

Biodiversity of Bhitarkanika...

there is no escape!

Why is Biodiversity important?

Biodiversity is critical to the operation of all the earth's systems. People cannot function apart from nature. We depend daily on the filtering of water through rain and watersheds, especially on wetlands like Bhitarkanika, on the chemical process of tiny bacteria in the soil which decompose organic matter to make the soil rich enough to grow food, on other organisms to provide that food and species of insects or birds to spread the seeds of these crops or on the many plants that produce the oxygen in the air we breathe. Biodiversity also serves as nature's insurance against changes in climate and natural disasters. Having a variety of species, all slightly different, with different capacities to adapt to environmental factors, increases the chances that one will be able to take on a new ecologically important role should the environment shift.

Like the uniqueness of each and every human life, species are worth protecting of their own right. They are all essentially our brothers and sisters in that we all evolved from the same protoorganism millions of years ago and "grew up together," depending on each other in the delicate system that is the Earth.

Biodiversity is the variety of life, as different and unique as the human population. Each species is special as any individual: friends, relatives, strangers (and biologically, there are upwards of 36 million amazing strangers) all working together to create an **earth-wide civilization** more wonderful and complex than anything man-made, simply because the biodiversity of this planet includes the human world within it.

Biodiversity works at four levels: **Genetic diversity** - difference in genetic makeup of individuals within a species that allow the species to adapt the changing environmental conditions. **Species diversity** - the variety of living organisms found within an ecosystem, adapted to fulfill different roles within that system. **Ecological diversity** - varieties of habitats on this planet as well as biological communities: deserts, forests, wetlands, coral reefs, oceans, tundra. **Functional diversity** - biological and chemical processes such as energy flow and nutrient cycling that sustain the variety of species and communities of the planet.

What is an Ecosystem?

An ecosystem is a community of different species interacting with each other and with their non-living environment of matter and energy. Like the fine strands of a spider's web, each

interaction linking organism to organism makes up a complex whole, more than the sum of its parts. Like a spider's web, a disturbance to any minute part of the web can be felt throughout. Also like a spider's web, an ecosystem is fragile, and cannot sustain itself if too many of the strands are removed. Its collapse affects not just the natural world, but the human beings that represent just one fine thread of many within it.

The Ecosystem of Bhitarkanika

Mangroves - These amazing trees are at the center of the ecosystem, serving as the primary producers of oxygen and organic waste material that feeds crabs, insects, tiny microorganisms, fish larvae and in turn, the larger organisms that eat these species. Mangroves also filter water, form the soil that people use to grow crops, protect against cyclones and coastal erosion and serve as habitat for birds, snakes, turtles, crabs and other animals upon which human beings depend. Bhitarkanika harbors 62 of the 80-odd global mangrove species.

Algae - Another primary producer that grows on the roots of the mangroves and in the soil, secreting an enzyme that helps in soil formation and feeding many of the herbivorous species in the ecosystem.

Zooplankton and Bacteria - These tiny microorganisms float in the water surrounding mangrove roots, decomposing the 'detritus' of leaves and dead branches, some of which is trapped in the mangrove roots as sediment that will later help to form soil. The rest is passed up the food chain to the larger fish and crabs that consume these organisms.

Insects - To an entomologist (someone who studies insects), Bhitarkanika is a natural wonderland. The insect population, including mosquitoes, beetles, fireflies, moths, bees, butterflies, and much more, support a large proportion of birds, bats, fish, and lizards. Insects play a key role in the variety of mangrove species, as they selectively prey on seedlings, as well as cycle organic material. Termites, which live in a symbiotic harmony with the wood-digesting bacterium that live in their gut, play the crucial role of removing deadwood from the forest. Bees help to pollinate mangroves and epiphytic orchids, while fireflies (actually a type of beetle) light up the night.

Fish - Along with the many fish species that spend their entire lives feeding off a rich feast of algae, detritus and other fish species found among the mangroves, Bhitarkanika is important for the commercial fish species that use it as a spawning ground. These species include: Ilisha, Khainga, Bhekti, Kantia and Kokill. The mudskipper represents a rare fish, specialized to live among the mangroves. Part aquatic, part terrestrial, like the trees themselves, it uses tiny forelegs to grip the aerial roots of the mangrove trees, and is thought by scientists to resemble the beginnings of terrestrial life as they crawled out of the sea millions of years ago.

Prawns - Several species such as *Penaeus indicus*, Tiger prawn, and *Metapenaeus affinis*, feed off the decomposing waste matter and the plankton species and algae.

Crabs - Bhitarkanika is home to many species of crab including fiddler crabs (which help to texture the soil) and hermit crabs, as well as king crabs and horseshoe crabs, which represent some of the longest living species on the planet, unchanged since before the time of the dinosaurs. A substance blood of these crabs represents a possibly valuable contribution to medicine as the cure for some of the worst of human diseases.

Olive Ridley Sea Turtles - Bhitarkanika is the largest nesting ground for these beautiful marine animals, who migrate here once a year to bury hundreds of eggs in the sanctuary's sandy coast, attracting scientists and tourists alike.

Birds - Bhitarkanika supports at least 215 species of migratory birds, who nest largely on the island of *Bagagahan* and take advantage of the large presence of mollusks in the sanctuary, which are able to survive due to the lack of poisonous pesticide runoff found in other suitable coastal habitats. Herons and an astounding 8 species of kingfisher feed off of the rich fish population, and in turn serve as food for crocodiles, lizards, snakes, and mammals which prey on eggs and juveniles.

Eagles and owls prey on small mammals and snakes, woodpeckers on the termites, and Bee-eaters and larks on insects. Some of these birds show remarkable intelligence, such as the sand plover, which fakes a broken wing display in order to lure predators away from its nest.

Lizards and Snakes - A variety of reptiles make their home in Bhitarkanika, sunning themselves in the canopy of the mangroves or on the muddy banks at low tide, these cold-blooded creatures feed off the vast insect population and small rodents, such as the Indian palm squirrel and the Bandicoot Rat.

Deer - These majestic animals can be seen bounding down the muddy banks at low tide. Though they may serve as prey for one of the gigantic estuarine crocodiles or as meat for people, their agility moving in such a difficult environment of mud and twisted roots and pneumatophores (spike like projections that rise up from the soil, allowing the mangrove roots to breathe), make human beings look clumsy stumbling through the swamp. Leopards and other Cats - the large rat and fish population, as well as the dense tree habitat of the sanctuary, serve as a lure for many cat species typical to tropical jungles. Though there are relatively few mammals that specialize in the mangrove habitat, these cats make their home in the dense canopy of Bhitarkanika and thrive.

Estuarine Crocodiles - Bhitarkanika is preserved as a crocodile sanctuary in hopes of protecting these magnificent marine reptiles, hunted to the brink of extinction. Crocodiles in Bhitarkanika can grow to be between 7 and 8 meters in length, the largest in the world. They eat fish, deer, wild boar, water buffalo, and sometimes even humans.

Estuarine Dolphins - these incredibly rare species, such as the Irrawady dolphin, are largely in danger from motorboat traffic and fishing, and represent a dwindling wonder. Wise stewardship of the Irrawady in Chilika lagoon has represented a tourist boon for the region, as people travel from afar to appreciate these rare and amazing creatures.

PEOPLE - The people living in or around the sanctuary make up a key part of the ecosystem and potentially the most impact. They depend on the mangroves for firewood and on crabs and fish for food. The chopping of the mangrove trees decreases the habitat for all of the other animals living on this fertile coast, and harvesting of young fish and prawns decreases fish stock and robs other large predators of their meals. But people also represent the biggest hope for the sanctuary as the only animals within it capable of planting and cultivating mangrove trees and protecting the sanctuary from further intrusion or natural destruction. It is up to us whether or not we will choose to act as wise stewards or destroyers.