**Ecosystem Type: RIVERS AND STREAMS**

**Category: Biodiversity Conservation**

1. **Materials**

***Supplier*** – Rivers and streams are habitats for a wide range of aquatic species (Williams et al., 2004). Buffer zones and floodplains of these ecosystems are rich in species and provide a variation of habitats to support biodiversity (Ward, Tockner, and Schiemer, 1999). There are existing efforts to protect and restore these ecosystems so that biodiversity is maintained locally (Hansen et al., 2002), nationally (Lydeard and Mayden, 1995), and worldwide (Arthington and Pusey, 2003; Pimm et al., 2014).

***Driver*** – Flooding that occurs from increased impervious area in a watershed can change the assemblage of aquatic species living in rivers and streams, therefore affecting the ecosystem’s diversity (Arthington et al., 2009). Homogenization of species may also occur in rivers and streams that have been modified either with dams or with changes in a stream’s length, meanders, or depth (Poff et al., 2007).

***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*** – Streams and rivers can dilute wastes and toxics from water resources to protect the biodiversity of plants and animals within the channel (Azrina et al., 2006), connected to the channel (Amano et al., 2010), and along the buffers and floodplains. Stream buffers and floodplains contain plants that filter freshwater (Qasaimeh, AlSharie, and Masoud, 2015; Westbrook, Brunet, Phillips, and Davies, 2011), sequester heavy metals (Qasaimeh, AlSharie, and Masoud, 2015), and trap sediment (Kreutzweiser and Capell, 2001). These processes help maintain the biodiversity of stream and river ecosystems.

***Driver*** – Characteristics of a stream or river affect its ability to dilute wastes and toxics from water resources that protects the biodiversity of plants and animals within the channel and along the buffers and floodplains (Power, Dietrich, and Finlay, 1996). Changes in stream length, meanders, and other fluvial dynamics can influence the types of species present in this ecosystem type (Hamilton et al., 2007).

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – Rivers and streams allow upstream and downstream species to disperse and spawn (Sheldon, Boulton, and Puckridge, 2002; Lynch et al., 2011), improving the overall biodiversity of the habitat.

***Driver*** – Land use, stream density, and stream length impact the flow of water, sediment, and aquatic species in a river or stream ecosystem (Arthington et al., 2009). As a result, the biodiversity of these ecosystems is affected. For example, biodiversity of fish species are impacted by the damming of rivers and deforestation of the watershed (Dudgeon, 2000b). Impervious surfaces are increasing with population and cause issues like flash flooding and polluted runoff from sources like roads and private property (Arnold and Gibbons, 1996), which impact the quality of waters needed for the survival of sensitive aquatic species.

***Demander*** – not applicable

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

***Supplier*** – Rivers and streams provide a habitat for a diverse group of species and maintain a biological pool of aquatic plants and animals. This supports the biodiversity of its ecosystem and nearby ecosystems because of the connection that aquatic species have in the food web (Peterson et al., 1993).

***Driver*** – Land use in a stream or river’s watershed impacts the physical, chemical, and biological components of the ecosystem’s biodiversity. Impervious surfaces are increasing with population and cause issues like flash flooding—disrupting the habitat necessary for the biodiversity of aquatic wildlife (Power and Stewart, 1987; Dudgeon, 2000a)—and polluted runoff from sources like roads and private property (Arnold and Gibbons, 1996), which impact the quality of waters needed for the survival of sensitive aquatic species harvested for human consumption.

***Demander*** – not applicable

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

***Supplier*** – People have protected rivers and streams because of the spiritual connection they have to the resource (Dudley and Hamilton, 2010) and to the species that exist within them (Simaika and Samways, 2008). This benefits the species that reside in these habitats because the ecosystem stays intact, which ultimately maintains its biodiversity.

***Driver*** – Alteration of streams impacts the biodiversity of the ecosystem (Geist, 2011). Therefore, groups that value biodiversity like conservationists believe that it is important to protect this resource and its watersheds (Angermeier, 2000), such as limiting the amount of impervious area or minimizing channel disruptions.

***Demander*** – not applicable

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

***Supplier*** – The species that live in rivers and streams can be studied and interacted with by humans.

***Driver*** – The desire to use water for varying interests has historically created wars, and continues to be a problem as stream length and densities are depleted from increased demand (Wolf, 1998).

***Demander*** - not applicable

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