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| <p><u>Fact File</u></p> <ul style="list-style-type: none"> ▪ The Arctic region lies within the Arctic Circle (66.5° line of latitude). It includes countries such as Russia (Siberia), the USA (Alaska, Canada, Greenland, Norway and Finland). ▪ Average January temperatures are -35° with average July temperatures being -15°. Much of the Arctic is ice. ▪ In 2006, NASA reported a 14% decrease in the amount of sea ice between 2004-2005, this is around the size of the UK. ▪ Around 80% of the sun's energy was reflected by sea ice (albedo) however the melting means that the darker ocean absorbs more energy, converting it to heat, speeding up the warming effect. This is known as the positive ice albedo feedback. ▪ At current rates 50-60% of the Arctic will be lost by 2100, however some critics say all of it by 2070. ▪ Permafrost varies in thickness but can be up to 150m. ▪ Active layer (surface of permafrost which repeatedly thaws & freezes) | <p><u>Vegetation impacts</u></p> <ul style="list-style-type: none"> × Vegetation zones are predicted to shift northwards. × Coniferous forests beginning to encroach on tundra and ice deserts to the north. × These shifts will disturb and destabilise existing food webs. × Warmer temperatures will increase insect caused tree deaths; increase in insect infestations = Spruce bark beetles, cone worms, larch sawflies & spruce budworm have all had increased outbreaks in the boreal forests in the last decade. <p><u>Threats</u></p> <ul style="list-style-type: none"> × Thawing will release large quantities of methane. × Increased coastal erosion as thawing permafrost weakens the coast. × With less sea ice there will be more waves and storm surges that strike land. × Greenland ice sheet already melting, this could lead to a warmer, less saline water in the Arctic = weaken the Arctic conveyor which draws the warm Gulf Stream northwards. | <p><u>Environmental impacts</u></p> <ul style="list-style-type: none"> × 40% of permafrost (<i>permanently frozen ground</i>) is likely to thaw especially in Siberia. × Thickening of the active layer. × Lakes & rivers may drain as the land beneath them thaws and drains the water. × In other areas rising rivers could food and create new wetland areas. × Warmer temperatures will increase forest fires. × Increased UV rays will reach the earth's surface. × Increased precipitation could transport pollution from the south to the Arctic region. <p><u>Opportunities</u></p> <ul style="list-style-type: none"> ✓ Longer, warmer growing season will benefit agriculture although soils will be a limiting factor. ✓ Increasing forest cover will increase carbon dioxide uptake. |
| <p><u>Social impacts</u></p> <ul style="list-style-type: none"> × Loss of hunting culture for the indigenous Inuit. × Traditional knowledge for navigating and safety is less relevant. More lives are in danger because of this. × Loss of food security. × Herd animals (reindeer) will have to have different migration routes. × Decline in northern fresh water fisheries. × Disruption of land based transport due to permafrost thawing. × As ice melts exposing land and sea, the Arctic will become more accessible, and vulnerable to exploitation for oil, gas, fish and other resources. ✓ Enhance marine fisheries (e.g. arrival of cod and herring in warming arctic waters.) ✓ Increasing access for marine shipping. ✓ Access could lead to tourism (commercial) and industrial shipping access advantages = revenue. ✓ Enhance agriculture & forestry. | <p><u>Ecological impacts (impacts on distribution and abundance of organisms-plants and animals)</u></p> <ul style="list-style-type: none"> × Changes in rivers and wetlands will have an impact on freshwater fish e.g. Arctic char and lake trout. × Many freshwater ecosystems are sensitive to UV changes; can destroy phytoplankton at the base of the marine food chain. × Species will shift north with the forest habitats. × Some species are likely to decline. × <u>Marine species</u> such as polar bears, ice-living seals, walrus & some birds will decline. Some may face extinction. × Birds like geese will have different migration patterns. <u>Land species</u> like lemming, vole, Arctic fox, snowy owl & caribou are at risk. × The ivory gull has seen a 90% decrease in number in Canada over the last 20 years | <h1>Arctic Case Study</h1> |

