**Ecosystem Type: BARREN/ROCK AND SAND**

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

1. **Materials**

***Supplier*** – Beaches have become one of the most popular ecosystems for recreational activity (Jedrzejczak, 2004).

***Driver*** – A study found that the subsoils of deserts have been trapping a large amount of nitrate (Walvoord et al., 2003), which may be contribute by land use changes and nutrient inputs such as manure application. This reservoir of nitrate can be leaching into water resources, negatively affecting the health and quality of the waterways. Sandy ecosystems are also sensitive to fecal bacteria, which can pollute adjacent waters (Alm, Burke, and Spain, 2003).

***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*** –

1. **Mediation of Flows**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Researchers have found that people have a cultural connection with desert ecosystems, even if they do not recognize the additional benefits these ecosystems provide (Sagie et al., 2013). Beachgoers also value the presence of beach ecosystems because they provide many services and they contain a diverse group of species (Lucrezi and van der Walt, 2016).

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Sand dunes are popular ecosystems for tourists to visit for activities like hiking and bird watching (Everard, Jones, and Watts, 2010).

***Driver*** – not applicable

***Demander*** - not applicable

**Sources:**

Everard, M., Jones, L., and Watts, B. (2010) Have we neglected the societal importance of sand dunes? An ecosystems services perspective. *Aquatic Conservation, 20*(4), 476-487. DOI: 10.1002/aqc.1114. [abstract only]

Jedrzejczak, M.F. (2004) The modern tourist’s perception of the beach: Is the sandy beach a place of conflict between tourism and biodiversity? *Coastline Reports,* (2), 103-108.

Lucrezi, S. and va der Walt, M.F. (2016) Beachgoers’ perceptions of sandy beach conditions: demographic and attitudinal influences, and the implications for beach ecosystem management. *Journal of Coastal Conservation, 20*(1), 81-96. <https://doi.org/10.1007/s11852-015-0419-3>. [abstract only]

Sagie, H. et al. (2013) Cross-cultural perceptions of ecosystem services: A social inquiry on both sides of the Israeli-Jordanian border of the Southern Arava Valley Desert. *Journal of Arid Environments, 97,* 38-48. <https://doi.org/10.1016/j.jaridenv.2013.05.007>. [abstract only]