THE FRIENDLY ISLE

Molokaʻi, Hawaiʻi

Economic Case Study

Investing in Nature

Often it is easy for the conservation community to communicate the ecological and recreational importance of their habitat conservation work. However, these benefits are only some of many benefits that may be derived from this work, which may include support for local businesses, healthcare savings (i.e., reduced healthcare costs), and clean water. Awareness and effective communication of all these benefits allow communities to present a more compelling narrative that reflects the importance of this conservation work and its contributions to the local community. Furthermore, communication of these benefits can increase support for and appreciation of habitat conservation among stakeholders.

The Land Trust Alliance and U.S. Fish and Wildlife Service (Service) - Coastal Program published Investing in Nature – a brochure that presents how conservation can have an economic value to communities. Its purpose was not to compare the economic benefits of conservation versus development, but rather to tell a more complete story about our conservation work.

Following the successful publication of the brochure, the Land Trust Alliance and Coastal Program are working with local land trusts on several economic case studies that will estimate some of the economic outcomes associated with their habitat conservation work. These economic case studies will be available online, along with resources that will help land trusts and others evaluate and communicate economic outcomes.

Molokaʻi, Hawaiʻi

Molokaʻi is the fifth largest island in the Hawaiian archipelago that was formed one and a half million years ago with the emergence of two volcanoes and later a third volcano. Native Hawaiians can trace their ancestry to early Polynesian voyagers who arrived on the island from the Marquesas and Tahiti around 1,000 A.D.

The Native Hawaiian Community and residents of Molokaʻi have long resisted the pressures of tourism and large-scale development, choosing instead to nurture an agricultural economy and a more traditional lifestyle. Small-scale farms thrive on the island, cultivating cattle and a vibrant array of produce, including bananas, papayas, kalo, sweet potatoes, and other fruits and vegetables.

Molokaʻi also supports a wide-range of natural habitats, including rainforest-covered plateaus, forest understories composed of giant ferns and tiny flowers, and the country's longest fringing coral reef. However, the island's ecosystems face challenges from historical land practices and invasive species, such as non-native plants and feral pigs and goats. These pressures have led to the extinction of several native species, including the kokiʻo – deciduous tree cotton extinct in the wild and the olomaʻo and kākāwahie – extinct bird species.

Recognizing the importance of the natural habitats and the wildlife that rely on these areas, Native Hawaiian Community and residents are working to conserve natural habitats by creating natural sanctuaries, such as the Kamakou Preserve, Molokaʻi Forest Reserve, and Moʻomomi Beach Preserve. These efforts will help to ensure that the island's natural beauty, rural landscape, and cultural richness

continues to serve the island's Native Hawaiian Community and residents as well as attract nature enthusiasts and visitors seeking to immerse themselves in the culture of the "Friendly Isle".

Invasive Species Threats

Islands are home to remarkable plants and animals often found nowhere else on Earth. These unique species are supported by the isolation of islands; however, it is for the same reason that their ecosystems and native species are especially vulnerable to invasive species. For example, more than 50 forest bird species once inhabited the Hawaiian Islands; however, only 20 species remain today. Their extinction has been accelerated by avian malaria – a disease transmitted by invasive mosquitoes.

Although the challenges may seem overwhelming, islands provide an unmatched opportunity to save some of the world's rarest and most imperiled species. Once the invasive species are removed and the habitat restored, an island's isolation can sustain these recovery efforts and hinder the re-introduction of invasive species. There are many stellar organizations, such as the Molokaʻi Land Trust, that are working to address the threats of invasives species on native plants and animals.

Molokaʻi Land Trust

The Native Hawaiian Community and residents of Molokaʻi have a history of conserving natural resources and cultural traditions – ideals shared by the broader conservation community, such as the Molokaʻi Land Trust. The Land Trust's mission is to conserve natural habitats and resources and preserve cultural traditions for the benefit of the future generations, especially for Native Hawaiians.[1]

The land trust achieves its mission by protecting and restoring natural habitats and preserving cultural sites. The land trust owns the Mokio and Kawaikapu Preserves, which protect a wide-range of habitats, including remnant native forests and coastal strands. The preserves also contain Native Hawaiian archeological and cultural sites, including a fishing shrine and adze quarries. At least five naturally occurring federally endangered plant species are located on the Mokio Preserve, including the ʻihiʻihilauākea – an endemic, deciduous fern that resembles a four-leaf clover.

Despite their designation, the preserves are heavily impacted by invasive plants, which provides an excellent opportunity for restoration. The Molokaʻi Land Trust works with partners and communities to restore native habitats, both on and off the preserves, which address a wide-range of challenges, including invasive plants and wildlife predation by invasive and feral species. For example, the land trust worked with the Coastal Program to protect 90 acres of coastal habitat by installing predator-proof fencing that excludes invasive rodents, feral cats, and other pests that threaten native plants, ground-nesting seabirds, and pollinators, including federally endangered Nalo meli maoli (yellow-faced bees).

The Molokaʻi Land Trust also strives to be an asset for the local community, especially addressing the needs of Native Hawaiians. The preserves own by the land trust offer subsistence hunting and fishing opportunities for the local community. The land trust also has an Operations and Learning Center that provides workspace and a nursery for the land trust as well as an educational and training venue for the local community.

The Molokaʻi Land Trust works with public and private schools to provide science, technology, engineering, and mathematics (STEM) learning and internship opportunities. These opportunities can

[1] https://molokailandtrust.org/

help students and other community members develop the necessary skills to pursue a higher education in STEM-related natural sciences and/or a career in natural resource management.

Hawai‘i Economic Case Study

This case study estimates annual economic contributions to the economy of Moloka‘i for restoration activities implement by the Moloka‘i Land Trust from 2009 to 2020. To derive an estimate of the annual economic contributions, the Service used the IMPLAN model.[2] The analysis evaluates local economic outputs using economic data for Maui County, which includes the island of Moloka‘i. This analysis does not include the expenditures associated with the purchase of any parcels of land because it was unclear how, where, and when the sellers would spend the money received for the sale of the land.

The following steps help describe how the annual economic contributions were estimated. The steps listed are not meant to be a comprehensive guide, but more to provide a general overview of the steps to conduct an IMPLAN analysis of restoration activities of similar scale and scope.

1. Collect data on project activities and expenditures (e.g., expenditure purpose, expenditure year, expenditure amount).
2. Determine IMPLAN sector(s) corresponding to expenditure activities associated with the project.
3. Determine the geographic area for the IMPLAN analysis (e.g., state and county).
4. Sum expenditures by year and IMPLAN sector(s) to determine total annual expenditures by sector(s).
5. Run IMPLAN on total annual expenditures by sector(s) by year. IMPLAN models are estimated separately for each year annual expenditures were available.[3]
6. Summarize annual IMPLAN results: Output, Value Added, Jobs supported, and Labor Income.

The approach taken in this analysis is reasonable given the small scope and scale of restoration activities analyzed. An analysis that encompasses a larger geographic area and larger scale of restoration activities may require more detailed data and take a different approach. As such, the results of this analysis should not be extrapolated or generalized in a broader way.

Estimate of Economic Contributions

Table 1 shows the IMPLAN model results for Output, Value Added, Jobs, and Labor Income, respectively. The Appendix provides a description of IMPLAN terms. The annual economic contribution

[2] “IMPLAN utilizes an economic modeling technique called Input-Output analysis, which is a type of applied economic analysis that tracks the interdependence among various producing and consuming industries of an economy. It measures the relationship between a given set of demands for final goods and services and the inputs required to satisfy those demands.” (Source: https://implanhelp.zendesk.com/hc/en-us/articles/360044985833-About-IMPLAN) For more information about the IMPLAN model see https://www.implan.com/.

[3] All IMPLAN models were estimated using 2015 model year data. While the project expenditures occurred over a multi-year timeframe, it was not feasible to estimate IMPLAN models where the input data (i.e., expenditure data for restoration activities) corresponds more closely to the year of the IMPLAN model year data. To the extent that the structure of the local economy in years other than 2015 differs from the structure of the local economy as represented by the 2015 model year data, the results of the analysis can be affected. However, it is not possible to determine if the results would be affected in a positive or negative direction.

estimates presented in Table 1 represent estimates that include the sum of the direct, indirect, and induced effect associated with habitat restoration projects implemented by the Molokaʻi Land Trust from 2009 to 2020. During that period, the land trust planned and implemented numerous restoration projects that removed invasive plants and/or excluded feral and invasive animals and replanted native vegetation. The annual estimates of jobs represent jobs supported, not jobs created, where the jobs supported are a combination of full-time, part-time, and seasonal employment because IMPLAN is not able to directly estimate full-time jobs. For example, restoration activities in 2018 were estimated to help support 8.5 jobs, $782,314 in total output, $403,231 in value added, and $317,836 in labor income in the Maui County economy of Hawaiʻi.

It is natural for people to want to compare results from different economic studies. However, it is generally discouraged, especially without a thorough understanding of the underlying assumptions and analyses used for the various studies. Furthermore, results are influenced by a wide variety of factors, such as the study area size, geographic location, scope and scale of operations, and business sectors involved in the analysis. For example, an analysis with higher job numbers does not mean it is "better" than a project with lower job numbers; rather the former project may have engaged more business sectors of the economy or more labor-intensive sectors.

Furthermore, while restoration activities offer an array of public benefits, as described in the introduction, information and data limitations prevent the complete evaluation of all the potential public benefits produced along with any associated annual economic activity generated for the local economy. However, the results of this study and similar economic evaluation efforts can help improve the understand and appreciate of the benefits delivered by habitat restoration practitioners.

Table 1. Estimate of Annual Economic Contributions

Year	Employment (Jobs)	Expenditures (Nominal $)	Expenditures (Real 2021 $)	Labor Income	Value Added	Output
2009	3.5	$161,100	$202,941	$118,992	$153,228	$288,850
2010	1.7	$71,974	$89,204	$56,113	$63,933	$131,657
2011	3.7	$170,000	$204,250	$126,403	$154,032	$303,198
2012	3.6	$172,465	$203,010	$125,408	$156,055	$306,059
2013	3.2	$136,225	$158,037	$103,298	$117,693	$242,366
2014	3.5	$149,297	$170,437	$113,762	$129,616	$266,918
2015	3.9	$178,336	$203,346	$131,071	$158,330	$310,786
2016	3.7	$161,234	$181,556	$120,158	$138,408	$282,503
2017	6.7	$302,538	$333,563	$224,767	$261,177	$522,534
2018	8.5	$479,506	$516,075	$317,836	$403,231	$782,314
2019	1.5	$165,166	$174,599	$85,616	$134,280	$240,226
2020	1.5	$165,166	$172,471	$84,807	$133,011	$237,956

Notes: Expenditures (Real 2021 $) calculated using annual average Consumer Price Index for All Urban Consumers. Labor Income, Value Added, and Output are in 2021 dollars as calculated by IMPLAN. Annual estimates cannot be summed.

Appendix: Terms and Definitions

Direct Effects[4] – The set of expenditures applied to the I-O multipliers for impact analysis. It is one or more production changes or expenditures made by producers/consumers as a result of an activity or policy. Direct effects can be positive or negative.

Indirect Effects[5] – Economic Effects stemming from business to business purchases in the supply chain.

Induced Effects[6] – Economic Effects stemming from household spending of Labor Income, after removal of taxes, savings, and commuter income.

Input-Output (I-O) Analysis[7] – A type of applied economic analysis that tracks the interdependence among various producing and consuming sectors of an economy. More particularly, it measures the relationship between a given set of demands for final goods and services and the inputs required to satisfy those demands. Also referred to as Economic Impact Analysis

Jobs[8] – An Industry-specific mix of full-time, part-time, and seasonal employment. An annual average that accounts for seasonality and follows the same definition used by the Bureau of Labor Statistics (BLS) and Bureau of Economic Analysis (BEA). In IMPLAN, Employment is not equal to full time equivalents.

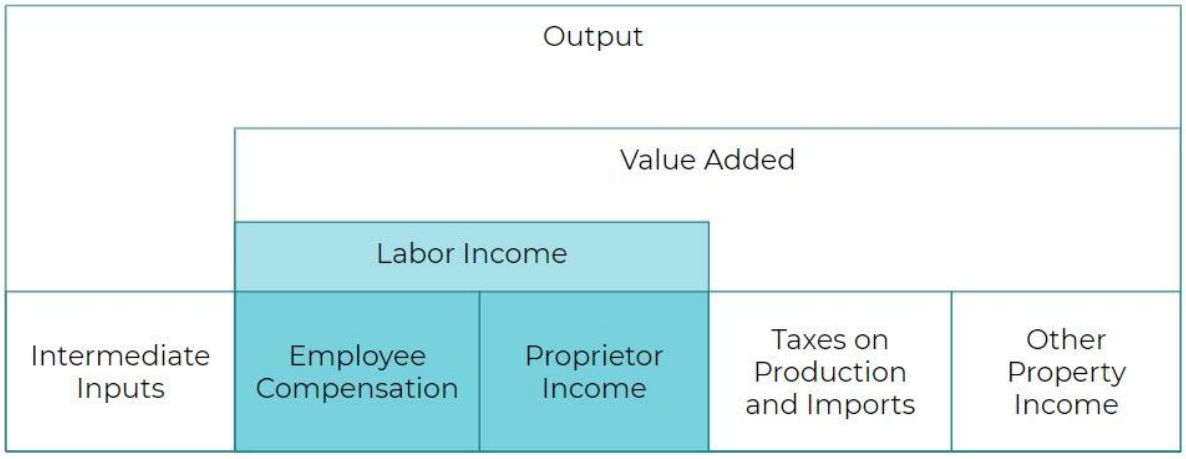
Labor Income[9] – All forms of Employment income, including Employee Compensation (e.g., wages, salaries, and benefits) and Proprietor Income (e.g., the current-production income of sole proprietorships, partnerships, and tax-exempt cooperatives; excludes dividends, monetary interest received by nonfinancial business, and rental income received by persons not primarily engaged in the real estate business).

Output[10] – For all Industries, output equals the value of Industry production, which is equal to sales plus net inventory change. In the IMPLAN model, these are annual production estimates for the year of the dataset in producer prices. Note that for wholesale and retail sectors, Output is equal to gross wholesale margin or gross retail margin, respectively, not gross sales. The value of production for wholesale and retail sectors is the value of the services they provide; it does not include the value of the items sold within their establishment.

Value Added[11] – The difference between an Industry's or Establishment's total Output and the cost of its Intermediate Inputs; it is a measure of the contribution to GDP. Value Added is a large portion of Output,

[4] https://implanhelp.zendesk.com/hc/en-us/articles/115009668548-Direct-Effects
[5] https://implanhelp.zendesk.com/hc/en-us/articles/115009499547-Indirect-Effects
[6] https://implanhelp.zendesk.com/hc/en-us/articles/115009668568-Induced-Effects
[7] Source: https://implanhelp.zendesk.com/hc/en-us/articles/115009666948-Input-Output-I-O-Analysis
[8] Source: https://implanhelp.zendesk.com/hc/en-us/articles/115009668628-Jobs
[9] Source: https://implanhelp.zendesk.com/hc/en-us/articles/115009668468-Labor-Income
[10] Source: https://implanhelp.zendesk.com/hc/en-us/articles/115009668388-Output
[11] Source: https://implanhelp.zendesk.com/hc/en-us/articles/115009498847-Value-Added

as it encompasses Labor Income (LI), Other Property Income (OPI), and Taxes on Production and Imports (TOPI).



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