**Ecosystem Type: FORESTS**

**Category: Food, Fuel, and Materials**

1. **Materials**

***Supplier*** – Forests supply food, fuel, and materials to humans on a daily basis. The use of forest materials ranges across cultures and societies. For example, an indigenous population in Honduras relies on the rain forest for craft materials and medicines that can be directly consumed or a source of income (Godoy et al, 2000). Agricultural populations might use the materials for feed that goes to their livestock in addition for medicines and food (Perez, Arnold, and Byron, 1996). Recognizing the value that forests play in these communities has encouraged organizations to launch initiatives that make it easier to better manage this ecosystem type, such as FAO’s Special Programme for Food Security (Sene, 2000). This program specifically highlights support for low-income food-deficit countries and tries to find ways to improve food production by utilizing the role of forests and trees (Sene, 2000).

***Driver*** – not applicable

***Demander*** – not applicable

1. **Nutrition**

***Supplier*** – Forests supply a variety of plants and animals that can be consumed by people to maintain proper nutrition. The types of species eaten may change based on the population and culture, but this ecosystem type is a common resource that remains to be a vital part to many individual’s well-being. In fact, forests have been found to support nutritionally balanced diets and have been an important ecosystem to reduce malnutrition (Vira, Wildburger, and Mansourian, 2015).

***Driver*** -not applicable

***Demander*** - not applicable

1. **Energy**

***Supplier*** – Forests can be used as materials for energy and has been a supply of fuel for a long time (Szego and Kemp, 1973; Hall, 2002; Gunnarsson, H., Ronnqvist, M., and Lundgren, J.T., 2004). Harvesting trees as opposed to fossil fuels has been a preferred method to reduce the emissions of pollutants like sulfur dioxide (Szego and Kemp, 1973, Stupak et al, 2007). It has been predicted by that the use of forest biomass for energy will increase over 113 percent by 2050 (Alavalapati, 2013).

***Driver*** - not applicable

***Demander*** - not applicable

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

***Supplier*** – Forests can support food, fuel, and materials by supplying resources that help mediate wastes and toxics. For example, forests can protect the quality of aquatic ecosystems by working as a filter of pollutants and chemicals (Vidon et al., 2010; Kreutzweiser and Capell, 2001). This can help protect the organisms that live there, and consequentially keeps them available as resources that can be used for food, food, or materials. Forests can also provide shade for crops that are intolerant to long periods of sunlight, such as shade-coffee agroecosystems (Greenberg, Bichier, and Sterling, 1997).

***Driver*** – The increasing occurrence of nitrogen deposition can cause soil acidification, which raises the presence of ammonium (Bobbink, Hornung, and Roelofs, 1998).

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – Forests can control the flow of water and sediment (Naiman and Decamps, 1997), which supports the provision of food, fuel, and materials. For example, mangrove forests are a habitat for a range of aquatic species that are consumed for food like fish, crustaceans, and mollusks (Walters et al, 2008; Ronnback, 1999). Sedimentation or high fluxes of water can negatively impact the population of these species, influencing their availability for consumption. However, a riparian forest, like mangroves, reduce the risks associated with flow variability in water and sediment that can occur from events like deforestation, urbanization, or increased rain events. The control of sedimentation by forests also reduce the affects suspended soils and particles have in aquatic resources that are used for hydroelectric power or other materials (Kaimowitz, 2005).

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Forests can act as buffers to streams for reducing nutrient loads that come from non-point sources, such as agricultural runoff (Lowrance et al, 1997; Schultz, 2004). Consequences from deforestation also negatively affect water ecosystems, which a riparian forest buffer can help minimize (Lorion and Kennedy, 2008). Protecting water resources helps maintain the biological and physical integrity of this ecosystem so that potentially consumable, aquatic plants and animals are not degraded in quality.

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Forests can provide resources that are harvested for spiritual, symbolic, religious or social experiences. As a social and symbolic bind to their ancestors, there are tribes that collect the same fruits and roots from forest plants that were consumed for hundreds of years (Shack, 1971). Other communities, such as the “ecology monks”, have a spiritual connection to forests and believe that they contain valuable materials worth protecting from logging (Walter, 2007). Large trees have historically been identified as a part of human identity (Blicharska and Mikusinski, 2014).

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – Forests provide materials that can be incorporated into an individual’s experiential use for activities like walking, hiking, and climbing (Janowsky and Becker, 2003; Shelby et al, 2005). These activities are increasing in numerous locations. Forests also provide resources that can be hunted for food (Solino, Farizo and Campos, 2017). This is a popular physical interaction humans have with this ecosystem type.

***Driver*** - not applicable

***Demander*** - not applicable

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