

Ecosystem Services



While nature provides a vast array of goods and services for free to humans from clean water and fisheries to places of recreation and spiritual significance—the value of these gifts is rarely taken into account in decision making because no market exists for these benefits. The emerging framework of ecosystem services is an attempt to better understand and, if possible, quantify the flow of nature's goods and services so that managers can better evaluate tradeoffs when making complex decisions that affect the environment. Part of this framework involves the development of “ecosystem market mechanisms” in which landowners are financially compensated for keeping their lands healthy so that they can deliver ecosystem services, such as the provision of fresh water to downstream users or the sequestration of carbon dioxide. SIG helps clients in every stage of the process of implementing ecosystem service-based decision making, from initial scoping, to detailed analytics, to market mechanism development, to facilitation and communication with stakeholders

SCOPING

- Creation of typologies and common vocabulary
- Analysis of voluntary and compliance markets
- Cost and revenue estimation

ECOSYSTEM SERVICES QUANTIFICATION

- Monetary estimation of ecosystem services using primary valuation methods or value transfer
- Dynamic spatial modeling of ecosystem service flows to beneficiaries
- Detailed forest carbon storage assessments and accounting
- GIS and remote sensing data development to enhance quantification

INDICATORS

- Development of ecological indicators and monitoring protocols
- 'Score Card' and dashboard development to clearly track progress and visually communicate changes online
- Performance measurement of ecosystem degradation and restoration activities
- Scoping and implementation of triple bottom line accounting protocols

MARKETS & PAYMENTS

- Assessment and scoping of appropriate payment mechanism and estimation of startup costs
- Business risk and impact assessment of ecosystem market options ver 450 missions flown to date

ECOSYSTEM SERVICES

- Development of ecosystem service based restoration and conservation plans
- Prioritization analysis for site restoration and conservation
- Sustainable management planning, fire planning, and carbon offset planning to provide a blueprint for holistic natural resource management

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Ecosystem Services

Our team's experiences and education in the fields of ecology, natural resource management and economics makes SIG uniquely qualified to deliver ecosystem services analyses, tools and products to our clients. Our clients for ecosystem services products have included private land owners, provincial governments, and nation states that are inclined to embrace novel approaches to conserving natural landscapes. Using tools like GIS, spatial modeling, and stakeholder engagement processes, SIG provides a wide array of analytical services to its clients. Below are a few examples of our recent work in this area.

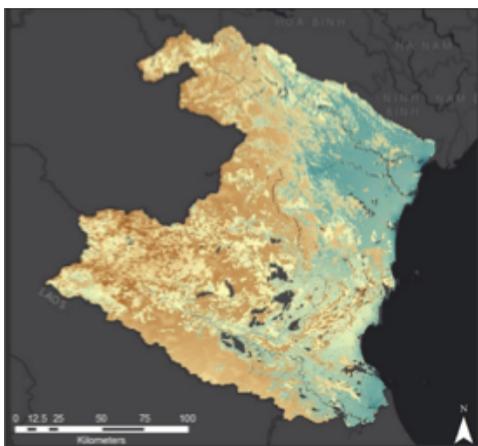
ECOSYSTEM SERVICES VALUATION ON KAMEHAMEHA SCHOOLS LAND

Kamehameha Schools (KS) owns and manages several hundred thousand acres of land across the Hawaiian Islands, including working farms, ranches, and conservation land. Its conserved lands include many hotspots of biodiversity and endemism, as well as areas of great scenic beauty and cultural significance. In this project, SIG has been working with KS staff to help integrate the ecosystem services framework into their land management planning and decision-making process. Through activities like mapping the location of ecosystem service beneficiaries and how they relate to KS lands; meeting with stakeholders to establish critical issues; implementing a framework of socioeconomic and ecological indicators; and assessing the feasibility of ecosystem market mechanisms.



MAPPING ECOSYSTEM SERVICE BENEFITS OUTSIDE PROTECTED AREAS

The Ontario Ministry of Natural Resources manages nearly 10 million hectares of protected lands throughout the province. Their Division of Parks and Protected Lands worked with SIG to explore the possibilities of applying the ecosystem services framework to their land management. SIG examined two different approaches to quantifying and assessing ecosystem services in and around several provincial parks in Ontario - one based on dynamic spatial modeling and one using "benefits transfer" to estimate economic values.



THE ECOSYSTEM SERVICES FRAMEWORK APPLIED TO THAN HOA AND NGHE AN PROVINCES OF VIETNAM

The goal of this study was to assess baseline ecosystem services in the Than Hoa and Nghe An provinces of Vietnam. The approach utilized a first-pass, rapid assessment based on existing data and InVEST, a collection of models that generates indicators of ecosystem function from which ecosystem service flows can be inferred. The study focused on five ecosystem services identified by local stakeholders as important and were deemed feasible to model given availability of existing data sets, including: 1) regulation of greenhouse gas fluxes (including carbon sequestration), 2) regulation of water quantity for hydropower, 3) habitat quality, 4) regulation of nutrients, and 5) retention of soils and sediments.