

CHAPTER 1

INTRODUCTION

1.1 GENERAL

When something is added to the environment that makes it unclean or unsafe it is called pollution. Water Pollution occurs when the water becomes overloaded with too much of one thing and the aquatic organisms cannot keep up with their cleaning responsibilities. Some organisms may die and others may grow too fast. The demand for fresh water rises continuously as the world's population grows. From 1940 to 1990 withdrawals of fresh water from rivers, lakes, reservoirs and other sources increased fourfold. Sewage, industrial wastes, and agricultural chemicals such as fertilizers, sand, pesticides are the main causes of water pollution. In developing nations, more than 95 percent of urban sewage is discharged untreated into rivers and bays, creating a major human health hazard. There are several major types of water pollution. One of the most destructive types is Petroleum Pollution. Petroleum products, such as oil and gasoline, enter the water from ships and marine terminals, offshore oil rigs, runoff from parking lots, factories, oil dumping, and other sources. Many of the worst pollution disasters have been due to accidents involving oil rigs, pipelines, or oil tankers. The marine fisheries supported by ocean ecosystems are an essential source of protein, particularly for people in developing countries. Yet pollution in coastal bays, estuaries, and wetlands threatens fish stocks already depleted by overfishing. In 1989, 260,000 barrels of oil spilled from the oil tanker Exxon Valdez into Alaska's Prince William Sound, a pristine and rich fishing ground. In 1999 there were 8,539 reported spills in and around U.S. waters, involving 4.4 billion litres (1.2 billion gallons) of oil. Sewage Pollution comes from both urban (city) and rural (country) areas. Although many cities and towns have sewage treatment plants, at times, such as during a flood event some may be unable to handle the amount of sewage produced. Treatment plant failures and overflows may result in untreated sewage entering rivers and coastal waters. Some coastal cities may still be using the open ocean as a sewage dumping site. Small pleasure boats, as well as larger ships, can pollute waters by illegally dumping.

Pollution from Solid Wastes is a major problem for many communities. Most solid wastes are handled by taking them to landfills, but some illegal dumping of garbage, old tires and other solid wastes occurs. A hazard to both humans and wildlife, solid wastes are unsightly, slow to

degrade and, in some cases, non-degradable. Nuclear-powered ships, power plants and other users of Nuclear Energy are possible sources of Radiation Pollution, not so much from accidents, but from disposal of nuclear materials such as spent nuclear fuel cells. Many factories and nuclear power plants use water cooling during manufacturing processes and reactor cooling. Water taken from rivers, bays or lakes is heated and, if returned directly to the environment, can lead to what is called Heat or Thermal Pollution. Chemical and industrial plants produce thousands of different types of Toxic Chemicals and Wastes. Chemicals such as PCB's (polychlorinated biphenyls) and TCE (trichloroethene) have been highly publicized due to being found in the environment and their harmful effects on living things. The use of Fertilizers and Pesticides on cropland, gardens and yards helps farms and homeowners but can also be damaging to aquatic and marine life when not properly applied or managed in rural and urban areas. Poorly managed animal wastes from farms can also add excess nutrients to rivers and lakes. In addition, runoff from farm lands and urban areas carries large amounts of sediment into waterways making the water cloudy or murky.

Nonpoint source pollution can originate from urban environments such as yards in neighborhoods or from agricultural production areas such as crop fields. Chemicals, waste products and soil that are carried by rain into streams or rivers become a part of NPS. Common examples are fertilizers, herbicides, pesticides, spilled motor oil and wastes from pets, wildlife and livestock. Point source pollution (PS) comes directly from a known source like an industrial or sewage outfall pipe. Point sources are typically associated with manufacturing processes. Electrical generating plants can create thermal water pollution when they use surface water to condense steam, which is used to turn turbines, back to the liquid state where water can be used again. When water is heated, oxygen and carbon dioxide levels drop. Heated water becomes harmful to many aquatic organisms because it deprives them of oxygen or carbon dioxide required to live. Most population centers are located near major waterways. These areas were first settled because of their access to water, but there is a continuing nation wide trend for people to move to areas near the coast or major rivers. This movement places more stress on aquatic environments as more people use water resources for recreation, food, water sources, energy and transportation. Pollution of water resources can interfere with swimming and fishing activities, make boating unsafe, affect wildlife and food resources and even contaminate water supplies. Lakes, rivers and coastal areas are much more enjoyable and safe when they are pollution free. Not only do you benefit from a pollution free environment, but organisms that live there do as well.