Declining sea ice and warming trends are resulting in changes to vegetation in arctic coastal areas, according to research results published by two University of Alaska Fairbanks scientists in a recent edition of Science magazine.

The review examining how losses of northern sea ice affect surrounding areas was written by Uma Bhatt, an associate professor at UAF's Geophysical Institute, and Skip Walker, a professor at UAF's Institute of Arctic Biology.

The pair analyzed 10 years worth of data and research on the subject. Their findings show that sea ice loss is changing marine and terrestrial food chains. Sea ice loss means a loss of sea ice algae, the underpinning of the marine food web, they said. Larger plankton is thriving, replacing smaller, but more nutrient dense plankton, and what that means exactly is not yet understood, they said.

Above water, loss of sea ice has destroyed old pathways of animal migration across sea ice, while opening new pathways for marine animals in others. Some animals and plants will become more isolated. In the case of the farthest north and coldest parts of the Arctic, entire biomes may be lost. A biome is a complex biotic community characterized by distinctive plant and animal species and maintained under the climatic conditions of the region.

Warming soils provide an opportunity for new vegetation to grow where less vegetation occurred previously, said Walker, a plant biologist. This contributes to a general greening of the Arctic that is visible from space. Bhatt, an atmospheric scientist, examined a 1982-2010 time series of remote sensing data to examine trends in sea ice, land-surface temperatures and changes in the vegetation abundance.

Despite a general warming and greening of Arctic lands in North America, some areas in northern Russia and along the Bering Sea coast of Alaska are showing recent cooling trends and declines in vegetation productivity. "We don't know why," Bhatt said.

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