**Ecosystem Type: TUNDRA**

**Category: Climate Stabilization**

1. **Materials**

***Supplier*** – Tundras are ecosystems that stay covered in permafrost, which creates a heat sink that reduces the surface temperature of surrounding microclimates in the summer (Eugster et al., 2000). These ecosystems are also known to help retain carbon in the winter periods and store up to 50% of the global belowground carbon (Fan et al., 1992; Dagg and Lafleur, 2010; Tagesson et al., 2012).

***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*** – Tundras experiencing extremely cold permafrost season have lower exchanges of carbon dioxide to the atmosphere, which has an impact on climate change (Kutzbach, 2006). There is a large amount of carbon that is stored in these ecosystems, so as they thaw, there is an exchange of gases like carbon dioxide to the atmosphere (Oberbauer et al., 1996; Dagg and Lafleur, 2010).

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Tundras provide a habitat that allows for the exchange and transformation of carbon, removing the gaseous form from the atmosphere (Kutzbach, 2006; Dagg and Lafleur, 2010). This minimizes the impact carbon dioxide has on the climate.

***Driver*** – not applicable

***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:**

Dagg, J. and Lafleur, P. (2010) Vegetation Community, Foliar Nitrogen, and Temperature Effects on Tundra CO2 Exchange across a Soil Moisture Gradient. *Arctic, Antarctic, and Alpine Research, 43*(2), 189-197. <https://doi.org/10.1657/1938-4246-43.2.189>.

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Fan, S.M. et al. (1992) Micrometeorological measurements of CH4and CO2 exchange between the atmosphere and subarctic tundra. *Journal of Geophysical Research, 97*(D15), 16627-16643. DOI: 10.1029/91JD02531. [abstract only]

Kutzbach, L. (2006) *The Exchange of Energy, Water and Carbon Dioxide between Wet Arctic Tundra and the Atmosphere at the Lena River Delta, Northern Siberia* (Unpublished doctoral dissertation). Universität Hamburg, Bremerhaven, Deutschland.

Oberbauer S.F. et al. (1996) “Landscape Patterns of Carbon Dioxide Exchange in Tundra Ecosystems. In: Reynolds J.F., Tenhunen J.D. (Eds) Landscape Function and Disturbance in Arctic Tundra.” *Ecological Studies (Analysis and Synthesis)*, vol 120. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-662-01145-4\_11

Tagesson, T. et al. (2012) Land-atmosphere exchange of methane from soil thawing to soil freezing in a high-Arctic wet tundra ecosystem. *Global Change Biology, 18*(6), 1928-1940. DOI: 10.1111/j.1365-2486.2012.02647.x. [abstract only]