**Ecosystem Type: TUNDRA**

**Category: Recreation, Culture, and Aesthetics**

1. **Materials**

***Supplier*** – Tundras are filled with terrestrial plant species that support the life cycle of animals that can be hunted recreationally. One study found that the presence of diverse shrub species enhances the success of a group of reindeer herders because reindeer prefer shrubs to other vegetative types (Kumpula et al., 2011).

***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*** – Tundra microbial species have the ability to mediate wastes such as leaf litter through decomposition, which also allows them to filter out nutrients to transform them for productive processes (Hobbie, 1996). These processes support the life cycle of a diverse group of plant species by providing them nutrient resources for growth.

***Driver*** – not applicable

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – Tundra species are susceptible to changes in species diversity because of their ability to alter energy fluxes and the exchange of water that occurs across the landscape (Myers-Smith et al., 2011).

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Certain plant species in tundras can tolerate the impact of human recreation, permitting the levels of disturbance are low to moderate (Monz, 2002). This allows the habitat to be used by multiple individuals for unique experiences. Tundras have a mix of terrestrial habitat that allow for a diverse group of species to exist. For example, tundras can be completely occupied by ice, herbaceous-dominated plant species, or shrub-dominated plant species (Walker, Gould, and Chapin III, 2001). These habitats supply resources that support the life cycle of animals living in these high latitude locations (Hofgaard, Harper, and Golubeva, 2012).

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Tundras supply a diverse group of plant and animal species that can be enjoyed by humans in different ways. One study found that there is an industry of indigenous reindeer herders in Arctic Russia that rely on the mix of vegetative shrub species for the success of their business (Kumpula et al., 2011). Another indigenous group in Alaska has been relying on tundra ecosystems to supply brown bears, fish, and other wildlife for hunting, which represents a large part of their cultural identity (Van Daele et al., 2001).

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Tourism has increased in tundra ecosystems (Kaltenborn and Emmelin, 1993).

***Driver*** – not applicable

***Demander*** - not applicable

**Sources:**

Kaltenborn, B.P. and Emmelin, L. (1993) Tourism in the high north: Management challenges and recreation opportunity spectrum planning in Svalbard, Norway. *Environmental Management,* 17(41). <https://doi.org/10.1007/BF02393793>. [abstract only]

Kumpula, T. et al. (2011) Land use and land cover change in Arctic Russia: Ecological and social implications of industrial development. *Global Environmental Change, 21*(2), 550-562. <https://doi.org/10.1016/j.gloenvcha.2010.12.010>. [abstract only]

Monz, C.A. (2002) The response of two arctic tundra plant communities to human trampling disturbance. *Journal of Environmental Management, 64*(2), 207-217. <https://doi.org/10.1006/jema.2001.0524>. [abstract only]

Van Daele, L.J. et al. (2001) Grizzlies, Eskimos, and Biologists: Cross-Cultural Bear Management in Southwest Alaska. *Ursus, 12*, 141-152. [abstract only]