**Ecosystem Type: ICE AND SNOW**

**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*** – Research has found that the density and age of snow and ice play an important role in solar energy absorption (Grenfell and Maykut, 1977; Jin et al., 1994). Solar energy is more likely absorbed and distributed in thinner ice (Jin et al., 1994) and older snowpacks (Grenfell and Maykut, 1977). This affects the climates of the surrounding ecosystem because the land becomes warmer, and more susceptible to changes in temperature. However, newer snowpack and thicker ice has a greater ability to reflect sunlight and heat back into the atmosphere, maintaining a cooler environment for the surrounding landscape.

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – The albedo effect of snow and ice can reduce the warming of surrounding ecosystem (Grenfell and Maykut, 1977; Jin et al., 1994; Hansen and Nazarenko, 2004). The albedo effect is the ability of land cover to reflect sunlight and heat back into the atmosphere. Ice and snow can reflect radiation at a higher rate, keeping the land cooler, thus the ecosystem cooler.

***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:**

Grenfell, T.C. and Maykut, G.A. (1977) The Optical Properties of Ice and Snow in the Arctic Basin. *Journal of Glaciology, 18*(80), 445-463. <https://doi.org/10.3189/S0022143000021122>. [abstract only]

Hansen, J. and Nazarenko, L. (2004) Soot climate forcing via snow and ice albedos. *PNSA, 101*(2), 423-428. <https://doi.org/10.1073/pnas.2237157100>. [abstract only]

Jin, Z. et al. (1994) The effect of sea ice on the solar energy budget in the atmosphere-sea ice-ocean system: A model study. *Journal of Geophysical Research, 99*(C12), 25281-25294. DOI: 10.1029/94JC02426.