

## Algee 1

I have been interested in a science career since my freshmen year of high school. My curiosity prompted the opportunity to attend two summer sessions at the Acadia Institute of Oceanography (AIO) in Maine as well as an AIO course in tropical marine biology in Jamaica. These experiences taught me basic techniques needed for success in scientific research, such as quadrat sampling, beach profiling, Secchi disk operation, and artificial induction of external fertilization.

My increasing knowledge of marine science led to my expanding interest in the policies needed to protect the resources of the world's oceans. I entered a debate competition in which marine policies were analyzed in great depth and scientific research was used to support arguments; my partner and I advanced to 1<sup>st</sup> in the National Qualifier competition (National Forensics League, Policy Debate). My passion continued to build as I attended the Environmental Leadership Lab at Brown University and examined the underlying concepts of nature appreciation and risk prevention.

When entering college, I chose to major in Marine Biology due to my aforementioned fascination with ocean science as well its impact on human life. Still, the biologically-rich waters of our planet never cease to heighten my excitement about science. I have completed courses with lab components in Chemistry, Biology, Ocean Science, Technical Physics, and Marine Botany, as well as non-lab courses Design and Applied Statistics in Science. By this upcoming summer, I plan to have also completed courses in Marine Zoology, Marine Ecology, Cell Biology, and Research Preparation. Additionally, I attended a two-week intensive course in Tropical Marine Science in Tobago, W.I., where I completed three instructor-directed projects as well as an independent project on algal population characteristics of a small rocky intertidal area.

During my time at Maine Maritime Academy, I have found that countless academic areas contribute to a full understanding of the world's oceans, from the physics of waves and chemistry of aqueous solvents to the behavioral patterns of marine mammals and cultivation of new botanicals. I find it particularly important to focus on connection to of human health, especially considering that marine species can serve as model organisms. Studies on sea urchins, for example, have helped improve technologies such as test tube fertilization for sterile couples and thus greatly improved

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their quality of life. Even some the sunscreens we use to prevent skin cancer and premature aging are derived from amino acids produced by symbiotic corals.

Looking toward a career in environmental law, with a focus on marine policy, I hope to play a role in decreasing the risks facing our oceans. Chemical contaminants, sound pollution, unsustainable fishing practices, coral bleaching, and desalinization of the ocean represent only a fraction of the problems facing our sensitive marine environments. Although many scientists, policy-makers, seafarers, fishermen, and coastal management employees agree about the serious impact of these risks, it has been difficult to establish concrete plans to preserve ocean health on a global basis. I believe that marine laws must be reviewed and amended, new policies must be established, and enforcement must be standardized and strengthened.

As a marine biologist, I am concerned about many aspects of ocean health. I believe that one of the greatest problems facing our oceans today is non-point pollution, especially run-off contaminants. Studying the ecology of and the anthropological effects on watersheds is thus a pivotal step in understanding and preventing problems such as eutrophication of coastal waters. For example, regulating the use of agricultural fertilizers in land-based ecosystems would reduce the severity of nitrogen and phosphorous addition to the marine ecosystem. I thus realize the importance of considering the relationship between impacts of ecological disturbances on land and in the ocean.

I also believe that the effectiveness of strategies to prevent anthropologically-caused ocean pollution relies heavily on the ability of both policy-makers and law-abiding citizens to undergo a paradigm shift from a reactionary approach to a precautionary approach; the advancement of “green” technology is the necessary stepping stone in this essential shift. For example, another significant problem facing our oceans today is eutrophication (induced by both point and nonpoint sources of nitrogen and phosphorus pollution). The prevention of eutrophication is an issue that shows how technology can aid conservation efforts. I believe that the first step in establishing effective policies to prevent eutrophication should be regular monitoring, using technologies designed to analyze primary productivity as an indication of eutrophication, *e.g.* the measurement of radioactive carbon isotope uptake. Ideally, Biological Nutrient Removal (BNR) technology should be introduced to waste water plants serving the

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C<sup>14</sup>-identified areas of vulnerability. BNR technology has the power to remove bloom-inducing concentrations of nitrogen and phosphorus in a variety of climates. Recent advances in BNR technology include primary sludge fermentation, the shortening of bioreactor time, inexpensive real-time monitoring, and feed-forward control mechanisms. I believe that funds for government grants should be set aside for companies that are willing to invest in and implement the aforementioned technologies, providing an economic resource that will hopefully encourage willingness to comply with policies enforcing reduced pollution. I believe that an understanding of marine and environmental law will allow me to further such efforts in encourage positive changes.

In conclusion, I intend to use my background in science to protect the ocean for the benefit of future generations. I hope to represent the fragile ocean ecosystems that can no longer repair themselves due to devastating acute and chronic human impacts. A dual education in the Marine Sciences and Law/Policy will be necessary to bring together solutions for ocean environments and the power to initiate actions for change. My passion to protect marine life is best summarized with my favorite quotation: “I am I plus my surroundings; and if I do not preserve the latter, I do not preserve myself (José Ortega y Gasset, 1914)”.