Benefits of forest resources essay sample

A forest, also referred to as a wood or the woods, is an area with a high density of trees. As with cities, depending on various cultural definitions, what is considered a forest may vary significantly in size and have different classifications according to how and of what the forest is composed. A forest is usually an area filled with trees but any tall densely packed area of vegetation may be considered a forest, even underwater vegetation such as kelp forests, or non-vegetation such as fungi, and bacteria. Tree forests cover approximately 9. 4 percent of the Earth’s surface (or 30 percent of total land area), though they once covered much more (about 50 percent of total land area). They function as habitats for organisms, hydrologic flow modulators, and soil conservers, constituting one of the most important aspects of the biosphere.

ETYMOLOGY

The word “ forest” comes from Middle English forest, from Old French forest (also forès) “ forest, vast expanse covered by trees”; first introduced in English as the word for wild land set aside for hunting without the necessity in definition for the existence of trees. Possibly a borrowing (probably via Frankish or Old High German) of the Medieval Latin word foresta “ open wood”, foresta was first used by Carolingian scribes in the Capitularies of Charlemagne to refer specifically to the king’s royal hunting grounds. The term was not endemic to Romance languages (e. g. native words for “ forest” in the Romance languages evolved out of the Latin word silva “ forest, wood” (English sylvan); cf. Italian, Spanish, Portuguese selva; Romanian silvă; Old French selve); and cognates in Romance languages, such as Italian foresta, Spanish and Portuguese floresta, etc. are all

ultimately borrowings of the French word. Other terms used to mean “ an area with a high density of trees” are wood, woodland, wold, weald, holt, frith and firth. Unlike forest, these are all derived from Old English and were not borrowed from another language. Some classifications now reserve the term woodland for an area with more open space between trees and distinguish among woodlands, open forests, and closed forests based on crown cover.

DISTRIBUTION

Forests can be found in all regions capable of sustaining tree growth, at altitudes up to the tree line, except where natural fire frequency or other disturbance is too high, or where the environment has been altered by human activity.

The latitudes 10° north and south of the Equator are mostly covered in tropical rainforest, and the latitudes between 53°N and 67°N have boreal forest. As a general rule, forests dominated by angiosperms (broadleaf forests) are more species-rich than those dominated by gymnosperms (conifer, montane, or needleleaf forests), although exceptions exist.

FOREST LOSS AND MANAGEMENT

The scientific study of forest species and their interaction with the environment is referred to as forest ecology, while the management of forests is often referred to as forestry. Forest management has changed considerably over the last few centuries, with rapid changes from the 1980s onwards culminating in a practice now referred to as sustainable forest management. Forest ecologists concentrate on forest patterns and

processes, usually with the aim of elucidating cause and effect relationships. Foresters who practice sustainable forest management focus on the integration of ecological, social and economic values, often in consultation with local communities and other stakeholders.

Canada has about 4, 020, 000 square kilometres (1, 550, 000 sq mi) of forest land. More than 90% of forest land is publicly owned and about 50% of the total forest area is allocated for harvesting. These allocated areas are managed using the principles of sustainable forest management, which includes extensive consultation with local stakeholders. About eight percent of Canada’s forest is legally protected from resource development (Global Forest Watch Canada) (Natural Resources Canada). Much more forest land – about 40 percent of the total forest land base – is subject to varying degrees of protection through processes such as integrated land use planning or defined management areas such as certified forests (Natural Resources Canada).

By December 2006, over 1, 237, 000 square kilometers of forest land in Canada (about half the global total) had been certified as being sustainably managed (Canadian Sustainable Forestry Certification Coalition). Clear-cutting, first used in the latter half of the 20th century, is less expensive, but devastating to the environment and companies are required by law to ensure that harvested areas are adequately regenerated. Most Canadian provinces have regulations limiting the size of clear-cuts, although some older clear-cuts can range upwards of 110 square kilometers (27, 000 acres) in size which were cut over several years. China instituted a ban on logging, beginning in 1998, due to the erosion, and flooding that it caused.

In 2010, the Food and Agriculture Organization of the United Nations reported that world deforestation, mainly the conversion of tropical forests to agricultural land, had decreased over the past ten years but still continues at an alarmingly high rate in many countries. Globally, around 13 million hectares of forests were converted to other uses or lost through natural causes each year between 2000 and 2010 as compared to around 16 million hectares per year during the 1990s. The study covered 233 countries and areas. Brazil and Indonesia, which had the highest loss of forests in the 1990s, have significantly reduced their deforestation rates. In addition, ambitious tree planting programmer in countries such as China, India, the United States and Viet Nam – combined with natural expansion of forests in some regions – have added more than seven million hectares of new forests annually. As a result the net loss of forest area was reduced to 5. 2 million hectares per year between 2000 and 2010, down from 8. 3 million hectares annually in the 1990s.

Smaller areas of woodland in cities may be managed as Urban forestry, sometimes within public parks. These are often created for human benefits; Attention Restoration Theory argues that spending time in nature reduces stress and improves health, while forest schools and kindergartens help young people to develop social as well as scientific skills in forests. These typically need to be close to where the children live, for practical logistics.

BENEFITS

* SOCIAL, PSYCHOLOGICAL, RECREATIONAL, WILDLIFE

The presence of trees reduces stress, and trees have long been seen to benefit the health of urban dwellers. The shade of trees and other urban green spaces make place for people to meet and socialize and play. The Basophilic hypothesis argues that people are instinctively drawn to nature; while Attention Restoration Theory goes on to demonstrate tangible improvements in medical, academic and other outcomes, from access to nature. Proper planning and community involvement are important for the positive results to be realized.

Trees and shrubs provide nesting sites and food for birds and other animals. People appreciate watching, feeding, photographing, and painting urban wildlife and the environment they live in. Urban trees, shrubs and wildlife help people maintain their connection with nature.

* AIR POLLUTION REDUCTION

As cities struggle to comply with air quality standards, the ways that trees can help to clean the air should not be overlooked. The most serious pollutants in the urban atmosphere are ozone, nitrogen oxides (NOx), sulfuric oxides (SOx) and particulate pollution. Ground-level ozone, or smog, is created by chemical reactions between NOx and volatile organic compounds (VOCs) in the presence of sunlight. High temperatures increase the rate of this reaction. Vehicle emissions, emissions from industrial facilities, gasoline vapors, and chemical solvents are the major sources of NOx and VOCs. Particulate pollution, or particulate matter (PM10 and PM25), is made up of microscopic solids or liquid droplets that can be inhaled and retained in lung tissue causing serious health problems. Most particulate pollution begins as

smoke or diesel soot and can cause serious health risk to people with heart and lung diseases and irritation to healthy citizens. Trees are an important, cost-effective solution to reducing pollution and improving air quality.

* TREES REDUCE TEMPERATURES AND SMOG

With an extensive and healthy urban forest air quality can be drastically improved. Trees help to lower air temperatures and the urban heat island effect in urban areas (see: ‘ Trees are energy savers’ for more information on this process). This reduction of temperature not only lowers energy use, it also improves air quality, as the formation of ozone is dependent on temperature.

As temperatures climb, the formation of ozone increases. Healthy urban forests decrease temperatures, and reduce the formation of ozone. Large shade trees can reduce local ambient temperatures by 3 to 5 °C Maximum mid-day temperature reductions due to trees range from 0. 04 °C to 0. 2 °C per 1% canopy cover increase.

* LOWER TEMPERATURES REDUCE EMISSIONS IN PARKING LOTS

Temperature reduction from shade trees in parking lots lowers the amount of evaporative emissions from parked cars. Unshaded parking lots can be viewed as miniature heat islands, where temperatures can be even higher than surrounding areas. Tree canopies will reduce air temperatures significantly. Although the bulk of hydrocarbon emissions come from tailpipe exhaust, 16% of hydrocarbon emissions are from evaporative emissions that occur when the fuel delivery systems of parked vehicles are heated.

These evaporative emissions and the exhaust emissions of the first few minutes of engine operation are sensitive to local microclimate. If cars are shaded in parking lots, evaporative emissions from fuel and volatilized plastics will be greatly reduced. 1. Cars parked in parking lots with 50% canopy cover emit 8% less through evaporative emissions than cars parked in parking lots with only 8% canopy cover. 2. Due to the positive effects trees have on reducing temperatures and evaporative emissions in parking lots, cities like Davis, California, have established parking lot ordinances that mandate 50% canopy cover over paved areas. 3. “ Cold Start” emissions

The volatile components of asphalt pavement evaporate more slowly in shaded parking lots and streets. The shade not only reduces emissions, but reduces shrinking and cracking so that maintenance intervals can be lengthened. Less maintenance means less hot asphalt (fumes) and less heavy equipment (exhaust). The same principle applies to asphalt-based roofing.

* ACTIVE POLLUTANT REMOVAL

Trees also reduce pollution by actively removing it from the atmosphere. Leaf stomata, the pores on the leaf surface, take in polluting gases which are then absorbed by water inside the leaf. Some species of trees are more susceptible to the uptake of pollution, which can negatively affect plant growth. Ideally, trees should be selected that take in higher quantities of polluting gases and are resistant to the negative effects they can cause.

* INTERCEPTION OF PARTICULATE MATTER

In addition to the uptake of harmful gases, trees also act as filters intercepting airborne particles and reducing the amount of harmful particulate matter. The particles are captured by the surface area of the tree and its foliage. These particles temporarily rest on the surface of the tree, as they can be washed off by rainwater, blown off by high winds, or fall to the ground with a dropped leaf. Although trees are only a temporary host to particulate matter, if they did not exist, the temporarily-housed particulate matter would remain airborne and harmful to humans. Increased tree cover will increase the amount of particulate matter intercepted from the air. Large evergreen trees with dense foliage collect the most particulate matter.

* BIOGENIC VOLATILE ORGANIC COMPOUNDS

One important thing to consider when assessing the urban forest’s effect on air quality is that trees emit some biogenic volatile organic compounds (BVOCs). These are the chemicals (primarily isoprene and monoterpenes) that make up the essential oils, resins, and other organic compounds that plants use to attract pollinators and repel predators. As mentioned above, VOCs react with nitrogen oxides (NOx) to form ozone. BVOCs account for less than 10% of the total amount of BVOCs emitted in urban areas. This means that BVOC emissions from trees can contribute to the formation of ozone. Although their contribution may be small compared with other sources, BVOC emissions could exacerbate a smog problem. Not all species of trees, however, emit high quantities of BVOCs. The tree species with the highest isoprene emission rates should be planted with caution:

* Casuarina (Beefwood)

* Eucalyptus

* Liquidambar (Sweetgum)

* Nyssa (Tupelo or Black gum)

* Platanus (Plane)

* Populus (Poplar)

* Quercus (Oak)

* Robinia (Black locust)

* Salix (Willow)

Trees that are well adapted to and thrive in certain environments should not be replaced just because they may be high BVOC emitters. The amount of emissions spent on maintaining a tree that may emit low amounts of BVOCs, but is not well suited to an area, could be considerable and outweigh any possible benefits of low BVOC emission rates.

Trees should not be labeled as polluters because their total benefits on air quality and emissions reduction far outweigh the possible consequences of BVOC emissions on ozone concentrations. Emission of BVOCs increase exponentially with temperature. Therefore, higher emissions will occur at higher temperatures. In desert climates, locally native trees adapted to drought conditions emit significantly less BVOCs than plants native to wet regions. As discussed above, the formation of ozone is also temperature dependent. Thus, the best way to slow the production of ozone and emission of BVOCs is to reduce urban temperatures and the effect of the urban heat island. As suggested earlier, the most effective way to lower temperatures is with an increased canopy cover.

These effects of the urban forest on ozone production have only recently been discovered by the scientific community, so extensive and conclusive research has not yet been conducted. There have been some studies quantifying the effect of BVOC emissions on the formation of ozone, but none have conclusively measured the effect of the urban forest. Important questions remain unanswered. For instance, it is unknown if there are enough chemical reactions between BVOC emissions and NOx to produce harmful amounts of ozone in urban environments. It is therefore, important for cities to be aware that this research is still continuing and conclusions should not be drawn before proper evidence has been collected. New research may resolve these issues.