

Water and climate change assignment



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Change Over the course of the past decade, the Increase of greenhouse gases due to anthropogenic influences has sparked many concerns regarding global climate change and the effects it may have on our daily lives. According to a report that the Intergovernmental Panel on Climate Change published in late 2007, water impacts caused by climate changes will be “ one of the greatest concerns California will have to worry about as a result of global warming. “(lips, 2007)The severity of the consequences of this dilemma is already noticeable in many areas across the west coast.

This can be seen in the recent report published by the California Department of Water Resources which stated that snowplow water was only at seventeen percent of normal levels this year (DIR). Such stark changes occurring in our in climate mark this as a critical time in history, when it is more crucial than ever before to sustain and manage our water resources. Human activities have accelerated the pace of global warming by Increasing the concentration of carbon dioxide In the atmosphere, altering the global nitrogen cycle, and converting ecosystems to serve human purposes.

Elevated levels of atmospheric carbon dioxide and other greenhouse gases have led to reduced nutrient concentrations in plant tissues, forcing herbivores to “ consume more tissue to acquire sufficient protein and other nutrients for growth and development” while suffering “ higher mortality in the process” (Evolutes 1994). Consequently, decomposer “ encounter lower quality tissue” which leads to repercussions in “ their own populations and in ecosystem-level nutrient cycling” (Vitreous).

An ecosystem's responsiveness to these elevated levels of carbon dioxide is affected by the quantity of nitrogen, a limiting nutrient, that is available. The nitrogen cycle has been modified by human activities to the extent that "more nitrogen is fixed annually by human-driven processes" than by natural processes (Vitousek). Nitrogen can be transported through a number of alternative pathways that "could include balkanization of reactive nitrous oxides," stable greenhouse gases, that contribute to the "formation of troposphere's ozone. Nitrogen can also be lost to "aquatic systems, which can reduce water quality." Humans have significantly altered "one-third to one-half of the terrestrial surface, including some of the best land in terms of water supply and soil fertility." Changes in land use, such as for farming, will require the transportation and use of available water. Repercussions of humans' use of altered lands have reduced "some major ecosystem types to fragments" or less.

For instance, freshwater systems have been put under severe stress because of "watershed modifications and use, and contamination of aquatic resources." (Evolutes) Projected climate change is an increasingly pressing risk for all businesses and individuals. A region's weather determines its agriculture, leisure, and tourism, all of which directly impacts local businesses. In addition, buildings designed with the region's climate in mind were not built to withstand the newly introduced weather conditions that they become susceptible to as a result of shifting global patterns.

Climate variability "causes more extreme floods and droughts globally". Evidence is 'strongly affecting human health, including mortality and morbidity from extreme heat, cold, drought or storms (Degradation, 2012) Warmer

ambient temperatures are projected to intensify the water cycle, which would “ alter the present hydrological resources ND add pressure on the availability of future water resources in some parts of the world” (Mushier, 2012).

Areas with warming climates will experience an increased “ rate of evaporation of water into the atmosphere” that “ may dry out some areas and fall as excess precipitation on other areas” (Water Resources Impacts & Adaptation). Heavier downpours will reduce our ability to store and use the runoff that either swiftly finds its way back into the salty oceans, or washes pollutants and “ other materials into water supplies, making them” unfit for human use and in need of expensive water treatment (Water Resources Impacts & Adaptation).

The increased volumes of water from these downpours also overwhelm the water infrastructure in coastal cities including sewer systems and wastewater treatment facilities that “ face risks from rising sea levels and the damaging impacts of storm surges” (Water Resources Impacts & Adaptation) During winters, warmer weather “ causes more precipitation to fall as rain rather than snow’ and prompts snow and glaciers to melt earlier during the year, directly influencing “ the timing of stream flow in rivers that eave their sources in mountainous areas” .

While this temporarily increases lakes’ and rivers’ supply of water, it essentially leaves a smaller reserve of fresh water left for the hotter months of summer, when the demand for water is highest and stresses on water resources are greatest. Once these glaciers have melted and no longer

replenish our freshwater rivers, the farther upstream salt water can advance. As the global temperature rises, there is also accelerated melting of ice caps which gradually adds volumes of water to the ocean and causes sea levels to rise.

Freshwater resources along the coasts are put at risk from rising sea levels, which could spill over into and contaminate freshwater resources. (Water Resources Impacts & Adaptation). Rises in temperature affect aquatic ecosystems by “changing ocean chemistry” and making them more acidic, adversely disrupting the delicate environment in which coral reefs are viable. The destruction of coral reefs, which “shelter much of the ocean’s biodiversity,” will consequently harm many other species, including the “fish that people eat” and the “marine life that fascinates so many people” (NCSC).

Such changes affect “coastal populations” and “other industries in those waters” such as shipping, swimming, and fishing. Climate change puts “land at risk of being severely constrained for crop agriculture” that would have serious consequences for food production. In the agricultural industry, a shift in weather and temperature will “alter where various plants and animals can live” and thus influence the value of farmland.

Areas of cropland where precipitation falls heavily in response to weather shifts suffer from crop damage and soil erosion, while droughts assess the salinity of the soil. Already, “gardeners and farmers see plants sprouting, flowering, and losing their leaves at different times, forcing them to change what they can plant” (NCSC). Water is used for many economic activities,

such as agriculture and generating hydrophone, and is also utilized both in industrial and domestic settings.

A fixed resource, water needs to be better managed in order to sustain the expanding human population, but the potential effects of climate variability “ greatly following a command and control approach which would require an impossible increase in water volumes, water management must become more flexible in order to deal with the extreme weather conditions over which we have limited ability to control by technical means.

More adaptive and integrated management approaches that rely “ solely on instruments such as demand management[... Also] recognize that there are multiple pathways to building resilience” against climate impacts on water resources. (Lamer, 2000) Pushing local governments in arid regions to promote scrapping, a “ climate appropriate landscaping” can reduce the demand for water tit the utilization of native plants that thrive in local conditions and aesthetically pleasing arrangements of rocks.

Flood-prone areas, however, are encouraged to build green stemware infrastructures that integrate rain gardens, stemware planters, and green roofs into the urban design” to quickly restore “ the natural hydrology of the land” (EPA). While mitigation efforts to reduce the severity and slow the processes of global warming have begun, the amount of greenhouse gases already released into the atmosphere will continue to warm the “ atmosphere over the next 30 ears” (EPA).

Warming atmospheric temperatures will invigorate the hydrological cycle, which will have wide-ranging impacts on numerous sectors around the globe

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including “ production, infrastructure, human health, agriculture, and ecosystems” (EPA). With changing climates certain to come, society has already begun to adapt and adjust to the effects of global warming. Shifts in energy sources serve to reduce emissions of carbon dioxide; tree plantations sequester and reduce atmospheric carbon; and adaptation approaches increase resilience to expected climate changes.