Context Document: Trail and Boardwalk Installation Ecosystem Service Logic Model

Project: GEMS
http://bit.ly/NI-GEMS

Ecosystem Service Logic Models (ESLMs) are conceptual models that summarize the effects of an intervention, such as a habitat restoration project, on the ecological and social systems. Each model links changes in biophysical systems caused by an intervention to measurable socioeconomic, human well-being, and ecological outcomes. ESLMs assume that the restoration is successful and include all potentially significant outcomes for the intervention; not all outcomes will be relevant to each individual project, depending on location and environmental conditions.

The direction of an outcome (whether the restoration will have a positive or negative influence) often depends on the specific situation or is unclear due to multiple links (arrows) leading into an outcome that may have opposite effects. Thus, language like "increased" or "decreased" is not included in the models. These models are often used to consider management with or without an intervention or to compare different interventions.

This context document includes additional information about the restoration approach and details about some of the relationships in the trail and boardwalk installation ESLM. It also includes a list of the references used to develop the ESLM and names of experts with whom we spoke to refine the model.

Trail and Boardwalk Description and Use in the Gulf of Mexico

Specific techniques for trail and boardwalk projects are generally site specific and can vary in installation processes and materials used. More broadly, trails and boardwalks aim to increase accessibility to waterfront areas for a range of activities including walking, hiking, biking, horseback riding, and fishing. Whereas trails are generally installed on raised ground, or ground that does not easily become submerged by water and can therefore provide consistent accessibility, boardwalk installation is required for access over wet or marshy areas or areas associated with sensitive wildlife and vegetation (Kusler n.d.). Boardwalks therefore consist of raised platforms, requiring the installation of footings into the substrate (Portland Parks and Recreation 2009). The materials used to make boardwalks can vary based on substrate composition and other adjacent environmental factors, including sunlight, moisture, and sediment composition (Portland Parks and Recreation 2009). Despite these differences in installation methodologies, trail and boardwalk infrastructure ultimately impacts similar ecological and anthropogenic factors, albeit in varying ways, allowing for a unified ESLM. Trail and boardwalk networks are common throughout recreational areas of the Gulf Coast.

External Factors That Influence Restoration Success

Central to the success of a trail or boardwalk installation project is accessibility. Physical accessibility to these projects is impeded by factors including land that is privately owned, areas that are not free to use, or construction that keeps individuals with disabilities from utilizing them.

Model Notes and Clarifications

Fishing to Physical Health (excluded): Fishing activity (both on boats and from shore) can require some level of physical exertion or alternatively reduce an individual's opportunities to be physically active or dedicate effort towards physical health. However, there is limited evidence showing a demonstrable relationship between these two outcomes. While it is included in the oyster model and evidence library, it is excluded in the recreational enhancement models as the relationship is very tenuous.

Camping and Pathogens (excluded): New or enhanced trails can have an effect on access to camping grounds and therefore camping activity in the Gulf of Mexico. Waterways close to campgrounds tend to have higher levels of pathogens, particularly coliform bacteria, through higher concentrations of mismanaged human waste being released (Stott 2019). However, there is not sufficient evidence in the region to suggest that this increased concentration would impact other social and economic outcomes in the Gulf of Mexico, especially compared to the effect that stormwater and wastewater have on water quality in the region.

Intervention to Air Quality (excluded): There are several modes by which air quality can be affected by this kind of restoration project: 1) localized and short-term impact from project construction and 2) vehicle exhaust or dust particles from parking lots adjacent to trails and boardwalks. While even a brief exposure to these kinds of conditions can potentially have an impact on human health, it is likely that construction workers using best management practices would utilize provisions to minimize impacts to them as well as nearby residents. The link between the intervention, air quality, and any sort of socioeconomic impact felt too tenuous to include in the model.

Nutrition for Communities: This as an expected socioeconomic outcome of restoration projects can come from two sources: changes in fish and shellfish harvesting, and changes in land-based hunting on restoration areas. For this model, the source of nutrition is mainly from changes in fish and shellfish harvesting.

Experts Consulted

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References

Kusler, J. n.d. The International Institute for Wetland Science and Public Policy. https://www.aswm.org/pdf_lib/2_boardwalk_6_26_06.pdf.

Stott, T. 2019. "Camping, Wild Camping, Snow Holing, and Bothies." In *Outdoor Recreation*, edited by David Huddart and Tim Stott, 187–214. Cham, Switzerland: Palgrave Macmillan.

Portland Parks and Recreation. 2009. Trail Design Guidelines for Portland's Park System. https://www.portlandoregon.gov/parks/38306?a=250105.