**Ecosystem Type: FORESTS**

**Category: Natural Hazard Mitigation**

1. **Materials**

***Supplier*** – Forests can reduce the effects of natural hazards. For example, the amount of forest coverage can play a factor in how well people and ships are protected from tsunami drifts (Harada1 K. and Imamura F., 2005). Further, the reduction in energy produced by tsunamis can be interfered by forest’s density, stem and root diameter, and shore slope (if applicable) (Alongi, D., 2008).

***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*** – no literature review available at this time

***Driver*** – not applicable

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – Forests help manage sediment and water flows from natural disasters like landslides and flood events, respectively (Cheng, J.D., Lin, L.L., and Lu, H.S., 2002). This ecosystem type is often managed to protect downstream waters from pollutants delivered from flooding (Lu, S.Y., Cheng, J.D., and Brooks, K.N., 2001).

***Driver*** – not applicable

***Demander*** – no literature review available at this time

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

***Supplier*** – Forests can help mitigate the damage created by natural disasters such as flood events and tsunamis. The protection provided from storm surges helps maintain soil structure and vegetation prone to destruction from such events (Tanaka, N., 2009, Cheng, J.D., Lin, L.L., and Lu, H.S., 2002 and Lu, S.Y., Cheng, J.D., and Brooks, K.N., 2001).

***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:**

Alongi, D.M. (2008) Mangrove forests: Resilience, protection from tsunamis, and responses to global climate change. *Elsevier, 76*(1), 1-13. <https://doi.org/10.1016/j.ecss.2007.08.024>.[abstract only]

Cheng, J.D., Lin, L.L., and Lu, H.S. (2002) Influences of forests on water flows from headwater watersheds in Taiwan. *Elsevier, 165*(1-3), 11-28. <https://doi.org/10.1016/S0378-1127(01)00626-0>. [abstract only]

Harada1 K., Imamura F. (2005) Effects of Coastal Forest on Tsunami Hazard Mitigation — A Preliminary Investigation. In: Satake K. (eds) Tsunamis. Advances in Natural and Technological Hazards Research, vol 23. Springer, Dordrecht. <https://doi.org/10.1007/1-4020-3331-1_17>.

Lu, S.Y., Cheng, J.D., and Brooks, K.N. (2001) Managing forests for watershed protection in Taiwan. *Elsevier, 143*(1-3), 77-85. <https://doi.org/10.1016/S0378-1127(00)00507-7>. [abstract only]

Tanaka, N. (2009) Vegetation bioshields for tsunami mitigation: review of effectiveness, limitations, construction, and sustainable management. *Landscape and Ecological Engineering, 5*(1), 71-79. <https://doi.org/10.1007/s11355-008-0058-z>.