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DOCUMENTATION OF THE EFFECT OF ENVIRONMENTAL CHANGES ON AQUATIC ECOSYSTEM

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Abstract

The physical and biological properties of coastal systems, as well as the structure and function of their ecosystems, will be modified as a result of the consequences of higher atmospheric CO_2 concentrations, such as changes in ocean chemistry. Consequently, coastal nations are losing marine life, fish stocks, and coastlines. Coral reefs, which are extremely sensitive to changes in sea surface temperature, are among the most biologically diverse ecosystems on Earth. Most coral reefs are at risk of being destroyed by a 2°C temperature rise, which is associated with CO_2 concentrations of 500 ppm. As the ocean becomes more acidic due to absorbed CO2 from the Earth's atmosphere, it poses a threat to living reefs, which could eventually be replaced by seaweed-dominated mounds of rubble as temperatures continue to rise. The global biosphere faces an unprecedented challenge from these impacts, which will compound the strain caused by local anthropogenic effects. While everyone on the planet will feel the effects, certain places will feel them more keenly than others.

Keywords: Physical and biological properties, ecosystem and coral reefs.

Introduction

Human interference with ecosystems has a major impact on global biodiversity. The climate's constant flux has a profound effect on biodiversity. The loss of biodiversity is already threatened by previous human pressures, and now a new kind of climate change brought about by human activity is being added to this natural variability. Seventy percent of Earth's surface is made up of water. The distribution and quantity of aquatic ecosystems are already being altered by climate change. Surface ocean currents are sensitive to even little shifts in water temperature and will respond accordingly. There are two main types of aquatic ecosystems: those found in salt water (marine) and those found in fresh water (fresh) environments. The ocean's response to a warming climate [1-5].

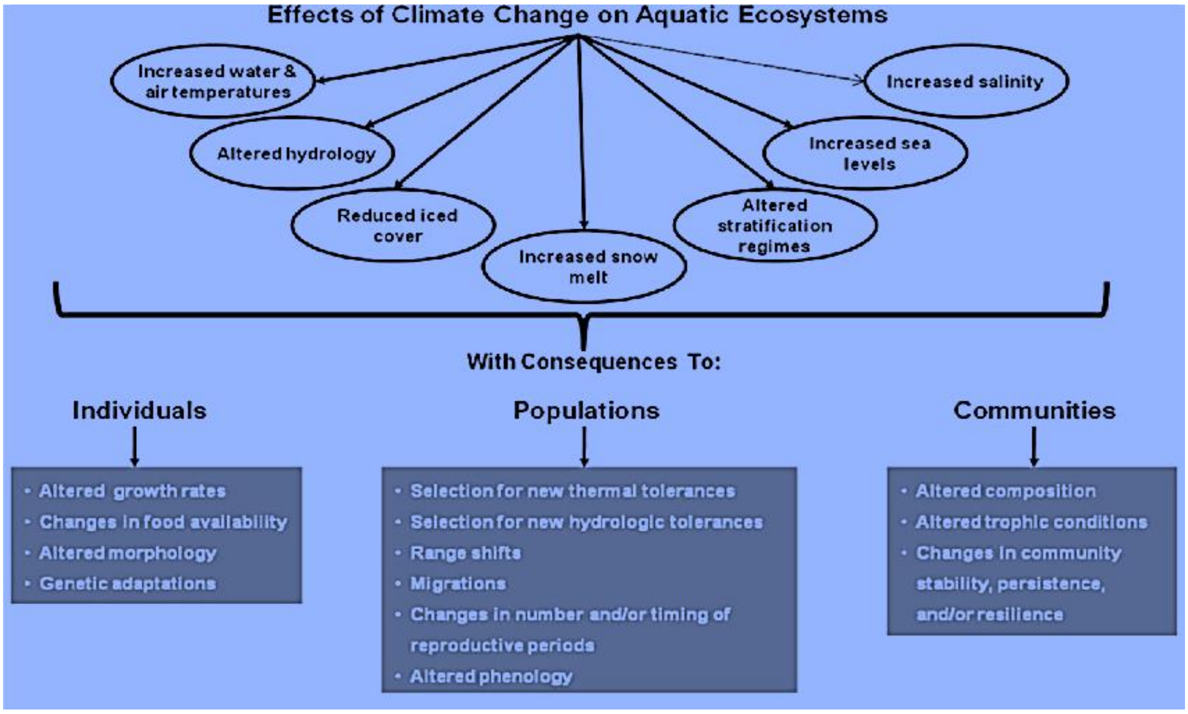

Figure 1: Illustration of climate change effects on aquatic ecosystems

THE BUILDUP OF GREENHOUSE GASES IN EARTH'S ATMOSPHERE WILL ALTER THREE PRIMARY FACTORS:

Total carbonate alkalinity decreased

As atmospheric CO2 levels rise, oceans will become less alkaline due to a drop in total carbonate alkalinity. It is anticipated that this variable will have a major impact on the acidity and carbonate ion pool of the world's oceans. The saturation state of aragonite in the tropics will decline by 30% by 2050 as a result of a doubling of atmospheric carbon dioxide concentrations.

Rising Sea Levels

Rising sea levels have had far-reaching effects on the distribution and richness of marine and terrestrial life. As climate change raises global temperatures, sea levels will also rise. This happens because the ocean water is warming, glaciers are melting, and ice sheet distribution is shifting. In the next 40 years, sea levels are projected to rise by anything from 9 to 29 centimeters. Up to 22 percent of the world's coastal west lands could be lost by 2080 due to sea level rise, according to research by Nichols and colleagues. When added to the loss of coastal wetlands caused by other human activities, this figure is projected to rise to 70 percent by the end of the 21st century [6].

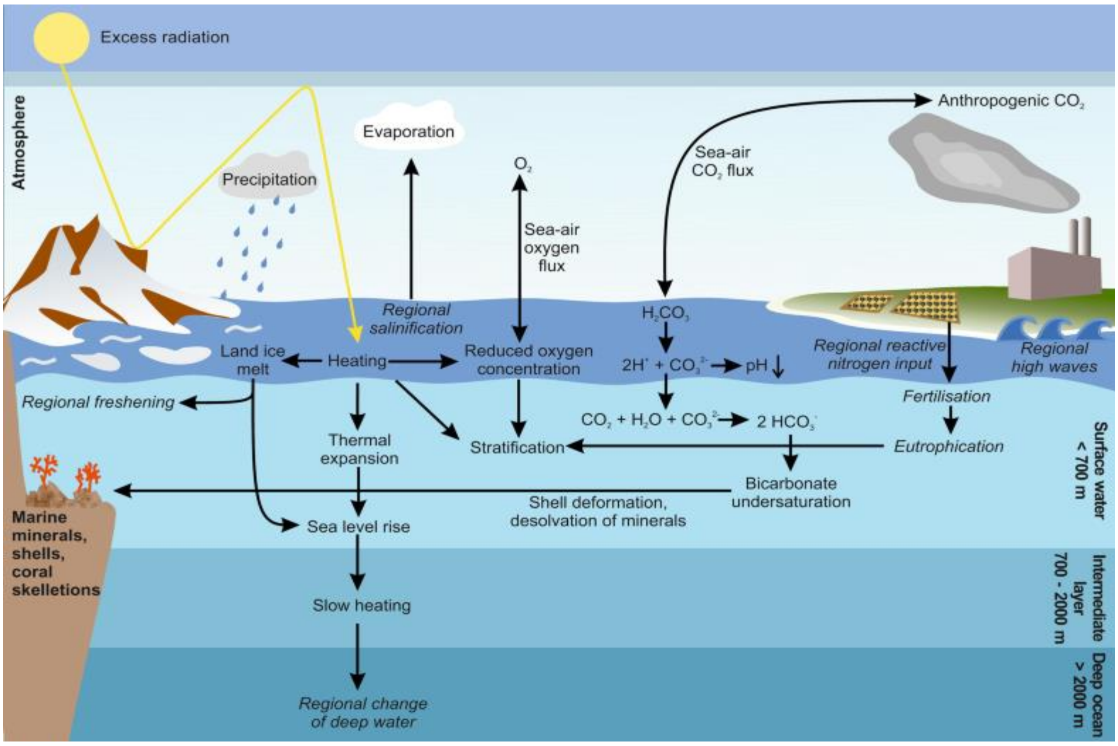

Figure 2: Effects of climate change on oceans

A rise in ocean temperatures

There has been an inequitable rise un temperature. The marine ecosystem is affected by the sea's temperature. Changes in global temperatures can have an immediate impact on the velocities and courses of ocean currents because of their impacts on the density of saltwater.

Oceanic life forms

The vast variety of the ocean floor is becoming increasingly appreciated. It is

Section A-Research paper
ISSN 2063-5346

hypothesized that more species can be found in the deep sea than in any other marine habitat. While pollution, shipping, military activities, and climate change all pose a risk to marine life and ecosystems, fishing is currently the greatest hazard facing these systems.

The primary danger to marine life at the ocean's depths

Means fishing by dragging a net down the floor. Seamounts and the cold-water corals they support are especially vulnerable to this form of fishing on the high seas. Several species of commercially important bottom-dwelling fish can be found in these environments.

The Fish Stocks

Many hundreds of millions of people rely heavily on coastal fishing. Overfishing and the accompanying collapse of fish populations has been blamed by many scientists for the drastic shifts observed in ecosystems over the past two centuries. New information suggests that climate and oceanic conditions play a major effect on fish populations. There is likely a lot of nuance involved in the way climate change affects fish populations. Conditions and the fish's life cycle may undergo dramatic shifts as a result of seemingly insignificant human interventions. Climate change has the greatest impact on marine ecosystems' main and secondary productivity.

Coral Reef

Scleractinia corals provide the backbone of the ecosystems that dominate the tropical ocean's intertidal and subtidal zones. Over the past 20 years, they have undergone significant alterations, many of which may be traced back to the effects of climate change and other pressures. Large populations of fish, birds, turtles, and marine mammals are maintained in these ecosystems due to the rich and complicated food chains that exist there. The creation of carbonate reefs is hampered by a decrease in light, temperature, and the carbonate alkalinity of seawater as one travels toward the poles. Major impacts from climate change have already been felt by coral reefs. Over the past 30 years, we have seen a huge rise in the frequency and severity of major disturbances to coral reefs, and this rise is inextricably related to times of warmer-than-average sea temperatures.

Bleaching happens when corals lose their cells too quickly. When colonies are bleached, they go from brown to white, and the host organism's magnificent colours become visible. Changes in reef-building coral communities are predicted to have large effects on marine biodiversity if reef-building corals lose these critical symbionts, which can reduce death rates by as much as 90 percent. Corals provide the structural support for an ecosystem that is

Section A-Research paper
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home to a wide variety of different organisms. Reef-building coral communities are anticipated to have major implications on marine biodiversity, especially on fish that rely on corals for food, shelter, or settlement. Corals provide the structural support for an ecosystem that is home to a wide variety of different organisms. The quantity of fish that rely on corals for food, shelter, or settlement cures may drastically shift, if not completely disappear. Threats to marine biodiversity affect tens of thousands of more species. Corals provide the structural support for an ecosystem that is home to a wide variety of different organisms. Reef-building coral communities are anticipated to have major implications on marine biodiversity, especially on fish that rely on corals for food, shelter, or settlement. Corals provide the structural support for an ecosystem that is home to a wide variety of different organisms. The quantity of fish that rely on corals for food, shelter, or settlement cures may drastically shift, if not completely disappear. There are thousands upon thousands of other species that are at risk [7].

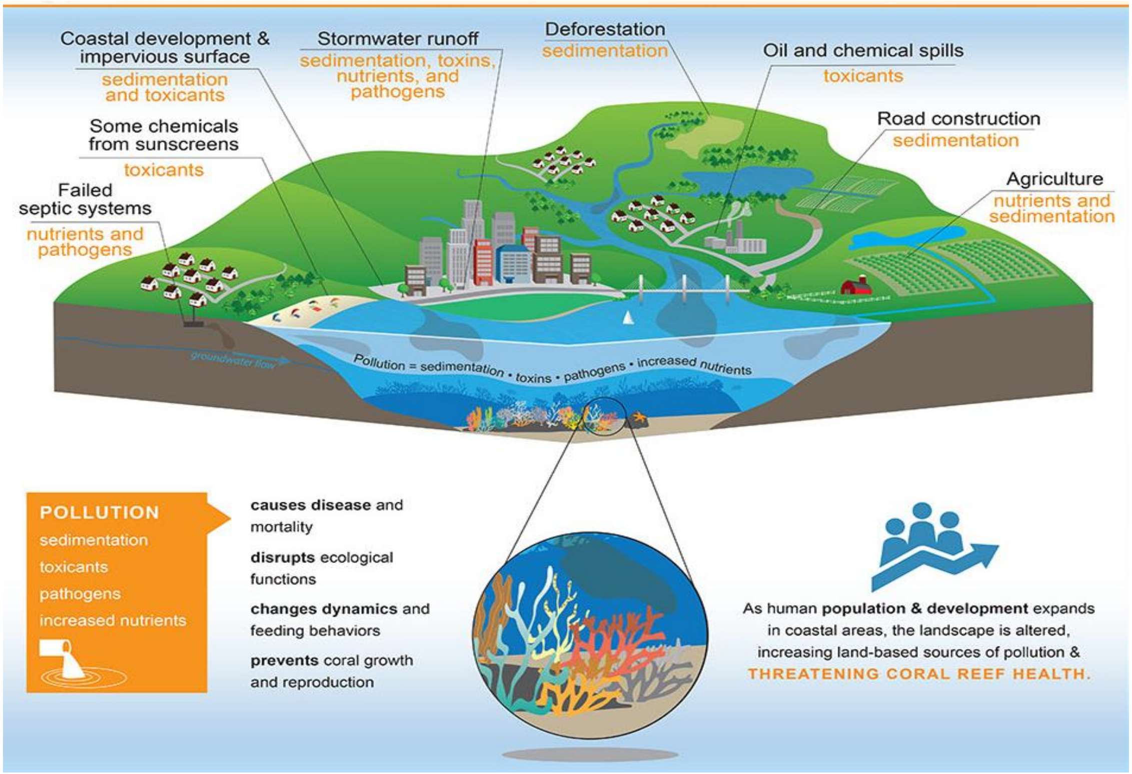

Figure 3: Pollution threaten coral reefs

Ecosystems in Fresh Water

Nutrient enrichment, hydrological modifications, habitat loss and degradation, pollution, and invasive species are all major hazards to freshwater fauna. Extreme weather events and higher UV radiation levels present new dangers on top of those already present.

Rapid land use change, habitat disruption, and a changing climate are seen as a triple whammy that poses a significant threat to aquatic ecosystems.

Value of inland water systems

A negligible portion of the world's water is freshwater found on the surface. Clean water for human consumption, agriculture, fisheries, and recreation are just a few examples of the many important ecosystem services provided by thriving freshwater ecosystems. In many parts of the world, people lack access to safe drinking water that is adequate for their most basic needs [8].

Adapting to a changing climate: the hydrologic cycle

Changes to the hydrologic cycle will have an unpredictable impact on freshwater habitats. Increased transpiration from plants and increased evaporation from water surfaces both contribute to a more robust water cycle in a warmer climate. Warmer temperatures and shifts in the hydrologic cycle are two ways in which future climate change will have an immediate impact on lake ecosystems.

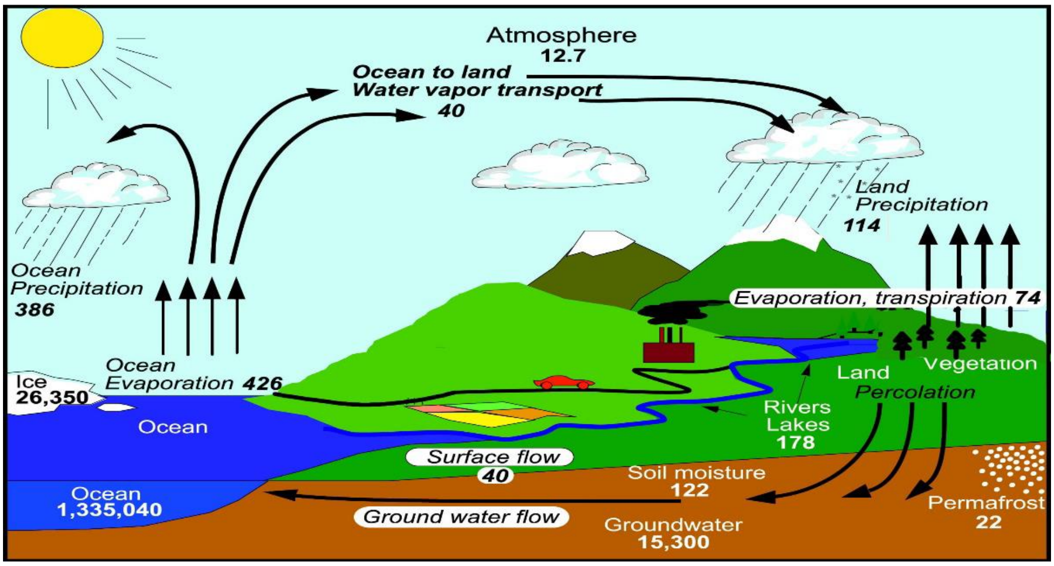

Figure 4: Hydrologic cycle

Influences on Biology

There are many different ways in which rapid climate change poses a threat to the biodiversity of rivers and streams. The effects of climate change may result in the extinction of multiple trophic levels of organisms. Because of the limitations imposed by the environment, certain species run the risk of becoming extinct on a global scale if they have a limited distribution. The entire diversity of species is in jeopardy of extinction, but this is especially true in the case of fish, as more specialized species have a tendency to congregate in particular places. [9].

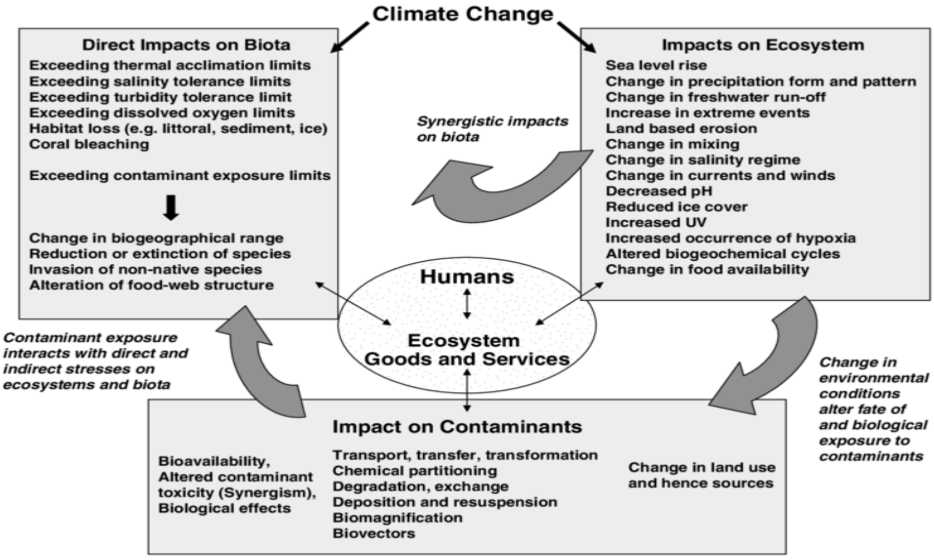

Figure 5: Biological impact of climate change

Conclusion

As a result of human needs, aquatic ecosystems are under increasing stress. Future climate change will interact with the various human stressors that affect aquatic ecosystems. Human activities continue to play a major role in driving changes in biodiversity. Changes in global climate, even slight ones, can have a significant impact on biodiversity. When this need is met with a single desire, we can create a sustainable biodiversity that benefits all people. There is no single person or group to hold responsible for the present nationwide food shortage. All the problems plaguing society, such as poverty, hunger, corruption, etc., are interconnected and perpetuate themselves in a vicious cycle. There is an urgent need for public discussion and localized action. Good governance and political will need to be translated into concrete reforms. People in our country who are struggling with poverty need our collective assistance.

To organize and manage biological resources in a way that ensures their widespread use and steady supply while also preserving their quality, value, and diversity is the goal of biodiversity conservation. Extinction must be avoided at all costs, which is why careful preparation and administration are essential. More needs to be done now to slow biodiversity loss and institute permanent safeguards for this precious resource. Decisions on where and how much to invest in the future of humanity and other people's wealth are necessary. Conservation of biodiversity cannot be achieved through legal mandate alone. Because we care about the

Section A-Research paper
ISSN 2063-5346

planet and all its inhabitants, it has to originate from within ourselves. Biodiversity is life is the motto for the International Year of Biodiversity. Life itself is biodiversity. Remember that biodiversity is nature's safety net in times of crisis.

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Section A-Research paper
ISSN 2063-5346

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