Hardy Pond Trail: Economic Impact Analysis

April 30, 2014

Anthony S. Orlando*

Steven R. Miller*

MSU Center for Economic Analysis

Justin S. Morrill Hall of Agriculture
446 W. Circle Dr., Room 88
East Lansing, MI 48824-1039

Abstract

The purpose of this study is to provide an analysis of the potential impact of the Hardy Pond Trail on the local economy of Newaygo County. This proposed bicycle and hiking trail encircles Hardy Pond, a 4,000-acre impoundment lake formed by the Hardy Dam, located in Newaygo County, MI along the Muskegon River. Economic impacts arise from expenditures and employment associated with the installation of the Hardy Pond Trail and through expenditures of trail users. Impact estimates start with direct effects, which measure the dollar value of direct infusion into the local economy. These direct effects are specified by economic activity – for example retail, non-residential construction, etc. Each of these activities give rise to secondary activities that may or may not occur within the local economy – for example, accounting services, land surveys, and equipment rental. Expected direct effects of installation are well established and provided by the International Mountain Biking Association, while direct effects from trail users must be estimated from surveys of similar trails that share similar demographics. Secondary effects are estimated using the IMPLAN economic impact modeling system for Newaygo County.

Introduction

Tucked away in west-central Michigan exists Newaygo County, a small community bestowed with a resource rich environment. Located on the eastern border, along the Muskegon River is Hardy dam. A hydroelectric source of energy built in 1931, this Consumers Energy-owned dam has created an upstream reservoir which is rightfully named, Hardy Pond. Hardy Pond has naturally become a recreation hotspot with five public parks, roughly 2,000 campsites, and several boat launch sites on shores spanning nearly 4,000 acres. In seeking maximize the recreational potential[1] of this site, a roughly 30 mile, trail surrounding the lake has been proposed by Newaygo and Mecosta Counties. Construction of the trail and its maintenance has been contracted out to the International Mountain Biking Association (IMBA). It is expected that the addition of this trail will enhance existing recreational opportunities and will have a positive impact on the surrounding communities in the form of increased tourism expenditures in the area.

Methods

Economic impacts are based on standard economic impact modeling approaches. IMPLAN Pro 3.0 is an input-output modeling software commonly used for assessing such economic impacts. This software and underlying data is built on social accounting approaches used to measure national and regional economic activities. That is, IMPLAN allows the tracking of transactions across the local economy, and changes in those transactions through direct infusions into the local economy can be traced to all subsequent transactions. The Appendix A of this document provides a description used to calculate economy-wide effects that entail not only the direct expenditures in the region for installation of the trail and visitor expenditures, but also takes into consideration associated transactions between businesses (indirect effects) and purchases by households who benefit from increased economic activity in the region (induced effects).

The methods start with specifying direct effects measured in dollars. Two direct effects are specified. The first is expenditures required to establish the Hardy Pond Trail. This impact entails all the expenditures around construction, planning and associated services used in making the trail. Since much of the trail installation entails volunteer efforts, employment impacts are not significant, though some marginal effects are expected. In addition, the effects are limited to the time span by which installation activities take place. The second direct effect is more complex to estimate but represents ongoing, annual impacts due to visitor expenditures.

Direct effects of visitors arise through visitor purchases of goods and services in the region. The term visitor is used to denote those that visit the trail from outside the region and those that visit the trail from within the region, but would have likely left the region for recreational activities in the absence of the Hardy Pond Trail. That is, direct effects of expenditures can arise from new expenditures in the region from users that live outside the region and commute in to take advantage of the trail, and can arise from saved expenditures that would have likely left the region should the trail not be available. The latter allows us to recognize that transactions from local residence give meaningful rise to economic impacts if those transactions would likely arise outside the region.

Estimates of trail usage were derived from secondary sources. A primary source of estimates was collected from an *ex post*[2] economic impact assessment of the Creeper Trail in Virginia (Bowker,

[1] The Newaygo County website refers to tourism as its "…main economic support."

[2] An *ex post* impact study is one conducted after the fact and entails greater site-specific data than *ex ante* impacts, which largely rely on conjectures of visitors and spending.

Bergstrom, & Gill, 2004). The Creeper Trail shares similar demographic and trail characteristics as to the planned Hardy Trail, and because the Creeper Trail study was an *ex post* study of usage and expenditures, it provides an ideal basis for estimating the expected economic impact of the Hardy Trail. Other sources were used for comparison with the Creeper Trail study including the Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends by Cordell et al. (Cordell et al., 1999), and the National Survey on Recreation and the Environment (USDA Forest Service Southern Research Station, 2014).

Usage estimates were derived based on Creeper Trail realized usage. In the Creeper Trail study, this included a sampling of visitors by entry point by day of the week and by season (winter/summer) that concluded that just over 104,537 users were generated annually. The break outs of shares are shown in Table 1, below, where nonlocal users made up 52 percent of total visits, while local residents made up the remaining 48 percent. Similarly about 85 percent of users were day visitors compared to 15 percent that resulted in overnight stays. Of the day users, most visited Creeper Trail with the intended purpose of using the trail (Primary), while the delineation is more equitable for overnight users.

	Day User		Overnight		Visits by source
	Primary*	Non-primary**	Primary*	Non-primary**	
Nonlocal visits	30%	7%	8%	7%	52%
Local visits	48%	0%	0%	0%	48%
Visits by type	78%	7%	8%	7%	100%

Table 1. Shares of Visitor Types

* primary purpose of trip is to use trail

** primary purpose of visit is for non-trail purposes

Source: Bowker, Bergstrom and Gill; 2004

For many users, the trail was a recreation activity of opportunity. That is, the trail did not constitute the primary purpose of the trip, and hence, associated expenditures would likely exist in the absence of the trail. Such unassociated expenditures should not be used when estimating the economic impact of the Hardy Pond Trail.

In total, about 104,537 people visit Creeper Trail annually. We anticipate visitation is largely impacted by the size of the surrounding population, though other factors may contribute. Amenities near large population centers will have more local visitors and, because of the urban amenities of larger population centers, more non-local visitors. However, other non-population attributes including natural amenities, proximity to transportation nodes and recreation destinations also play a role. Similar with Creeper Trail, the Hardy Pond Trail is located in proximity to outdoor recreation opportunities. Where the Creeper Trail is located within the Cherokee National Forest, the Hardy Pond Trail will be located in proximity to the Manistee National Forest. Both recreation areas afford water recreation as well as camping. The Hardy Pond Trail is in greater proximity to a major highway than is Creeper Trail, but highway traffic on Michigan's 131 is lighter than the main U.S. interstate 81 between Knoxville, TN and Roanoke, VA. Finally, Hardy Pond Trail has a surrounding population of 415,716,[3] while the regional

[3] This comprises the following counties in Virginia Washington, Scott, Russell, Smyth, Grayson, Wythe and Carroll and the following counties in Tennessee Sullivan, Johnson, and Ashe Count in North Carolina.

population around Creeper Trail is comparable at 417,130.[4] Based on local population and relative proximity to the Hardy Pond Trail, we expect approximately an equal number of non-event usages of the Hardy Pond Trail as shown for the Creeper Trail. Based on population, we anticipate 104,893 users will take advantage of Hardy Pond Trail annually. Using Table 1, the breakdown of expected visit types and sources are reported in Table 2.

	Day User		Overnight		Visits by source
	Primary	Non-primary	Primary	Non-primary	
Nonlocal visits	31,533	7,461	8,117	6,976	54,087
Local visits	50,806	0	0	0	50,806
Visits by type	82,338	7,461	8,117	6,976	104,893

Table 2. Expected source and types of visits to Hardy Pond Trail
Source: Authors' calculations

Understanding how visitors generate an economic impact in the region requires estimating typical visitor expenditures. A few options were available for estimating expenditures. However, two appeared most relevant to the Hardy Pond Trail impact estimates, the recreation/tourism expenditure profiles used by the USDA Forest Service National Visitor Use Monitoring project (Stynes & White, 2005), or the expenditure profiles generated in the Creeper Trail impact study (Bowker et al., 2004). While total expenditures were comparable between the two sources, the USDA estimates provides finer expenditure granularity that affords greater impact estimate precision. In addition, the USDA expenditures delineate between expenditure patterns of local visitors from those of non-local visitors, where the difference primarily consists of differences in restaurant and lodging expenditures. Hence, the USDA visitor expenditure profiles were used to estimate visitor-day expenditures.

Table 3 provides expected visitor expenditures, adjusted for inflation, based on Stynes and White estimates (2005). Accordingly, day visitors generate no lodging expenditures and generate fewer revenue dollars in the surrounding communities. Non-local day visitors tend to generate more local economic activity than local visitors, at $65.09 per day compared to $41.44 per day respectively. Non-local overnight visitors spend on average about $309.35 per visit. Total direct visitor expenditures are calculated by multiplying the expected per day expenditures by the number of expected annual visits. Only local margins earned by retail establishments were used. That is, the local economic activity from purchases at establishments like gasoline stations only count the difference between the cost of goods sold and the actual sell price as contributing to the local economy. These values go toward expenditures for operation including utilities, wages, and proprietor's incomes and other local expenditures.

[4] This comprises of the following Michigan counties, Newaygo, Mason, Oceana, Muskegon, Kent, Montcalm, Mecosta, Osceola, and Lake Counties

	Non-Local		Local
	Day	Overnight	Day
Lodging	$0.00	$81.80	$0.00
Restaurant	$17.15	$74.31	$7.72
Groceries	$9.60	$39.46	$6.82
Gas and oil	$20.17	$45.14	$14.72
Other Transport	$1.24	$9.51	$0.26
Activities	$4.88	$19.54	$2.30
Admission	$6.61	$11.38	$4.31
Souvenirs	$5.44	$28.22	$5.30
Total	**$65.09**	**$309.35**	**$41.44**
Visits	**31,533**	**8,117**	**50,806**

Table 3: Expected Hardy Pond Trail Visitor Expenditures in Region
Source: Stynes and White; 2005 adjusted for inflation

Analyses and Findings

Construction Impacts

Construction expenditures for establishing the Hardy Pond Trail are expected to be $259,384.00. These expenditures are spread between non-residential construction expenditures and wholesale purchases in the IMPLAN software. These one-time expenditures will give rise to short-term changes in regional employment. Table 4 shows the expected economic impacts of these expenditures. Each column represents a different aspect of economic activity starting with employment, labor income, value added (or Gross State Product) and output (the sum of Gross State Product and industry-to-industry transactions). Each row represents the source of the impact. Direct impacts are the initial infusion of economic activity as measured by the output column. The indirect effects represent impacts resulting in industry-to-industry transactions. Finally, the induced effects arise through expenditures from labor income. As all three sources of impacts are additive, the total impacts to the region is the sum of all three impacts.

	Employment	Labor Income	Value Added	Output
Direct Effect	2	$79,204	$90,734	$257,288
Indirect Effect	0	$10,032	$14,752	$26,234
Induced Effect	1	$13,484	$26,542	$43,446
Total Effect	**3**	**$102,720**	**$132,028**	**$326,968**

Table 4: Expected Economic Impact of Hardy Pond Trail Installation

As shown in Table 4, $257,288 of the initial cost is expected to give rise to direct impacts. These impacts are expected to be associated with two regional jobs accounting for about $79,204 in total annual income. When accounting for all indirect and induced effects, the local economy expects to have a short-term bump in transactions of $326,968 and an addition of three jobs.[5] These impacts only

[5] IMPLAN does not distinguish between full- and part-time employments, but rather assumes average industry average work commitment.

expected to take place during the installation phase of this project and therefore do not represent ongoing economic impacts of the Hardy Pond Trail. However, some upkeep activity is likely to take place, although this activity is not modeled in this analysis.

Visitor Impacts

Visitor impacts arise from the expected expenditures of visitors to the Hardy Pond Trail. These impacts are largely ongoing so long as the trail is open and utilized. While the make-up of visitors may change over time, the estimates are based on experienced approximations based on *ex post* analysis of a similar trail, the Creeper Trail in Virginia.

Direct effects were broken into three types of visitors and their associated expenditures as previously shown in Table 3. Table 5 shows the expected visitor impacts on the local economy considering direct expenditures, and all associated secondary effects through indirect and induced transactions. As indicated the largest component of the expenditure impact arises through direct expenditures in the local economy. These expenditures are expected to be just under $3.08 million. Through secondary transactions, total expenditures in the local economy are expected to be $4.15 million greater than before installing the Hardy Pond Trail. These expenditures are expected to generate 60 direct jobs and 70 total jobs in the region with total annual wage gains of about $1.45 million. It should be noted that while the job gains appear significant, these are not expected to be high-paying jobs, but rather a combination of part and full-time service-oriented jobs, with typical wages of around $20,000 annually.

	Employment	Labor Income	Value Added	Output
Direct Effect	60	$1,113,966	$1,744,191	$3,079,702
Indirect Effect	4	$151,937	$252,110	$458,646
Induced Effect	6	$188,888	$370,201	$607,524
Total Effect	**70**	**$1,454,791**	**$2,366,502**	**$4,145,871**

Table 5: Expected Economic Impact of Hardy Pond Trail Visitor Expenditures

Summary and Conclusion

The Hardy Pond Trail is a modest project proposal to install a bicycle-friendly trail in the forest setting around Hardy Pond. While this region is amenity rich for outdoor recreation types, the region suffers from a low density of recreation activities. Such a trail contributes to the inventory of recreation opportunities in the Newaygo and Mecosta County region. We used an *ex post* study of a similar bicycle-friendly trail, Creeper Trail, in Virginia as a basis for our study. That after-the-fact study documented the demographic and visitation characteristics of visitors to the Creeper Trail. We postulate that this study was an ideal comparison based on surrounding demographics and similar recreational opportunities as those that surround the proposed Hardy Pond Trail. As such, rates of usage and types of visitors were postulated to be similar. Published surveys of outdoor recreation seekers were used to generate visitor spending profiles. These expected direct infusions into the local economy are documented, as well as expected installation costs of the proposed trail, and used to generate expected, economy-wide economic impacts for the region. This report documents those expected impacts.

In total, installation activities of the Hardy Pond Trail are expected to generate modest economic impacts. Much of this is attributed to volunteer activity in the installation. Larger economic impacts are associated with visitor expenditures. In total, the total expected economic impact is projected to

contribute less than .5 percent increase in overall economic activity. However, these impacts are expected to generate approximately 70 additional jobs in the region, mostly around tourism-related establishments like restaurants and retail. Through experience with similar economic impact studies we largely anticipate that the estimates represent a maximum expected impact. This largely draws on seasonality of trail usage, though the impact is expected to be noticeable to local businesses and residents.

References

Bowker, J. M., Bergstrom, J. C., & Gill, J. K. (2004). The Virginia Creeper Trail: an Assessment of User Demographics, Preferences, and Economics. Richmond, VA: Virginia Department of Conservation.

Cordell, H. K., Betz, C., Bowker, J. M., English, D. B., Mou, S. H., Bergstrom, J. C., . . . Loomis, J. (1999). *Outdoor recreation in American life: a national assessment of demand and supply trends*. Champaign, IL: Sagamore Publishing.

Stynes, D. J., & White, E. M. (2005). Spending Profiles of National Forest Visitors, NVUM Four Year Report. East Lansing, MI: Michigan State University.

USDA Forest Service Southern Research Station. (2014). National Survey on Recreation and the Environment. from http://www.srs.fs.usda.gov/trends/nsre-directory/

Appendix A: The IMPLAN Economic Impact Model

The Minnesota IMPLAN Group Inc. model for economic impact evaluation, IMPLAN Pro. 3 (Minnesota IMPLAN Group Inc. 2004), is a general application economic impact evaluation model based on a common economic construct known as a social accounting matrix (SAM). The SAM is a comprehensive accounting system that identifies all the monetary transactions between the sectors in an economy. The SAM is comprised of a square matrix (number of columns equals number of rows) that represents individual sectors as both buyers and sellers. Each row represents the revenue earned by the corresponding sector while each column represents its expenditures (Isard et al. 1998, pp. 283). This construct builds a closed system that represents transactions within and amongst all sectors: inter-industry transactions; transactions between industries and government; transaction between industries and households; transaction between households and government; and the purchases and sales between the state economic sectors and the rest of the world.

IMPLAN provides industry detail to 440 different industry categories including agricultural, goods-producing, and service-providing industries. Institutions are broken out into households by income group, federal, state and local government sectors, and by import and export markets. The SAM also provides household and government purchases of goods and services. Additional transactions are recorded within the SAM including transactions across households, government transfers to households, and household transactions to government in the form of taxes and fees. Because the social accounting system examines all the aspects of a local economy, it provides a comprehensive snapshot of the economy and its spending patterns.

The I-O framework was first described by Francois Quesnay in 1758 and developed by Wassily Leontief (1960). The structure supports demand-driven responses, where changes in output demand in one industry materializes in changes in the demand for production of other industries. For example, an increase in local demand for printing services will spur demand for feed paper, ink, printer repair services and other goods and services required by printing companies. The beneficiaries of these direct transactions will increase the demand for inputs used in their respective production processes. Households that enjoy enhanced employment opportunities earn and spend more on goods and services and taxes. Such household impacts generate additional direct and secondary transactions across the economy. The extent to which initial stimulus generates such secondary transactions is hindered by the degree of purchases made outside the modeled region. Industries that purchase inputs from local suppliers generate greater secondary transactions than industries that tend to purchase inputs produced outside the state, holding all else constant.

I-O models have become staple economic impact models for regional analysis (Blakely and Bradshaw 2002). I-O models provide a systematic and intuitive approach to estimating economy-wide impacts of a change in the local economy. This approach uses linear relationships to reflect production processes that equate industry inputs and outputs. The linear transactions that define a SAM are generalized in a set of multipliers that capture the full extent of transactions associated with any changes in the level of production in an industry (Cabrera et al. 2008). To exemplify, within the I-O analysis, the total impact is specified in value of transactions as,

$$\textit{Total Effect} = \textit{Direct Effect} + \textit{Indirect Effect} + \textit{Induced Effect} \quad (1)$$

The I-O model takes changes in demand called direct effect and relates them to overall economic impact called total effect through a set of mathematical equations described above. In this analysis, the direct effect is the value of transactions generated from horse ownership and equine-related activities. The indirect effect is the value of secondary inter-industry transactions in response to direct effects. The induced effect is the value of transactions resulting from changes

in income in response to direct effects. Because the relationships are linear, the direct, indirect and induced effects can be specified as multiples of the direct effect and equation (1) can be restated as,

$$Total\ Effect = (1 + k_1 + k_2) \bullet Direct\ Effect, \qquad (1.1)$$

where k_1 and k_2 greater than or equal to zero. More simply, Equation (1.1) can be restated as,

$$Total\ Effect = k \bullet\cdot Direct\ Effect \qquad (2)$$

where $k = (1 + k_1 + k_2)$. Equation (2) says that the economy-wide impact, Total Effect, is some multiple of the direct effect, where the multiplier takes a positive value equal or greater than one. The minimum value the multiplier can take, one, reflects the intuitive result that if the economy's output of agricultural products – for example – expands by $1 million dollars, the economy will expand at least by $1 million dollars. However, if the indirect and induced effects are not equal to zero, this $1 million increase in output will spur other industries to expand output of goods and services and will generate household income that are applied to the purchase of goods and services in the economy; generating a total economic impact greater than the initial $1 million expansion.

Generally, the economic multiplier is specified as a ratio of the total to direct effects. Rearranging equation (2) provides,

$$k = \frac{Total\ Effect}{Direct\ Effect} \qquad (3)$$

where the multiplier, k encompasses all the direct, indirect and induced effects for a given industry and denotes the impact of a change in direct effects on the total economic system. Each industry in a region is characterized by its own multiplier k. Industries with expansive localized production chains will tend to have higher multipliers than industries that rely on suppliers outside of the modeling region. When there is adequate supply within the state, the state has more potential to retain the total effects of the industry. However, when producers have to depend on supplies outside the state, leakage occurs and part of the total effect is lost.

The I-O impact evaluation model requires several restrictive assumptions. First, the model imposes constant returns to scale, such that a doubling of output requires a doubling of all inputs. Second, technology is fixed with no substitution. These two assumptions impose that an increase in industry output requires an equal and proportionate increase in all inputs. Additionally, supply is assumed perfectly elastic such that there are no supply constraints. This final assumption also asserts that all prices are fixed, such that an increase in demand for any commodity will not result in a price changes for that industry. I-O models have been criticized on the grounds that some of these assumptions are overly restrictive and the magnitude of the bias generated by these assumptions are greater the larger the industry direct effects are relative the overall size of the industry (Coughlin and Mandelbaum 1991). Despite this criticism, I-O models have become a standard by which economic impact assessment generated.

References

Blakely, Edward J., and Ted K. Bradshaw. 2002. *Planning Local Economic Development: Theory and Practice*. 3rd ed. Thousand Oaks, CA: Sage Publications.

Cabrera, V.E., R. Hagevoort, D. Solfs, R. Kirksey, and J.A. Diemer. 2008. Economic Impact of Milk Production in the State of New Mexico. *Journal of Dairy Science* 91:2144-2150.

Coughlin, Cletus C., and Thomas B. Mandelbaum. 1991. A Consumer's Guide to Regional Economic Multipliers. *Review* 73 (1):19-32.

Isard, Walter, Iwan J. Azis, Matthew P. Drennan, Ronald E. Miller, Sidney Saltzman, and Erik Thorbecke. 1998. *Methods of Interregional and Regional Analysis*. Brookfield, VT: Ashgate.

Leontief, W. W. 1960. *The Structure of the American Economy, 1919-1939*. New York: Oxford University Press.

Matthiessen, Lisa Fay, and Peter Morris. 2004. Costing Green: A Comprehensive Cost Database and Budgeting Methodology. Washington, D.C.: Davis Langdon.

Miller, Ronald E., and P.D. Blair. 1985. *Input-Output Analysis: Foundations and Extensions*. New York, NY: Oxford University Press.

Minnesota IMPLAN Group Inc. 2004. *Implan Professional Version 2.0: 3rd Edition*. Stillwater, MN: MIG, Inc.