

Evaluating the Economic Benefits of Land Conservation in Maine

A white paper prepared for
the board of directors of



Land for Maine's Future

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Table of Contents

Executive Summary	1
I. Introduction	2
II. The Need to Assess Economic Benefits of Land Conservation.....	6
III. Potential Economic Benefits of Land Conservation	11
Economic Development Benefits.....	12
1. Recreation Related Jobs and Revenue	13
2. Natural Resource Industry Related Revenue and Jobs.....	14
Ecosystem Services.....	16
1. Water Purification and Drinking Water Protection.....	16
2. Storm Water Runoff.....	17
3. Flood Control	17
4. Property Values	17
5. Species Habitat.....	18
6. Health Benefits.....	18
7. Cost of Services	18
8. Wetlands Banking.....	19
IV. Methods for Assessing Economic Benefits of Land Conservation	20
V. Comparing Other State-Level Public Conservation Funding Mechanisms	22
VI. Conclusion	25
References	26
Appendix: Methodology	28
1. Cost to LMF.....	28
2. Recreational Visits.....	29
3. Tourism Revenue.....	30
4. Tourism-related Jobs.....	33
5. Industry-related Jobs	34
6. Value-added Ecosystem Service.....	36

Executive Summary

The modern land conservation movement has sustained itself for over 100 years through a nostalgic, and sometimes difficult to define, appreciation for nature, wildlife, and wilderness. In the last 20 years, that idealism has come to recognize that the lands it sought to protect provide quantifiable economic benefits, which include revenue related to recreation, water purification, public health, clean air, tax base protection, natural disaster mitigation, species habitat, and jobs related to resource extraction. While a large number of conservationists rightly question the ability of economics to distill all of a parcel's value in terms of dollars, environmental economics represent a tremendous asset for the conservation movement as it seeks to conserve lands, especially in challenging fiscal times.

There is an increasing need for conservationists to articulate the economic benefits associated with their projects. Irrespective of the difficulty to fully account for nature's value in monetary terms, it is a practical necessity to attempt to do so. Fortunately, even when the practitioner restricts their analysis to the most pedestrian of economic measures, conservation provides numerous benefits. It fosters investment, encourages recreation and tourism, attracts a skilled labor force, protects watersheds, augments municipal tax revenues, provides habitat for game, and protects traditional natural resource industries, in addition to numerous other benefits.

This analysis assessed the value of jobs, revenue, and watershed protection provided by the conservation of a discrete set of eight completed Land for Maine's Future (LMF) projects. Even after limiting the analytical scope to a relatively limited set of measures, this study concluded that LMF projects provide substantial returns.

I. Introduction

Land for Maine's Future (LMF) is a voter-approved bond program that provides funding to secure lands with exceptional natural or recreational value in the state of Maine. Established in 1987, LMF matches funds raised by non-profit conservation groups, land trusts, and state and local conservation entities to purchase fee simple ownership or conservation easements for a variety of land types throughout the state. Since its founding, the program has been renewed through five separate bond offerings (the most recent was passed in November, 2010) that have totaled over \$125 million and have gone towards the conservation of over 500,000 acres of land to date with fresh proposals being solicited.

Throughout its existence, LMF has simultaneously pursued the goals of both conservation and community access. Waterfront purchases have been funded to preserve boating access on lakes facing private development while forest purchases have conserved both habitat and recreational access. To LMF, the use of public monies for conservation requires a promise of enhanced public benefit. Purchases matched with LMF funds are kept open for hiking, camping, hunting, fishing, and other recreational uses. The only exceptions to this rule are the projects that LMF funds for the purpose of preserving natural resource industries such as fishing, agriculture, and forestry. As the scarcity of such parcels increased in step with development pressures, LMF has devoted increasing resources to farming, fishing, and forestry projects that require working easements of this nature. In 1999, the legislature placed a requirement on LMF to allocate 10% of its funds to farmland related projects. The bond-issue referendum of 2005 entailed an additional five million dollars to fund a working waterfront pilot project, devoted to preserving waterfront space

for fishermen and other traditional coastal professions.¹ The increase in LMF's portfolio of conservation projects with economic benefits is evidence of the board's interest in supporting not only classical conservation (such as wildlife or ecosystem conservation initiatives) but also projects that integrate the objectives of conservation and economic development.

A 2004 report jointly authored by the University of Southern Maine's Muskie School of Public Policy and the University of Maine's Margaret Chase Smith Center for Public Policy assessed the effectiveness of LMF. The report found that LMF had been successful in fostering conservation for a wide range of projects throughout the state and that it enjoyed broad public support. Additionally, the report produced a series of recommendations for the program that included giving greater weight to the economic benefits resulting from conservation in the granting process, selecting projects that fit into regional economic development plans, and targeting priority focus areas such as farmland and waterfront properties that have witnessed rapidly increasing development pressures over the last decade.²

In an attempt to address these recommendations, LMF partnered with Coastal Enterprises, Inc. (CEI) —a statewide community development corporation and community development financial institution —on a research project to identify opportunities for encouraging the integration of economic development impacts into conservation projects in 2009. This led LMF and CEI to begin a consulting arrangement with the Berkley Scholars program at the Yale School of Forestry & Environmental Studies (FES) to study possible avenues for growing the program's economic conservation portfolio.

¹ LMF Biennial Report, 2009

² Barringer et al, 2004 (pp.12-20).

The first product to arise from this relationship was a report authored by Yale FES student Jessica Seigal detailing recommendations for increasing the visibility of economic benefits from potential projects in their grant applications, increasing awareness among applicants about the intersection of economic development and conservation, and recognizing projects with economic benefit in LMF scoring criteria.³ This paper advances prior efforts by quantifying some of the economic benefits associated with a discrete set of LMF projects,⁴ presenting other non-market benefits of conservation, and discussing the practices of other state-level funding agencies. While the original analysis of LMF parcels focused on frequently cited benchmarks for economic performance, such as earnings and job creation, there are numerous non-market economic benefits of land conservation that escape such traditional analyses. While the methods for evaluating such benefits are somewhat more theoretical, the economic consensus is that they represent real value. Therefore, future proposals and studies would be well served to attempt to quantify such facets so long as they are transparent in their methodology and forthright with caveats about assessing such benefits.

This study also analyzed the grant making processes of other state-level, public conservation funds for insights on how LMF might assess economic benefits in its application review process. This survey showed that few other states delegate all their conservation funding activities to a single entity. Those states with substantial forest products industries usually kept their funds for conservation of working forest lands separate from their fund for preserving natural habitat or recreational areas. As a

³ Siegal, 2009.

⁴ The projects studied in conjunction with this work included: the Katahdin Forest Easement, Katahdin Ironworks, Port Clyde Fisherman's Co-op, Mt. Blue Region/Tumbledown Mountain, Dead River Trail, Branch Lake, Kelly Farm, and Scarborough Beach.

consequence of segregated funding streams, economic considerations are usually only taken into account in the fund devoted to protecting working lands. The funds devoted to protecting sites of recreational, natural, or cultural value assess their applicants in terms similar to those historically employed by LMF.

II. The Need to Assess Economic Benefits of Land Conservation

Between 1992 and 2001, public money funded approximately 95% of all conservation activity in the United States. State and local sources provided 61% of this figure, with the rest being funneled through federal programs mostly directed at farm restoration.⁵ However these programs have recently found themselves on the cutting block as state and local governments struggle to close budget deficits. South Carolina cut the budget of its conservation fund to one quarter of its pre-2008 level.⁶ Washington suspended the Washington Wildlife and Recreation Program in its recently passed budget, despite it being funded through general obligation bonds and not tax revenues.⁷ North Carolina's proposed budget plans to cut funds for the state's Department of Environment and Natural Resources by 22%. The new governor of Florida has similarly proposed cutting \$17M from a \$50M Everglades restoration fund.⁸

Underlying this legislative pattern is a growing emphasis on economic growth relative to environmental protection. A 2009 Gallup Poll found a majority of respondents willing to compromise some environmental protection in favor of economic growth. In 25 years of polling on this question, this was the first time that environmental protection at the cost of some economic growth had not been the majority preference.

⁵ Kim Elliman, Open Space Institute. Presentation at Yale School of Forestry, February 1, 2011.

⁶ <http://coastalconservationleague.org/projects/conservation-bank/>;

⁷ <http://wildliferecreation.org/news-events/press-releases/washington-wildlife-and-recreation-coalition-supports-a-washington-wildlife-and-recreation-program-for-all-of-washington>;

⁸ <http://www.nytimes.com/2011/04/16/science/earth/16enviro.html?scp=3&sq=paul%20lepage&st=cse>

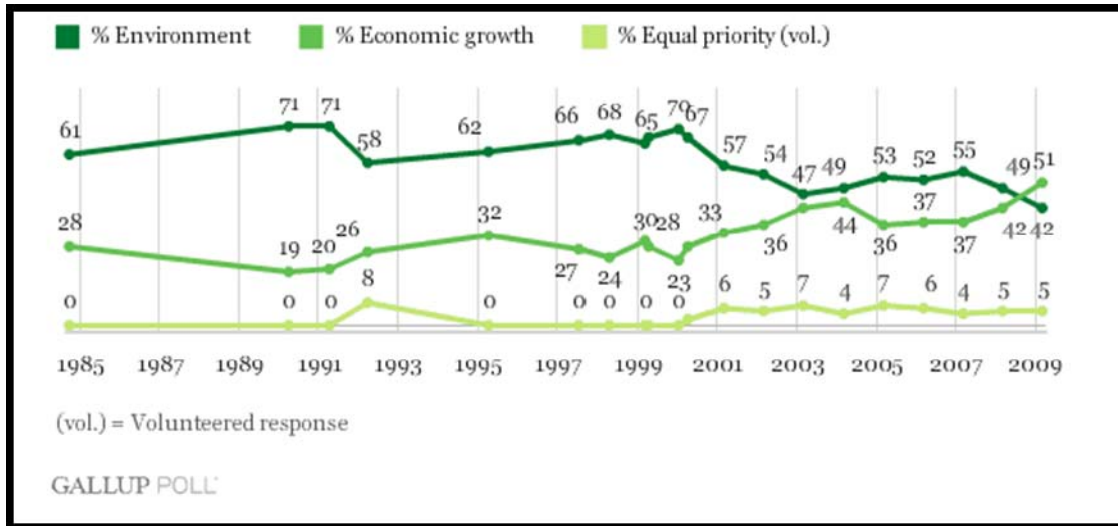


Figure 1: Environment vs. Economic Growth Polling Trend⁹

Land conservation is hardly the only issue to have lost priority to the economy in recent years. Since 2008, general economic concerns have outpaced non-economic concerns among the majority of American voters. Gallup’s research indicates issues relating to healthcare, military conflict, education, ethics, and religion have decreased in importance compared to economic growth, job creation, and deficit reduction. Perhaps most relevant to conservationists who rely on public bond funding, 11% of respondents cited deficit reduction as their primary concern in 2011 after only 3% cited it in 2008.

⁹ Gallup Organization, 2009. Responses to the polling question: “With which one of these statements about the environment and the economy do you most agree: protection of the environment should be given priority even at the risk of curbing economic growth OR economic growth should be given priority, even if the environment suffers to some extent?” <http://www.gallup.com/poll/146681/Americans-Increasingly-Prioritize-Economy-Environment.aspx>.

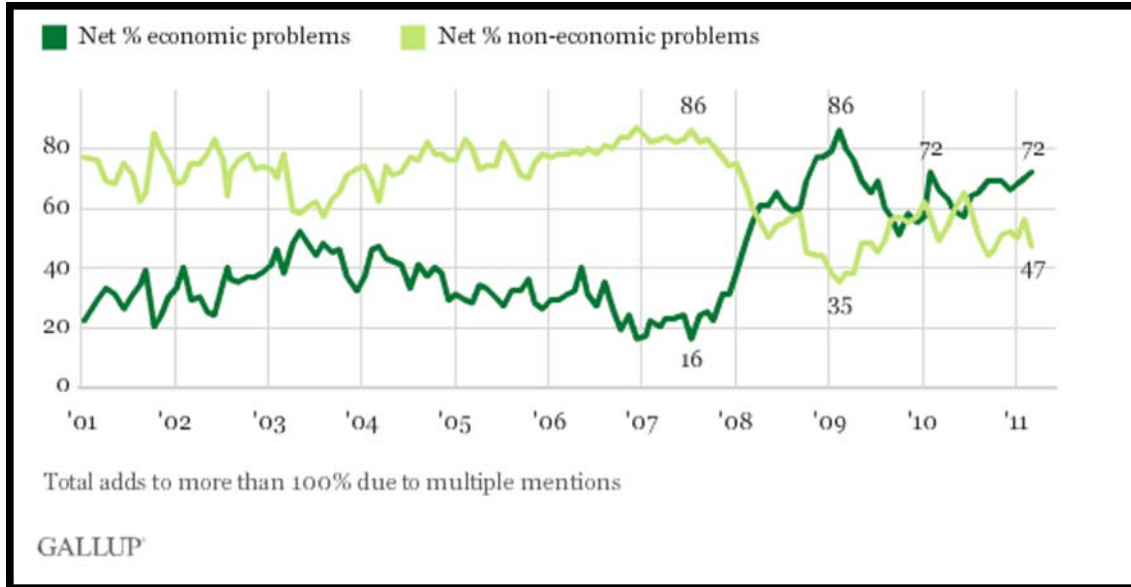


Figure 2: Economic vs. Non-Economic Issues Polling Trend¹⁰

The passage rate of LMF bonds referenda indicate a similar trend is occurring within Maine. In 1999, a \$50M bond referendum passed with 69%. Over the next 11 years that passage rate dropped to 59% while funding decreased to just under \$10M. While it is important to remember that the decline in funding occurred in conjunction with an increase in referendum frequency and an economic downturn, the fact remains that Maine voters approve lower amounts of conservation spending in fewer numbers than they did a decade ago.¹¹ This trend¹² underlines the need to articulate the economic upside of land conservation.

¹⁰ Gallup Organization. <http://www.gallup.com/poll/146558/americans-concern-economy-rises-month-high.aspx>.

¹¹ Data from the Trust for Public Land, LandVote Database.

¹² Despite lower approval ratings, an April 2011 poll by the Portland-based policy research firm Critical Insights found that 86% of Mainers approved of providing funding for the Land for Maine's Future program: http://www.nrcm.org/2011_economy_environment_poll.asp

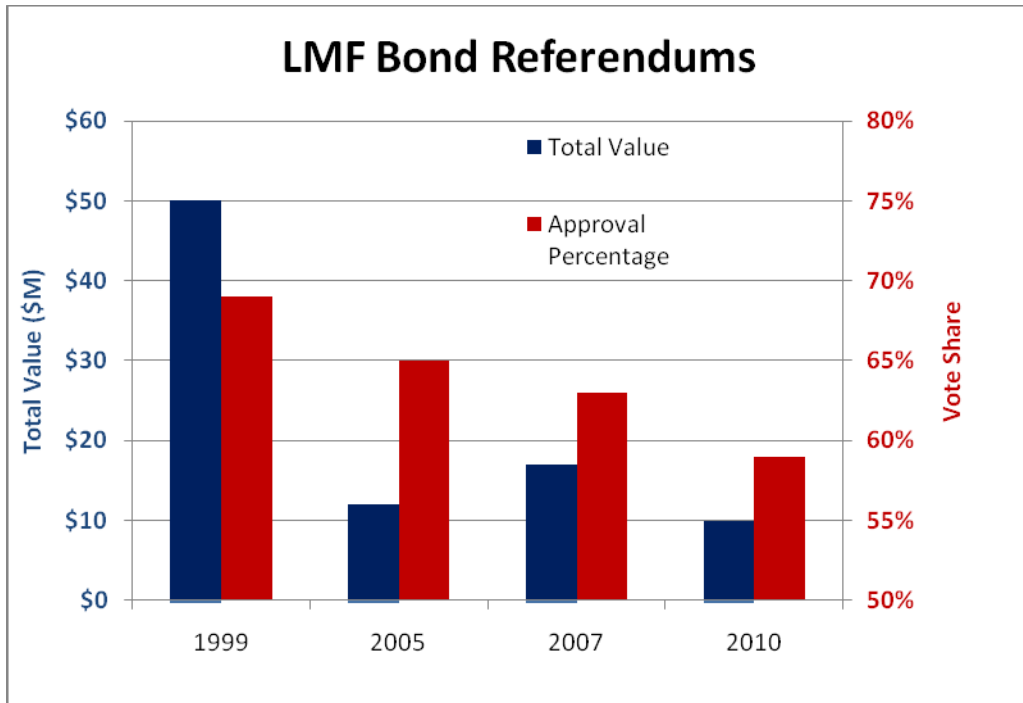


Figure 3: Trends in Four LMF Bond Referenda

Land conservation provides real economic value which is further corroborated by a robust literature. Environmentalists have always been hesitant to attach a dollar value to the lands and ecosystems they seek to protect and it would be flawed to claim that the full suite of values can be distilled to a dollar figure. However, the chorus of demand for economic growth requires that the conservationist attempt to quantify the benefits associated with land conservation.

Many non-market benefits, such as some provided by conservation projects, require substantial time, funding, and expertise to fully estimate, which therefore puts their articulation beyond the capability of most land trusts. However, this should not dissuade applicants from attempting to quantify the value of their desired parcels. This paper lays out possible methods for rapidly conducting economic assessments that, while not up to the level of an academic article, are credible. So long as assumptions are clear and methods

avoid certain pitfalls while addressing specific tenants, evaluations can be done quickly and inexpensively. Many other public conservation funds base their allocation decisions partly on economic considerations and LMF will do so in its next round of applications. Apart from the fact that describing the full value of open space conservation is the prerogative of a land trust, present fiscal trends necessitate such an approach. An increase in the visibility of economic benefits associated with land conservation will only enhance the movement's ability to access public funds.

III. Potential Economic Benefits of Land Conservation

There are hundreds of studies that attempt to evaluate environmental economic benefits and multiple academic journals devoted to the subject. These tend to focus on non-market values that traditional accounting schemes fail to recognize but which have direct economic impacts or non-use values that are more theoretical in nature. Non-market values are environmental benefits, such as clean water and healthy fish and wildlife populations, that are not traded in markets. Their economic value —how much people would pay for them —is not revealed in market prices.¹³ Non-use values such as the utility someone gains from knowing that a particular rare species or remote wilderness exists are usually determined exclusively through revealed preference surveys, which do not entail expenditures. Therefore, such evaluations are often criticized for lack of practical relevance and are not included here. This analysis of LMF projects primarily focused on assessing jobs and revenue associated with the parcel and only included readily quantifiable non-market values such as water purification where appropriate. However, this set of indicators only represents a small portion of the economic value of land conservation. The Trust for Public Land, American Farmland Trust, and other conservation organizations correlate a larger range of benefits including increased land values, attraction of residents, development cost mitigation, preservation of ecosystem services, and resident health.¹⁴ Many of LMF's past projects has provided such benefits to varying degrees, some of which are presented below.

¹³ GreenFacts: <http://www.greenfacts.org/glossary/mno/non-market-value.htm>

¹⁴ Gies, Conservation: An Investment that Pays, 2009; Greenspace Alliance, 2010.

This study analyzed eight completed projects that represent the approximate range of conservation objectives in Maine. One recreational waterfront, one working waterfront, one working farm, one watershed preserve, one working forest, one freshwater corridor, and two recreational forests were surveyed.

Project	Type of Parcel
Katahdin Forest Easement	Working Forest
Katahdin Iron Works	Recreational Forest
Port Clyde Fisherman's Co-op	Working Waterfront
Mt. Blue/Tumbledown Mountain	Recreational Forest
Dead River Corridor	Freshwater Corridor
Branch Lake	Watershed Preserve
Kelly Farm	Working Farm
Scarborough Beach	Recreational Waterfront

Table 1: LMF Projects Analyzed

Even when looking at this relatively small sample, the different types of benefits ascribable to different parcel types is apparent. Kelly Farm, Port Clyde, and Branch Lake do not attract much if any recreational revenue but provide jobs and ecosystem services that are explicitly valuable to their respective communities. Scarborough Beach and Mt. Blue/Tumbledown generate a substantial amount of recreational value but offer little to traditional natural resource industries or other non-tourism-related businesses. Some tracts like the Katahdin Forest Easement, Dead River Corridor, and Katahdin Ironworks, however, offer a range of both.

Economic Development Benefits

This section first quantifies recreation- and industry-related jobs and revenue for the sample projects. It then looks at ecosystem services (non-market benefits), including water purification and drinking water protection, storm water run-off, flood control,

property values, species habitat, health benefits, cost of services, and wetlands banking. Of the non-market benefits, this study quantifies only water and drinking water purification.

1. Recreation Related Jobs and Revenue

Maine’s forests, wilderness areas, ocean fronts, lakes, rivers and all manner of open spaces support recreational activities that support jobs and generate revenue for both state and local economies. Campers, boaters, skiers, snowmobilers, hikers, and kayakers spend money on food, equipment, lodging, tours, instruction, and entertainment both at their chosen recreation site and while in transit. The Maine Office of Tourism estimated that in 2008 the state saw 2.7 million leisure trips representing 7.3 million individual visitors. The Maine office of tourism also collects data on the average size of overnight and day trip groups and average group expenditures based on region and activity.¹⁵ Where site specific figures or more appropriate proxy data was unavailable, these figures were used.¹⁶ The estimates for tourism revenue generated by the five parcels with recreational appeal are given below.

	Person Visits/ Year	Mean Group Size	Group Visits/ Year	Mean Expenditure/ Group	Tourism Revenue	Related Jobs
Katahdin Forest Easement Project	60,000	3.9	15385	\$495	\$7,600,000	220
Katahdin Iron Works	7500	3.9	1923	\$495	\$950,000	30
Mt. Blue/ Tumbledown Mountain	70,000	3.9	17949	\$374	\$6,700,000	200
Dead River Corridor	3000	3.9	769	\$962	\$740,000	20
Scarborough Beach	65000	4.3	15116	\$87	\$1,300,000	40

Table 2: Recreation Revenue and Related Jobs Generated by LMF Projects

¹⁵ Davidson, Peterson, 35-8, 70.

¹⁶ Whittington and Bissell, 27; Morris et al., 4; Anderson et al., 28.

These estimates do not make an attempt to determine what share of this revenue is ascribable to the act of conservation itself and therefore “new money”. Determining this would require survey work that is beyond the scope of this analysis but may well be feasible for a land trust or other applicant. Revenue estimates can then be used to estimate the number of recreational jobs associated with a parcel. Research indicated that approximately 47% of revenue generated in the tourism industry was applied toward wages and a RIMS model confirmed that figure.¹⁷ Recreational and tourism job figures were calculated using the average tourism industry wage of \$15,897.¹⁸

2. Natural Resource Industry Related Revenue and Jobs

Maine’s economy continues to rely on fishing, forest products, agriculture, and other natural resource industries to provide the livelihoods for the state’s citizens. Conservation easements have proven an effective tool for protecting such jobs and revenue streams in the face of external economic pressures so LMF has increasingly funded their purchase in recent years. The 2007 bond issue earmarked \$5M specifically for a pilot fund to purchase working waterfront easements. In the act of preserving harbor space, the Port Clyde easement ensured the continued use of the facility by dozens of local fishermen for years to come. Similarly the Kelly Farm easement protected a piece of pristine farmland in the section of the state most prone to developmental threats. Assessing the job preservation benefit to working forests is somewhat more difficult as logging would likely have continued had the land not been conserved. Regardless, the easement ensures that forestry

¹⁷ Pollock, 65. RIMS is an economic input-output model developed by the U.S. Bureau of Economic Analysis that, among other things, quantifies the number of jobs associated with expenditures in a particular industry

¹⁸ Maine Quarterly Census of Employment and Wages. Average wages for NAICS codes 712, 713, 721, and 722.

operations will continue to operate there so long as they remain competitive within the global industry.

In addition to the jobs conventionally associated with natural resource industries, conservation organizations frequently make infrastructural or other improvements in recently acquired lands. The Appalachian Mountain Club is spending over \$2M on improvements to lodges and campsites within its new Katahdin Ironworks tract and Maine Huts and Trails has invested approximately \$1.5M into its assets since incorporation.¹⁹ While these are certainly small figures in relation to commercial development projects, it is important to recognize that these projects occur in extremely remote areas where contractors subsist on small projects such as these.

Stakeholder-provided employment data was used wherever possible to estimate the jobs associated with a parcel. When such information proved unattainable, a forest industry revenue model was used to produce estimates of employment statistics.²⁰ The weighted average of the applicable North American Industrial Classification System

	Applicable Industry	NAICS Code(s)	Total Industry Jobs	Total Earnings
Katahdin Forest Easement Project	Forestry and Related	113,321, 337, and 322	278	\$13,400,000
Katahdin Iron Works	Forestry and Related / Construction	113,321, 337, 322, and 236	88	\$3,900,000
Port Clyde Fisherman's Co-op	Fishing	114	116	\$5,500,000
Dead River Corridor	Construction	236	18	\$700,000
Kelly Farm	Agriculture	111	50	\$1,100,000

Table 3: Industry Related Jobs and Earnings Generated by LMF Projects

¹⁹ Personal Correspondence Dave Herring and Bryan Wetzel.

²⁰ LMF Internal Methodology Document.

(NAICS) wages for Maine was used to estimate earnings. Full methodological details can be seen in the appendix.

Ecosystem Services

1. Water Purification and Drinking Water Protection

Conserved forestland surrounding drinking water supplies and watersheds provides natural filtration systems that can obviate the need for additional levels of mechanical water filtration, if not remove the need entirely. Conserved land along lakes and streams filter pollutants and curtail surface water runoff. Water supplies are therefore left cleaner, flooding and erosion are minimized, and groundwater reserves replenish. In the 1990s, New York City analyzed the costs of water purification conducted by treatment plants versus forest lands and found that a \$1 billion investment in land conservation target toward water purification would provide the same water quality as \$6 billion invested in chemical treatment.²¹ The 1,200 acre Branch Lake preserve was put under easement for the same purpose. Branch Lake serves as the reservoir for the City of Ellsworth and sits within short driving distance of Acadia National Park, Bangor and Augusta. As such, it faces considerable residential development pressure. The city waterworks and the state department of Health and Human Services indicated that a \$4M retrofit to the town's water treatment plant would be necessary to compensate for the loss of the parcel's natural purification capabilities, as would result from the conversion of the land to housing lots. This upgraded plant would then incur an additional \$100K in annual operating costs.

²¹ Trust for Public Land, Protecting The Source, 23.

2. Storm Water Runoff

Storm water diffuses the pollutants found in urban areas into surrounding streams and ecosystems. Parks and conserved lands can act as a natural filtration system within urban environments to treat the outgoing runoff; as mentioned above, conserved lands also curtail surface water runoff. This was not an attribute of the LMF projects analyzed but may be worth considering for open space projects within or adjacent to city projects.

3. Flood Control

Coastal storms, heavy spring rains and runoff, and winter ice buildup result in flooding in Maine. This flooding has been responsible for millions of dollars of property damage, and there are approximately 33,000 structures at risk of flooding in Maine, according to the State Planning Office. By providing more area for heavy rains to infiltrate into the ground, conserved forested lands have the potential to help reduce flash flooding from rainfall.

4. Property Values

There are numerous economic and policy studies showing that proximity to conserved lands positively impacts property values, especially in urban and suburban areas. The value that home buyers place on access to parks or open space reserves is demonstrable through the premiums they pay on their purchase. Furthermore, increases in property values augment municipal tax revenues in addition to building home owner wealth.²²

²² Just a few of the studies linking land conservation and home values include. King & Anderson, 2004.; Johnston et al. 2002.; Netusil et al., 2010.

5. Species Habitat

Conserved open space provides habitat for game animals, pollinators, and fishery spawning grounds. As such, they represent valuable assets to the industries and activities that rely on them. Riparian reserves in the Pacific Northwest protect the salmon hatcheries that Seattle fishermen will later harvest. Conserved forests provide habitat to the bees, moths, and hummingbirds that pollinate crops throughout the country.

6. Health Benefits

The benefits associated with regular physical activity include the reduced risk of coronary heart disease, hypertension, colon cancer, and non-insulin-dependent diabetes; improved maintenance of muscle strength, joint structure, and joint function; weight loss and favorable redistribution of body fat; improved physical functioning in persons suffering from poor health; and healthier cardiovascular, respiratory, and endocrine systems. Ready access to conserved open space can mitigate this suite of health problems by providing citizens with a free place to exercise. A study by the Center for Disease Control found the creation of or enhancement of access to parks and other conserved lands resulted in 25.6% more people exercising three or more days per week, the recommended level.²³

7. Cost of Services

Conservation of rural or working land at high risk of residential development frequently entails cost saving benefits to local governments. The arrival of new residents that follow such development does attract more tax revenue, but almost never as much as

²³ Sherer, Parks for People, 13-14.; CDC, Increasing Physical Activity, 2001.

they demand in public services, most notably education. Commercial and agricultural enterprises, by contrast, almost always pay more in local taxes than they demand in services. Therefore, land conservation can save town and city governments revenue by limiting development and/or preserving natural resource industries.²⁴

8. Wetlands Banking

The Clean Water Act requires that any wetland developments be offset with the restoration of a wetland in the same watershed. They do this by purchasing Mitigation Banking Instruments from land trusts or private firms that conserve and restore other wetlands. This has the effect of compensating for the loss of biodiversity, water filtration, and other benefits that follow the development of one parcel with the improvement and perpetual protection of a similar site. The price of these credits depends on the pace of real estate development in the watershed but can be as high as \$12,000 per acre restored.²⁵

²⁴ Gies, Conservation: An Investment that Pays, 11; Farmland Information Center, Cost of Community Services Fact Sheet, 2010.

²⁵ Internal Methodology Document, Working Lands Investment Partners LLC.

IV. Methods for Assessing Economic Benefits of Land Conservation

In accordance with the recommendations laid out by Seigal and Barringer et al., the analysis of completed LMF projects focuses on direct, readily understandable economic benefits such as tourism revenue generated by conserving a parcel, jobs associated with the conservation of a parcel, and the earnings tied to those jobs. But by no means do these represent the full range of economic benefits that have historically been associated with land conservation.

Numerous economic studies have associated improved home prices, higher tax revenues, watershed conservation, runoff treatment, endangered species preservation, fisheries restoration, carbon sequestration, tax base protection, health benefits and other ecosystem services with land conservation.²⁶ While these certainly represent a share of the benefit associated with any conservation project, the economic methods used to evaluate these returns are not widely understood. Therefore, this paper focused on quantifying benefits which could be explained intuitively. For example, in researching the benefits associated with the Branch Lake purchase, this study used a cost of replacement method to assess the value of the property's water purification attributes. Discussions with water treatment experts and conservationists indicated that the City of Ellsworth's water treatment plant would require a \$4M retrofit to compensate for the loss of natural purification features, as would happen if the property was developed instead of conserved.

The desire to produce conservative estimates also led the study to exclude any

²⁶ Hundreds of ecosystem service market evaluations and related studies have been conducted over the last twenty years. Studies reviewed in support of this effort include: Turner & Daily, 2007; King & Anderson, 2004; Johnston et al., 2002; Geoghegan et al, 2003; Thorsnes, 2002.

multiplier effects from its analysis. Multiplier effects are usually included in assessments of economic benefits in order to capture those jobs or expenditures that stem from an initial direct investment.²⁷ For example, the jobs created by Bath Iron Works winning a defense contract are not restricted to the shipyard but extend to restaurants, barber shops, retailers, doctors, insurance agencies, lawyers and other businesses who sell goods and services to BIW and its employees. In their analysis of the economic impacts of Baxter State Park, Whittington and Bissell estimated that the \$3.8 million spent on goods and services in Maine to facilitate recreation at Baxter generated an additional \$3.1 million in indirect spending. However, owing to the inherent difficulty in determining tourism expenditure explicitly caused by the conservation of a specific parcel, this study felt that using a multiplier in this manner was unjustifiable and opted for a more conservative approach.

The conservation practitioner must also be mindful of the difference between benefits associated with conservation and benefits caused by conservation. Investments in working lands or major recreational areas will nominally be associated with all the jobs and earnings that the land generated before the transaction went through. However, care must be taken to delineate the share of those jobs and earnings directly ascribable to conservation when reporting the benefit of the land deal. Some methods for discerning this figure include:

- 1) Surveying recreationists at the site in question and asking if they would visit the state if this site were not available, or spend their vacation budget elsewhere.
- 2) Quantifying a difference in employment at the site before and after conservation.
- 3) Citing historical precedents from similar tracts.

²⁷ Studies that employ multiplier effects to estimate the benefits of conservation related projects in New England included: Morris et al., 2006; Whittington & Bissell, 2008; Pollock, 2006.

V. Comparing Other State-Level Public Conservation Funding Mechanisms

Larger states tend to divide their conservation funding streams into multiple funds with independent governance and allocation priorities. They are also funded through a variety of means that include legislative appropriations, general obligation bonds, dedicated sales tax revenue, and dedicated lottery proceeds. Usually, these revenues are split by established percentages between programs targeted at more classical conservation initiatives and funds targeted at preserving working landscapes. Historical, farmland, and watershed preservation are also commonly funded through these initiatives. Public conservation funds that spend \$100M or more annually usually earmark a certain percentage of their budget to certain project types before proposals are received. This allows for the application of differentiated evaluation schemes between certain project types. The result is that working parcels are evaluated largely for their economic contributions while wildlife reserves are evaluated primarily for their ecological attributes. State funds that spend \$10M or less annually (on average), such as those found in South Carolina, Connecticut, and Maine, do not employ such differentiated conservation funding streams and therefore use standardized evaluation methods. This study did not find any other fund that applied a single means of evaluating economic benefits to all of its applicants.

While many comparable programs to LMF in other states (including California, Colorado, Florida, and New York, and North Carolina) stress the economic impacts of conservation, none have a universal requirement that all project proposals quantify

potential economic benefits, much less a standardized process for evaluating them.²⁸

Florida's programs, funded under the state's umbrella authority, Florida Forever, address the economic impacts when sponsoring governments present their projects to the grant committees; projects will often receive extra points for ancillary economic benefits.

Minnesota allocates a portion of its sales tax to conservation of working landscapes, ecological reserves, watershed, recreational sites, and places of cultural or historical significance. Four separate entities evaluate applications and oversee the distribution of funds for these four priority areas. Proposals for working farm and forests conservation, made to the Minnesota Outdoor Heritage Fund, are evaluated for their economic benefits. However, the evaluation is much more technical than that proposed by LMF. Timber and agricultural entities must demonstrate the long-term financial viability and ecological sensitivity of their operation.²⁹

Washington State's Washington Wildlife and Recreation Program operates under a similar paradigm in that funding levels for different project types are pre-established and evaluation processes differ between these types. Habitat restoration projects are chosen almost exclusively on their ecological merits while agricultural operations are chosen largely on economic merits. Half of the criteria points are awarded based on a proposed farm's size, productivity, and the conduciveness of the soil type for farming. All proposals must provide matching funds, demonstrate sustainable management plans, and public benefits but the decision-making process depends almost entirely on project type.³⁰ Most large states like New York, California, and Ohio employ differentiated evaluation schemes

²⁸ Personal Correspondence with program staff, research from CA, CO, FL, NY, and NC.

²⁹ Various sources from the Lessard-Sams Outdoor Heritage Council. <http://www.lsohc.leg.mn/>

³⁰ WWRP website. Manuals 10a, 10b, 10f http://www.rco.wa.gov/doc_pages/manuals_by_number.shtml

when awarding conservation grants. The legislative, regulatory, or electoral decision to differentiate funding streams necessitates differentiated evaluation methods.

Unlike larger funds that secure the business plans of their timber and agro applicants as part of the evaluation process and the other small funds that decline to consider conservation economics at all, LMF prefers a single metric to evaluate the economic benefits of proposals irrespective of the project type. The qualitative nature of the evaluation process allows for such broad application. However, applications which at least attempt to quantitatively demonstrate economic benefits will likely make a stronger case than those which do not.

VI. Conclusion

With increasing public attention to fiscal and economic issues, LMF must continue to employ innovative ways to sell the program, highlighting the economic benefits of land conservation to the state of Maine. The revised funding application is an important example of this. LMF is a small enough program with centralized funding to be able to make such effective changes. The organization is pioneering this approach – no other state land conservation-funding agency has included, in a structured way, economic considerations into their application process.

As shown in the analysis of the eight projects in this paper, the economic benefits from these conservation projects are considerable, especially in regions of the state that have experienced prolonged, economic hardship. These benefits can be measured easily and do not require a technical economic or business background. Regardless of whether those benefits that can be expressed in monetary terms even constitute a significant share of a project's real value, articulating those benefits helps to preserve public conservation funding in Maine. Conservation has been providing economic benefits to states and communities for as long as it has been practiced. It is therefore in the interests of the land conservation community to take credit for them. Applicants will have the opportunity to do just this as LMF begins to take economic considerations into its allocation decisions with its next round of proposals.

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Appendix: Methodology

This study used data collected from stakeholders, the Bureau of Economic Analysis (BEA), various studies on the economic benefits of preserved lands in the Northeast, Maine state tourism reports, and project proposals to LMF to estimate the overall economic benefits. This methodology was designed to be repeatable and understandable even for those without an economics background so that benefits of this nature might be included in future proposals for LMF matching funds.

1. Cost to LMF

These figures were provided directly from the LMF. The Katahdin Iron Works and Mt. Blue/ Tumbledown Mountain projects studied here were actually funded in three stages, so for the purposes of LMF book keeping they were three distinct projects but for all other purposes they represent a single conserved parcel. The Katahdin Forest Easement is by far the most expensive, but at 200,000 acres it also represents 40% of the land that LMF has conserved in the state.

	Total LMF Cost	Documented Match	Total Project Cost
Katahdin Forest Easement	\$2,124,464	\$21,935,000	\$24,059,464
combined Katahdin Iron Works	\$1,345,738	\$8,870,000	\$10,215,738
Port Clyde Fisherman's Co-op	\$400,000	\$450,000	\$850,000
combined Mt. Blue Region/ Tumbledown Mountain	\$2,300,596	\$3,070,000	\$5,370,596
Dead River Corridor – Maine Huts and Trails	\$539,482	\$1,591,000	\$2,130,482
Branch Lake	\$954,666	\$1,500,000	\$2,454,666
Kelly Farm	\$500,000	\$500,000	\$1,000,000
Scarborough Beach	\$408,849	\$324,060	\$732,909

Table 4: Project Costs

2. Recreational Visits

Where possible, direct stakeholder input was used to determine the number of recreational visits to a specific parcel in a given year. Otherwise, reasonable assumptions were made to estimate the number of annual visits.

	Person Visits/Year
Katahdin Forest Easement Project	60,000
Katahdin Iron Works	7500
Port Clyde Fisherman's Co-op	0
Mt. Blue/Tumbledown Mountain	70,000
Dead River Corridor	3000
Branch Lake	0
Kelly Farm	0
Scarborough Beach	65000

Table 5: Annual Visits

Reliable data on visitation rates for the Katahdin Forest were difficult to obtain. Although the easement holder casually estimated that 200,000-300,000 people used the tract for recreational purposes every year, this estimate was disputed by SPO. Additionally, the degree by which it dwarfs the 60,000 annual visitors to neighboring Baxter State Park (BSP) casts doubt on its veracity.³¹ As the forest is approximately the same size as BSP and hosts similar recreational activities (e.g. hiking, fishing, mountain biking, canoeing, kayaking, and rafting), the Katahdin Forest's visitation rate was assumed equal to Baxter's. The visitation figure for the Katahdin Iron Works was determined by looking at hiker utilization of that section of the Appalachian Trail and the use rates of the AMC maintained camps and lodges in the tract.³² The figure for the Mt. Blue/Tumbledown region was reported in the project proposal, the Dead River Corridor usage figure was determined through correspondence with Maine Huts & Trails (the executive director expected the

³¹ Whittington & Bissell (2006), 6.

³² Katahdin Iron Works Project Proposal, 2003; Personal Communication AMC Policy Director.

number to grow to 10,000 in the coming years once the Trail's publicity grows), and the Scarborough Beach estimate was drawn from a 1999 internal LMF document.³³ The Port Clyde Fisherman's Co-op, Branch Lake, and Kelly Farm either do not serve in a recreational capacity or do not attract recreational visitors, so their visitation rates were scored as zero. These figures were the basis for all estimates of tourism revenue made in the next step.

3. Tourism Revenue

For the purposes of this study, tourism revenue is defined as revenue generated through recreational expenditures associated with tourism activities within the state of Maine. As LMF is primarily concerned with the state-level impact of its investments, no attempt was made to differentiate regional and local revenue from the overall total.

The primary challenge with assessing the revenue generating characteristics of a particular conservation project is assessing how much of the tourism revenue was, in effect, new money that would not have entered the state's economy if the parcel were not conserved. The most accurate way to gauge this figure is to survey visitors at the parcels in question. As such a step was beyond the capabilities of this analysis; it assumed that in-state residents who visit a parcel would still spend their recreating funds within Maine at another site if the tract were not conserved, and that the number of out-of-state residents dedicated to a specific site is equal to the percentage of first-time out-of-state residents visiting that tract.

Out-of-state visitor percentages to the various sites were gleaned from a series of tourist studies on Maine and other northeastern outdoor attractions. A study on Baxter State Park indicated that 40% of the visitors there were from out of Maine, so the Katahdin

³³ LMF Scarborough Beach Talking Points, 1999.

Forest and Katahdin Iron Works were estimated to experience equivalent rates as they occupy the same geographic region of the state and offer a similar slate of attractions.³⁴ A study of overnight campgrounds in state parks, such as Mt. Blue, indicated that 40% of visitors also originated from outside of Maine. The same study's treatment of day parks, such as Scarborough Beach, indicated that 32% of their visitors were from out-of-state.³⁵ Through personal communication, Maine Huts and Trails indicated that 35% of the users of the Dead River Corridor originated from out of Maine.³⁶ The Port Clyde Co-op, Kelly Farm, and Branch Lake do not attract noteworthy tourism revenue.

To estimate how many of these visitors would not visit Maine if their site of choice were not conserved, the visitation rates were weighted by the percentage of first-time out-of-state visitors to the region in which the parcel lay. A report prepared for the Maine Office of Tourism, listed the first-time visitation rates to the Highlands (which includes the Katahdin Iron Works and the Katahdin Forest) as 22%, to the Mountains and Lakes Regions (which includes the Dead River Corridor and Mt. Blue/Tumbledown) as 25%, and to the Greater Portland Area (which includes Scarborough Beach) as 15%.³⁷ These weighted visitation rates represent the percentage of visits ascribable to the conservation actions of LMF.

³⁴ Whittington and Bissell, 27.

³⁵ Morris et al., 4.

³⁶ These visitation figures are comparable to those reported in Anderson et al.'s analysis of recreation in the 100 Mile Wilderness (33%) and Pollock's analysis of the Northern Forest Canoe Trail Maine segments (55%). These figures may form the basis of a later sensitivity analysis.

³⁷ Davidson and Peterson, 35-38.

	Person Visits/Year	Group Visits/Year	Mean Expenditure /Group	Weighting Factor*	Tourism Revenue
Katahdin Forest Easement Project	60,000	15385	\$495	9%	\$669,937
Katahdin Iron Works	7500	1923	\$495	9%	\$83,742
Port Clyde Fisherman's Co-op	0	0	\$0	0%	\$0
Mt. Blue/Tumbledown Mountain	70,000	17949	\$374	10%	\$671,282
Dead River Corridor	3000	769	\$962	9%	\$64,750
Branch Lake	0	0	\$0	0%	\$0
Kelly Farm	0	0	\$0	0%	\$0
Scarborough Beach	65000	15116	\$87	5%	\$63,126

Table 6: Tourism Revenue Methodology

Sources detailing tourism expenditure reported their information in terms of dollars per group while visitation rates were given in terms of persons per annum. Therefore, average group sizes of 3.9 people for overnight sites and 4.2 for Scarborough Beach (the only day use site) were used for this conversion.³⁸ Average group expenditures within Maine were determined from the same literature that provided visitation rates. Again, the Katahdin Iron Works and the Katahdin Forest were estimated as equal to Baxter in this respect, or \$495 per group,³⁹ Mt. Blue/Tumbledown was estimated equal to the average state-owned campground, or \$374, and Scarborough Beach was estimated as equal to the average day-use state park, or \$87.⁴⁰ Expenditures for the Dead River Trail were estimated to be substantially higher than the other sites. This is due to the fact that users of this trail pay for less rustic accommodations than the back packers and campers who frequent the other sites. Therefore, the state average expenditure for out-of-state, overnight,

³⁸ Morris et al., 7.

³⁹ Whittington and Bissell, 2.

⁴⁰ Morris et al., 26.

recreational visitors of \$962 was applied in this instance.⁴¹ Total tourism revenue ascribable to conservation was determined to equal the product of group visits, mean expenditure, and weighting factor. This only represents a small product of the tourism revenue produced from recreation in these conserved areas and does not begin to consider multiplier effects. Instead, it represents LMF's approximate contribution to the total amount of tourism revenue generated by each parcel.

4. Tourism-related Jobs

The total number of tourism industry jobs created as a result of LMF conservation actions was determined by assuming that 47% of tourism expenditures went towards paying the wages of tourism sector employees.⁴² The proportion of tourism revenue devoted to labor was then divided by the average tourism sector wage in Maine to give the total number tourism jobs ascribable to the conservation of each site.⁴³ Again, these figures

	Tourism Revenue	Percent Earnings	Tourism Earnings	Tourism Wage	Tourism Related Jobs
Katahdin Forest Easement Project	669,937	47%	\$312,130	\$15,897	20
Katahdin Iron Works	83,742	47%	\$39,016	\$15,897	2
Port Clyde Fisherman's Co-op	0	47%	\$0	\$15,897	0
Mt. Blue/Tumbledown	671,282	47%	\$312,756	\$15,897	20
Dead River Corridor	64,750	47%	\$30,168	\$15,897	2
Branch Lake	0	47%	\$0	\$15,897	0
Kelly Farm	0	47%	\$0	\$15,897	0
Scarborough Beach	63,126	47%	\$29,411	\$15,897	2

Table 7: Tourism-related Jobs

⁴¹ Davidson, Peterson, 70.

⁴² Pollock, 65.

⁴³ Maine Quarterly Census of Employment and Wages. Average wages for NAICS codes 712, 713, 721, and 722.

only represent a small portion of the total number of tourism jobs directly supported by these parcels.

5. Industry-related Jobs

While a problematic term, those jobs associated with conservation project not related to tourism were categorized as “industry-related jobs” in recognition of their natural resource industrial heritage. Where possible, figures for industry-related jobs were given by stakeholders through direct communication or through their proposals. Unlike in the case of tourism-related jobs where the numbers reported only represented a relatively small percentage of the jobs actually supported by the site, some sites were allocated all of the jobs they support. The easements at Kelly Farm, for example, support continued agricultural and fishing activities in areas with some of the greatest development pressures in the state. Therefore, this methodology credits their actions with the preservation of all jobs associated with the parcels. Where stakeholder’s input was unavailable, estimates were made based on preexisting methodology. In the cases of the Katahdin Forest and Katahdin Iron Works, which are harvested for timber, total jobs were determined by taking each tract’s share of the state’s total commercially harvestable timberlands and multiplying that by the total number of forest product industry employees in the state.⁴⁴ This process, of course, assumed that employment in the forest product industry is proportional to the amount of timberland available to harvest but produced defensible figures. The Katahdin Forest Easement proposal estimated that 1,000 people were directly employed in timber activities related to the forest, this study estimated that the forest supported 280 full-time

⁴⁴ LMF Internal Methodology Document

industry jobs. There may well be more people working with forest products produced by this tract but the aim of this study was to estimate full-time equivalent positions.

The construction and service jobs of associated improvements made to these tracts following conservation are also included in this section. The specific instances are the Katahdin Iron Work and Dead River Corridor tracts where the non-profit owners have invested \$3M and \$1.5M respectively in lodges, huts, and other improvements since taking ownership, with plans and funding to do significantly more work. The jobs produced by these investments were estimated by assuming a 47% labor cost of investment (the share of the investment spent on labor)⁴⁵ and dividing that share by \$38,824, the average, full-time construction wage in Maine.⁴⁶ These were then weighted by factors similar to those used in the tourism sections to represent those jobs preserved directly as a result of conservation. The Katahdin Forest and Katahdin Iron Works, where commercial forestry would have continued regardless of whether or not conservation efforts took place, were issued 9% weights for their forest product related jobs. Parcels undergoing improvements such as Katahdin Iron Works and the Dead River Corridor were credited with producing 100% of the resultant construction jobs as these stemmed directly from conservation. Owing to the lack of substitutable farmland in the state, and the immanent developmental pressures around Merrymeeting Bay, the conservation of Kelly Farm was also credited with preserving 100% of the jobs associated with the parcel. The Port Clyde easement was credited with preserving 50% of the jobs supported by it because while lobstermen are somewhat restricted in movement, owing to the zone license system, many would still relocate if their traditional waterfront became unavailable but many would also retire.

⁴⁵ Pollock, 65. (Ratio of income to expenditure)

⁴⁶ Maine Quarterly Census of Employment and Wages, 2009. NAICS code 236.

The total earnings for industry jobs were calculated by taking the mean wage associated with the applicable NAICS code, or weighted average of several NAICS codes if the tract supported multiple industries, and multiplying that by the total jobs associated with the tract. The average forest industry wage was \$58,987.13, the average fishing industry wage was \$47,549, the average agricultural industry wage was \$22,694, and the average construction wage was \$38,824. Total earnings are displayed in Table 8.

	Applicable Industry	NAICS Code(s)	Total Industry Jobs	Weighting Factor	Jobs Credited to Conservation	Total Earnings
Katahdin Forest Easement Project	Forestry and Related	113,321, 337, and 322	278	9%	25	\$1,474,773
Katahdin Iron Works	Forestry and Related / Construction	113,321, 337, 322, and 236	88	9%/100%	41	\$4,257,095
Port Clyde Fisherman's Co-op	Fishing	114	116	50%	58	\$2,757,842
Mt. Blue/Tumbledown Mountain	N/A		0		0	\$0
Dead River Corridor	Construction	236	18	100%	18	\$698,864
Branch Lake	N/A ⁴⁷		0		0	\$0
Kelly Farm	Agriculture	111	50	100%	50	\$1,134,700
Scarborough Beach	N/A		0		0	\$0

Table 8: Industry-related Jobs

6. Value-added Ecosystem Service

While there is a suite of ecosystem services that might be considered in such an analysis including carbon sequestration, fishery preservation, and endangered species

⁴⁷ Some sustainable forestry takes place on the Branch Lake tract, but this is too limited to support any full-time positions.

habitat, this study only considered ecosystem services that provided direct, quantitative benefits to a town, region, or the state. Among the eight projects, the only example of such service was the Branch Lake parcel. This tract surrounds the southern half of Branch Lake, which serves as the reservoir to the city of Ellsworth. The lake and area are under substantial residential development pressure owing to its proximity to both job markets in Bangor and Ellsworth and the summer home market growing out of Mount Desert Island and Acadia National Park. This land provides purification services to the city, which would cost approximately \$4M to provide through mechanical water treatment.⁴⁸ The value of this service was therefore estimated as equal to \$4M.

⁴⁸ Personal communication Andrew Tolman, Assistant Director, Maine CDC.