BSCS Biology An Ecological Approach

Chapter 24 - Managing Human-Affected Ecosystems

There is a sufficiency in the world for man's need but not for man's greed: Mohandas K. Gandhi

Introduction

In many ways this is the most important chapter in this book. It brings together the scientific principles studied throughout the text and makes a hopeful case for reversing the trend of human negative impacts on natural systems. Key in this process is an understanding of natural principles. From this can follow respect, and then commitment, both personal and group to stewardship of our earth now and for future generations.

The Development of Human Culture

Early humans (hominids) lived simply off and with the land. All their food was either **scavenged** or **gathered**. Over a relatively short period, human **cranial capacity** (brain size) enlarged. This allowed for the development of more complex skills such as the use of **language**. Language development allowed humans to communicate information and transmit their **culture** to the next generations. Over time, humans developed ways to sustain themselves through **agriculture** (the planting, growing, and harvesting of crops). Techniques such as **slash and burn** agriculture were harmful to the environment, but were on a small scale. The **plow** was the first major tool that allowed agriculture to take place on a larger scale. The **downfall** of some early civilizations is thought to be the result of **environmental degradation** as a result of poor environmental practices such as overgrazing and forest destruction. The **Industrial Revolution** began in England and moved to the United States in the 1800's. It was during this period that **mass production** and other forms of **industrialization** such as **mechanized agriculture** began to put great pressures on the environment. This caused further **degradation** to the earth's ecosystems. Human **population** growth is the root cause of all environmental problems. The degradation of the environment has occurred at a relatively slow pace until recently. Population growth is a factor of **fertility** and **mortality** (birth and death rates). Population charts are one way to visually observe these trends.

The Challenges of Change and the Future

One nation cannot solve the environmental problems of the earth. Air pollution crosses national **boundaries** and water pollution eventually finds its way to the ocean. The nuclear power plant disaster at **Chernobyl** (Ukraine) is an example of technology negatively impacting the environment in a grand way. Acid rain generally falls a great distance from the sources (generally coal power plants). Long term studies underway will help provide answers to these challenges. The same **technology** that has caused so many problems for earth's environment can be used to help solve the problems. Humans are an integral part of earth, and therefore responsible for passing on a **stewardship** to future generations. Technology can be used to develop more efficient cars, heating systems, and manufacturing techniques. **Efficiency** helps resources go much further. **Legal measures** such as legislation to protect air and water are an important factor. The **Clean Air Act** of 1990 is one such example. Short term gain at the expense of long term damage must be reconciled. **Sustainable agriculture** is the wave of the future if we are to protect our land. The present system of **industrialized agriculture** must be minimized because of dependence on fossil fuels.

Ethics and the Future

Many of the decisions and actions will require humans to make **bioethical** decisions. In addition, a **personal commitment** on the part of each human will be required to manage earth's resources.