

INTERDISCIPLINARY COASTAL MANAGEMENT RESEARCH AT UNB



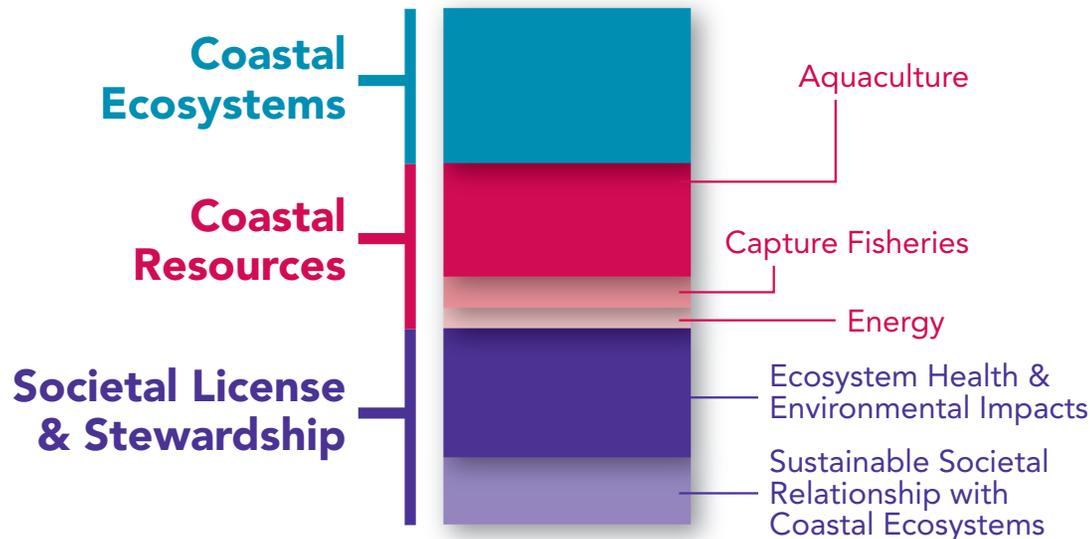
Coastal areas are home to nearly half of the world's population (UN), and account for an estimated 61% of the world's gross national product (World Bank).

Coastal ecosystems are undeniably under stress. They are also inherently complex. As a home and shared resource to many communities and interests, the best available natural, economic and social science research, along with community and industry engagement, must be applied to ensure sustainability and resilience. The University of New Brunswick (UNB) has deep interdisciplinary research expertise in the various fields that contribute to an understanding of the coastal ecosystem/economy, as well as humanity's complex relationship with the coast. Biologists, anthropologists, geographers, mathematicians, economists, computer scientists, engineers, and

other practitioners – all provide significant research in both fundamental and applied science to support more sustainable practices related to our coasts and coastal waters.

UNB conducts extensive research related to the physical and biological dynamics of the coast's varied, complex, and changing ecosystems. This includes imaging and modeling of sedimentation and circulation within harbours, as well as biodiversity and spatiotemporal studies in estuary and rocky subtidal/intertidal habitats. Phylogenetics, ecological genomics, evolutionary ecology, and physiology research is carried out in the study of marine organisms that range from the microbial to the complex (e.g., phytoplankton, macroalgae, invertebrates, fish, seabirds and mammals). UNB is also a major contributor to the marine biodiversity initiative of the International Barcode of Life (iBOL) project. The university engages in considerable fundamental research in ecological and population dynamics (e.g., reproduction, migration, and recruitment) of marine invertebrates, such as lobster and the soft shell clam. These studies support the making of evidence-based management decisions for commercially-important species.

Research Focus Areas



Applied research supporting the sustainable management of numerous coastal resources is another UNB strength. The university is a founding member of the NSERC Canadian Fisheries Research Network (CFRN) – a unique collaboration of academic researchers, the fishing industry, First Nation groups, and government researchers from across Canada. Research into the sustainable practice of integrated multi-trophic aquaculture (IMTA) is being intensively pursued. IMTA combines the cultivation of fed species (e.g., fish) with extractive species (e.g., seaweed, shellfish, and other invertebrates) to create a balanced, ecosystem-based management approach.

Applied finfish aquaculture research is directed primarily at species like salmon and cod, with focus on physiology and genetics – to maximize the growth and health of fish, while minimizing risk and impact to surrounding ecosystems. The aquaculture industry also benefits from engineering research aimed at developing innovative equipment and processes. Energy represents another important coastal resource. UNB researchers are designing and developing technologies to harness wind, wave, and tidal power, as well as exploring the viability of algae as a bioenergy resource.

UNB researchers are active in monitoring the health of coastal ecosystems, and the measuring of impacts to the coastal environment – including their economic effects. Other research explores sustainable approaches to managing society’s relationship to the ecosystem, including conservation, remediation, participatory governance, and spatial planning. Valuable knowledge and innovations gained through UNB research and collaboration find applications around the world.

45

Average number of faculty undertaking research in this area each year

\$5.4 million

Average amount of funding received for research in this area each year

80

Average number of research projects in this area each year

16 Faculties and Departments pursuing research in this area

- **Arts (Fredericton)**
 - Anthropology
 - Economics
 - Sociology
- **Computer Science**
- **Engineering**
 - Chemical Engineering
 - Civil Engineering
 - Electrical and Computer Engineering
 - Geodesy and Geomatics Engineering
 - Mechanical Engineering
- **Forestry and Environmental Management**
- **Science**
 - Biology
 - Chemistry
 - Earth Sciences
 - Mathematics and Statistics
- **Science, Applied Science and Engineering**
 - Biological Sciences
 - Computer Science

4 Facilities and Groups conducting research in this area

- **Institutes and Centres**
 - Canadian Rivers Institute (CRI)
- **Labs and Research Groups**
 - Centre for Environmental and Molecular Algal Research (CEMAR)
 - Ocean Mapping Group
 - Seaweed and Integrated Multi-Trophic Aquaculture (IMTA) Research Laboratory

7 Research Chairs engaging in research in this area

- **Canada Research Chairs**
 - Aquatic Molecular Ecology and Ecological Genomics
 - Chemical Contamination of Food Webs
- **Other Research Chairs**
 - Chemical Process and Catalysis
 - Molecular Systematics and Biodiversity
 - Ocean Mapping
 - Vaughn Chair in Economics
 - Wildlife Ecology