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TITLE: The EBM-DPSER Conceptual Model: Integrating Ecosystem Services into the DPSIR Framework

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ABSTRACT:

There is a pressing need to integrate biophysical and human dimensions science to better inform holistic ecosystem management supporting the transition from single species or single-sector management to multi-sector ecosystem-based management. Ecosystem-based management should focus upon ecosystem services, since they reflect societal goals, values, desires, and benefits. The inclusion of ecosystem services into holistic management strategies improves management by better capturing the diversity of positive and negative human-natural interactions and making explicit the benefits to society. To facilitate this inclusion, we propose a conceptual model that merges the broadly applied Driver, Pressure, State, Impact, and Response (DPSIR) conceptual model with ecosystem services yielding a Driver, Pressure, State, Ecosystem service, and Response (EBM-DPSER) conceptual model. The impact module in traditional DPSIR models focuses attention upon negative anthropomorphic impacts on the ecosystem; by replacing impacts with ecosystem services the EBM-DPSER model incorporates not only negative, but also positive changes in the ecosystem. Responses occur as a result of changes in ecosystem services and include inter alia management actions directed at proactively altering human population or individual behavior and infrastructure to meet societal goals. The EBM-DPSER conceptual model was applied to the Florida Keys and Dry Tortugas marine ecosystem as a case study to illustrate how it can inform management decisions. This case study captures our system-level understanding and results in a more holistic representation of ecosystem and human society interactions, thus improving our ability to identify trade-offs. The EBM-DPSER model should be a useful operational tool for implementing EBM, in that it fully integrates our knowledge of all ecosystem components while focusing management attention upon those aspects of the ecosystem most important to human society and does so within a framework already familiar to resource managers.

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