**Ecosystem Type: LAKES AND PONDS**

**Category: Climate Stabilization**

1. **Materials**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

1. **Nutrition**

***Supplier*** – not applicable

***Driver*** -not applicable

***Demander*** - not applicable

1. **Energy**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

1. **Mediation of Waste, Toxics, and Other Nuisances**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

1. **Maintenance of Physical, Chemical, and Biological Indicators**

***Supplier*** – Lakes and ponds are climate regulators because of their ability to cycle carbon (Williamson et al., 2009), a major greenhouse gas and contributor to climate change. Sediment is also captured in lakes and ponds, which makes these ecosystems a sink of carbon preventing the carbon from entering the atmosphere (Kling, Kipphut, and Miller, 1991). Further, these ecosystems maintain the microclimates of adjacent habitats because they intercept rainfall (Cereghino et al., 2014) and undergo freezing and thawing cycles (Quayle et al., 2002), which manages the water supply available for cooling microclimates.

***Driver*** – Impervious surfaces can increase the amount of runoff flowing into a lake or pond. As precipitation intensifies with climate change, higher discharge into lakes can lead to changes in the physical habitat of the ecosystem due to an increase in nutrient loading, bacteria, and other wastes that occur from combined sewer overflows (Patz et al., 2008). This intensified discharge may lead to a decrease in the overall residence time water has in a lake if the habitat overflows, reducing a lake’s service of capturing sediment and allowing it to settle into a carbon sink.

***Demander*** – not applicable

1. **Spiritual, Symbolic, Religious, and Social Experiences**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

1. **Physical and Intellectual Interactions w/ Biota, Ecosystems, and Land/Seascapes**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** - not applicable

**Sources:**

Cereghino, R. et al. (2014) The ecological role of ponds in a changing world. *Hydrobiologia, 723*(1), 1-6. <https://doi.org/10.1007/s10750-013-1719-y>.

Kling, G.W., Kipphut, G.W., and Miller, M.C. (1991) Arctic Lakes and Streams as Gas Conduits to the Atmosphere: Implications for Tundra Carbon Budgets. *Science, 251*(4991), 298-301. DOI: 10.1126/science.251.4991.298. [abstract only]

Patz, J.A. et al. (2008) Climate Change and Waterborne Disease Risk in the Great Lakes Region of the U.S. *American Journal of Preventive Medicine, 35*(5), 451-458. DOI: <https://doi.org/10.1016/j.amepre.2008.08.026>.

Quayle, W.C. et al. (2002) Extreme Responses to Climate Change in Antarctic Lakes, *Science, 295*(5555), 645. DOI: 10.1126/science.1064074. [abstract only]

Williamson, C.E. et al. (2009) Lakes and reservoirs as sentinels, integrators, and regulators of climate change. *Limnology and Oceanography, 54*(6 part 2), 2273-2282. DOI: 10.4319/lo.2009.54.6\_part\_2.2273.