

Marine pollution

A case study of oceanic pollution and how it affects the ecosystem.

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Introduction

The study of the ocean is a valuable undertaking in that it provides a greater understanding about the world and how all things living and non-living are dependent on the stability of the marine environment. A reciprocal relationship exists between humans, living organisms as well as non-living organisms and when corrosive elements are added the effects are widely spread. This study examines the influence of a healthy marine environment versus that of an unhealthy one.

Important factors

The oceans cover more than seventy-percent of the earth's surface. They contain ninety-nine percent of the living space on earth.¹ Oceans, lakes, rivers, streams, estuaries and wetlands are all components of the aquatic ecosystem. An ecosystem is a natural environment that requires the cooperation and interaction of both living and non-living entities to provide a stable environment. Ecosystems operate day to day by exchanging energy. The ecosystem provides a cycle of exchanged energy between the physical and biological components. The cycle is a system of co-dependency where each participant depends on each other for survival.² "We have a connection to all

¹ "Why the Oceans are Important" USF College of Marine Science Project Oceanography <<http://www.marine.usf.edu/pjocean/index.htm>>. [accessed 20 February 2005].

² "Aquatic Ecosystems" USF College of Marine Science Project Oceanography <<http://www.marine.usf.edu/pjocean/index.htm>>. [accessed 19 February 2005].

living things in the ocean, from the microscopic floating plants that supply us with the oxygen we breathe, to the huge blue whale that fills its belly with a ton of krill”.³ Biosphere is the circle of life that includes all living things in the air, land and water. The biosphere includes biotic factors such as living plants and animals it also includes abiotic (non-living) factors such as soil, water, temperature, light and salinity. Together they function as anecosystem. The abiotic factors help the ocean to work. Phytoplankton which is the base of the food chain need light, nutrients and CO2 to photosynthesize.⁴ One of the most important reasons for protecting the ocean is to maintain biodiversity of the earth. Biodiversity is the number of different species that are able to be supported by the ocean. Estuaries, coral reefs and mangroves provide for high biodiversity. Estuaries are water systems that empty into the oceans, supporting many fish and other organisms. Coral reefs and estuaries sustain seventy-five percent of all commercial fish and shellfish. Organisms flock to these sites because of the wealth of food and the excellent protection from harm. Mangroves act as nurseries and filtering systems for coastal waters. They also provide protection against shoreline erosion and flooding.⁵ Since Florida is a coastal state mangroves are vitally important. The problem arises from the fact that the number of increasing housing developments is drastically decreasing mangroves. This is the main reason why flooding is major problem in Florida’s largest communities including the Tampa Bay area. There is simply

³ “The Oceans Biosphere: From Microbes to Mammals” USF College of Marine Science Project Oceanography <<http://www.marine.usf.edu/pjocean/index.html>>. [accessed 19 February 2005].

⁴ “Oceans Biosphere: From Microbes to Mammals”

⁵ “Why the Oceans are Important”

nowhere for the water to go when natural agents are taken away. The oceans provide many great benefits which is why the need for protection is necessary.

Indications of Problem

Pollutants affect the entire aquatic community.⁶ According to the EPA, the major threat to coastal waters is from urban runoff. Runoff is the water that runs over the city streets picking up pollution and carrying it to the open ocean. More than three-quarters of marine pollution start as a man made source.⁷ Another important pollutant that is aided by humans is atmospheric pollution. An example of this is smog; it is carried through the air and reaches the ground by acid rain. Acid rain contains high concentrations of atmospheric pollutants and is damaging to fish, plants and other organisms.⁸

Nutrients, debris, silt, toxic chemicals and pathogens are all classified as types of pollutants. Nutrient pollution is often caused by excessive amounts of nitrates and phosphates, which are used in the manicuring of lawns. They accumulate and are carried into the ocean by runoff where harmful algae bloom develops.⁹ This is the main cause of fish kills and beach closings.

Marine debris is trash that has been improperly disposed of or mishandled. It includes all items found in the marine environment that does not belong there. The term generally applies to items that have been made or used by people then discarded. The most typical items of marine debris are plastic,

⁶ "Where the River Meets the Sea" USF College of Marine Science Project Oceanography <<http://www.marine.usf.edu/pjocean/index.html>>. [accessed 19 February 2005].

⁷ "The Water Planet at Risk" USF College of Marine Science Project Oceanography <<http://www.marine.usf.edu/pjocean/index.html>>. [accessed 26 February 2005].

⁸ "Pollution and Water Quality" USF College of Marine Science Project Oceanography <<http://www.marine.usf.edu/pjocean/index.html>>. [accessed 20 February 2005].

⁹ "The Water Planet at Risk" & "Where the River Meets the Sea"

glass, rubber, metal, paper, wood and cloth.¹⁰ Plastic presents the greatest threat because of entanglement and entrapment. "...entanglement can impair an animal's ability to swim, which can cause drowning or difficulty in moving about, finding food, and escaping predators".¹¹ Studies conducted show that 30,000 marine animals die annually because of entanglement.¹² In contrast the article about marine debris states there is approximately 100,000 marine mammals that die annually due to entanglement and marine debris ingestion. Mistaking plastic debris for food leads many marine animals to starve to death. The clearing of the forest leaves soil erosion to wreak havoc on seagrass beds, wetlands and coral reefs. Many marine plants and animals require clear water and because of the turbidity due to dredging up the land this drastically reduces the light available.¹³

Amazingly most of the oil that ends up in the ocean is not caused by large tank spills the real culprit is terrestrial runoff. Pathogens are released into the marine ecosystem through raw sewage leaks, open septic systems or discharged overboard via boat. This can contaminate the waters and shellfish with cholera, hepatitis A and many more.¹⁴ Human actions also affect the ecosystem. Runoff seems to play a bigger role than I had first anticipated. All of the harmful elements are directly tied to human abuse of the land. We are getting out what we put in.

¹⁰ "Marine Debris: A Lesson in Conserving the Ecosystem" USF College of Marine Science Project Oceanography <<http://www.marine.usf.edu/pjocean/index.html>>. [accessed 20 February 2005].

¹¹ "Marine Debris: A Lesson in Conserving the Ecosystem"

¹² "The Water Planet at Risk"

¹³ "The Water Planet at Risk"

¹⁴ "The Water Planet at Risk"

SOLUTIONS

Educate, educate, educate, this resonates through every piece of advice on how to halt pollution on the ecosystem. Educate your neighbors, friends and the community at large about the effects that one person has on the environment. Conservation is key. People need to understand that undertaking superfluous excursions are not necessary and should not be sought after. The contributions of individuals far out weigh the contributions of government and private organizations. Every day opportunities are available for the individual to show consideration toward the environment. This amounts to a lot. The oceans importance cannot be debated. The ocean provides natural resources that sustain the lives of everything involved with the food chain, from microscopic organism to humans. The oceans play the largest part in foreign trade and marine related jobs account for one of every six jobs. Climate and weather is also directly related to the condition of the ocean.¹⁵ One important factor in reducing the amount of pollutants carried off by runoff is to remember that oceans begin in our backyard.¹⁶

Helpful tips:

¹⁵ “Why the Oceans are Important”

¹⁶ “Where the River Meets the Sea”

Top 10 Things You Can Do To Help Our Oceans

- 1. Learn all you can about the ocean.**
- 2. Be a smart shopper. Know the source and quality of your seafood.**
- 3. Conserve water. Be careful when washing your car, or watering your lawn. Use a broom instead of a hose to clean your driveway and sidewalk.**
- 4. Reduce household pollutants. Cut down and properly dispose of herbicides, pesticides and cleaning products.**
- 5. Reduce waste. Dispose of trash properly. Where possible, recycle, re-use and compost.**
- 6. Reduce automobile pollution. Use efficient vehicles or carpool. Recycle motor oil. Repair oil and air conditioning leaks.**
- 7. Protect ocean wildlife. Don't dispose of fishing lines, nets or plastic items in or near the water.**
- 8. Be considerate of sea life habitats. Don't feed sea birds, mammals and turtles or disturb their nesting grounds. Support marine protected areas.**
- 9. Get involved. Take part in a beach cleanup or other ocean-oriented activities!**
- 10. Care! Pass on knowledge.**

<http://www.yoto98.noaa.gov>

Facts About Water

- 🌍 There are about one million miles of pipeline and aqueducts for water delivery in the US and Canada...enough to go around the earth 40 times!
- 🌍 Water is the most common substance on earth, however only 1% of the earth's water is available for drinking.
- 🌍 66% (two-thirds) of the human body is water. A cow must drink 3 gallons of water to make 1 gallon of milk.
- 🌍 75% of a tree is water. 70% of an elephant is water.
- 🌍 You can survive about three weeks without food, but only 3 days without water.
- 🌍 It takes 50 glasses of water to grow enough oranges to make 1 glass of orange juice.
- 🌍 You can fill an 8 oz. glass of water about 15, 000 times for the same cost as a six pack of soda pop.
- 🌍 Rivers and streams make up 3.5 million miles.
- 🌍 Lakes cover 41 million acres
- 🌍 The average daily requirement for freshwater in the United States is about 338 billion gallons.
- 🌍 There are more than 200,000 individual water systems providing water to the public in the United States.
- 🌍 If the Earth were completely flat, it would be covered by water 2 miles deep!
- 🌍 One gallon of gasoline can contaminate 750,000 gallons of water.
- 🌍 We use about 108 gallons of water per person per day in our homes.
- 🌍 There's as much water in the world today as there was thousands of years ago. In fact, it's the same water.
- 🌍 A single dripping faucet can waste far more in a single day than one person needs for drinking in an entire week.
- 🌍 Every glass of water brought to your table in a restaurant requires another two glasses to wash and rinse the glass.
- 🌍 A leak of one drop per second wastes 2,400 gallons of water per year.

<http://www.marine.usf.edu>