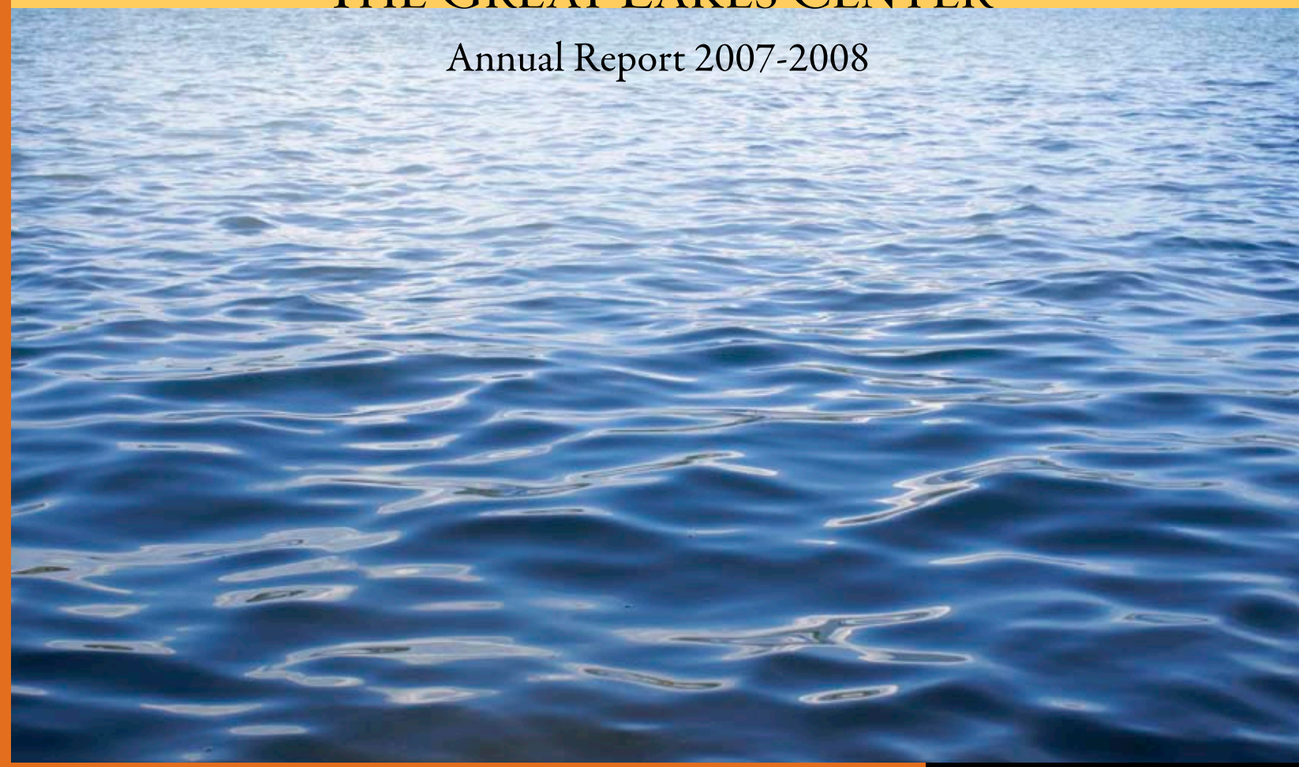
The Great Lakes Center

Annual Report 2007-2008



www.buffalostate.edu/greatlakescenter

Buffalo State
State University of New York

In memory of
Captain John Freidfhoff
(August 29, 1961 – October 19, 2007)

Content

Mission of the Great Lakes Center

The Great Lakes Center (GLC) mission is to improve the quality of the environment by providing the best possible science to decision-makers concerned with the health and sustainability of resources, with a primary focus within the Great Lakes and their watersheds. This is accomplished through high quality research, informed and current graduate and undergraduate education, and dissemination of information to the public through outreach. The Center is committed to improving human-environment interactions in the Great Lakes ecosystem guided, in part, by an understanding of the evolutionary and ecological processes and patterns acting on the system. Although the main focus of the research in the GLC concentrates on the Great Lakes basin, nation-wide and international projects are also considered of high priority as they expose GLC scientists to the cutting edge of modern science, facilitate collaboration, and greatly increase visibility of the Center's activity in the scientific community.

Highlights

Over the last year, the Great Lakes Center saw sustained activity and productivity in all areas of our operations, including research, education and service. We continued our excellence in research conducted by GLC personnel and in collaboration with other faculty from Buffalo State College, as well as other universities in North America, Europe, and South America. Our researchers have published 22 peer-reviewed papers, presented 24 talks at state, national and international meetings, and submitted 16 grant proposals (total requested amount $5,782,090). Nine projects for research and education (including multi-year grants) are currently funded in the GLC totaling $1,264,317. Center personnel acted as major advisers to graduate students, and taught five graduate and undergraduate courses. All of the Center resources, including vessels, sampling equipment, field station labs and the conference room, and the environment toxicology lab were used extensively to train undergraduate and graduate students either as part of a course or, in some cases, the entire course was completed at the GLC facilities. Numerous classes representing offerings in three departments used Center resources (including space, equipment, vehicles or boats) in the last year. We are making progress in our plans to renovate our facilities and equipment and have made continued efforts for outreach to the community. As part of the New York Initiative for Lower Great Lakes Research, Restoration and Management, the GLC submitted a federal appropriations request for FY09 for the acquisition of a Lake Erie Research Vessel (total requested amount $2,000,000). Finally, we produced a Strategic Plan for the GLC for 2009-2014 to identify our priorities in research, education and outreach for the next five years, and to more effectively focus our resources to achieve these goals.

I. Staff

This year we suffered a great loss when field station manager Captain John Freidhoff died in a diving accident in Lake Ontario in October 19, 2007. We salute Captain John for his years of dedicated service to the country, Great Lakes research, Buffalo State College, and especially to the students. We will deeply miss his friendly nature, his incredible smile and willingness to help everybody. Captain Mark Clapsadl was appointed as our new Field Station Manager. Mark has an MSc degree from SUNY-Environmental Science and Forestry in Fisheries Biology and ample experience in Great Lakes and marine research and management.

Alexander (Sasha) Karatayev and Lyubov (Lyuba) Burlakova from Stephen F. Austin State University (Texas) took positions in the GLC last year. Sasha was appointed as the new director of the GLC in August of 2007. His research interests include aquatic invasive species; biodiversity, conservation and management of freshwater ecosystems. Lyuba is a Research Scientist and an Adjunct Associate Professor in the Biology Department. She graduated from the Physics Department of the Belarusian State University and received her PhD in Aquatic Biology. Her research interests are mainly in aquatic invasive species, their ecology, spread and role in ecosystems; diversity and conservation of unionid bivalves, and benthic ecology. Being also an expert in biostatistics and experimental design, she will teach a course in Biostatistics for undergraduate and graduate students in the fall of 2008.

In March of 2008 the GLC temporary secretary Susan Dickinson was replaced by a permanent secretary Cathleen Nasca.

In June 2008 we also hired a technician Kathleen Hastings to work at the field station. Kathleen graduated from the State University of New York at Fredonia and will focus on long-term monitoring program of Lake Erie that we have initiated this year.

GLC Personnel

Director: Alexander Y. Karatayev

Research Scientists: Subodh Kumar, Director of the Laboratory of Environmental Toxicology
Lyubov Burlakova
Sheila Christopher
Mark Clapsadl
Sergey Mastitsky
Jagat Mukherjee
Christopher Pennuto
Alicia Pérez-Fuentetaja
Charlotte Roehm

Secretary: Cathleen Nasca

Field Station Director, Research Associate & Ships: Captain Mark Clapsadl

Research Fleet Manager & Ships: Captain Caleb P. Basiliko

Research Assistant: Christopher Janik

Work Study: Chelsea Neff

GLC Affiliates

Randal J. Snyder, Associate Professor, Buffalo State College

Howard P. Riessen, Professor, Biology Department, Buffalo State College

Gary W. Pettibone, Professor, Biology Department, Buffalo State College

Kimberley N. Irvine, Professor and Geography & Planning Department Chair, Buffalo State College

Kelly M. Frothingham, Assoc. Professor, Geography & Planning Department, Buffalo State College

Collaborators

In New York State:

- Daniel P. Molloy, Associate Scientist, New York State Museum
- Dianna Padilla, Professor, Department of Ecology and Evolution, State University of New York at Stony Brook
- Edward Mills, Professor and Director of the Cornell Biological Field Station, Cornell University
- Don Dittman, Ecologist, USGS Great Lakes Science Center, Tunison Laboratory of Aquatic Science, Cortland, NY
- Joseph C. Makarewicz, Distinguished Service Professor Environmental Science and Biology, State University of New York, Brockport, NY
- Joe Atkinson, Professor Environmental Engineering, State University of New York at Buffalo
- Bill Edwards, Assistant Professor of Biology, Niagara University
- Paul Patrick, senior consultant, Senes Consulting, LTD
- Mike Goehle, Regional ANS Coordinator, USFWS
- Gregory L. Boyer, Director, Great Lakes Research Consortium and Professor of Biochemistry, State University of New York, College of Environmental Science and Forestry, Syracuse, NY

In Other US Institutions:

- Jake Vander Zanden, Associate Professor, Center for Limnology, University of Wisconsin, Madison
- Stanley I. Dodson, Professor, Department of Zoology, University of Wisconsin, Madison
- Dick Lathrop, Wisconsin Department of Natural Resources, University of Wisconsin, Madison
- James F. Kitchell, Professor and Director of the Center for Limnology, University of Wisconsin, Madison
- Marsha M. May, Texas Nature Trackers, Wildlife Diversity Branch, Texas Parks and Wildlife Department, Austin, Texas
- Tom Miller, Director, Lamar Bruni Vergara Environmental Science Center, Laredo Community College, Laredo, Texas
- Heidi Bunk, Lake Biologist, Southern Region, Wisconsin Department of Natural Resources, Waukesha, Wisconsin
- Donald M. Jerina, Head, Laboratory of Bioorganic Chemistry NIDDK, National Institutes of Health, Bethesda, Maryland
- Kenneth K. Laali, Professor in Chemistry, Kent State University, Kent, Ohio
- David DeMarini, Environmental Carcinogenesis Division (B-143-06), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.
- Dave Evers, Assistant Professor, Biology Department, Universtiy of Southern Maine
- Mark Green, Associate Professor, Biology Department, Saint Joseph's College of Maine
- Alan vanArsdale, Senior Ecologist, US EPA

International:

- Demetrio Boltovskoy, Professor, University of Buenos Aires, Argentina
- Sergej Olenin, Professor, Coastal Research and Planning Institute, Klaipeda University, Lithuania
- Marina Orlova, Senior research Scientist, Zoological Institute of the Russian Academy of Sciences, St.-Petersburg, Russia
- Daniel Minchin, Marine Organism Investigations, Killaloe, Co Clare, Ireland
- Francisco Sylvester, Postdoctoral Fellow, University of Windsor, Canada
- Charles W. Ramcharan, Associate Professor, Department of Biology, Laurentian University, Sudbury, Ontario, Canada

Awards and Achievements

Mark Clapsadl completed 80 hrs of classroom training and successfully completed an exam for the U.S. Coast Guard Masters License

Mark Clapsadl, Caleb Basiliko, Christopher Pennuto, Lyubov Burlakova, and Alexander Karatayev completed CPR First Aid training

Alicia Pérez-Fuentetaja, Lyubov Burlakova, Kathleen Hastings, and Alexander Karatayev took the America's Boating Course and received certificates of completion

Subodh Kumar was cited among other recognized researchers in chemical toxicology at the cover page of the January 2008 issue of Environmental Toxicology and Chemistry

Caleb Basiliko received 2008 American Planning Association Award for grassroots efforts on the redesign of the Ontario Street boat launch.

II. Research Activities

Aquatic Ecology and Ecosystems Research

Most of the aquatic ecology/ecosystems research is carried out at the GLC Field Laboratory, and focuses on the Great Lakes and their tributaries; however, Center personnel are also involved in numerous projects in other states (e.g. Wisconsin, Texas), as well as in Europe, South America, and Canada. We maintain an active international collaboration with world experts in invasion biology that allow us to be aware of future invaders, and concentrate our limited resources in order to minimize the negative effects of aquatic nuisance species.

Sampling at Lake Ontario for the project "Lake Ontario Nearshore Nutrient Assessment" – Chris Pennuto and Allyse Fischer

Current Projects:

Lake Ontario Nearshore Nutrient Assessment.
This is a multi-institutional, binational effort that is aimed at understanding the dynamics of a lake changing in response to impacts of climate change, non-indigenous species, and anthropogenic factors. This project is in collaboration with SUNY Brockport, SUNY Buffalo, SUNY ESF, Niagara University, and University of Rochester.

Senes.
This project will determine the biomass and coverage of benthic algae to field-verify satellite imagery on color spectra from nearshore Lake Ontario near the FitzPatrick nuclear power facility.

Goby Barriers.
This project will determine the interaction between water velocity, substrate composition, and streambed slope on round goby swimming performance. Ultimately, these data may assist in barrier design to reduce upstream passage or allow us to predict which streams are most at risk to further invasion.

Amphipod intraguild predation.
This project will assess intraguild predation as a mechanism promoting successful invasion of non-native benthic amphipod species.

Crayfish predator avoidance.
This project will assess the importance of learning in predator avoidance by native and invasive crayfish.

International workshop "Predict the characteristics and spread of aquatic invertebrate invaders", Ireland. Alexander Karatayev, Dan Minchin (Ireland), Sergej Olenin (Lithuania), Demetrio Boltovskoy (Argentina), Dianna Padilla (Stony Brook University) and Lyubov Burlakova.

Predict the characteristics and spread of aquatic invertebrate invaders.

Long-term experience of studying the exotic species has allowed us to bring together an international team currently working on a project. For 98 freshwater, marine, and brackish species, we collected data on a wide range of biological and ecological parameters. Using this database, we will be able to employ a quantitative approach to address many important problems in invasion biology, and to predict a set of future scenarios that determine invasion success.

Status of invasive freshwater mollusks in Texas.

The goal of this project was to examine the patterns of distribution, vectors of introduction, and potential ecological impacts of freshwater exotic species in Texas over the last 45 years. Five species of exotic gastropods are currently established in Texas freshwaters: channeled-type applesnail (*Pomacea insularum*), red-rim melania (*Melanoides tuberculatus*), quilted melania (*Tarebia granifera*), giant rams-horn snail (*Marisa cornuarietis*), and Chinese mysterysnail (*Cipangopaludina chinensis*). Four of these exotic gastropods were found in highly vulnerable aquifer-fed springs and rivers, which contain numerous endemic and endangered species. Potential negative ecological effects of exotic gastropods include competitive exclusion of native snails, and the introduction of exotic parasites (trematodes) which could infect fish and waterfowl, including federally-protected species.

Sampling invasive gastropods in Dolan Spring, Devils River, Texas – Lyubov Burlakova and Captain Caleb Basiliko.

Predict the potential effects of zebra mussels on benthic community and lake ecosystems of the Madison lakes.

The objectives of this 3-years study are to: provide pre-invasion information on the community composition, density, biomass and production of benthic habitats in the Madison lakes; predict the effect of zebra mussel invasion on benthic communities in the Madison lakes through comparisons with data obtained in southeastern Wisconsin lakes and an extensive long-term database from Eastern European lakes; and to estimate the potential effect of zebra mussels on benthic and pelagic communities and associated fisheries in the Madison lakes.

Ready to take samples in Lake Mendota – Alexander Karatayev, Lyubov Burlakova, Vadim Karatayev and Dima Karatayev

Sampling Wisconsin lakes. Heidi Bunk (Wisconsin DNR), Lyubov Burlakova, and Tyler McCombs (University of Wisconsin Madison student).

Endocrine-disrupting effects of persistent organic pollutants in fish populations from eastern Lake Erie.

We have sampled steelhead trout, common carp, and largemouth bass from eastern Lake Erie to determine levels of the endocrine disrupting pollutants PCB and PBDE, which have estrogenic effects on exposed populations of fish. We assess the impacts to reproduction of these chemicals by measuring in male fish the levels of a unique female protein synthesized for egg production. The effects of these pollutants on fish include the alteration of their sexual characteristics and reproductive fitness.

Sampling freshwater mussels in Rio Grando River, TX – Captain Caleb Basiliko, Tom Miller (Laredo Community College), Lyubov Burlakova

Freshwater Unionidae in Texas.

Freshwater Unionidae is the most rapidly declining faunal group in the US, including Texas. Among the 52 species known in Texas, there are at least 26 species that require special attention, including six endemic and one federally listed endangered species. Currently we are funded by the U.S. Fish and Wildlife Service (State Wildlife Grants, 2004 - 2009) to conduct statewide surveys of the rare and the most valuable Unionidae populations in Texas. We are assembling a database that will include, along with our own data, all published information on unionid diversity and abundance in Texas. This comprehensive dataset will be used to analyze the current status and long-term dynamics of unionid diversity across the whole state.

Sampling freshwater mussels in Rio Grande River in Laredo, TX – Alexander Karatayev

Botulism type E in the Great Lakes.

We have seven years of research experience in the new and ongoing botulism outbreaks in the Great Lakes basin. Our current role in this topic is to act as a resource of information for federal (EPA) and state agencies (DEC, NY-F&WS) as well as the Great Lakes Research Consortium and to the greater research community. Our expertise includes sources of type E botulism in the Great Lakes and food web transmission.

Applesnails *Pomacea insularum* collected on a rice field in Texas – Lyubov Burlakova

South American channeled applesnail *(Pomacea insularum)*.

This snail is of special concern for the USA coastal ecosystems and rice industry. The goals of our research are to determine *Pomacea insularum* current distribution, and to estimate the rate, patterns and vectors of applesnail spread in Texas. These data will allow us to predict their potential spread in Texas, and the US. With our four years of research experience in the biology and ecology of this invader, we are acting as information resource for state agencies in Louisiana (Louisiana Department of Wildlife and Fisheries, and USGS National Wetlands Research Center).

Limnoperna research in South America.

Limnoperna fortunei, a bivalve mollusc native to China, is now rapidly spreading in South America. As with *Dreissena* (the zebra mussels), *Limnoperna* has rapidly become a major nuisance for many industries and power plants, and its impact on the environment may be even stronger than that of *Dreissena*. Together with colleagues from Argentina, we conducted the first quantitative survey of *Limnoperna* in Rio Tercero Reservoir, analyzed mussel coverage on different substrate types, estimated the overall population size, and studied their effect on the benthic community. Our data will help us to predict the potential effect of *Limnoperna* on aquatic ecosystems in the US.

Invasive bivalve *Limnoperna fortunei* in Rio Tercero Reservoir, Argentina – Alexander Karatayev

Sampling Limnoperna fortunei in Rio Tercero Reservoir, Argentina – Lyubov Burlakova

The role of the zooplankton grazer *Holopedium gibberum* in acidifying lake ecosystems.

This organism plays a vital role in the future of lakes that are exposed to acid rain and deforestation and, therefore, have declining calcium levels. *Holopedium* is an acid tolerant species that has low *Ca* requirements and, therefore, can potentially replace the common grazer *Daphnia* in many of the thousands of lakes that are part of the Canadian Granitic Shield, altering permanently the structure of the food webs. We are working with researchers at York University, Ontario, to compare in a highly replicated experiment the competitive and environmental advantages of *Holopedium* in lakes suffering from decalcification and Global Warming.

Water Quality/Watershed Studies

The Great Lakes Center has made a substantial commitment to study the impact of the contributing watersheds on the Great Lakes. We have continued the development of our model watershed in Point Peter Brook watershed in Cattaraugus County, where we have installed weirs with water level gauges and automated samplers along the trunk stream and several tributaries; piezometers; rain gauges, and a meteorological station. The initial goal for this project was to identify Variable Source Area (VSA) controls on the exports of nitrogen (N) and dissolved organic carbon (DOC) during storm events. This year, Dr. Sheila Christopher undertook a study of soil nitrogen processes and export during winter under snow cover. We have expanded our watershed monitoring program, with funding from the USACE, USEPA, and NYS DEC as part of an effort to identify critical sources of sediment and nutrients to the Cattaraugus Creek, a major contributing watershed to Lake Erie. Part of the goal of the Cattaraugus Creek project is to assess how land use and climate change will affect sediment and nutrient loading, via model predictions. The model can then be used 1) as input to a lake-wide model and 2) for managers and stakeholders to make informed decisions about nutrient management such as developing remediation plans to reduce future excessive loading.

Environmental Toxicology

The Environmental Toxicology Laboratory of the Great Lakes Center maintains state of the art facilities on the campus of Buffalo State College, where studies of a variety of problems affecting the water quality of the Great Lakes and contributing waters take place. Its principal research focus is on study of the metabolism and mechanism of carcinogenesis of polynuclear aromatic hydrocarbons (PAHs), disposition and metabolism of toxic chemicals in fish, microbial degradation of hazardous chemicals, and on monitoring of the levels of environmental contaminants.

Jagat Mukherjee in Ecotoxicology Lab.

Current projects:

Among the projects currently in progress is an investigation of the mechanism of synergistic interaction of tobacco smoke constituents most of which are also present in the Great Lakes and their tributaries. Certain heavy metals like cadmium and nickel enhance the genotoxicity of benzo(a)pyrene,

a commonly occurring polycyclic aromatic hydrocarbon (PAH) in the environment and in cigarette smoke. Researchers of the Environmental Toxicology Lab are attempting to find the mechanism(s) underlying the potentiating effect of cadmium and other heavy metals on the genotoxicity of PAH's. Researchers in ETC lab are also engaged in identifying the tumor promoting phenolic component(s) which mediates the carcinogenic potential of hazardous environmental pollutants e.g. PAHs and deciphering the chemo-preventive mechanism which will abrogate the tumor promotion function of phenolic component(s).

Another area of current research is to develop a strategy to prevent tumor metastasis which is the most common cause for cancer death. There is now growing evidence that the environmental pollutants may also be involved in this process of carcinogenesis. Our initial effort is to develop small organic molecules as potential MMP inhibitors; some of MMPs are known to be involved in the metastasis events of tumor progression. In addition, this lab is also involved in studying the mechanism of action of polybrominated diphenyl ethers (PBDEs). PBDEs which are used world-wide as fire retardants are emerging contaminants that act as endocrine disruptors.

Grants and Funding

Burlakova, L. E., A. Y. Karatayev. Distributional survey and habitat utilization of freshwater mussels. Texas Water Development Board. 2006-2007.

Burlakova, L. E., A. Y. Karatayev. State-wide assessment of unionid diversity in Texas. State Wildlife Grants, U.S. Fish and Wildlife Service, and Texas Parks and Wildlife Department, 2007-2008

Christopher, S. Phosphorus and nitrogen monitoring and modeling in the Cattaraugus Creek Watershed, a major tributary to Lake Erie, New York. Great Lakes Protection Fund Small Grant Program (Funding by the NY-DEC)

Karatayev, A. Y., L. E. Burlakova. Effect of natural factors on rate of spread of aquatic invasive species. Buffalo State College Research Council Incentive Funds, 2007-2008

Karatayev, A. Y., L. E. Burlakova. Potential effects of zebra mussels in the Madison lakes. Wisconsin DNR Aquatic Invasive Species Grants Program, 2006-2008

Karatayev, A. Y., L. E. Burlakova. Status of invasive freshwater mollusks in Texas. State Wildlife Grants, U.S. Fish and Wildlife Service. Texas Parks and Wildlife Department, 2006-2007

Mukherjee, J. J. Phenolic component of tobacco smoke as tumor promoter. National Institutes of Health, 2008-2011

Pennuto, C. Assessing barriers to round goby migration into Great Lake tributary streams. NY Sea Grant, 2007-2009

Pennuto, C. URM: The watershed as a model for training minority undergraduate Biology majors for graduate careers. National Science Foundation, Division of Biological Infrastructure, 2007-2011

Pennuto, C. Verification of Cladophora biomass near the Fitzpatrick nuclear power facility, Lake Ontario, Senes Consulting, Inc., 2009

Pennuto, C., and others. Lake Ontario Nearshore Nutrient Assessment (L.O.N.N.). US EPA. Co-investigator with SUNY Brockport, SUNY ESF, RIT, Niagara University, and UB, 2009

Pérez-Fuentetaja, A., and others. Food-web mediated transport and bioaccumulation of flame retardants (PBDE) in sport fish from Eastern Lake Erie. New York Great Lakes Protection Fund (Large Grants Program), 2008

III. Field and Laboratory Activities

The bulk of the ecosystems/fisheries research is carried out at the GLC Field Laboratory. The Field Laboratory was designed as a state-of-the-art facility at the head of the Niagara River on Lake Erie that is capable of supporting high-level research in a variety of disciplines. The Field Laboratory houses a fully-automated aquaculture system, a variety of data loggers and automated sampling equipment, and both macro and micro-visualization equipment, including a multi-chamber tank for digitizing and analyzing foraging, habitat selection, and predator-prey interactions. Unfortunately, due to a long period of underfunding, most of the laboratory and field sampling devices are now partially or completely worn out and require substantial investment. Although the Field Laboratory can support numerous research projects, a thorough analysis of all facilities revealed that many of them are in critical condition and that in the near future we will need to fix and/or replace most of the old or broken equipment. Particularly serious attention is needed to our fleet of research vessels. All three of our open water vessels are old, and require constant time and financial investments. Currently the only R/V, Seneca, is operational, and two other R/Vs (Aquarius and Pisces) need substantial improvements. Therefore, the Field Laboratory facility and research fleet improvement has become one of the highest priorities for the GLC.

Improvements to the Infrastructure

The R/V Seneca received mechanical and electronic upgrades in preparation for the 2008 sampling season. The cabin received some necessary repairs and the mahogany doors were re-installed with new framing to replace the rotten predecessor. A new paint scheme to BSC colors has been underway and should be completed by the end of the year.

R/V Pisces is currently laid up due to engine failure in the spring and is slated for rebuild over the winter. Prior to the engine troubles, new mufflers were installed along with new navigation electronics. Much of the wiring was repaired or replaced as needed and improvements to the cooling system were completed.

The work on the R/V Aquarius has been halted for the time being due to a busy sampling season and limited personnel. In the fall of 2007, Caleb and Ben, the campus welder, removed most of the rotten steel and rebuilt the keel. The work was halted when campus reallocated the welder and a private firm will need to be employed to complete the repairs.

The electro-shocker was rewired to make operations safer and new floorboards were installed. A new kicker motor was purchased to provide a secondary means of propulsion for the whalers in case of main engine failure. The small boats, trailers and motors received their annual service and minor maintenance.

A new, updated diving plan and program was written and instituted by Caleb Basiliko with assistance from the environmental health and safety department. The plan meets and exceeds the OSHA requirements for scientific diving.

Instructional Support

- Elisa Bergslein's class was taken on R/V Seneca to show sampling methods on Lake Erie;
- Dr. Standoro's class was assisted with calorimeter demonstrations and lecture;

- Help was provided on electro-fishing demonstrations for Math/Science Upward Bound high school students;
- Boats, equipment and logistical support were provided for the Bi-Annual Gull Lake Limnology class field trip;
- Facilities were provided for Lisa Anselmi's Anthropology class experiments;
- Provided support for 5 MS Ed projects as part of Dr. Pennuto's master's project research course (BIO 690).

Support for Research

The Field Laboratory offered advice, facilities, and assistance for the following research activities:

- Built sampling equipment, provided research vessel and logistical assistance for the collaborative Lake Ontario Nearshore Nutrient Survey (LONNS);
- Provided vehicles and lab space for Shelia Christopher for the watershed studies;
- Took over long term sampling from USFWS;
- Assisted Jill Singer with logistics and instrument installation design for her Buffalo River current sonar modeling project;
- Provided support and facilities for Kim Irving's CSO monitoring project;
- Assisted Chris Pennuto in his study of crayfish predator avoidance using the AHAB Unit and the replicate tanks;
- Assisted David Kukulka in his study of fresh water bioaccumulation on various metals and painted surfaces;
- Assisted David Kukulka in his work with Cooper Industries in studying methods of reducing fresh water biofouling in heat exchangers;
- Worked with archeologists in their study of a 1690 shipwreck in Erie Harbor;
- Worked with Lee Harper constructing and emplacing protective structures to shield tern nesting sites from predators along the breakwalls of the Buffalo Harbor and Black Rock Canal;
- Assisted Mark Clapsadl with electrofishing for the research on endocrine disruptors in fish;
- Assisted with construction, placement, and operation of large Vogel flume for round goby swimming performance research.

Community Outreach

- Caleb Basiliko helped John Montague and Dick Butz in their program with the children from the Valley Community Center. They had built boats with the children over a 5-week period and they launched the boats from the Field Station and worked them to do biological sampling and water quality testing;
- Caleb Basiliko helped to organize and run the Scajaquada Creek clean up and volunteered the use of small field station boats to clean out the creek;
- Assisted students from the McKinley HS Aquatic Biology Program to do the sampling for their class project with the electro shocker;
- Assisted Dick Butz with his annual Spring Water Quality Testing Training/Workshop by use of facility and a small and boat;
- Russ Liss and a group McKinley High School juniors were taken on the R/V Seneca to demonstrate sampling methods.

IV. Education

The Great Lakes Center fulfills its educational mission directly through: the classes its researchers teach; its graduate program; the support we offer to faculty teaching classes pertaining to environmental sciences; the seminar speakers we sponsor, and through our educational activities in the community.

Classes Taught

Fall 2007:

- BIO104
  Environmental Biology
  A. Pérez-Fuentetaja

- BIO 690
  MS Ed Research Methods
  C. Pennuto

Spring 2008:

- BIO 612
  Freshwater Macroinvertebrate Ecology
  C. Pennuto

- BIO 635
  Great Lakes Ecology
  A. Pérez-Fuentetaja

- BIO 213
  Problem Solving Sessions Ecology and Evolution
  A. Pérez-Fuentetaja

Graduate Program

During the year, eight graduate students were enrolled in the Multi-disciplinary Masters Degree Program administered by the Great Lakes Center.

Student:	**Advisor:**
Jeffrey Diers	Fraser, G. S.
Hovey, Adam	Fraser, G. S.
Kreuger, Amy	Frothingham, K.
Reth, Kimly	Irvine, K.
Wang, Xiao	Tang, T.
Winkler, Katherine	Frothingham, K.
John Karcz	Kumar, S.

Degrees Granted

Student: Crance, Mary Jo
Advisor: Frothingham, K.
Graduated: Fall 2007

In addition, Chris Pennuto was also the advisor of three graduate students from the Biology Department (Bryan Young, Nini Dong, and Shannon Rupprecht), and Alicia Pérez-Fuentetaja was the advisor of one graduate student (Eric Snyder). Lyubov Burlakova and Alexander Karatayev supervised and advised graduate students from Stephen F. Austin State University, Michael Cook and Kevin Nichol (both graduated in spring 2008).

Professional Training

Subodh Kumar organized and coordinated waste water treatment plant courses which were comprised of Basic Operation, Activated Sludge, Grade 3 supervision, Grade 4 Management, and Basic Laboratory. Each of these courses was given during the fall and spring semester of 2007-2008.

Community Outreach

- The Aquanaut Training Program is administered through the Great Lakes Center at Buffalo State College. It presents teachers with a user-friendly water quality/water sampling program that provides schools and community based groups in Niagara and Erie counties with curriculum, training, supplies and support enabling them to conduct a meaningful health assessment of a lake or stream within their community. Included in the program is a tour of the Field Station and a lecture on Great Lakes ecology. This year, 15 classes with more than 300 students took part in the program.

- This year we continued our cooperative program with Russ Liss and the Aquatic Ecology Program at McKinley High School. Students came to the Field Station as part of this class, where they work on various projects under the supervision of Liss and Caleb Basiliko.

V. New Initiatives

Strategic Plan for 2009-2014

Last year, one of the GLC priorities was to develop a strategic plan for the Center for the next five years. The Strategic Plan is a product of numerous discussions with the members of the GLC, College faculty, faculty from other universities, federal and state agencies and other stakeholders. As a result of these discussions we created a comprehensive plan; formulated strategic directions, initiatives and actions for research, education and public outreach; and determined resources required for GLC to fulfill these initiatives.

The Great Lakes Center is a multidisciplinary research, education, and service institute with a primary focus on the Great Lakes. On campus, the Center serves as both a catalyst and facilitator to link high-quality research with graduate and undergraduate education, increasing the college's role and visibility in the community. The Center also serves as a regional resource to promote activities which enrich the cultural, social, and intellectual lives of the people of Western New York. The Great Lakes Center brings together faculty from academic departments with particular emphasis on the specialties of aquatic ecology, fisheries, watershed hydrology, water quality, environmental toxicology and chemistry, urban ecology, and environmental education. In addition, the Center actively promotes collaborative research with other academic and research institutions in the United States, Canada, Europe, and South America, and is a member of the Great Lakes Research Consortium.

The Great Lakes Center and its staff are engaged in three broad areas: research, education, and outreach. Although research activities provide the major extramural funding revenue generated by the Center and comprise the majority of staff time, they support and enhance both education and outreach.
As a priority, the GLC is to be recognized as:

- regional, national, and international center for research excellence in aquatic and watershed studies;
- regional, national, and international center for the education and training of students in aquatic and watershed studies, with particular emphasis on graduate students;
- regional center for excellence in public outreach and service to the community.

Monitoring Program

Sampling Lake Erie – Lyubov Burlakova and Sergey Mastitsky.

In Spring of 2008 we joined a collaborative group of the State and Provincial agencies that are cooperating on a long term project for Lake Erie to evaluate trends in water quality, provide early detection of non-native species, and establish a base for comparisons in the future. The group routinely collects information of abiotic parameters, benthos, and plankton in eastern Lake Erie. This program is supported by multiple external stakeholders and will bring greater visibility to the GLC activities. Our participation in this project provides Buffalo State College

GLC staff with an opportunity to work directly with lake managers on a regular basis. Our participation also insures that we are likely to be at the forefront of developing issues related to new aquatic invasive species and impacts of climate change. To facilitate this process, we recently hired a full-time technician to assist in sample collection, as well as processing, analysis, and maintaining of a data base.

Federal Ask

As part of the New York Initiative for Lower Great Lakes Research, Restoration and Management, the GLC submitted a federal appropriations request for FY09 for the acquisition of a Lake Erie research vessel. This is Buffalo State College's only federal appropriations request and, thus, is our top priority. We requested a state of the art research boat with modern equipment that will allow us to conduct monitoring and initiate multiple research projects in collaboration with other SUNY institutions and various agencies in the US and Canada. The request totaled $2,000,000 and included a 60' research vessel, travel lift and floating dock, side scan sonar, various sampling equipment, electroshocking boat, buoy with automatic monitoring equipment, and analytical laboratory/field equipment. The request was sent to Congresswoman Louise Slaughter, Congressman Tom Reynolds, Senator Charles Schumer, Senator Hillary Clinton, and Congressman Brian Higgins.

Seminar

In order to facilitate the collaboration between GLC personnel and leading experts in aquatic ecology and related sciences and increase the visibility of the Center in 2007 – 2008, we invited 5 scientists to present their talks in our seminar, including:

- Dawn E. Dittman, USGS Tunison Laboratory (December 2007)
- Timothy Kratz, UW-Madison, Trout Lake Station (January 2008)
- Winfred R. Arnold, Copper Development Association Inc. (February 2008)
- Daniel P. Molloy, New York State Museum (April 2008)
- David Strayer, Cary Institute of Ecosystem Studies (April 2008)

Diving policy

In 2007 – 2008, we created and approved our dive policy to ensure the diving and snorkeling activities under the Auspices of the State University of New York College at Buffalo (BSC)/Great Lakes Center are conducted in a safe manner that:

1. Protects divers and snorkelers from accidental illness and injury; and
2. Complies with applicable diving regulations established by the Occupational Safety and Health Administration (OSHA).

This Policy and Procedure identifies the qualifications, safety protocols, and oversight responsibilities for Scientific Diving and Snorkeling operations and instructional/certification diving activities for obtaining "Scientific Diving" authorization from the BSC/GLC Diving Control Board (DCB). In particular, this policy and procedure governs Scientific Diving and Snorkeling associated with research into aquatic environmental conditions. Commercial diving activities are not authorized by this policy or the BSC Environmental Health and Safety (EH&S) Office and are therefore prohibited. This policy and procedure applies to individuals conducting Scientific Diving or Snorkeling activities under the Auspices of BSC/GLC. The requirements and equipment protocols herein shall be observed and apply to equipment rented, BSC/GLC owned, or privately owned, anywhere Scientific Diving or Snorkeling is performed under the Auspices of BSC/GLC.

VI. Publications and Presentations

Last year, the researchers of the Great Lakes Center were very active in publishing papers and presenting their results on international and national meetings and conferences. Twenty two manuscripts were published or are in press in peer-reviewed journals (in addition, six manuscripts have been submitted for review, and seven are being prepared). In comparison, only ten papers were published or were in press in 2006 – 2007. A total of 24 presentations were made by the GLC researches, including: 17 presentations at national/international conferences, 3 invited talks and 4 presentations in non-refereed venues. This is substantially higher than in 2006 – 2007, when a total of 15 presentations were made.

Refereed Journal Publications (Published/in Press)

Burlakova, L. E., A. Y. Karatayev, D. K. Padilla, L. D. Cartwright, and D. N. Hollas. 2008. Wetland restoration and invasive species: applesnail (*Pomacea insularum*) feeding on native and invasive aquatic plants. *Restoration Ecology*. DOI 10.1111/j.1526-100X.2008.00429.x

Campbell, J. L., L. E. Rustad, E. W. Boyer, S. F. Christopher, C. T. Driscoll, I. J. Fernandez, P. M. Groffman, D. Houle, J. Kiekbusch, A. H. Magill, M. J. Mitchell, and S. V. Ollinger. 2008. Consequences of climate change for biogeochemical cycling in forests of eastern North America. *Canadian Journal of Forest Research*. In press.

Christopher, S. F. and R. Lal. 2007. Nitrogen Management Effects Carbon Sequestration in North American Cropland Soils. *Critical Reviews in Plant Sciences* 26: 45-64.

Christopher, S. F., H. Shibata, M. Ozawa, and Y. Nakagawa. 2008. The effect of soil freezing on N cycling: Comparison of two headwater subcatchments with varying snowpack, Hokkaido, Japan. *Biogeochemistry* (In press).

Christopher, S. F., M. J. Mitchell, M. R. McHale, E. W. Boyer, D. A. Burns, and C. Kendall. 2008. Factors controlling nitrogen release from two forested catchments with contrasting hydrochemical responses. *Hydrological Processes* 22: 46-62.

Christopher, S. F., R. Lal, and U. Mishra. 2008. Long-term no-till effects on carbon sequestration in the Midwestern U.S. *Soil Science Society of America Journal* (In press).

Inamdar, S. P. 2007. Exports of dissolved ammonium (NH4+) during storm events across multiple catchments in a glaciated forested watershed. *Environmental Monitoring & Assessment* 133(1-3): 347-363.

Inamdar, S. P. and M. J. Mitchell. 2008. Sulfate exports from multiple catchments in a glaciated forested watershed in western New York, USA. *Environmental Monitoring & Assessment* 139: 227-245.

Inamdar, S. P. and M. J. Mitchell. 2007. Contributions of riparian and hillslope waters to storm runoff across multiple catchments and storm events in a glaciated forested watershed. *Journal of Hydrology* 341: 116-130.

Inamdar, S. P. and M. J. Mitchell. 2007. Storm event exports of dissolved organic nitrogen (DON) across multiple catchments in a glaciated forested watershed. *Journal of Geophysical Research* 112, G02014, doi:10.1029/2006JG000309.

Inamdar, S. P., J. M. Rupp, and M. J. Mitchell. 2008. Differences in dissolved organic carbon (DOC) and nitrogen (DON) responses to storm-event and groundwater conditions. *Journal of American Water Resources Association*. In Press.

Karatayev, A. Y., L. E. Burlakova, and S. I. Dodson. 2008. Community analysis of Belarusian lakes: correlations of species diversity with hydrochemistry. *Hydrobiologia* 65: 99-112.

Karatayev, A. Y., L. E. Burlakova, D. P. Molloy, and S. E. Mastitsky. 2007. *Dreissena polymorpha* and *Conchophthirus acuminatus*: What can we learn from host-commensal relationships. *Journal of Shellfish Research* 26:1153-1160.

Karatayev, A. Y., S. E. Mastitsky, L. E. Burlakova, and S. Olenin. 2008. Past, current, and future of the Central European Corridor for aquatic invasions in Belarus. *Biological Invasions* 10: 215-232.

Karatayev, A. Y., L. E. Burlakova, and D. K. Padilla. *Dreissena polymorpha* in Belarus: history of spread, population biology, and ecosystem impacts. In: The Zebra Mussels in Europe (G. van der Velde, S. Rajagopal and A. bij de Vaate, eds.). In Press.

Krakowiak, P. J. and C. M. Pennuto. Fish and macroinvertebrate communities in tributary streams of Eastern Lake Erie with and without round gobies (*Neogobius melanostomas* (Pallas 1814). *Journal of Great Lakes Research.* In Press.

Laali K. K., J.-H. Chun, T. Okazaki, S. Kumar, G. L. Boroski, and C. Swartz. 2007. Electrophilic chemistry of thia-PAHs: Stable carbocations (NMR and DFT), S-alkylated onium salts, model electrophilic substitutions (Nitartion and Bromination), and mutagenicity assay. *Journal of Organic Chemistry* 72: 8383-8393.

Molloy, D. P., L. Giamberini, L. E. Burlakova, A. Y. Karatayev, J. R. Cryan, S. L. Trajanovski, and S. P. Trajanovska. 2008. Investigation of the endosymbionts of *Dreissena stankovici* with morphological and molecular confirmation of host species. In: The Zebra Mussels in Europe (G. van der Velde, S. Rajagopal and A. bij de Vaate, eds.). In Press.

Mukherjee, J. J., S. K. Gupta, and S. Kumar. 2008. Inhibition of benzopyrene diolepoxide-induced apoptosis by cadmium(II) is AP-1-independent: Role of extracellular signal related kinase. *Chemico-Biological Interactions* 172: 72-80.

Pennuto, C. M. and D. A. Keppler. 2007. Short-term predator avoidance behavior of invasive and native amphipods in the Great Lakes. *Aquatic Ecology* DOI 10.1007/s10452-007-9139-6. In Press.

Riley, C., S. Inamdar, and C. Pennuto. 2007. Use of benthic macroinvertebrate indices to assess aquatic health in a mixed-landuse Great Lakes watershed. *Journal of Freshwater Ecology* 22:539-551.

Wang, Y., N. C. Schnetz-Boutaud, H. Kroth, H. Yagi, J. M. Sayer, S. Kumar, D. M. Jerina, and M. P. Stone. 2008. 3'-Intercalation of a N2-dG 1R-trans-anti-benzo[c]phenanthrene DNA adducts in an Iterated (CG)3 repeat. *Chemical Research in Toxicology* 21: 1348-1358.

Refereed Journal Publications Submitted

Karatayev, A. Y., L. E. Burlakova, V. A. Karatayev, and D. K. Padilla. Vectors of introduction, distribution, spread and impacts of exotic freshwater gastropods. *Hydrobiologia* (In review).

Karatayev, A. Y., L. E. Burlakova, V. A. Karatayev, D. K. Padilla, S. E. Mastitsky, and S. Olenin. Invaders are not a random selection of species. *Biological Invasions* (Accepted).

Mukherjee, J. J., S. K. Gupta, H. C. Sikka, and S. Kumar. Inhibition of benzopyrene-diol-epoxide-induced bax and caspase-9 by cadmium: Role of mitogen activated protein kinase. *Chemico-Biological Interactions* (In review).

Pennuto, C. M., P. J. Krakowiak, and C. E. Janik. Seasonal abundance, diet, and energy consumption of round gobies (*Neogobius melanostomus*) in Lake Erie tributary streams. *Journal of Great Lakes Research* (In review).

Pérez-Fuentetaja, A., S. Lupton, M. Clapsadl, F. Samara, L. Gatto, and D. S. Aga. Environmental sentinels: PCBs, PBDE and vitellogenin levels in wild common carp (*Cyprinus carpio*) from eastern Lake Erie. *Environmental Toxicology and Chemistry* (In review).

Pérez-Fuentetaja, A., S. Lupton, M. Clapsadl, F. Samara, L. Gatto, and D. S. Aga. Differences in bioaccumulative response of wild common carp (*Cyprinus carpio*) from Eastern Lake Erie to ambient levels of polychlorinated biphenyls and polybrominated diphenyl ethers. *Environment International* (In review)

Swartz, C. D., L. C. King, S. Nesnow, D. M. Umbach, S. Kumar, and D. M. DeMarini. Mutagenicity, stable DNA adducts, and abasic sites induced in *Salmonella* by phenanthro[3,4-*b*]- and phenanthro[4,3-*b*] thiophenes, sulfur analogs of benzo[*c*]phenanthrene. *Mutation Research* (In review).

Wang, Y., H. Yagi, J. M. Sayer, S. Kumar, D. M. Jerina, and M. P. Stone. 5'-Minor Groove Orientation of the 1*S-trans-anti*-Benzo[*c*]phenanthrene N^2-dG Adduct in a Non-Reiterated 5'-CXC-3' Oligodeoxynucleotide Sequence**.** *Chemical Research in Toxicology* (In review).

Refereed Journal Publications in Preparation

Burlakova, L. E., A. Y. Karatayev, D. K. Padilla, L. D. Cartwright, D. N. Hollas, and K. Nichol. Life history flexibility drives population dynamics and impact in a freshwater invader. To be submitted to *Biological Invasions.*

Christopher, S. F. and M. J. Mitchell. The effect of soil freezing on nitrogen dynamics: A snow manipulation study in a forested watershed in the snow belt of Gowanda, NY. To be submitted to *Ecological Applications*.

Karatayev, A. Y., D. Boltovskoy, V. A. Karatayev, and L. E. Burlakova. Could *Limnoperna fortunei* be a worse invader than *Dreissena polymorpha*? To be submitted to *Biological Invasions.*

Karatayev, A. Y., L. E. Burlakova, J. M. Vander Zanden, and R. C. Lathrop. Temporal and spatial variability in zoobenthos: application to long-term community changes. To be submitted to *Ecology.*

Piatek, K. B., S. F. Christopher, and M. J. Mitchell. Controls on the spatial temporal and dynamics of stream chemistry in a northern forest watershed. To be submitted to *Ecological Hydrology*.

Ruddock, P. J., S. Kumar, and H. C. Sikka. Disposition and metabolism of 2,4,2',4'-tetrabromodiphenyl ether (BDE-47) by rainbow trout (*Oncorhynchus mykiss*).

Ruddock, P. J., S. Kumar, and H. C. Sikka. Disposition and metabolism of 2,4,5,2',4'-pentabromodiphenyl ether (BDE-99) by rainbow trout (*Oncorhynchus mykiss*).

International/National Conference Presentations

Burlakova L. E., A. Y. Karatayev, I. Hung, K. Nichol, and D. Padilla. Distribution, density, and population dynamics of invasive applesnail *Pomacea insularum* in Southeast Texas. 15th International Conference on Aquatic Nuisance Species. September 23-27, 2007, Nijmegen, The Netherlands.

Burlakova, L. E., and A. Y. Karatayev. The Effect of Zebra Mussel Invasion on Benthic Communities in North American and European Lakes. IAGLR's 51st Annual Conference on Great Lakes Research (The International Association for Great Lakes Research), May 19-23, 2008, Trent University, Peterborough, Ontario.

Burlakova, L. E., and A. Y. Karatayev. Zebra Mussel Impacts on Wisconsin's Lakes: The effect of zebra mussel invasion on benthic communities of Wisconsin lakes and consequences for ecosystem functioning. 30th Wisconsin Lakes Convention, Green Bay, WI, April 17-19, 2008.

Burlakova, L. E., A. Y. Karatayev, J. M. Vander Zanden, and R. C. Lathrop. Temporal and spatial variability in zoobenthos: application to long-term community changes. 2008 American Society of Limnology and Oceanography Summer Meeting, 8-13 June 2008, St. John's, Newfoundland and Labrador, Canada.

Christopher, S. F., M. J. Mitchell, and S. Inamdar, The effect of soil freezing on nitrogen dynamics: A snow manipulation study in a forested watershed in the snow belt of Gowanda, NY. American Geophysical Union Fall 2007 Meeting Abstract No. B31A-0066.

Dong, N., and C. M. Pennuto. Effects of experience on predators avoidance behavior of native and invasive crayfish. Great Lakes Research Consortium Annual conference, Syracuse, NY.

Karatayev, A. Y., and L. E. Burlakova. Zebra mussel impacts on Wisconsin's Lakes: Long-term dynamics and current status of benthic community of Lake Mendota, and potential effects of Zebra mussels. 30th Wisconsin Lakes Convention, Green Bay, WI, April 17-19, 2008.

Karatayev, A. Y., L. E. Burlakova, D. K. Padilla, S. E. Mastitsky, and S. Olenin. How freshwater macroinvertebrate invaders differ from native species? IAGLR's 51st Annual Conference on Great Lakes Research (The International Association for Great Lakes Research), May 19-23, 2008, Trent University, Peterborough, Ontario.

15th International Conference on Aquatic Invasive Species in Nijmegen, The Netherlands, September 2007 – Marina Orlova (Institute of Zoology Russian Academy of Sciences), Alexander Karatayev, Lyubov Burlakova, Sergey Mastitsky, and Dianna Padilla (Stony Brook University).

Great Lakes Center affiliates at ASLO Conference in Canada, 2008 – Lyubov Burlakova, Alicia Pérez-Fuentetaja, Mark Clapsadl, Randal Snyder, Howard P. Riessen and Alexander Karatayev

Karatayev, A. Y., L. E. Burlakova, D. K. Padilla, S. Olenin, and S. E. Mastitsky. Invaders are not a random selection of species. 15th International Conference on Aquatic Nuisance Species. September 23-27, 2007, Nijmegen, The Netherlands.

Karatayev, A. Y., L. E. Burlakova, S. E. Mastitsky, and S. Olenin. Aquatic exotic species in Belarus: past, current and future invasions. 15th International Conference on Aquatic Nuisance Species. September 23-27, 2007, Nijmegen, The Netherlands.

Karatayev, A. Y., L. E. Burlakova, D. K. Padilla, S. E. Mastitsky, and S. Olenin. Aquatic invaders are not a random selection of species. 2008 American Society of Limnology and Oceanography Summer Meeting, 8-13 June 2008, St. John's, Newfoundland and Labrador, Canada.

Mukherjee, J. J., and S. Kumar. AP-1-independent inhibition of benzopyrene diol epoxide-induced apoptosis by Cadmium: Role of ERKs. American Association for Cancer Research Annual Meeting at San Diego, CA, April 12-16, 2008.

Pennuto, C. M., Krakowiak, P. J., and C. E. Janik. Seasonal abundance, diet, and summer energy consumption of round gobies (*Apollonia melanostoma*) in Lake Erie tributary streams. 15th Annual International Conference on the St. Lawrence River / Great Lakes, Cornwall, ONT, 2008.

Lobster dinner during the ASLO Conference, 2008

Pennuto, C. M., P. J. Krakowiak, and C. E. Janik. Seasonal abundance and summer energy consumption by round gobies (*Apollonia melanostoma*) in Lake Erie tributary streams. IAGLR's 51st Annual Conference on Great Lakes Research (The International Association for Great Lakes Research), May 19 – 23, 2008, Trent University, Peterborough, Ontario.

Pérez-Fuentetaja, A., S. Lupton, M. D. Clapsadl, L. Gatto, and D. S. Aga. Endocrine Disrupting Chemicals in Eastern Lake Erie Fish and Vitellogenin Response. 2008 American Society of Limnology and Oceanography Summer Meeting, 8-13 June 2008, St. John's, Newfoundland and Labrador, Canada.

Rupprecht, S., and C. M. Pennuto. Assessing barriers to round goby (*Apollonia melanostoma*) invasion of Great Lakes tributary streams. Great Lakes Research Consortium Annual Conference, Syracuse, NY. This presentation won Best Poster award at the conference.

Young, B. A., and C. M. Pennuto. Context dependency and the role of intraguild predation in invasion success of amphipods in the Great Lakes. Great Lakes Research Consortium Annual Conference, Syracuse, NY.

Conference Presentations (Non-Refereed)

Christopher, S. F., and M. J. Mitchell. The effect of soil freezing on nitrogen dynamics: A snow manipulation study in a forested watershed in the snow belt of Gowanda, NY. 8th Annual Faculty and Staff Research and Creativity Fall Forum. Buffalo State College, Buffalo, NY. November 8, 2007.

Pérez-Fuentetaja, A., M. Clapsadl, and D.S. Aga. Determination of Plasma Vitellogenin and Concentrations of PBDEs and PCBs in Wild Carp from Lake Erie. Eight Annual Faculty Research and Creativity Fall Forum. Buffalo State College.

Mukherjee, J. J. Inhibition of PAH-induced apoptosis by cadmium (II) is AP-1-independent and associated with ERK up-regulation., Presented in Research and Creativity Fall Forum at Buffalo State College, 2007.

Kumar, S. Analysis of DNA adducts in TA100 strain of Salmonella typhimurium treayed with highly mutagenic phenanthro[3,4-b]thiophene and its potential metabolites., Presented in Research and Creativity Fall Forum at Buffalo State College, 2007.

Invited Talks

Pérez-Fuentetaja, A., S. Lupton, M. D. Clapsadl, L. Gatto and D. S. Aga. Environmental Sentinels: PCB, PBDE and Vitellogenin Levels in Wild Carp from Lake Erie. Toxicology Dept., Cornell University. February 29, 2008.

Pennuto, C. M. Dynamics of insect symbioses in streams of southern Maine. Invited presentation: University of Buffalo, Ecology and Environmental Biology Seminar Series, March 2008

Burlakova, L. E. Temporal and spatial variability in zoobenthos: application to long-term community changes in Lake Mendota. Invited Seminar at the Cornell University Biological Field Station, Bridgeport, NY. June 17, 2008.

Karatayev, A. Y. Invaders are not a random selection of species. Invited talk at the Cornell University Biological Field Station, Bridgeport, NY. June 17, 2008.

VII. Service Activities

Members of the Great Lakes Center have been active in service to the profession, to the College, and to the community.

Professional Service

Alicia Pérez-Fuentetaja

- Moderator and Judge at Student Conference: Great Lakes Research Consortium Conference. March 16-17. SUNY-ESF, Syracuse, NY;
- Scientific reviewer for preparation of a FAQ page on Botulism in the Great Lakes for the Sea Grant webpage;
- Reviewer for *Canadian Journal of Fisheries and Aquatic Sciences*;
- Reviewer for *International Journal Great Lakes Research*.

Caleb P. Basiliko

- Member Great Lakes Association of Science Ship;
- Member International Association of Mates and Masters.

Jagat J. Mukherjee

- Reviewer for the *Journal of the National Cancer Institute*;
- Member, MS thesis committee for Alice DelToro.

Subodh Kumar

- Reviewer for *Chemical Research in Toxicology, Archiv der Pharmazie, Current Medicinal Chemistry*;
- ARKIVOC (Serves in Editorial board).

Sheila Christopher

- Member of Technical Advisory Group for a Watershed Management Plan along the Cattaraugus Creek (southwestern, NY, 5 counties);
- Reviewer for *Plant and Soil*;
- Reviewer for USDA NRI Large Grant Program.

Christopher Pennuto

- Reviewer, National Science Foundation, DEB, Biological Infrastructure, March 2008;
- Workshop Co-presenter with D. Derrick and P.: Stream Ecology, Biomonitoring, and Restoration. This activity was a 1-day workshop presented for the UB Dept of Civil and Environmental Engineering Dept;
- Judge, Student presentations, Great Lakes Research Consortium annual conference, Syracuse, NY, March 2008.

Lyubov E. Burlakova

- Reviewer for *Biological Invasions*;
- Reviewer for *Aquatic Conservation: Marine and Freshwater Ecosystems*;
- Reviewer for *Aquatic Invasions*;
- Advised invasive species coordinators from Barataria-Terrebonne National Estuary Program and USGS National Wetlands Research Center in Lafayette, Louisiana on biolody, ecology, spread and control of invasive snail *Pomacea insularum*;
- Advised specialists from Geneva Lake Environmental Agency in Wisconsin on sampling methods to estimate density and population size of invasive bivalve *Dreissena polymorpha*.

Alexander Y. Karatayev

- Reviewer for *Biological Invasions*;
- Reviewer for *Austral Ecology*;
- Reviewer for Application for tenure of Dr. Shirley Baker at the University of Florida.

Campus Service

Caleb Basiliko

- Assisted with sampling for mussels in Texas;
- CERT volunteer;
- Member of Evergreen Committee;
- Assist students and researchers with field work;
- Trained and certified students to operate small boats;
- Dive Safety Officer and chair of Dive Control Board.

Sheila Christopher

- Mentor Summer (2008), Great Lakes Center Technician, Christopher Janik.

Mark Clapsadl

- Coordinator for the Aquatic Internship Program in the Biology Department.

Alicia Pérez-Fuentetaja

- Member of the Graduate Committee;
- Member of the Communication Committee;
- Member of Graduate Committee for students:
    - Bryan Young (Advisor: Dr. Pennuto)
    - Nini Dong (Advisor: Dr. Pennuto)

    - Shannon Rupprecht (Advisor: Dr. Pennuto)
- ~ Major Advisor Graduate Student: Eric Snyder;
- ~ Advised Undergraduate students.

Alexander Karatayev

- ~ Campus Representative for Great Lakes Research Consortium.

Subodh Kumar

- ~ Radiation Safety Committee;
- ~ New Science Building Renovation Committee;
- ~ Chemical Hygiene Committee.

Christopher Pennuto

- ~ Faculty advisor, NASO (Native American Student Organization);
- ~ Faculty advisor, Biology Club;
- ~ Chair, Biology Department Graduate Committee;
- ~ Advisory Board Member, McNair Scholars Program;
- ~ Member, Search Committee for a joint Great Lakes Center/Geography & Planning;
- ~ Invited Panelist: Valuing Science. Sponsored by BSC, November 2007;
- ~ Hooder at Master's graduation ceremony in May 2008.
- ~ Major advisor: Nini Dong, Biology M.A.;
- ~ Major advisor: Bryan Young, Biology M.A.;
- ~ Major advisor: Shannon Rupprecht, Biology M.A.;
- ~ MA thesis committee member for Noelle Raymon and Jackie Walters;
- ~ MS Ed Adviser to the following:
    - Stephanie Gugino
    - Reva Gilbert
    - Joy Stoddard
    - Rich Walton
    - Jennifer Benson

Community Service

Caleb Basiliko

- Organized and ran the Scajaquada Creek Cleanup;
- Ongoing volunteer work with Sea Scouts at the FS;
- Assist Buffalo Underwater Recovery Team with training;
- President of Grant Amherst Business Assn;
- Vice President of Grant Amherst Block Watchers;
- Vice President of the Canadiana Preservation Society;
- Site Captain of Buffalo Niagara Riverkeepers;
- 12th Annual Halloween Haunted Sidewalk for neighborhood children;
- Assisted the Lake Champlain Maritime Center bring their replical vessel "Lois McClure" to Buffalo by towing the vessel from the Erie Canal;
- Good Neighbors Planning Alliance committee member.

Sheila Christopher

- Mentor for school children through NSF funded, Science Firsthand, Buffalo, NY.

Mark Clapsadl

- Organized Buffalo State College participation in providing assistance to NYS Department of Environmental Conservation Lake Trout stocking in Eastern Lake Erie.

Christopher Pennuto

- Presenter, "Considering Science Careers". Presentation to 3 classes of 8th graders at School 19, Buffalo.

Alicia Pérez-Fuentetaja

- Assistance to Chiara Zuccarino-Crowe, US- Environmental Protection Agency, as scientific advisor for issues concerning Botulism in the Great Lakes;
- Assisted Susan Peterson Gateley on information regarding the botulism outbreaks in Lake Ontario for a book she is writing (second edition review) on Lake Ontario's natural history;
- Assisted and reviewed an article assigned to Noreen Parks by the journal Environmental Science and Technology on the botulism outbreaks in the Great Lakes;
- Attended and participated as a board member in the Buffalo Public Schools Career and Technical Education program. January 30th, 2008;
- Attended the State of Lake Erie Conference at Hamburg organized by NY Sea Grant, April 3rd, 2008;
- Judge at Student Conference: Great Lakes Research Consortium Conference. March 14-15. SUNY-ESF, Syracuse, NY.