

**SAINT JOHN HIGH SCHOOL**

**MARINE BIODIVERSITY: COMING TO TERMS WITH THE FUTURE**

**A DISSERTATION SUBMITTED TO  
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MARINE BIODIVERSITY ESSAY CONTEST**

**BY**

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*“Man's attitude toward nature is today critically important simply because we have now acquired a fateful power to alter and destroy nature. I truly believe that we in this generation must come to terms with nature, and I think we're challenged as mankind has never been challenged before to prove our maturity and our mastery, not of nature, but of ourselves”*

– From Rachel Carson's Silent Spring

## Introduction

The field of *marine biodiversity* is concerned with the following questions: “what lived in the oceans, what lives in the oceans, and what *will* live in the oceans?” (CMB, 2003). The Census of Marine Life was recently established as an insightful ten year program designed to investigate this comprehensive three part inquiry. The founding of this census suggests that these issues have become a political focal point of concern for the economy. Why, exactly, are these questions of such vital importance, and what major role does the mysterious world of marine life play in our own lives?

Dr. Gerhard Pohle states in a work for The Saint Croix Courier, that “humanity depends upon biodiversity for the very sustenance of life... it may be considered as the sum of living resources... our natural capital” (Pohle, 1999). Intense local economical expansion in regions surrounding our oceans is having a ruinous effect on this capital. Extinction must be accepted as a natural process; nevertheless, while our economy is expanding, the rate of extinction is now accelerating. Offshore oil and gas, pollution, over-harvesting, and global warming are all factors that are influencing our diverse marine populations. While research and development efforts concerning these processes are well in place, the issue of insufficient knowledge and concern from the economic sector is acting as a road block.

There is a lack of scientific knowledge concerning the variety of marine life in Canada and the processes that effect it. This is the greatest obstacle standing between our Canadian researchers and their goal of conserving *marine biodiversity*. Recognizing this problem, the Census of Marine Life has begun to provide funding for marine biodiversity research institutes.

In recent years, research communities funded by the Census of Marine Life have recognized the crux of there being very little public awareness towards biodiversity in the Maritimes. The lack of concern coming from the uninformed working population will be difficult for marine biological enthusiasts to change.

It becomes apparent from these problems that two goals must be achieved in order to stop the accelerating pace of biodiversity loss in Canada. The *first goal* is to establish a *national* effort towards uncovering further knowledge about the extent of biodiversity in our oceans. The *second goal* is to establish a method of educating our country’s young people on the scientific and economic importance of biological diversity. Only when these two goals are realized can the stability of the Maritime’s largely marine-dependent economy, and the oceans that facilitate its growth, be ensured.

### **Explanation of Biodiversity and Marine Biodiversity**

To fully comprehend the importance of achieving these goals, the basic concepts of biodiversity must be understood. Biological diversity – or biodiversity – can be defined as the heterogeneity of life forms on Earth. While a total of approximately 1.75 million species have been accounted for, there have been estimates made by scientists suggesting that there could be anywhere from 3 million to 100 million species currently in existence on Earth (Convention on Biodiversity, 2002). These are unfathomable numbers in the human mind, but each of these species has an important place in the “intricate living assemblage that has evolved over millions of years” (Pohle, 1999).

There are three distinct branches of biodiversity. The branch of biodiversity concerning different species and their relative abundance is known as *species biodiversity*. Small differences within each species’ genetic makeup are also an integral part of biodiversity. This branch is known as *genetic diversity*. Equally significant is yet another branch of biodiversity called *ecosystem* or *habitat diversity* which deals with the many environments in which organisms may dwell. In the example of marine biodiversity, the ecosystems dealt with are those that qualify as oceans or seas. The presence of species diversity, genetic diversity, and ecosystem diversity, in relation to marine life, is referred to as *marine biodiversity*.

### **The Problem of Industrialization and Lack of Public Awareness**

It has been established that there is a public awareness problem concerning the effects that economic growth is having on the range of biodiversity in Canada’s marine habitats. According to Dr. Gerhard Pohle, “the general belief is that biological diversity is necessary for a healthy and sustainable environment since all living things are dependent on each other” (Pohle, 1999). Pohle also makes the analogy that “like a house of cards, when you start taking away increasing numbers of components of this intricate living assemblage... one increases the chances of ‘collapse’ of the system” (Pohle, 1999). Unfortunately the sudden importance of these facts has not yet been integrated into the everyday decisions of the economical sector.

From the advent of agriculture, we have devised complex methods to consume more and more of the earth’s natural resources, in order that we may possess sufficient amounts of food and supplies. What can no longer remain without consideration is the consequent degradation of the environment that has recently escalated. A choice example of this degradation concerns fish - one of the most beneficial marine resources that humans historically relied upon for many thousands of years. Due to the rapid advancement of fishing techniques and growing economical demands in the last hundred years, communities have lost the fisheries that have provided food and steady work for countless decades. Massive ships, using sonar guiding technology, can pinpoint exact locations of large schools of fish and then proceed to swallow them up using nets larger

than imaginable (CoBD, 2002). The effect of over-harvesting and other such industrial fall-outs (e.g. pollution, global warming) is devastating.

### **The Convention on Biological Diversity**

It was in 1992 that the world officially came together in a common determination to protect our planet's resources. At the Earth Summit in Rio de Janeiro, the leaders of political parties across the globe collectively decided on an inclusive strategy for what has been deemed "sustainable development" (CoBD, 1992). It is a plan that will hopefully "meet the growing economic needs of the world, while ensuring that we leave behind us a viable and healthy planet Earth for the following generations" (CoBD, 1992). The *Convention on Biological Diversity* is one of the most significant agreements that arose from the summit. The Convention established three main goals: "the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources" (CoBD, 1992).

Since the Convention was put in place in 1992 it has initiated "national action plans" (CoBD, 2002) in over 100 countries, one of these countries being our own. Canada signed the international Convention on Biological Diversity in the mid-1990's (CMB, 2003), and by signing on as a member country, our nation undertakes the responsibility of identifying the magnitude of biodiversity throughout our territory, and also the responsibility of researching methods on how to conserve or enhance this diversity. For the ocean regions of Canada this means studying the wealth of marine diversity caused by evolution, and researching methods of sustaining the existing marine populations. Considering that Canada has the longest coastline of any nation in the world, it becomes an immediate priority that we deal with the obstacles preventing the advancement towards the conservation of biodiversity in our oceans.

### **The Knowledge Problem**

More than 1,600 scientists worldwide declared together in January of 1998 that Earth's ocean is in jeopardy (BBSR, 2002). They share the same concern that on national and international levels, the lack of knowledge concerning marine biodiversity in our oceans is so extreme that it is "compounding" (BBSR, 2002) the problem of biodiversity loss. This issue is significant in Canada.

### **The *First Goal*: Establishing a National Research Effort**

A plan of action must be devised to expand the scope of our knowledge concerning the variety of marine species in our oceans. This is the *first goal* that must be achieved in order to conserve marine biodiversity in Canada. The Centre for Marine Biodiversity (CMB) in Dartmouth, Nova Scotia, recently released a draft of their "National Biodiversity Plan" (CMB and CoML, 2002), which outlines the following goals: "identify the present knowledge and knowledge gaps about marine biodiversity in Canada's three oceans; identify the present state of knowledge on major processes affecting biodiversity; develop a 5 – 10 year plan outlining data collection and research

directions to address gaps; and establish a national committee on marine biodiversity to implement and adapt the plan” (CMB and CoML, 2002). With the development of the CMB’s plan, an initiative has been taken by the scientists of Canada to follow through on their nation’s commitment to the international Convention on Biological Diversity.

What stands out most about the CMB’s plan is that it identifies the need for a *national* effort. Besides being legally required by the Convention on Biological Diversity to commit to a national effort, it would also enforce a close correspondence between marine biological researchers, the government, and industrial businesses. The importance of forming this alliance is so that proper research can be done on behalf of all three parties concerning the development of processes that may have an affect on marine biodiversity. Without national unity, the common goal of preserving marine biodiversity cannot be reached.

### **The *Second Goal*: To Capitalize on the Potential of Our Young People**

The *second goal* must be to establish a method of educating Canada’s young people concerning the importance of biodiversity. This relates not only to the immediate problems within our oceans, but also to the future research of marine biodiversity in Canada. There are many research facilities which must be maintained here in the Maritimes, such as the Huntsman Marine Science Centre, the Centre for Marine Biodiversity, and the University of New Brunswick Saint John’s marine biology program. We must ensure that interest levels in the field of marine biology remain high, for it is the up and coming youth that will carry the responsibility of utilizing these facilities. These youth must be made aware of Canada’s commitment to the International Convention on Biodiversity.

Not only are Canada’s young people the future of marine biological research, but they will also be indirectly involved with the future of marine biodiversity. The business leaders and economists of the past have not been adequately informed on the importance of maintaining marine biodiversity in Canada. This has dealt staggering blows to our economy, one of the most significant being the loss of the northern cod population in Newfoundland. This was a result of over-harvesting. The need for citizens in Atlantic Canada to have a basic understanding about marine biodiversity is crucial, so that problems like these may not develop in the future.

Besides this, the young people of Atlantic Canada have a *right* to know how important an issue marine biodiversity has become in recent years. In his article titled “Biodiversity – what’s the big deal?”, Dr. Pohle quotes Elliot Norse as saying “the level of concern about the health of the sea resembles that accorded to rainforests” (Pohle, 1999). A problem of this magnitude carries the potential to affect the Maritime economy and may also pertain to certain ethical issues. Some enthusiasts believe that humans do not have the right to significantly alter the lives of other species. Without education concerning the issue of biodiversity, ethical dilemmas may also arise.

## Education Solutions in the Secondary School System

There is a feasible method of increasing the awareness of Canada's young people to issues concerning biodiversity. This could be most readily carried out by government sponsored marine biodiversity organizations. The youth of Canada *must* be educated in the basic significance of marine biodiversity and its connection to the economy. The most efficient way of accomplishing this would be to introduce a section on the significance of biodiversity into the standard education curriculum. As a starting point, the Center for Marine Biodiversity, with the aid of the Census of Marine Life, can devise a plan for a generalized education program that could be introduced in standard high school biology courses, economics courses, and political science courses. International institutes such as the Bermuda Biological Station for Research offer sample lesson plans concerning biodiversity (BBSR, 2003).

In New Brunswick there is a well established biodiversity section in the advanced grade 12 International Baccalaureate Biology course at Saint John High School, which involves a trip to the Huntsman Marine Science Center to participate in a number of marine biodiversity labs. Students involved in this program may also be required to present to the class a research seminar on the importance of biodiversity. This section could easily be adopted by the standard education program, and could be redesigned in order to suit students taking standard level biology. The program would have two positive results: heightened awareness of students hoping to go into future economical careers *and* greater enthusiasm towards careers in marine biological research.

## Conclusion

These are two goals which must be achieved in order to ensure the conservation and enhancement of marine biodiversity in Canada. While the *first goal* will secure a national unity around marine biodiversity, the *second goal* will ensure that future generations are able to avoid making the critical mistakes that past generations have made due to a lack of awareness.

One may imagine the Atlantic Canadian economy as the gear train in a mainspring clock, and marine biodiversity as the spring. If the spring is not tightened periodically, the gear train slows down, and gradually the clock becomes less and less accurate at keeping time. In the case of our economy, the spring – marine biodiversity – has missed its periodic adjustments. Any further loss of marine biodiversity could potentially cause the Atlantic Canadian gear train to lose the impulsive productivity it has carried through many proud decades.

Fortunately, there are solutions which could be realized in the near future. The first significant step in the right direction was made in 1992 with the establishment of the Convention on Biological Diversity. Now, in 2003, ambitious marine biodiversity research centres have been established here in Atlantic Canada so that the foundation of our economy may be conserved. The recently released draft of the National Biodiversity Plan (CMB, 2002) shows that the goal of making marine biological research a strongly

unified national effort is a concept under certain consideration. This goal must be achieved. Furthermore, we must capitalize on the potential of the bright young people in our nation, and raise the awareness level of the youth in our country to the issues concerning marine biodiversity. In conclusion, as Rachel Carson suggested in Silent Spring some time ago, we must now become fully aware of nature, because we have now developed the means of destroying it.

- **Matthew Ryan Higgins**

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