- Mazumder, A. **1996**. Invited by **USEPA** (Chicago) to a workshop to advise on the future of research on the Great Lakes.
- Mazumder, A., G. Kyle, D. Schimdt, and J. Edmundson. **1996**. Impacts of stocking and fertilization on trophic interactions in Alaskan salmon enhancement lakes. Presented as an invited lecture at **American Society of Limnology and Oceanography** Conference (Joe Shapiro symposium), Milwaukee, USA June 1996.
- Mazumder, A., **1997**. Managing algal developments and water quality: Patterns, processes and predictions. Invited **Keynote speaker, Northwest Algal Symposium** at University of Victoria.
- Mazumder, A., **1997**. Foodweb manipulations and ecosystem processes. **Invited plenary speaker** for the **International Congress of Limnology of Francophone States CILEF.**, Belgium.
- Mazumder, A., **1997**. Trophic interactions in sockeye salmon enhancement lakes. Department of Biology, **University of Waterloo**, Ontario.
- Mazumder, A. and D. Lean, **1997**. Relationship between the biomass and size-distribution of epilimnetic and sedimenting algae. Joint marine and freshwater symposium on vertical fluxes, **ASLO Conference**, Santa Fe, New Mexico.
- Mazumder, A., Z. Weng, and N. Mookerji, **1998**. Fertilization is an effective tool to enhance fish production in Atlantic salmon streams. **International Lowell Wakefield Symposium**, American Fisheries Society, Anchorage, Alaska Sept. 1998..
- Mazumder, A., **1998**. Biological, chemical and climatological consequences of mixing processes in lakes: Implications

- for climate change. *AGU/ASLO Ocean Sciences Meeting*, San Diego.
- Mazumder, A., **1999**. Patterns of trophic interactions and growth dynamics of juvenile sockeye salmon in Alaska. Presented as invited speaker at *American Society of Limnology and Oceanography* Conference, Santa Fe, New Mexico Feb. 1999..
- Mazumder, A., **1999**. Nutrient-foodweb dynamics in lake ecosystems: Patterns, processes, predictions and applications. Presented as invited speaker at Canadian Society of Limnologists Conference at the University of Alberta Jan. 1999..
- Mazumder, A., 2000. Environmental Management of Drinking Water: An Ecosystem and Watershed Approach. Luncheon Speaker , invited jointly by Canadian Water Resources Association and Air and Waste Management Association of Canada. Victoria, Feb. 22, 2000.
- Mazumder, A., 2000. Nutrient-Foodweb Interactions: Patterns, Processes, Predictions and Applications. Invited talk at the UNBC Seminar, March 10, 2000.
- Mazumder, A., 2000. Quality of Drinking Water: Terrestrial-Aquatic Linkages. *Invited Plenary Speaker* at the International Symposium, Sustainable Forestry Beyond 2000, Lakehead University, May 15, 2000.
- Mazumder, A., 2000. Application of basic ecological concepts, theories and mechanisms to fisheries and marine aquaculture. *Invited Plenary Speaker*, Maricult Conference, Norway, June 26-28, 2000
- Mazumder, A., 2000. Ecological and Engineering approaches to sustaining clean and safe water for drinking. *Invited Luncheon Speaker*, Canadian Engineering Institute , 7 April, 2000.
- Mazumder, A., 2000. Ecosystem and watershed approach to sustainable clean and safe drinking water. *Invited Keynote Speaker* at the Annual Meeting of the Regional Health Officers of BC.

7d. 2. Other Lectures in National and International Conferences and Symposia

- Mazumder, A. and M.D. Dickman, **1984**. Factors effecting the temporal and spatial distribution of photosynthetic bacteria in meromictic Crawford Lake, Ontario. *Society of Canadian Limnologists*, Ottawa, Canada.
- Mazumder, A. and D.J. McQueen, **1986**. Radio-tracer feeding studies using larval walleye. *Renewable Resources Research*, Toronto, Canada.
- Mazumder, A., W.D. Taylor, and D.J. McQueen, **1987**. Effects of fertilization and planktivorous fish predation on the size-distribution of particulate phosphorus: large enclosure experiments. *American Society of Limnology and Oceanography*, Madison, Wisconsin.
- Mazumder, A., **1987**. Effects of fertilization and planktivorous fish predation on sedimentation of particulate phosphorus: large enclosure experiments. *Ontario Ecology and Ethology Colloquium*, University of Ottawa, Canada.
- Taylor, P., A. Mazumder, I. Martin, and F. Chaw, **1987**. Size categories: How many are there? An objective approach to the problem of insect instar determination. *Society of Canadian Entomologists*, University of Winnipeg, Canada.
- Mazumder, A., W.D. Taylor, D.J. McQueen, and D.R.S. Lean, **1988**. Impact of micro- and mesozooplankton grazers on contrasting plankton communities in lake enclosures. *American Society of Limnology and Oceanography*, University of Colorado, Boulder.
- Bentzen, E., W.D. Taylor, and A. Mazumder, **1988**. Recycled 5'-Nucleotides as an important source of phosphorus in lakes. *American Society of Limnology and Oceanography*, New Orleans, USA.
- Lean, D.R.S., M.A. Nelson, R.R.J. Stevens, and A. Mazumder, **1989**. Response of Lake Ontario to reduced phosphorus loading. *The Society of International Limnologists*, Munich, Germany.
- Mazumder, A., W.D. Taylor, D.J. McQueen, and D.R.S. Lean, **1989**. Effects of nutrients and grazers on periphyton phosphorus in lake enclosures. *North American Benthological Society NABS.*, Guelph, Ontario.
- Mazumder, A., D.R.S. Lean, and W.D. Taylor, **1990**. Micro- and mesozooplankton in Lake Ontario: 1970 and 1982. *International Association for Great Lakes Research*, University of Windsor, Ontario.
- Mazumder, A., W.D. Taylor, D.R.S. Lean, and D.J. McQueen, **1990**. Effects of plankton size-distribution and associated light penetration on thermal structure and mixing depths of small and large lakes. *American Society of Limnology and Oceanography*, College of William and Mary, Williamsburg, Virginia.
- Lean, D.R.S., M.A. Nelson and A. Mazumder, **1991**. Response of Lake Ontario to reduced phosphorus loading. *International Association for Great Lakes Research Conference*, June 2-5, 1991, Buffalo, New York.
- Proulx, M., F.R. Pick, and A. Mazumder, **1992**. Fish effects on phytoplankton community structure under contrasting nutrient enrichments. *The Society of International Limnologists*, Barcelona, Spain.
- Howard, S., A. Mazumder and D.R.S. Lean, **1992**.. Fish and nutrient effects on bacterial dynamics. *Society of Canadian Limnologists* in Halifax. Jan. 1992.

- Marchessault, P., A. *Mazumder*, and D. R. S. Lean, **1993**. Short-term responses of ciliates to *Daphnia*. *American Society of Limnology and Oceanography*, University of Alberta.
- Larocque, I., A. *Mazumder*, and D. R. S. Lean, **1993**. Factors affecting algal sedimentation. *American Society of Limnology and Oceanography*, University of Alberta.
- Mazumder, A. and D.R.S. Lean, **1994**. Consumer dependent responses of lake ecosystems to nutrient loading. *ASLO Conference*, University of Miami, Florida
- Proulx, M., A. *Mazumder*, and D.R.S. Lean, **1994**. Productivity-diversity patterns of algae in north temperate lakes. *American Society of Limnology and Oceanography*, University of Miami.
- Larocque, I., A. *Mazumder*, and D.R.S. Lean, **1994**. Sedimentation of algae: Relationships with biomass and size-distribution of epilimnetic algae. *American Society of Limnology and Oceanography*, University of Miami.
- Ridal, J., A. *Mazumder*, D.R.S. Lean and M. Fox, **1995**. Fate of contaminants in lake enclosures: Preliminary results. *5th Symposium of GRIL* at the Station de Biologie des Laurentides, Québec.
- Ridal, J., M. Fox, D. St. Arnaud, A. *Mazumder*, and D.R.S. Lean, **1995**. Chiral pollutants in water and biota of lake enclosures with different levels of productivity and planktivory. *Eastern Pesticides Residue Workshop*, Sault St. Marie, Ontario.
- Mazumder, A., G. Kyle, D. Schimdt, and J. Edmundson, **1995**. The foodweb structure and the growth patterns of sockeye salmon in Alaskan salmon enhancement lakes. *North American Lake Management Society*, Toronto.
- Ridal, J., A. *Mazumder*, T. Bidleman, G. Northcott, M. Fox, and D.R.S. Lean, **1995**. Chiral pollutants in water and biota of lake enclosures with different levels of productivity and planktivory. *Society of Environmental Toxicology and Chemistry SETAC*, Vancouver, BC.
- Proulx, M, *Mazumder*, A., G. Kyle, D. Schimdt, and J. Edmundson, **1996**. Impacts of stocking and fertilization on algal communities in Alaskan salmon enhancement lakes. *ASLO Conference*, Milwaukee.
- Choi, J. and A. *Mazumder*, **1996**. Of body size and metabolisms in lakes. *ASLO Conference*, Milwaukee.
- Baines, S., A. *Mazumder* and J. Kalf, **1996**. Impacts of fertilization and fish stocking on carbon cycling in experimental enclosures. *ASLO Conference*, Milwaukee.
- Marchessault, P. and A. *Mazumder*, **1996**. Seasonality of grazer and nutrient impacts on ciliate communities. *ASLO Conference*, Milwaukee.
- Mazumder, A. Z. Weng, N. Mookerji, S. Tucker, J. Rasmussen, and M. Rodriguez, **1997**. Fertilization is an effective tool to enhance stream productivity and Atlantic salmon production. *CIRSA Symposium*, Université Laval, Québec 6 Nov. 1997.
- Ridal, J., T. F. Bidleman, A. *Mazumder*, and D.R.S. Lean, **1997**. Chlordane enantiomers used to identify biological alterations. *SETAC Conference*, San Francisco, USA.
- Maynard, D. and A. *Mazumder*, **1997**. Patterns of trophic relationships in Atlantic salmon streams. *GRIL Symposium*, Laurentian Biological Station
- Mookerji, N., Z. Weng., A. *Mazumder*, J. Rasmussen and M. Rodriguez, **1997**. Resource partitioning between juvenile trout and Atlantic salmon. *GRIL Symposium*, Laurentian Biological Station.
- Weng, Z., A. *Mazumder* and N. Mookerji, **1998**. Impact of nutrients on the patterns of nutrient dynamics and trophic interaction in Atlantic salmon streams. Presented at the *NABS Annual Meeting* in PEI, Canada Aug. 1998..
- Andrade, J. and A. *Mazumder*, **1999**. Nutritional quality and trophic interaction of Coastal Tubificids and Isopods on the Caribbean Coasts of Venezuela. Presented at *ASLO Conference* in Santa Fe, New Mexico, USA January 1999..
- Mazumder, A., 2000. Environmental Management of Drinking Water: Ecosystem and Watershed Approach. Poster Presentation at ASLO Meeting in Copenhagen, Denmark, June-5-9, 2000.

7. **SCHOLARLY AND PROFESSIONAL ACHIEVEMENTS**

e. Professional Activities

1. Review manuscripts for the following international journals:
 - a. Canadian Journal of Fisheries and Aquatic Sciences.
 - b. Ecology, Ecological Monographs and Ecological Applications
 - c. Limnology and Oceanography
 - d. Journal of Plankton Research
 - e. Freshwater Biology
 - f. Hydrobiologia
 - g. Archiv fur Hydrobiologie
 - h. Aquatic Sciences
 - i. Journal of Great Lakes Research
 - j. Journal of North American Lake Management

2. Review Grant Applications for the following organizations
 - a. Natural Sciences and Engineering Research Council NSERC.
 - b. Formation du Chercheur à la Recherche FCAR, Québec.
 - c. Tricouncil Grants NSERC/MRC/SSHRC.
 - d. National Science Foundation NSF, USA.
 - e. Science Council of BC
 - f. NSERC Industry-University Program

3. Organization of International Symposia and Meeting
 - a. Organized and Chaired a special international symposium on “Comparative Patterns of Water-Column Processes in Lakes and Oceans” during 1990 American Society of Limnology and Oceanography in Halifax.
 - b. Organized and Co-Chaired a special international symposium on “Vertical Mixing in Water-Column Processes” during 1999 American Society of Limnology and Oceanography in Santa Fe, New Mexico.
 - c. As the Chair of Meeting Committee of the American Society of Limnology and Oceanography ASLO., I have been leading the organization of ASLO-2000 in Copenhagen.
 - d. Organizing Committee Member for ASLO-2001 Conference in Albuquerque, New Mexico.
 - e. Chair, ASLO Student Travel Award for ASLO-2000 in Copenhagen.
 - f. Judge for the selection of Chandler-Misener Award 2000. of the International Association for Great Lakes Research.
 - g. Given 5 radio CBC CFAX., 4 TV and 10 News Paper interviews since July 1999.
 - i. Chair, ASLO Student Travel Award for 2001 ASLO meeting in Albuquerque, New Mexico.

4. Grant Panels:

1995-1998	Advisory Board Member-Tricouncil	NSERC/MRC/SSHRC
1997-2000	Committee Member-Visiting Fellowship	NSERC
1998-2000	Committee Member-NATO Fellowship	NSERC
2000-2005	Chair, Site Visit Committee	NSERC IRC Grant in Forest Management
2001-2002	Grant Review/Selection Panel	Science Council BC

5. Editorial Board:

1995-2000	Associate Editor	Journal of Great Lakes Research
1999-2001	Editorial Board Member & Associate Editor	Can. J. of Fisheries & Aquatic Sciences
2000-present	Editorial Board Member	TheScientificWorld, UK

8. *TEACHING and SUPERVISION DUTIES*

b. Graduate Student Supervision

<i>Year</i>	<i>Student</i>	<i>Degree Program</i>	<i>Type of Supervision*</i>
95-Present	N. Bourassa	Ph.D. Student U. Montreal.	1. Supervisor Since Sep. 1995.
96-Present	Zhongyan Weng	Ph.D. Student U. Montreal.	1. Supervisor Since Jan. 1996.
96-Present	José Andrade	Ph.D. Student U. Montreal.	1. Supervisor Since Sep. 1996.
96-Present	Simon Trépanier	Ph.D. Student U. Montreal.	1. Supervisor Since Sep. 1996.
99-Present	John-Mark Davies	Ph.D. Student	1. Supervisor Since Sep. 1999.
99-Present	Weston Nowlin	Ph.D. Student	1. Supervisor Since Sep. 1999.
99-Present	Paula Caron	M.Sc. Student	1. Supervisor Since Sep. 1999.
00-Present	Jim Edmundson	Ph.D. Student	1. Supervisor Since Sep. 2000.
00-Present	Philippe Marchessault	Ph.D. Student (FCAR PGS)	1. Supervisor Since Sep. 2000.
01-Present	Kendra Clare	M.Sc. Student (NSERC PGS)	1. Supervisor Since Jan. 2001.
01-Present	Blake Matthews	M.Sc. Student (NSERC PGS)	
<i>Graduate Degree Completed:</i>			
92-94	Marc Proulx	M.Sc.	1. co-supervisor
92-94	Susan Howard	M.Sc.	1. co-supervisor
92-94	Aspa Tzaras	M.Sc.	1. co-supervisor
93-95	Isabelle Larocque	M.Sc.	1. Supervisor
94-97	Supervisor deceased prior to thesis defense, scheduled for June 1997.		Marc Proulx Ph.D. 1.
95-99	Jae Choi	Ph.D	1. Supervisor
94-96	Philippe Marchessault	M.Sc.	1. Supervisor
96-99	J.M. Frechette	M.Sc.	1. Supervisor
97-99	David Maynard	M.Sc.	1. Supervisor
<i>8c. Graduate supervisory committee and external examiner at University of Montreal.</i>			
92-94	Marc Trudel	M.Sc	2. Supervisory Committee President.
92-94	Wafa Aboul-Hosn	M.Sc	2. Supervisory Committee Member.
92-94	Pascal Sirois	M.Sc	2. Supervisory Committee President.
92-94	Anas Ghaduani	M.Sc	2&4. Supervisory Committee President.
92-94	Wafa Aboul-Hosn	M.Sc	2. Supervisory Committee Member.
93	Marc Schallenberg	Ph.D.	3. External Thesis Examiner McGill.
94	Paul del Georgio	Ph.D.	3. External Thesis Examiner McGill.
93-95	Martha Krohn	M.Sc.	2. Supervisory Committee Member.
93-95	Francois Marchand	M.Sc.	2. Supervisory Committee President.
94-99	Stephan Masson	Ph.D.	2&4. Supervisory Committee President.
96-98	Strahan Tucker	M.Sc. McGill.	2. Supervisory Committee Member.
98-99	Patrick Burton	M.Sc.	2. Supervisory Committee President.
97	Gilbert Cabana	Ph.D.	3. External Thesis Examiner McGill.
97-Present	Genvieve Morinville	M.Sc. McGill.	2. Supervisory Committee Member.
99-Present	Jerome Marty	M.Sc. Montreal.	2. Supervisory Committee Member.
<i>8c. Graduate supervisory committee and external examiner at UVic.</i>			
2001-	Louise Hahn	M.Sc.	2. Supervisory Committee Member

- * 1. Chairman of supervisory committee i.e. supervisor or co-supervisor.;
2. Member of supervisory committee;
3. External examiner indicate if at another university.; or
4. Chairman of examination committee.

9. ADMINISTRATIVE ACTIVITIES

a. University and Faculty Activities includes offices and dates.

00-present Departmental Representative to the Faculty of Science, Univ. of Victoria.

93-94 Departmental representative to the Syndicate at the U. de Montreal

95-98 Director of the Laurentian Biological Station Comparable in size and administration to BMS.

b. Department Committees and Responsibilities

Departmental Committees at Université de Montréal

includes offices held and dates.

92-93 Member of Committee to develop undergraduate course curriculum for ecology.

92-94 Member of Advisory Committee for Laurentian Biological Station

92-93 Member of Library Committee

92-93 Chairman of Library Committee

94-95 Member of Department Public Relation Committee

94-95 Chairman of Faculty Search and Selection Committee in Ecology

10. OTHER INFORMATION

1. Papers submitted to international journals

Mazumder, A., and J. Edmundson. Impacts of stocking and fertilization on trophic interactions and growth patterns of juvenile sockeye salmon in Alaska. *Ecology* resubmitted following minor revisions.

Tucker, S., J. Rasmussen, A. *Mazumder*, Z. Weng and N. Mookerji. Exploitation of resources in streams: Allen's Paradox revisited. *Can. J. Fish. Aqua. Sci.* (will be accepted after revision).

Mookerji, N., A. *Mazumder* and Z. Weng. Coexistence of Atlantic salmon and brook trout through resource partitioning in Sainte Marguerite River Ecosystem, Québec. *Journal of Fish Biology* (submitted)

2. Supervision of PDFs and other staff members at UVic and Univ. de Montréal.

Year	name	Positions	Type of Supervision and current job*
92-93	Dr. Ellen Bentzen	Postdoctoral Fellow.	1. Supervisor, Res. Scientist at Trent.
93-95	Dr. Stephen Baines	Postdoctoral Fellow	1. Co-Supervisor, Faculty at SUNY.
94-95	Dr. Donn Branstrator	Postdoctoral Fellow at University of Minnesota, Duluth.	1. Supervisor, Assistant Professor
94-96	Dr. Jeff Ridal	Postdoctoral Fellow	1. Supervisor Res. Scientist at St. Lawrence River Institute.
95-98	I. St-Laurent	Laboratory Manager	1. Supervisor currently at PapriCan.
95-98	H. van Leeuwen	Research Professional	1. Supervisor, currently at SBL.
95-98	R. Beausejour	Station Manager	1. Supervisor, continuing at SBL
95-98	4 staff members	Laurentian Biol. Station	1. Supervisor, continuing
92-99	50 UG students	Research Assistants	1. Assistance in lab. and field work
91-99	8 undergraduates Honors Theses		1. Supervisor.
99-present	Dr. Ben Basu	PDF/Research Manager	1. Supervisor since July 1999.
99-present	Dr. Yan Liang	PDF/Laboratory Manager	1. Supervisor since August 1999.
95-present	Dr. Nandita Mookerji	Postdoctoral Fellow	1. Supervisor Since Sept. 1995.
99-present	6 UG Res. Assistants	NSERC funded CO-OPs	1. Supervisor since January 2000.

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002							
Personnel		\$7.0							
Travel		\$5.2							
Contractual		\$29.3							
Commodities		\$0.0							
Equipment		\$0.0							
Subtotal	\$0.0	\$41.5	LONG RANGE FUNDING REQUIREMENTS						
General Administration		\$3.1	Estimated FY 2003						
Project Total	\$0.0	\$44.6							
Full-time Equivalentents (FTE)		0.1							
Dollar amounts are shown in thousands of dollars.									
Other Resources									
Comments:									

FY02

Prepared:

Project Number: 02612
 Project Title: Detecting and Understanding Marine-Terrestrial
 Linkages in a Developing Watershed: Nutrient Cycling in the
 Kenai River Watershed
 Agency: ADF&G

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overtime	
Name	Position Description					
W. Hauser	FB IV		1.0	7.0		
C. Rosen**	Librarian		0.5	6.2		
** This cost is paid by ADF&G SF Division						
Subtotal			1.5	13.2	0.0	
Personnel Total						
Travel Costs:		Ticket Price	Round Trips	Total Days	Daily Per Diem	
Description						
Anch - Kenai - RT <u>a/</u>		0.2	10	10	0.1	
Anch - Seattle RT - for expert scientist		0.8	2	6	0.1	
<u>a/</u> includes 10 one-day RT for PI or non-supported meeting participant						
Travel Total						

FY02

Prepared:

Project Number: 02612
 Project Title: Detecting and Understanding Marine-Terrestrial Linkages in a Developing Watershed: Nutrient Cycling in the Kenai River Watershed
 Agency: ADF&G

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases:		Number of Units	Unit Price	
Description				
Those purchases associated with replacement equipment should be indicated by placement of an R.			New Equipment Total	
Existing Equipment Usage:		Number of Units		
Description				

FY02

Project Number: 02612
 Project Title: Detecting and Understanding Marine-Terrestrial Linkages in a Developing Watershed: Nutrient Cycling in the Kenai River Watershed
 Agency: ADF&G

Prepared: