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AN IMPLEMENTATION STRATEGY TO QUANTIFY THE SOCIOECONOMIC BENEFITS OF  
SATELLITE INFORMATION IN DECISIONMAKING

**Abstract**

While it is clear that Earth observing satellites benefit society in significant ways, the body of empirical, peer-reviewed work that estimates a quantitative value for these socioeconomic benefits is limited. In 2016,

Resources for the Future (RFF) created the VALUABLES Consortium with a *3.5millionawardfromNASAtohelpaddressth*

Building on the approaches developed and applied in the consortium's case studies, this paper sets forth an implementation strategy that can be employed to measure socioeconomic benefits for cases in which an ensemble model is available for quantifying the impact of a new source of information on outputs used by decisionmakers.

To begin this process, researchers identify what ensemble model to employ to get the probabilities they need to measure the value that improved information offers decisionmakers in a specific context. In one of the consortium's case studies, for example, we measure the value that satellite data provides to decisionmakers using NOAA's WhaleWatch tool. In this example, the ensemble model is used to determine the probabilities of ships striking a whale in the Pacific Ocean. The second step involves identifying what is at risk—in our example above, whales are what is at risk—but more generally, this is often either a species or people (in the case of flooding or drought, for example). The third step entails developing a loss model to calculate the benefits that a decisionmaker experiences as a result of either a) avoiding a loss or b) obtaining a benefit by having more accurate information.

This process can be adapted to explore a wide range of questions of interest to the community. Is a particular loss smaller when satellite information is available than it is not available? Does the cost of improving an ensemble model by adding satellite data outweigh the benefits that model will yield in a specific context? How does the cost of a new sensor compare with the benefits it would generate when it is applied?