2014

Report on Scoping the Feasibility of Constructing an Economic Impact Model for Recreational and Conservation Projects in the State of Michigan

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Prepared for

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August 22, 2014

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EXECUTIVE SUMMARY

The purpose of this report is to determine the feasibility and estimated cost of developing a user-friendly model that can estimate the economic impact of recreational and conservation investments (RCIs) at the local and statewide level in Michigan. It can be argued that any such model will fall short of capturing the true impact of RCIs because economic measures such as employment, income, property tax revenues or tourist spending, are poor indicators of the experience of a walk in the woods, or a sunset over Lake Michigan, or the enjoyment of fishing, hunting, or kayaking. In short, if we can't live on bread alone, why do we try to measure everything in loaves of bread?

The clear answer, of course, is that RCIs compete for public dollars on the state and local level against public demands for roads, education, social services, and corrections. Without the ability to make an economic argument, recreation and conservation efforts will be marginalized in this arena.

Regional economic impact models have only improved during the past years, and I imagine that more improvements, especially in integrating econometrics with GIS spatial analysis, are on the way. Moreover, numerous studies and reports that are using advanced data gathering and statistical techniques, will improve the required coefficients that are used in these models. Today, economic models are readily available that can estimate:

1. The economic impact of existing natural resources on surrounding property values;
2. The economic impact generated by visitors; and
3. The economic value individuals place on the importance of open space and recreational lands.

These models and the unique challenges that they each face and attempt to resolve are discussed in the section: **Yes, We Can Do That**.

The greater challenge is the development of a predictive tool that can provide quality estimates of the potential impacts of future RCIs. It is problematic that the parameters and estimates generated in models designed to generate economic impact estimates for existing investments can be effectively applied to proposed investments. The multitudes of challenges include:

1. Forecasting the amount of private activity that will be leveraged by the public or non-profit investment. A project that ties private investment to the development of natural assets will only expand its impact.
2. Accounting for the effectiveness of outreach/marketing programs associated with the investment.
3. Understanding the "competitive" or "agglomerative" environment of the investment. In other words, will the project compete directly with an existing investment and, thus, generate a small net gain to the region or will it "crowd in" more visitors and users into the region? Another roller coaster at an amusement park will add riders to the existing rides by generating more visitors.

These serious issues will be discussed in the third section of the report: **Forecasting Is Difficult, Especially if It Is the Future.**

Finally there is the issue of users' acceptance and commitment to the model. If the governmental unit or non-profit organization that is interesting in pursuing the recreational or conservational project, does not accept the model's methodology or findings, it simply will not be used. Each project is unique and is uniquely set in an environment that will have a significant influence on its usage and overall impact. Local knowledge is required to inform the model of these unique characteristics; however, there may be reluctance or simply the inability of existing users to provide this information into the model. One concern is that in doing so, the user may bias the results and negatively impact the integrity of the model. Second, local users may be frustrated if they perceive that the model is requiring as inputs the very things they wanted as outputs. For example, the economic impact of a proposed bicycle path is highly dependent upon what is at its endpoints and along its shoulders. A model cannot predict these potential developments—an ice cream stand for example—however, these very developments will highly influence the attractiveness and resulting impact of the investment. Instead, most models require the user to enter these private investments into the model to generate the full impact. In other words, the model requires the users to enter inputs that the users want to see as outcomes.

In addition, the approval, construction, and usage of the RCIs will depend upon the community's public outreach effort and leadership. Without leadership and a vision, the RCI will not happen. If the public is not made aware of the RCI, its economic impact will be marginal. These thorny issues are addressed in the section: **Catching up to Accelerating Expectations.**

The concluding section**, Perhaps a Bridge Too Far,** provides our recommendations on the feasibility and cost of developing a user-friendly model that can estimate the economic impact of recreational and conservation investments on the local and statewide level. It is feasible to construct a model that can estimate the economic impact and value of existing RCIs at the state and county levels. However, it is unlikely that a model can provide a reasonable forecast of the economic impact of proposed RCIs, on a sub-county level, without the availability of detailed local information (that may or may not exist). In addition, economic models are not suited to measure the social equity impacts of RCIs that are accessible to economically disadvantaged populations. In short, models are a poor substitute for quality economic feasibility reports that examine the local landscape, market, leadership, and proposed outreach strategy.

This report focuses on the short-term local economic impact of recreational and conservation activities. In doing so, it negates the valuation of ecosystem services. It is beyond the scope of this paper to measure the value of ecosystems. However, the importance of ecosystems cannot be undervalued. It is extremely important to maintain the physical, chemical, and biological processes that are required for ecosystems to be self-sustainable. Moreover, the maintenance of existing ecosystems is valuable not only to us but for our future generations and for the many species that they protect.

In assessing the value of ecosystems in Michigan there are several excellent databases and models.[1]

- In April 2014, the United States Geological Survey (USGS) published the 2011 National Land Cover Dataset. In the database the USGS breaks down land cover types into 16 types at a spatial resolution of 30 meters.

- The U.S. Forest Service has developed an air pollution removal model called iTree.

In many studies the value of preserving an ecosystem is measured in the resulting "products" that it can generate. For example, the protection of fisheries or game preserves is measured by their harvest productivity. The natural abilities of ecosystems to purify water are measured as a cost savings in the avoidance of carrying out other more capital-intensive purification operations.

Another factor in determining the benefits of preserving ecosystems is the potential level of interaction by the public. A protected wetland near an urban area is more valued than one located in a rural setting. However, many individuals care deeply about saving the penguins living in Antarctica even though few plan to have any interaction with them or their habitat. Similarly, the Brazilian rainforest is extremely important to us all but most will likely never visit it.

Often the value ecosystem management is to correct for market failures, which is again outside the focus of this paper. Market failure occurs when prices do not properly reflect either the total society cost of generating the good or service or does not properly reflect the social value of properly managing the ecosystem generation of services. For example, the cost of natural gas may not fully account for the future cost of induced hydraulic fracturing. The cost of gasoline at the pump does not cover the full social cost of the air pollution generated by our driving. Many ecosystem services also have the qualities of a "public good" in that my enjoyment does not limit your enjoyment. Although, congestion at high traffic areas can diminish the enjoyment of all involved, making these areas more of a quasi-public good.

Finally, the findings of this report are highlighted in a power point presentation that is attached in the Appendix.

YES, WE CAN DO THAT

There are well accepted methodologies that have been developed over the years to measure the economic impact of existing RCIs. These models can be classified as:

1. **Economic transaction models** that measure the economic impact of visitors' spending at existing locations. Expenditures are determined by the type of visitor: day visitors, campers, cottagers or motel/hotel stayers. These models can also measure the impact of conservation organizations, increased agriculture, and the

[1] I am indebted to Jessica Sargent of The Trust for Public Land for this information.

development of recreationally based industry such as kayaking services or ski resorts.

2. **Property impact models** that measure the impact of the recreation or conservation projects on the surrounding properties. These models are particularly helpful in estimating local tax revenues that are generated due to the investment.
3. **Economic value estimation models—**revealed preference and contingent valuation models—that estimate the value of the investment beyond the fee for admission. While these models are extremely valuable in estimating the level of support the investment has in the region or state, they are not without their critics.
4. **Benefit transfers and meta-analysis** which is the simple transference of data findings from past research to the current analysis.
5. **Damage cost avoidance or replacement cost models** that measure the impact of conservation activities by estimating the dollar value of the damage they prevent to real and personal property.
6. **Net factor income or derived value models** that measure the value of marketable products and services that are generated at least in part by conservation activities.

A word should be said about the difference between measuring the economic impact and the economic value of recreational and conservation investments. Economic impact models, transaction models, and property impact models measure the actual level of economic activity including the potential increase in property values generated by the RCI. These models are designed to answer the following questions:

1. What is the amount of economic activity—as measured by changes in employment, personal income, sales and/or the region's gross region product—that are generated by the presence of the recreational or conservation investment?

2. What is the percentage of the local area's economy—including its tax revenue—that is dependent upon the recreational and/or conservational investment?

In contrast, economic value estimation models are designed to measure the value that individuals put on the availability of the recreational or conservational investment. The economic value that persons place on recreational and conservation investments is always greater than its economic impact.

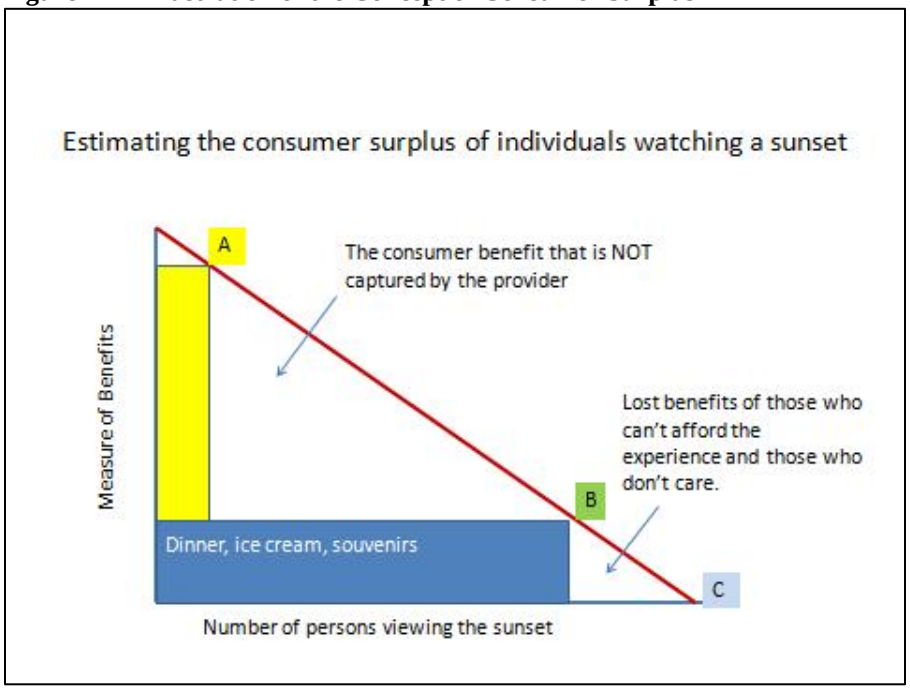
For example, living in Kalamazoo I highly value the opportunity drive over to Lake Michigan to watch the sunset. If asked to put a dollar amount on this experience, I could guess $150, especially if it is the first time in summer after a cold winter. I would likely value my tenth trip in August much less. Alternatively, an economic analyst could estimate my revealed value of the experience through my expenditures and by approximating the value of my time. Continuing with my example, if I traveled 100 miles round trip (at $0.50/mile) and spent three hours (leisure time is often valued as a percentage of my hourly wage), the analyst could estimate that my actions suggest that the sunset experience is worth $110 to me.

Either way, the ***economic impact*** of my trip could be zero or even negative if I did not buy anything, increased traffic congestion at the lake, and crowded-out visitors who would have bought something.

For local businesses and governments, clearly economic impact is more important than economic value; however, for state and county government, a measure of economic value is important in decision making.

Economists often use the concept of consumer surplus to measure economic value. In Figure 1, imagine that all sunset watchers are arranged in order from those that value the sunset the most to those that simply do not care. For the first group, denoted as A, the yellow box represents the value that they give to the sunset experience above what they pay for. For individual B, there is no consumer surplus, what he/she pays in expenditures is what the experience is worth. For individual C, the sunset has no value whatsoever. Clearly, preserving the ability for the general public to watch the sunset over Lake Michigan is worth much more that the expenditures that occur. If we depended only on economic impact models that estimated business transaction and increases in property value, we would certainly underestimate the importance of the state's natural resources to the general public.

Figure 1 An Illustration of the Concept of Consumer Surplus



Economic Transaction Models

Input-output models are the work horses of most economic transaction models. In short, they generate economic multipliers that can be used to estimate the indirect and induce impact of a new activity in a region. For example, say a bus full of visitors touring the Upper Peninsula stop in Houghton for the night: their direct impact is on the lodging establishment and eateries where they dine. The indirect impact of their visit is felt by the food wholesalers to the restaurants, the

laundry service of the lodging establishment. The induced impact occurs as the hotel and restaurants spend their earnings in the community. Regional input-output models are designed especially to capture these indirect and induced impacts.

Nearly all of these models are based on national inter-industry transaction data which are regionalized by the local area's mix of industries. Serious methodological concerns have been raised regarding the construction of these models; however, numerous papers have shown that they generate, on average, reasonable local multipliers. These models can be constructed on the county level; however, the multipliers that they generate are often used to measure the impact of activities on the sub-county area.

In the above example, an employment multiplier of 1.5 means that for every direct job created by the tourists in Houghton at their lodging facility or restaurant, another 0.5 indirect or induced jobs are also created for a total employment impact of 1.5.

Unfortunately, multipliers are often inflated. There are many reasons for this, including the assumption of input-output models that all establishments are working at full capability, which means that any new sale will force the establishment to expand. A second problem is that input-output models assume a horizontal labor supply curve—employers can hire as many workers as they want at the market wage. This is often not the case in the peak summer season.

In my opinion, a multiplier of more than two for most activities on the county level should be questioned. Second, the multiplier impact only exists if the money spent in the area is "new." A resident shopping at a local grocery store does not generate a multiplier impact. A new lodging facility, if it takes all of its business from an existing lodging facility, does not generate a multiplier impact. If a recreational or natural conservation effort competes directly with an existing activity in the region, strong "displacement" impacts can occur as individuals stop visiting the older activity to enjoy the newer one, and the multiplier effect will be small. At the same time, the new activity could "crowd in" many more visitors into the region than each of the activities can do on their own, because there is now more to do. Without further information, input-out models will ignore displacement effects and underestimate potential "crowd in" agglomerative effects.

Again, many papers have been written on the misuse of input-output models; nevertheless, they are well accepted and if used carefully can serve as a firm foundation of the construction of a recreational conservation model.

Input-output models can also estimate the impact of the construction phase of the conservation or recreation project (see Table 1). These impacts can be substantial for larger projects but, of course, they are short term. In addition, these models have and can be used to measure the economic impact of conservation organizations.

Table 1 Summary of Input-Output Models

Uses	Strengths	Weaknesses
Captures indirect and induced impacts of changes in economic activity	Can be constructed on the county level	The generated multipliers can be incorrectly used
Applications include 1. Measuring the impact of construction projects 2. Measuring the impact of the operation of a conservation organization that receives outside money 3. Impact of tourist/visitor expenditures including indirect and induced effects	Well researched and methodology is well understood Relatively inexpensive	Assumes that all existing facilities are at full capacity and that there is no shortage of workers regardless of the season A host of other technical problems that trouble economists but can be safely ignored

The major problem with input-output models for our purposes is that they cannot tell you how many visitors will come to any recreational or conservation area. They can only estimate the impact of any given number of visitors. Equally important, the models must be "told" what type of visitors. Each type of visitor, as shown in Table 2 below, has its own impact.

Table 2 Expected Economic Impact by Type of Visitor

Type of Visitor	Economic Impact
Residents	Zero
Visiting friends and family	Very low
Day Travelers	Low
Campers	Low
Cabins	Moderate
Hotel/motel stayers	High

This problem is typically addressed by surveying visitors. Federal and state park authorities have conducted numerous surveys of visitors that probe about their expenditures which are associated with their visit. Some of these surveys are designed to determine if the visitor was attracted to the park from an existing park, or was visiting the park as a package visit which included other visitor attractions in the region as well.

One of the major survey challenges is to measure the impact of secondary visitors, business travelers, or multiple-site visitors. For example, how do you measure the expenditure impact of a person who is visiting family or friends and on a side trip visits the recreational or conservation site? What about a person on a business trip who spends some "down time between meetings" at the park. For these individuals, visiting the recreational or conservation site was not the original purpose of the trip and, therefore, all of their related expenditures cannot be properly attributed to it. The question is what portion, if any, can be attributed? Most studies deal with this issue by putting small weights on these expenditures compared to destination visitors. However, there is not a set rule in determining these weights.

For conservation sites, several studies have measured the economic value on the resulting activity on the site. For example, if acres are put under farmland conservation agreements then the value of the crops grown on the land is attributed to the agreement. This is problematic in that it assumes that the land would not be used for any other activity without the agreement.

Crops would not be grown nor would the site be developed. For sites where erosion or other environmental problems would have to be resolved for the land to be used for any purpose, this approach is sound. However, for any situations where there are other, perhaps competing uses, the economic impact model should measure the difference between existing use allowed by the conservation activity and its second best alternative.

It is important to note that these surveys do not necessarily address the "value" that the person puts on the park, just their expenditures. Surveys that probe the "worth" of the recreational activity are discussed in the following section.

Moreover, due to the high number of good surveys that have been conducted throughout the state as well as nationwide, it is very reasonable to expect that a model can be constructed based upon existing surveys.[2] Of course, when this is possible it can generate considerable cost savings. This is the concept behind Benefits Transfer Models which apply the estimated findings of previous studies to the measurement of the impact of a new RCI. Benefits Transfer Models and their more sophisticated cousin, meta-analysis models are discussed below.

Property Impact Models

Another set of models that have been well develop are hedonic housing price models that can measure the impact on housing prices and the resulting tax revenue that are generated by nearby RCIs (Table 3). These models are constructed using local real estate data which may be available at the county assessor's office. These models estimate the impact of RCIs on the property value of neighboring houses by controlling for the unique characteristics of the house, and thereby isolating the impact on the house value of its proximity to the RCI. Controlling for the characteristics of the house is extremely important in these studies because while the conservation activity may trigger the construction of a large expensive home nearby, its impact is limited to the extra value of the house that the conservation activity generates. It is the difference in price between this house and an identical house built five miles away that can be contributed to the RCI.

These models typically find that the impact on property values falls quickly with distance. Again, these models control for the individual characteristics of the houses so that they can separate the impact of the recreational or conservation investment from the quality of the house itself.

These models definitely should be a component of a comprehensive model in that they can generate reasonable estimates of the impact of RCIs on local property tax revenues. In fact, they are highly complementary to input-output models that measure economic transitions but provide little information on the project's impact on property values.

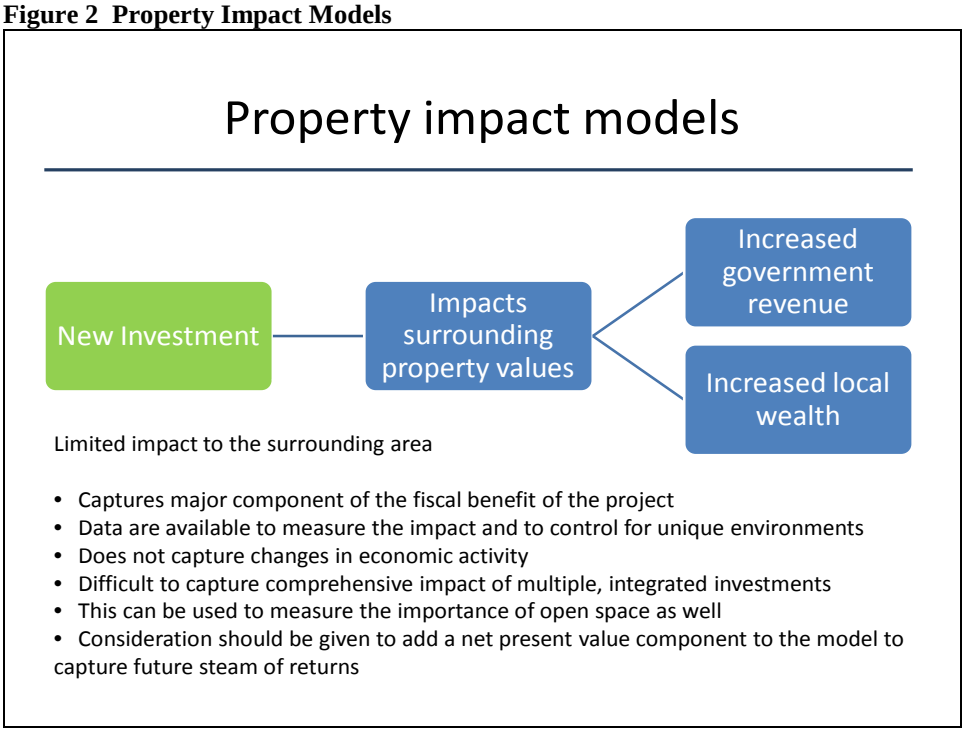
[2] There are several existing business transaction models already in use. The Money General Model developed by Daniel Stynes and associates at MSU, which is being updated, has been used in many studies http://35.8.125.11/mgm2_new/MGM2web.htm. A second model is the Ontario's *Tourism* Regional *Economic* Impact *Model* (TREIM) which is also on line http://www.mtc.gov.on.ca/en/research/treim/treim.shtml. There are several more; some are available to the public but others are proprietary.

Table 3 Property Valuation Models

Strengths	Weaknesses
• Captures land value impact of changes in public infrastructure • Provides a means to estimate the impact on property tax revenues for local governments • Possible to generate a distance parameter based on previous studies	• Can be very data intensive as you must control for house characteristics • Is limited to only the surrounding property, and impact does not capture economic transaction impact

In general, research suggests that the type of RCI impacts neighboring parcels differently. Passive well-maintained parks generate the greatest property value impacts. However, properties adjacent to congested parks that offer well-attended concerts, family events, or camping may have a negative impact. How the park is maintained is also an issue.

Figure 2 Property Impact Models



In summary, the coupling of an existing input-output model with survey-based estimates of the number and type of visitors along with a property valuation model is not only feasible but advisable.

Economic Value Estimation Models

The previous models have the "easy" task of measuring the economic impact of existing RCIs. A more difficult question is estimating what recreational and conservation investments are "worth" to users and non-users. As in the Lake Michigan sunset scenario, a person can truly value an activity and not spend a dime. Speaking for myself, I value the return of wolves in the Upper Peninsula (UP), as well as preserving the historical mining legacy of the Keweenaw County, but I will likely never see either. The issue of measuring the value of recreational and conservation

investments also has a social equity concern as well. Should some investments be more valued because they are in easier reach to economically disadvantaged populations? Should parks closer to Detroit be more valued than in the UP or west Michigan because they are accessible to populations with few alternatives?

There are two general approaches to measure economic value: revealed preference models and contingent valuation models. One way to think about these two approaches is that the former is useful in estimating the value of existing amenities that are used, while the latter is useful to estimate the value of activity that could be available.

Revealed Preference Model

The revealed preference model that is most commonly used is the travel-cost methodology introduced below (Table 4). Summing up an individual's travel cost, including a valuation of the time involved, provides a good approximation of his/her willingness to pay for the activity. Of course, it does not capture the number of persons, especially low-income individuals who also value the recreational area but do not have the means to travel.

Unfortunately, many travel-cost models are single-site models that overestimate the economic value of a new RCI because they do not take into account the resulting changes among "rival" areas that can serve as close substitutes (a problem that is more fully discussed below). Finally, surveys have to be conducted before and after a change in investment to measure its impact. Given the unknown nature of information flows, it is also unclear how long the travel adjustment process is for people to respond to a change in an investment. Finally, as mentioned above, travel-cost methods cannot measure non-use values. If state residents value the existence of park land in the UP, but if they never travel there, this method will underestimate the value of this park land.

Table 4 Travel-Cost Method

Strengths	Weaknesses
• Provides a measure of the willingness to pay • Numerous studies have been done making it likely that the findings could be transferred in cases where there are few competing RCIs.	• Single-site models cannot take into account possible changes in close substitutes. • When there are close substitutes, more detailed surveys must be conducted, and the ability to transfer the findings from these studies to another are questionable. • Cannot measure nonuse value

Contingent Valuation

In the contingent valuation (CV) approach, individuals are asked to make hypothetical choices and through their answers, they theoretically reveal their willingness to pay for the possible RCI (Table 5). CV is the only means to estimate nonuse value of recreational or conservation projects.

CV methodology is under constant attack. Care must be given to the wording of the questions used in CV surveys because it can bias the results. Researchers have consistently found that questions that ask about the "willingness to pay for an outcome" yield different results than

questions that ask about the "willingness to accept an outcome," even though they should generate the same answer. For example, when asked, how much are you willing to pay to keep a park beach clean?, the monetary amount is likely to be less than the amount offered in answering the question, "How much would you be willing to pay to accept having a dirty beach at the same park." However, logically the answer should be the similar.

In addition, it has been shown that when a project is broken down into components—three separate beach cleanup activities for example—individuals will value the components more than the sum of the activity.

Indeed, some researchers claim that the pitfalls of the CV approach are so great that it should be eliminated as a research tool. Some researchers claim that contingent valuation consistently overstates the person's true valuation of a service or activity and that

> ". . . respondents to contingent valuation surveys are often not responding out of stable or well-defined preferences, but are essentially inventing their answers on the fly, in a way which makes the resulting data useless for serious analysis."[3]

Still, actual behaviors of persons inadequately express the importance of environment conservation. A person may care deeply about conserving the natural habitat for future generations; however, his/her everyday actions will not necessarily reflect these views in light of everyday demands. Therefore, CV remains the only method available to estimate nonuse value no matter how flawed it may be.

Table 5 Contingent Valuation

Strengths	Weaknesses
• Only means to estimate the value of resources that are not directly used.	• Consistently overstates preferences • Willingness-to-pay questions yield different responses than willingness-to-accept—while they should be the same • CV rarely passes the summation test when the valuation of individual projects are compared to the valuation of the entire list of projects

Benefit Transfers and Meta-Analysis

Benefit transfers is simply using or "transferring" the findings of a previous study to another study that shares commonalities (Table 6). For example, it is reasonable to assume that the level of expenditures per visitor at a bird sanctuary in Indiana is similar to those at a bird sanctuary in Michigan. The key is to find previous studies that used a sound methodology to estimate the impact of similar activities that are currently being studied. When successful, this approach can generate reasonable benefit estimates at a significant cost savings.

[3] Hausman, Jerry. 2012. "Contingent Valuation: From Dubious to Hopeless." *Journal of Economic Perspectives* 26(4): 43–56.

Meta-analysis is a similar approach; however, it uses a statistical technique—a meta function—to estimate the economic values drawn from a set of similar studies. The results of the previous studies are combined commonly using an inverse variance weighing scheme. Moreover, meta-analysis can estimate coefficients for common independent variables used in the previous reports that can be applied to the current application. If available, the use of a meta function can yield better results than benefit transfer since it is drawing information from many previous studies rather than just one site-specific study.

Table 6 Benefit Transfers and Meta-Analysis

Strengths	Weaknesses
Inexpensive–avoids cost of conducting original survey	Previous studies may not capture the uniqueness of the current RCIs
If the studies relate to similar RCI, the findings are likely to be very reasonable	The quality of the estimates is limited to the quality of the previous studies
Meta analysis provides estimate based on many separate studies and weights them, usually, by the statistical accuracy of the findings and can generate coefficient estimates of independent variables that can be used in making the current estimates	

Damage Cost Avoidance or Replacement Cost Models

A commonly used model to estimate the impact of conservation activities is the damage cost or replacement cost model. The general approach that these models take is fairly straightforward; they estimate the cost that is avoided because of the conservation activity; however, they require extensive project-specific data. In other words, it would be very difficult to construct a general impact model that would be flexible enough to include a component that would estimate damage cost avoidance of potential conservation projects.

The first step in constructing one of these models is an analysis of the environmental prevention service that the conservation activity provides such as flood control, erosion protection, or water purification. The second step is to estimate the potential damage that could result if the conservation activity was not completed. Often this is measured as the replacement value of the potentially damaged asset such as structures or farmland. In the case of water purification, it would be the added cost to the communities downstream to clean their water. The evaluation is somewhat tricky; however, because the probability of the negative event, such as a flood, must be estimated and, second, the lifetime of the project must be determined.

The major drawback to these approaches is that cost avoidance is not the sole benefit of most conservation projects. The preservation of the natural surrounding is not measured as a benefit, only the service that it provides.

Net Factor Income or Derived-Value Models

This model is useful when a conservation activity helps generate a marketable good or service. Examples include situations where the activity preserves a fishery, game preserve, or a water supply. In these cases, the minimum benefit of the conservation activity is the value of the projects or services that it generates; the value of the fish caught or the cost-saving in water

purification. Again, it would be extremely difficult for a standard model to generate the value of these benefits without a great deal of local information which may not be available.

FORECASTING IS DIFFICULT, ESPECIALLY IF IT IS THE FUTURE

Methodologies are available to measure both the economic impact and value of existing recreational and conservation investments. And, due to the number of excellent impact studies that are available, it is feasible to construct a model based on existing data—a benefit transfer approach—to construct this model without conducting expensive surveys.

Unfortunately, this only partially completes the task at hand. The more difficult question is whether a model can be built that can estimate the economic impact and value of proposed or future project investments. What is the potential economic impact of a new state/county park, improving an existing park, or expanding a wilderness area for hunting, restoring a fishery, or constructing a new bike path?

It is unlikely that data gathered at known recreational areas can be used to estimate the impact of new investments. The first major challenge is to properly adjust for available substitutes. If the new RCI is located in an area where similar activities are available, then the RCI will have significant local economic impact but a modest regional impact. Individuals will switch to the improved site at the expense of the existing site, increasing the number of business transactions at the new RCI. On the other hand, if the RCI improvement is at an existing site that is unique and does not have close substitutes, then the RCI may have a modest impact. Individuals would visit the site with or without the improvement.

For example, an RCI improvement on Mackinac Island may not result in much of a change in economic activity as the island is already at near capacity and has few competitors. However, an RCI at a county park or along a fishery may have substantial local impact at the expense of neighboring facilities.

On the other hand, just like adding a new roller coaster at an amusement park, it is possible that an RCI can have a positive regional impact if it pulls new visitors into the region because the RCI is complementary to the other activities available in the area.

As mentioned above, many travel-cost models are based on a single site. Surveys at the site would be conducted asking visitors how far they traveled. This approach is clearly inadequate when substitutes are available. There are numerous studies that are based on multiple-site analysis that attempt to estimate the impact of changes in the quality of close substitutes. Most studies are typically based on a random utility model (RUM) that attempts, through a more detailed survey, to tease out the probability of a person selecting one site from a list of similar offerings. These surveys can include questions such as, “If this site was not available where would you go?” and “When was the last time you visited those alternative sites?”

While these studies are available and growing in number, it is becoming increasingly questionable if the benefit transfer approach or a meta-analysis is still plausible to insert their

findings into a general model. The unique situations of the study areas for these analyses may make it difficult to transfer the findings to Michigan's recreational areas.

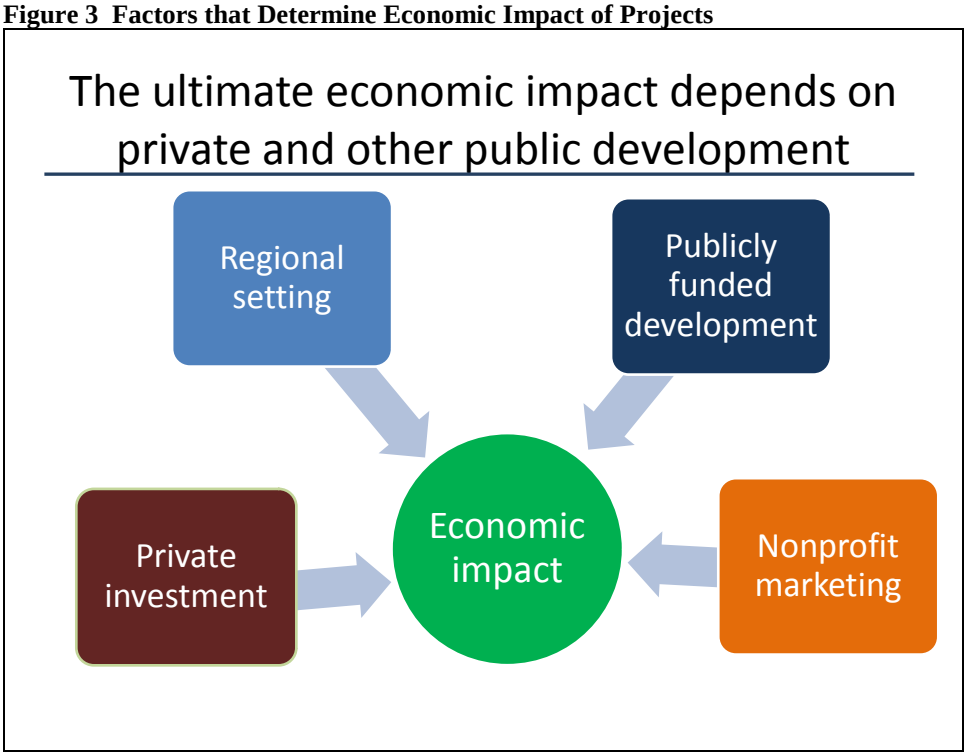
Below is the list of potential factors that increase the difficulty in properly estimating the economic impact of the new RCI (Table 7). The unique setting of the RCI is of utmost importance.

Table 7 List of Challenges that Must Be Addressed in Estimating the Economic Impact of New RCIs

Setting: Unique or competing with similar sites	Improvement of unique sites will draw fewer additional visitors—it already had few rivals. Improvement on competing sites will draw individuals from other sites.
Setting: Displace or crowd-in	Improvements on competing sites will displace individuals from neighboring sites; complementary sites will drawn more visitors in the region.
Combination of public and private investment	If the RCI triggers private investment in lodging, restaurant, and complementary activities the draw and impact will be greater.
Outreach and organization of events	

In summary, the uniqueness of new RCIs makes it difficult to transfer known benefits from existing RCIs that have similar characteristics because the likelihood of identifying a solid match become less likely. As highlighted in Figure 3 below, the economic impact of a potential project depends on the level of private investment that is "triggered" by the publicly funded activity. Will an ice cream store or other complementary investment be made because of the publicly funded recreational activity? The regional setting is equally important: will the activity attract more visitors into the region or "steal" users from existing activities. Finally, how will the activities be marketed and will these marketing efforts be effective? Clearly, the only solution to this problem is gathering more local data, and that brings us to the final challenge: meeting the expectations of the end user.

Figure 3 Factors that Determine Economic Impact of Projects



CATCHING UP TO ACCELERATING EXPECTATIONS

A lot of resources have been wasted building models that are not used. The primary problems are that the model:

1) Does not meet the needs of users;
2) Requires information that the user does not know or is unwilling to collect;
3) Is not trusted by the users.

Models constructed on the county level have stronger data foundations than models that are intended to be used on the township or city level. In fact, recent and ongoing budget cuts at the federal and state level are negatively impacting the quality of county-level data. Still, many users seek a model that can estimate the potential impact of a RCI on sub-county area.

In rural areas, it may be simply impossible to construct a model that will generate reasonable results, because of the lack of data, if it is not supplemented by additional local information. Moreover, the required local data may not be readily available or require guesstimates that local officials and stakeholders are unwilling or unable to make. In fact, for the model to work properly, it may require the users to enter the very data that they expect the model to generate.

For example, suppose a community is considering the construction of a new bicycle path that runs along an inland lake and connects to an existing path that continues to Lake Michigan. Its decision makers want an economic model or an economic study to be prepared to generate the likely economic impact of this proposed investment. The following table compares the steps a

researcher would likely take to prepare such an economic impact analysis and what an existing model could do (Table 8).

Table 8 Comparison between the Usage of an Existing Model and an Economic Impact Study

Economic Model	Economic Study	Differences
The economic impact of the construction phase of the bike path could be easily generated.	The study would use a multiplier from previous studies regarding the construction of a bicycle path.	Very similar
Could generate an estimate of usage based on population levels in the region and data from similar paths. The user would have to enter any private investment that would be triggered by the development.	The study would also estimate the future usage of the path by examining the region's population and data from similar paths. However, the study would also compile data on existing paths in the region and determine if the new path is a substitute or a complement to these paths. The study would also estimate the potential of private investment to occur due to the bike path. This will depend on its unique setting and the availability of buildable sites and estimates of demand. The study would also evaluate the effectiveness of any outreach effort the community could do to promote the path.	The baseline number of path users could be similar; however, the study would be better able to adjust this baseline to the unique environment. The user of the model would be required to guesstimate the private investment that would be triggered due to the path. The study would do this for the user. The study would more likely uncover important characteristics of the region and the path. Perceived safety could be an issue as well as scenery and mosquitoes.
The model would be able to generate the economic multiplier impact of the path based on its usage.	The study would use a similar multiplier.	The multipliers used would likely be very similar.
The model would be able to generate an estimate of the economic impact on property values.	So would the report	Estimates would be likely similar.
The model could not address social equity issues.	The consultant could address these issues.	

The success of local RCIs is likely dependent upon leadership and outreach. Most RCIs require public and private partnerships and a spokesperson who can clearly make the case for the project to economic stakeholders and residents. In addition, the usage of the RCIs will also depend upon the outreach or marketing effort that is pursued. None of these key elements can be put into an economic model, but they can be evaluated in a good economic impact study.

Finally, the model would not address the social equity impacts of the RCI, which could be identified in a good cost-benefit study. The model would not be able to identify the accessibility or attractiveness of the RCI to economically disadvantaged populations, nor could it put a "value" on the importance of the RCIs to meet the environmental and recreational needs of target populations who have limited access to such opportunities.

PERHAPS A BRIDGE TOO FAR

In conclusion, I believe it is feasible to build an economic impact model that could estimate the overall impact on the state and county level of most existing RCIs for approximately $170,000. The construction of this model would require the following:

1. The purchase of county-level input-output models for each of the state's 83 counties, such as IMPLAN (approximate cost: $32,000);
2. Extensive research to derive benefit transfer/meta-analysis coefficients and parameters ($50,000); and
3. Development of a property parcel database for the state ($85,000).

The addition of a cost avoidance component and a net factor income model for estimating the impact of conservation projects would likely add another $60,000 each.

However, there could be a serious gap between what this model can be reasonably expected to provide and the needs of the end user on the local level. In particular, the unique nature of individual RCIs and the wish to measure the potential economic impact of these RCIs on sub-county areas sharply increase the modeling problems and, at the same time, are likely to lower the confidence of potential users who will use the model. It is very likely that the user would be required to supply unique information into the model for it to capture the unique situation of the RCI. Key questions such as:

1. What private investments will likely be triggered by the RCI including retail, food services, and lodging?
2. Would the RCI likely pull visitors away from neighboring activities or pull visitors into the region due to an increase in activity?

In addition, the confidence or trust in the model's results will diminish the more that users are required to add data and, more importantly, feel that the project is unique.

The model that could be constructed would be more advanced and better than anything that is currently available; however, it would fall short of the expectations of the local user. In short, on the local level, an economic model cannot answer the questions that a solid economic impact study can address.

Scoping the Feasibility of Constructing an Economic Impact Model for Recreational and Conservation Projects in the State of Michigan

Final Presentation

George A. Erickcek
W.E. Upjohn Institute for Employment Research
June 17, 2014

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Purpose

To determine the feasibility and cost of developing a user-friendly model that can estimate the economic impact of recreational and conservational investments on the local and statewide level

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I will offer my answers to the following questions

- Can a tool/model actually be built?
  - *The follow-up question is: If it is built would it be used?*
- Why or why not? *On both counts*
- If it can be built:
  - *What would it cost?*
  - *What would it involve?*
  - *And, how long would it take?*
- If it can't be built what is or could be possible?

However, after thinking about this issue for a long time, I think that the real question is:

- Can a tool/model actually be built that would replace the need for individual research studies?

Not completely, because each situation is unique or perceived as such and will require customized data collection and analysis.

Structure of my presentation

- Can a tool/model actually be built?
  - *What I am "sure" a model would be able to do*
  - *What I am "not so sure" it could do*
- If it is built, would it be used?
  - *The model would require local inputs that may be difficult to estimate*
  - *The greater the demand on the user, the less it will be used*
  - *No model is without its critics*

Structure of my presentation

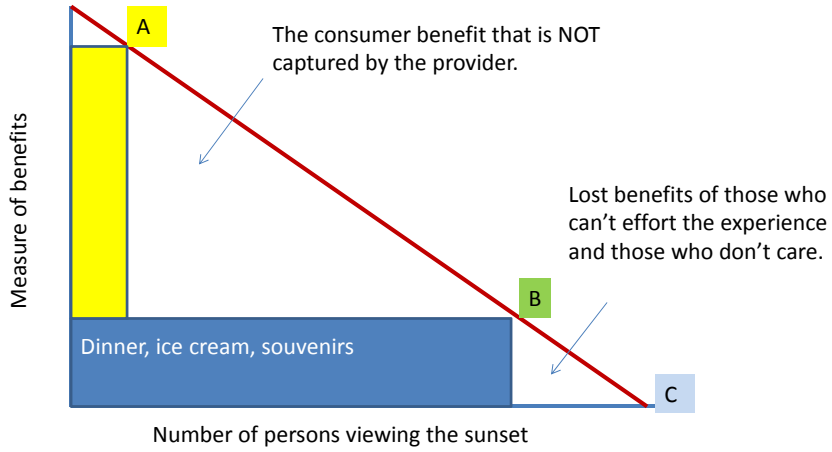
- What can be built may be insufficient as a stand alone
  - *It is possible that the model could be a component, perhaps a required component, of more complete project evaluations*
  - *An evaluation/impact guide would be useful*
- Costs – of course it depends on what the model is asked to do

Identifying expected outputs of the model

- The model's expected outcome measures would be:
  - *Change in employment*
  - *Fiscal impact of the involved government units*
  - *Personal income*
  - *Tourist spending*

Be aware that economic benefit to the individual or community is NOT the same as economic impact

State government should be interested in consumer benefits of its residents; local governments may be more focused on estimating realized gains



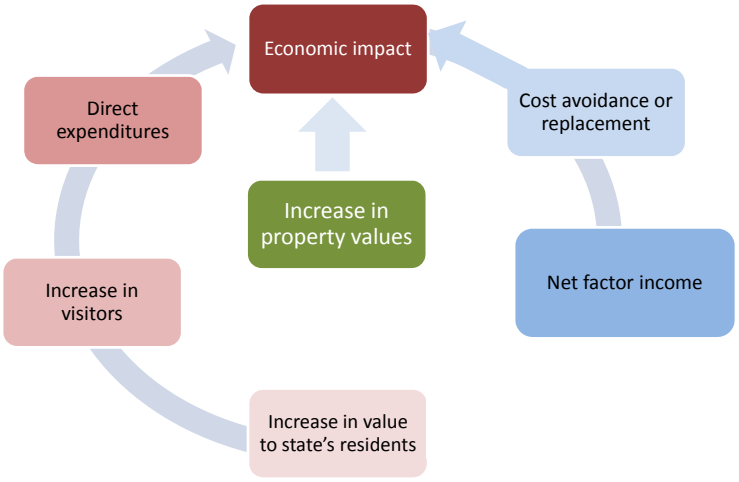
Again, economic benefit to the individual is NOT the same as economic impact

- I get an economic benefit from knowing that Isle Royale exists and is maintained as a wilderness area; however, it is very likely I will never visit it
- For statewide environmental decision making, the sentiments of residents matter; however, they are not directly translatable to determining economic impact

In considering the model, the following broad approaches should be integrated

- Economic transaction modeling
- Property impact modeling
- Benefit transfer
- Damage cost avoided or replacement cost
- Contingent valuation and revealed preference models
- Net factor income or derived value method
- Social equity modeling

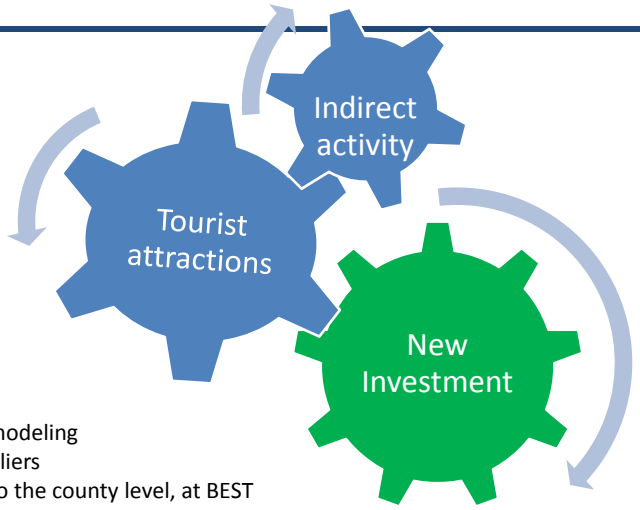
Necessary components of a conservation/recreational model



What can be readily built into the model?

- Recreational economic impact model for existing projects
- Property impact models

Transaction model for recreation



Input-output modeling
- Use of multipliers
- Data limited to the county level, at BEST
- Magnitude of initial impact is unknown and identifying linkages is difficult

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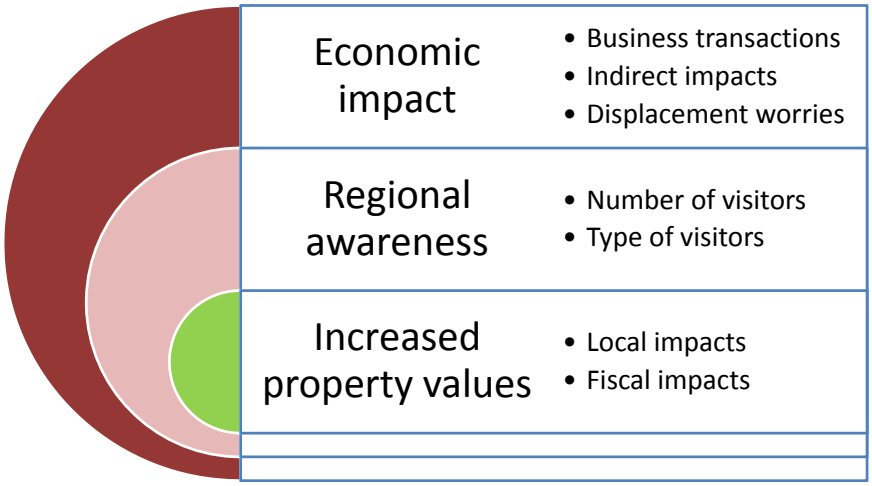
Key components



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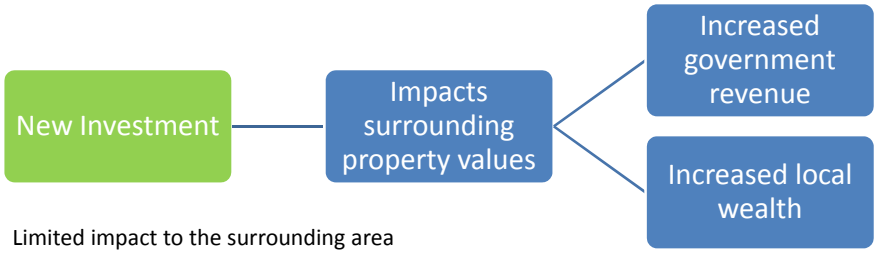
Pretty easy stuff

- Measuring the economic of investment spending on recreational and conservational projects
- Measuring the impact of expanding existing recreational investment
- Measuring the impact of existing tourist dollars

Measuring economic value using non-market valuation techniques

- Travel cost measure (TCM)
  - *Revealed preference: travel time and cost*
  - *Can parameters be constructed using existing studies? Questionable*
- Contingent valuation method (CVM)
  - *Stated preference through surveys*
  - *Studies show that survey responses have an upward bias, in general*
- Benefit transfer approach is feasible and a cost saver

Property impact model



Limited impact to the surrounding area

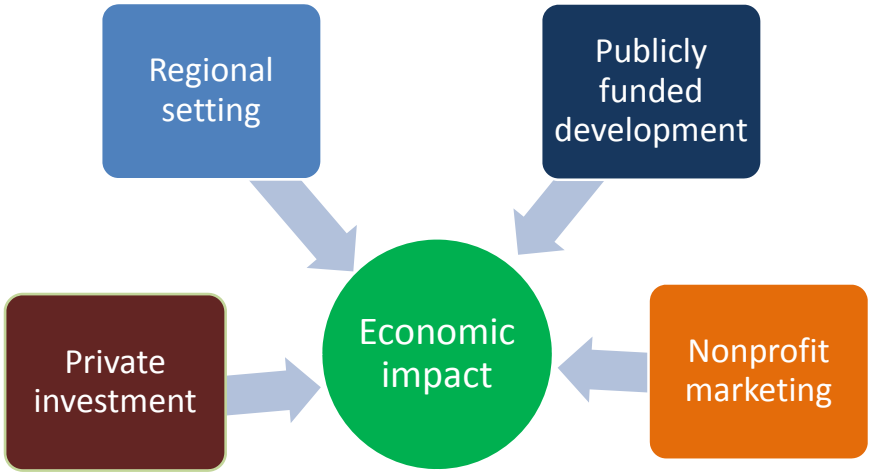
- Captures major component of the fiscal benefit of the project
- Data are available to measure the impact and to control for unique environments
- Does not capture changes in economic activity
- Difficult to capture comprehensive impact of multiple, integrated investments
- This can be used to measure the importance of open space as well
- Consideration should be given to add a net present value component to the model to capture future steam of returns

Not so easy for one model to handle

- Measuring the impact of new recreational and conservation projects
- Damage cost avoided or replacement cost models
- Net factor income or derived value method

Each requires unique information regarding the project and its surroundings that cannot be easily "stored" in the model

The ultimate economic impact depends on private and other public development



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Case study

- Public investment – *A new bicycle path*
- Private investment
  - *New: ice cream shops or eateries at the end points or along the path of the trail*
  - *Existing: available lodging*
- Non-profit marketing – *chambers of commerce brochures*
- Regional setting – *is the region known for bike trails and other complementary activities?*

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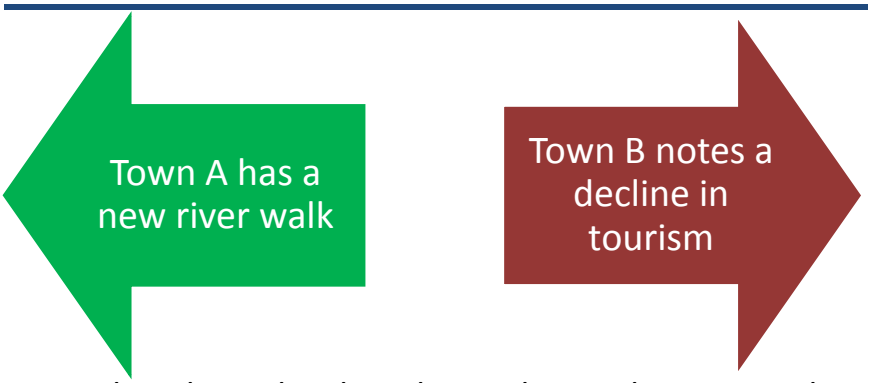
It is possible that activities and projects can work against each other creating a zero-sum gain



Researchers have developed a random-utility approach that addresses this issue; however, it would difficult to include in a model.

Additional modeling problems

- Social equity issues will be difficult to address
  - *Parks and activities that are accessible to economically disadvantaged populations may be more valued than other locations*
  - *I have not found a methodology that adequately addresses how this benefit can be measured economically*

Damage cost avoided or replacement cost models

- Estimate the value in conservation projects of abating current and future environmental damages and/or estimates the cost of repairing the environment
- These models are very straight forward but again would required the user to enter the necessary data

Net factor income or derived-value method for conservation projects

- Estimates can and have been made on the value of the protection of fisheries, hunting areas, water resources, erosion protection, and endangered habitat
- However, the best are in depth data-intensive studies
- Pushing the limits of a benefit transfer approach

Finally, the data requirements will be large and require updates

- The many various projects that the model is expected to be able to evaluate will require significant data entry and flexibility
- Data constraints may be large and updating will be challenging

The uniqueness of each project will require users to provide data into the model

- Some users would question if by supplying the data it will bias the results
- They may not know the information *"The model is asking for the information that I expected it to generate!"*
- The requirement of local data will negatively impact the usage of the model

Additional modeling problems

- Multiple destination trips are difficult to measure: *What can we show our family and friends now that they are here?*
- Each project could be so unique that local data must be entered into the model
  - *How do you enter the impact of an effective outreach effort?*
  - *Will the new activity generate a negative displacement effort or crowd more tourism in?*

If it can be built: What would it cost?

Business transaction model

Input-output model development with user-friendly interface and extensive research to derive benefit transfer impacts: $75,000 to $100,000

Would require the user to supply data on

Type of conservation/recreation project

Induced private investment

Number and type of visitors

Complementary or substitution impact

If it can be built: What would it cost?

Property impact model

Data collection on parcel characteristics for each county and development of the regression model: $75,000 to $100,000

Would require the user to supply data on

Type of conservation/recreation project

If it can be built: What would it cost?

- Damage cost avoided or replacement cost model for conservation projects with benefit estimates from other studies:
  - $50,000 to $70,000
- Net factor income or derived value method for conservation projects–again with benefit estimates from other studies
  - $50,000 to $70,000

If it can't be built what is or could be possible?

- The development of statewide standards to be used in estimating the impact of recreation and conservation projects
- A business transaction model for each county in the state with a manual describing the inputs required

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