

Observation of ecosystem in national park



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Ecology is the term that is used to describe habitation of organisms. This term was first used by the German zoologist in the year 1866. Ecosystem can, thus, be defined as a dynamic system in which the plant, animals and micro organisms interact with the non living (abiotic) components for survival (T. Vold 2008). Ecology can be plant ecology or animal ecology, depending upon the area of focus. When both, plants and the animals are given equal attention, then it is called bio ecology. The major component of ecology is the environment that prevails there. It can be categorized into 3 broad types: Biotic (living) environment, which consist of all the living organisms like plants, animals and micro organisms. The biotic component consist of three different groups of organisms- the producers, the consumers and the decomposers. The next type of environment is the Abiotic (non living) environment. This component basically defines the flow of energy that is required for sustainment of any living organism. It consists of all the physical factors like temperature, climate, precipitation, soil types, etc. The third type of environment is the cultural one. It comprises of all the means and mechanisms in which human interact with the environment and the influence on the ecosystem.

There are many functions associated with an eco system. Ecosystem forms the niche, where all the needs and requirements of the biotic components are satisfied completely. It forms the sole medium of interaction and interdependence of biotic and abiotic components on each other. An ecosystem is characterized by transfer of food, nutrients and energy from one source to another. In this report, the aim is to focus on the ecological character of Australian Ramsar Wetlands and study the interactions between

the biotic and the abiotic components. Further in this study the system's energy flow and the chemical cycling have also been discussed.

METHODS

The area of study in this report is the Kakadu National Park. The Kakadu National Park Ramsar site is located approximately 200 kilometers, east of Darwin, in the Northern Australia. This national park comprises of the sandstone plateau, escarpments, estuaries, seasonal floodplains, tidal flats, permanent freshwater pools, freshwater marshes that are seasonal in nature and the offshore islands. The ecological character of any wetland can be determined by summing together all the processes, components and services of that very wetland. Kakadu national park has eleven critical components: Melaleuca forests; mangroves; billabongs and the palustrine wetlands; seeps and water holes; waterfalls; populations of various birds; freshwater fish; populations of saltwater and fresh water crocodiles; sharks, turtles; invertebrate species. This park is known for having four critical processes: water bird breeding, fluvial hydrology, turtle nesting and the fire regimes. Also, it is characterized by three critical services: global diversity maintenance, resource of fisheries and the living culture that is contemporary. Since this national Park has variety of landforms and different flora and fauna species, it forms a natural ecosystem and has been chosen as the subject of this study. The day chosen to visit this site was 4th May 2014 and the time of observation was kept from 1: 00 Pm to 4: 00 PM.

RESULTS AND DISCUSSIONS

Biotic Components

The major biotic component of this ecosystem is the distinct flora that is spread across the park due to the presence of various landforms. Grasses and forest trees form the biotic components. The former can tolerate extreme heat and long spells of dryness, while the latter mostly develop in the cooler parts. In the lowlands, mainly spear grass, sedges and wild flowers are found (New world encyclopedia 1990). The Savannah woodlands are home for several species like the large reptiles, mammals and others. Each species has a specific role in the Kakadu's ecosystem food web (Kakadu National Park 2011). There is a large variety of vertebrates and invertebrates that inhabit this national park. There are certain density dependent limiting factors that inhibit growth of a population and affect the ecosystem. In the Savannah, predation and competition are such factors. The former involves predators that hunt their prey (in this case crocodile hunts the feral pigs) for food. The latter or the competition is when two organisms in the same ecosystem live together and compete for existence as they have same needs. They compete for best food, viable climatic conditions and most potential mates. Eventually, this results in survival of only one of the organisms and the other being harmed or dead (Kakadu National Park 2011).

Interaction between the biotic and abiotic components

The abiotic components are the non living things that shape an ecosystem like the weather, climate, and soil and water availability. During winters, the normal day is comparatively cooler but rarely gets cold. Summer season is characterized by humidity and wetness. As far as climate is considered, the Savannahs cannot be classified either as rain forests or as deserts, but fall

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somewhere between the two (Kakadu National Park 2011). Being tropical grassland, the soil here is very fertile and supports abundance of vegetation. Water availability is scarce during winters but abundant during summers, thereby allowing small shrubs and grasses to thrive. To study the interaction between the biotic and abiotic components, the flora and fauna was observed. Plant species and the widespread vegetation served as the primary producers. The food web was maintained by small reptiles and mammals. Since there are ponds and river systems too, the pond ecosystem can also be studied here. Kakadu has abundant fish which can be eaten by larger fishes like shark or can be attacked by aerial fauna.

Energy flow in the Ecosystem

The flow of energy is observed through distinct trophic levels:

The first trophic level comprise of the producers, which are majorly the flora of the national park. They utilize solar energy to manufacture food and therefore grow into large plants and trees. Next up are the primary consumers, who feed exclusively on the producers. Primary consumers are then eaten up by the secondary consumers and the later by the tertiary consumers. For an instance, the ants or bugs or other insects feed on the grasses in the wetlands. These ants or bugs are then eaten up by the distinct birds or reptiles that live across the Savannah's. These birds or reptiles are then attacked by the larger mammals or animals thereby continuing the food web.

Chemical cycling in the Ecosystem

The forest debris, when burnt, releases carbon and other nutrients into the atmosphere in form of gases, fine particles and also charred fragments of

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vegetation. There are many nutrients that are released during the fire-phosphorus, magnesium, sulphur, nitrogen and potassium. These nutrients are replenished during the wet season via rainfall, growth of the vegetation or dispersion and redistribution of all the charred particles to different parts of the landscape (CSIRO 2014). Also, the dead organic matter (in form of plant leaves, old grass, fruits and flowers) can serve as the source of nutrients for other species and their remains for further trophic levels.

CONCLUSION

The purpose of this report was to study and observe the ecosystem of the kakadu National Park, Australia. The example taken here demonstrated a wetland ecosystem with different kinds of landforms like plateaus and mountains. Some insects and reptiles were observed in this place and this helped in concluding about the energy flow within this ecosystem. The interactions between the two components of the ecosystem were also observed and we can conclude that this interaction is subject to change, depending upon the climatic conditions, which in turn affect the wetness of the soil. As a consequence, the plants and vegetation vary and so does the entire flow of energy.