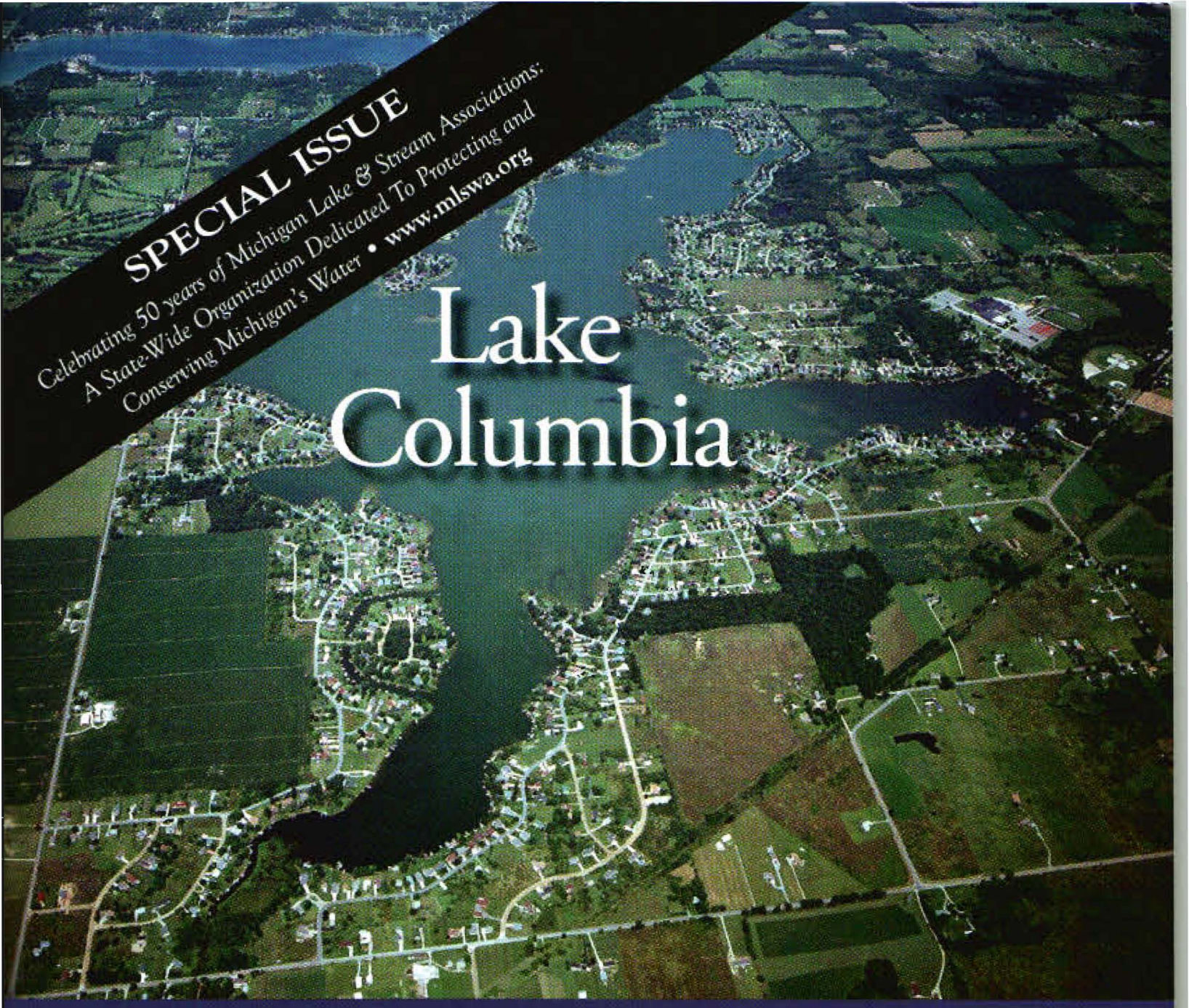

Lake Columbia in Jackson County is an 840-acre man-made lake with more than 12 miles of shoreline. The water source of Lake Columbia is Goose Creek, which is part of the Raisin River. There are more than 1,300 homes in the Lake Columbia Property Owners' Association. Most residents live on the lake year-round.

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THE MICHIGAN RIPARIAN

RIPARIAN (r-'per-EE-n) adj. Relating to or living or located on the bank of a natural watercourse, such as a river, or of a lake or a tidewater.

FEATURE A Look at the Values of A Lake

Everything From Tourism to Natural Resources

By Joseph M. Turner
CEO, Michigan Property Consultants

PART 1: INTRODUCTION

Did you ever wonder what the total value of your favorite lake is? If so, you've got company. The list of persons needing to determine at least one of the many values associated with lakes is long. It includes:

- those determining the value of natural resources for parks or environmental protection
- economists and tourism experts calculating the value a lake adds to a local economy
- government decision makers comparing losses associated with proposed changes to an ecosystem with benefits to be gained
- those deciding if financial resources required to remove dams or in the reverse, to create or retain impoundments, are justified
- special assessment administrators determining special assessment district boundaries and tax burdens for a special assessment levy

So, there are times when studying the value of a lake is not merely idle curiosity but a requirement. After all, water features generate big bucks. Many lakes are economic development engines, fostering agriculture, power generation, recreation and tourism, higher tax revenues and sustaining and creating jobs. An international study of dammed river systems (2005) found that catchments (impounded areas) have "about 25 times more economic activity per unit of water than do unaffected catchments."

In the June 1997 issue of *Watershed Protection Techniques*, Tom Schueler wrote an appropriate summary for considering the value of a water resource. He said, "... society measures the value it places on these resources every day, in terms of property values, real estate premiums, lease-up rates, storm water utility fees, construction costs and volunteer hours donated. While we may never know the true value of a stream, the research reviewed in this article clearly suggests that society does not value them lightly."

The purpose of this article is to provide a general review of the main forms of value that might be associated with a natural feature, a lake. The focus is on values commonly discernible by real estate appraisers, financial experts and experts in public trusts and governance. The values generated are expressed as cash equivalent "present values." Almost everyone understands the idea of the "present market value" of real estate. However, since investors often pay cash to receive a stream of money over a time period (e.g. the sale of active mortgages) and lakes routinely generate certain cash flows; the income streams used herein are converted to their cash equivalent present values.

VALUES ASSOCIATED WITH A LAKE

Lakes create value in affected properties and lakes have value themselves. Of the two types, some values (real estate affected by a lake) are well known and easily understandable. Others are identifiable (ecosystem values) but very difficult to measure. Economists, Michigan's courts of law and valuation experts may employ differing definitions of value. Therefore, this article will focus on major values commonly agreed upon to be associated with a lake and expected to be acceptable by Michigan's courts for special assessment apportionment purposes.

It is proposed that a lake has three major discernable value components: (1) the "enhanced" market value extended to real estate; (2) various kinds of cash flows arising directly because of the lake (e.g. higher property taxes and expenditures by non-resident visitors); and (3) biological, chemical and physical ecosystem functions valued by humans in cash equivalent terms. Each of the components exert an independent financial influence over a unique and distinct geographical area.

GEOGRAPHIC DISTRIBUTION OF VALUE – REAL ESTATE

All real property has value created from within and value arising from outside influences. Among the first to argue this point was Frederic Olmstead, an administrator of New York City's Central Park. Influenced by European beliefs, he used data from Central Park to argue property values increased when a park was nearby. Modern research has explored and confirmed his belief.

To examine external influences on real estate, let's first review internal values. Consider a newly built home. The internal value of a new residence may be found by adding the cost of the land to the cost of building the structure to the cost of other improvements and to a contractor's profit.

However, this cost-derived internally generated value is modified by the neighborhood of the home. For example, if two identical homes were built in different neighborhoods; the more expensive neighborhood generally increases the market value of a home placed within it. Poorly maintained neighborhoods bring down value. This form of price difference illustrates an external influence.

External value influences on real property are measured in two standard ways. A professional appraiser extracts the amount of value attributable to an outside influence by comparing similar properties with and without the influence being studied. This is called using paired associates. A statistical modeling technique known as multiple regression analysis is also commonly used in estimating contributory values from external as well as internal value influences. The example given above deals with a residential property. Similar external effects exist for all classes of real estate.

Studies of external value influences have been collected in a monograph titled

continued on page 13

FEATURE A Look at the Values of A Lake

continued from page 12

The Proximate Principle by Professor John Crompton. A section authored by Sarah Nicholls, PhD., of Michigan State University, shows that a body of water and other natural features affect the value of real estate for some distance. Influences on residential property commonly extend to at least 2,000 feet.

Sometimes the influence of a lake extends farther. In Chicago, a study of apartment rental rates (as they related to distance from Lake Michigan) found water influenced market values at distances much farther than 2,000 feet. Other research demonstrates views of natural features significantly affect property values or rental rates a great distance from the feature. Dr. Nicholls summarized the research related to the proximity of water: "premiums associated with waterfront location have varied from 9% to 147%, with figures exceeding 50% not being uncommon."

To the untrained, contrary to academic research, the value influence of a lake is commonly perceived to affect only a small area: properties with frontage on water, property with deeded access to water, and property with convenient access to water. This is an oversimplification. Both common sense and economic evidence recognize that commercial or other distant properties enjoy a flow of money directly from tourists and visitors to a body of water. Their expenditures sustain jobs, affect property rents, occupancy rates and values and the overall fiscal health of entire communities.

GEOGRAPHIC DISTRIBUTION OF VALUE - CASH FLOWS - DIFFER DEPENDING UPON PROPERTY TYPE

Geographic distribution of a value influence varies by the type of property and entity affected. The idea of location, location, location applies to each class of property, but with different rules.

Often, the geographic area of the fiscal impact of a natural feature on residential property will be smaller than the area of effected business properties. The contribution of a natural feature to a residential property value is related to the principles of substitution and scarcity. How easy is it to acquire property near water and how much would it cost for a comparable property? Residential values are driven by a buyer's desire to possess and use the amenities of an available natural resource.

Businesses are driven by profit and the driving amenity is cash. Here value is not directly a view or experiencing nature, but the contributory value to the business location of any cash flow arising from the natural feature. Because investors have cash flows from many sources available to them, the primary economic principle is one of increasing and decreasing returns rather than scarcity.

Think about the value of a farmer's produce stand along a busy roadway. Such a building is relatively small, inexpensively constructed and used only in the summer and fall. Yet, because its location, it may generate thousands of dollars from the sale of produce. Business property values increase where there are higher potential cash flows. There, property owners can demand higher rents and businesses earn higher profits. Natural features draw people with cash to spend. Thus, value enhanced business properties consist of locations along travel routes or clusters of properties lying in or near destination points that are important to visitors and residents. Business properties may be physically farther away from a natural feature than residential properties and still be influenced.

The geographic distribution of value to government units (communities) from a lake is tied to new or enhanced cash flows. What are some common forms of government revenue associated with a natural feature? Property taxes are the most well known. There may also be revenue from consumption, sales or income taxes directly linked to economic activity arising uniquely and specifically from the lake or another feature. Consequently, a map of communities benefitting almost always encompasses a greater area than a map of only affected real estate.

The 55th Circuit Court in Gladwin, Michigan, concurred. In a 2005 ruling, it declared four groups to be "materially and substantially" affected by a lake: "people who boat and/or fish, bathers, swimmers and skiers."... "The legislative government of the county" ... "the Department of Natural Resources" ... and "downriver owners of real estate and the taxpayers, not only in the special assessment district, but throughout the county who are affected economically." Testimony given the court described the area to which increased taxes flowed as consisting of taxing units in two counties. The area influenced was big and so were the dollars. Gladwin County is more than 500 square miles in size. Testimony of business owners and experts linked cash flows of $7,500 to $10,000 to non-resident owned property on or near the lake. Totaling over $2.25 million, their purchases sustained or created 25 to 30 jobs for every million dollars spent. It is easy to understand why it is important to identify, quantify and associate a duration of revenue streams with a lake or other feature.

GEOGRAPHIC DISTRIBUTION OF VALUE - ECOSYSTEMS - WHO VALUES THEM?

If buyers and sellers establish property values, and visitors and business owners determine the value of cash flows, who will speak for the ecosystem? What is the value of saving a forest or a species of fish or of maintaining wetlands for migrating fowl? What is the value of protecting an ecosystem from flood damage?

That there is value is certain. However, estimates of the value of a natural resource are fraught with uncertainty and dispute. Ecosystem valuation is the domain of economists and highly trained specialists. We know values are identified from damage in addition to market transactions. Michigan DNR employee Michael Jury recently pointed out that a flood from a broken dam not only "wipes out property," but a flood "wipes out a river" and it "wipes out benthic" (organisms living in a stream or lake bottom). There actually are several value measurement techniques in use today.

According to Professors Dennis King and Marisa Mazzotta, economists "measure the value of ecosystem services to

continued on page 14

FEATURE A Look at the Values of A Lake

continued from page 13

people by estimating the amount people are willing to pay to preserve or enhance services." These services are created from the functions of an ecosystem. Function means the biological, chemical and physical processes performed by the ecosystem. These include flood control, groundwater recharge, wildlife habitat and the purification of air and water. "Functions" are value neutral. "Services" are taken to mean benefits from an ecosystem's functions to which a value may be estimated. Though economists and other professionals have struggled, today there seems to be agreement that for an ecosystem: "total economic value is the sum of all the relevant use and non-use values for a good or service."

Over the past half-century, enough credible research has been done to establish a proper basis to identify value components and create a framework within which they can be viewed. Research has been augmented by court decisions which more clearly define valuation methods and the type of facts necessary to arrive at proper conclusions. It is not the intent of this article to explore the differences in valuation methodologies used by experts. Instead, we'll use a hypothetical lake and hypothetical values to highlight value components. The goal is to share background information with the reader.

Oh, ordinary citizens and economists often see the concept of value differently. Most people perceive value as what something would sell for. Drs. King and Mazzotta address this issue, saying:

"It is often incorrectly assumed that a good's market price measures its economic value. However, the market price only tells us the minimum amount that people who buy the good are willing to pay for it. When people purchase a marketed good, they compare the amount they would be willing to pay for that good with its market price. They will only purchase the good if their willingness to pay is equal to or greater than the price. Many people are actually willing to pay more than the market price for a good, and thus their value exceeds the market price."

PART 2: PUTTING THE THEORY TO WORK - AN EXAMPLE OF ASSEMBLING VALUES

Let's set the stage to value a hypothetical lake. Assume a lake of about 300 acres. Assume the lake has homes with water frontage that are homesteads of permanent residents – say one-third of the structures on the lake. Assume the lake has cottages and other secondary residences used by their owners from time-to-time – say two-thirds of the structures on the lake. Assume there are about 600 parcels of land surrounding the lake and the lake frontage is entirely used for residential purposes except for public access areas and wetlands. Assume the lake has public boat launches and is used by the public for fishing, hunting and boating, swimming and other recreational purposes.

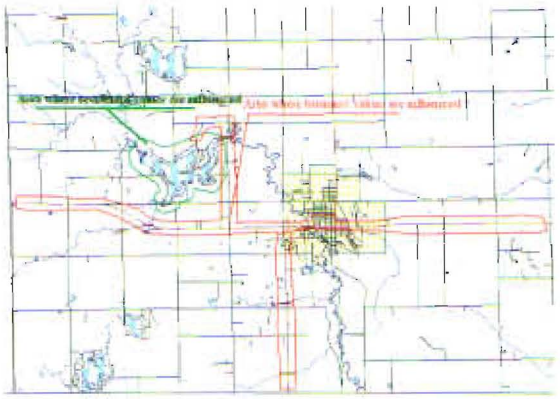

Figure 1 – Affected properties by use. *Drawing by Jeff Klopcic*

Assume a small community is located less than five miles from the lake. It is here that real estate agents, title companies, lawyers, home improvement contractors, carpet and furniture dealers and a number of other retailers and wholesalers conduct business. Geographic distributions of value are illustrated in the drawing. The green circle around the lake represents residential properties located within a quarter mile of the lake which receive an enhancement of their property values.

Areas from which expenditures of one kind or another create cash flows arising directly from the existence of the lake are outlined in red or green. Annual property taxes arise from within the green line surrounding the lake. The red line also surrounds major areas of travel to and from the lake and common destination points in the central business district of the closest community. Businesses there receive a substantial cash flow. With these assumptions we can begin to use Michigan's laws, analytical rules and best practices of experts to figure out what the hypothetical lake's value might look like.

A TABLE OF VALUES

The table at the end of the article lays out four areas of analysis: real estate values influenced by the presence of the lake; periodic cash flows arising uniquely and specifically from the lake; the value of commercial harvest from the lake (fish and wildlife) and the value of the (lake) as a publicly owned property held in trust by the government for the people.

It should be clear that in the illustration, examples of commercial harvesting of wildlife is intended to be a cash flow separate from recreational use of the lake. Just as commercial fish are harvested from the great lakes and fur bearing animals are trapped for pelts and other creatures are harvested for commercial purposes, the table shows the present value of several small commercial harvests at this lake. The value of that economic activity is separated from recreational uses.

REAL ESTATE VALUES IN TABLE

Methods of estimating real estate values have become standardized through court decisions and professional practices. In this hypothetical situation, we are looking at the total value of all real estate and not focusing on a specific parcel or parcels. Assume the aggregate property value within the geographical area outlined by a green circle on the drawing has doubled as a result of the lake. These are 600 residential properties with a current market value of $50 million and an identical aggregate State Equalized Value and Taxable Value of $25 million. Since values doubled, $12.5 million of the Taxable Value is directly attributed to the presence of the lake and $12.5 million would exist without the lake. Four hundred proper-

continued on page 15

FEATURE A Look at the Value

continued from page 14

ties are owned by non-residents and pay a higher millage rate.

There are no business properties located directly on the lake or in the area where proximity to water is a driving market force. Therefore, only cash flows to the businesses, property rental rates and vacancy rates need analysis. Surveys from visitors and non-resident property owners measure annual expenditures to local businesses. They reveal the geographic area where visitors spent their money. Surveys of business owners reveal the importance of the lake to various types of businesses. Quantifying local purchases by non-residents and determining the impact of the lake on local business rental and vacancy rates enables one to impute changes in business property values.

There have been wetland acquisitions across the state by conservation groups and there has been the construction of new wetlands by developers needing to satisfy environmental laws. Studies of the value of wetlands have been performed by economists. Examples include work sponsored by Michigan's DNR, Ducks Unlimited, the Saginaw Bay Watershed Initiative and others. This example uses such information and standard real estate valuation practices, to estimate the value of the wetlands created by the hypothetical lake. This hypothetical value was estimated at $3,000 per acre.

Cash flows shown in table and their Cash equivalent Present Value

Periodic cash flows are routinely converted into a "present value." The conversion is based upon the idea investors will pay cash now to receive some future series of cash payments.

What is a "Present Value" of a cash flow as used in the example?

Let's suppose someone owed you money and repayment would be at the rate of $100 due at the beginning of every year for five years. Under this arrangement, if you deposited the payment in your credit union at the beginning of each year you'd collect 5 percent interest at the end of the year. In January of the first year you receive your $100 and deposit it in the credit union. At the end of the first year you earn $5 interest and you deposit another $100 on the first day of the second year. Now you have $205 in the credit union. The $100 first payment, the earned interest and then the new second year payment. At the end of year two, you are paid interest of 10 dollars and 25 cents. Now you have $215.25 and you add $100 to it. Continuing this process, at the end of the fifth year, you will have $580.19. The cash flow at 5 percent interest is okay, but you want cash now.

What if someone were to offer you $580 cash today and they would collect the money over the five years? You might accept the offer. They offered what you could expect to receive and you wouldn't have to wait. But they want to make a profit, so instead they offer to pay only $525. Should you take it? You might, just because a bird in the hand is worth two in the bush. Maybe the interest now would be only three percent for a $525 deposit and you'd rather have the five percent. This is the principle behind finding the present value of a cash flow. Alternate rates of return are examined and the opportunity to receive cash now versus parts of the whole over time is evaluated.

Investors have choices. In the example used here, it was assumed 2 percent interest would be paid yearly, cash flows would continue for 20 years and the flow was unchanged over time.

Cash flows – new revenue from property taxes

For considerations in this example, annual property tax revenue flows throughout the entire county from collections of a county tax for operating and from a county tax to support public safety. Other property tax collections go to local units of government. The majority of property tax collections flow to the host county, portions are sent to an adjacent county for a community college (10%) and to the state of Michigan for education (15%).

If this were a real situation and the lake were gone, some amount of base tax collection would still take place. Therefore, calculations of cash flow from property taxes does not include the hypothetical "base" taxes ($12.5 million) discussed earlier. Those taxes would exist without the lake being present. In the table, only "enhanced market value" and taxes related to it are shown. The total market value of property affected by the lake contains an enhancement of $25 million of real property and an extra $5 million of business property. Total market value in the example is $60 million - $50 million (residential) and $10 million (business).

With property values addressed, we can look at the impact of millage rates on tax collections. Michigan laws have two overall millage rates that are to be used to calculate taxes: a "homestead" and a "non-homestead" rate. A lower millage rate is used for those who "reside" in a structure and a higher millage rate is applied to those who are non-residents; say someone who had a cottage up north. The millage rates generate distinct and separate cash flows. Qualifying "homesteads" pay about 18 mills less than non-resident property owners. The "non-homestead" rate charged to business and other non-qualifying classes of property includes certain school taxes.

To calculate taxes attributed directly to the lake, 22 mills is applied to the $12.5 million of taxable value for residential and business properties "enhanced" by the lake. Remember, two-thirds (400) water enhanced properties owned by non-residents pay an additional 18 mills.

As an aside, an argument could be made that if the water were not present, far fewer properties would be owned by non-resident owners. If that were the case, then there would be far fewer properties paying the additional 18 mills. Without the lake taxes collected by taxing authorities would go down for two reasons: (1) property values would drop; and (2) more non-resident properties would become "Homesteads" entitled to relief from the 18 mill burden. The point is, calculations used to arrive at the hypothetical value are conservative.

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Please see the upcoming Spring issue of The Michigan Riparian for Part Two of this "A Look At the Values of a Lake," which will explore new revenue and non-tax cash flows, as well as the value of the ecosystem and tourism.

Clifford Lake

These swans are enjoying a sunny day on Clifford Lake in Montcalm County, Michigan. Clifford Lake is a 202-acre lake with a maximum depth of 46 feet. Fish species found in this all-season lake include bluegill, crappie, walleye, Northern pike, and large-mouth bass. Clifford Lake also features the historic Clifford Lake Inn, which has been welcoming tourists and fishermen to this small, beautiful lake in central Michigan for more than 125 years.

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FEATURE A Look at the Values of A Lake

Revenue, non-tax cash flows, ecosystems and tourism

By Joseph M. Turner
CEO, Michigan Property Consultants

This article is Part II of an article that appeared in the Winter 2009 issue of The Michigan Riparian. This portion will explore new revenue and non-tax cash flows, as well as the value of the ecosystem and tourism.

NEW REVENUE: NON-TAX CASH FLOWS – SECOND HOMES AND TOURISM

Even though the subject and calculations for this article are fictional, where possible, calculations used in the table were taken from realistic sources. They include surveys by property owner associations and academic research. For example, in a study of spending patterns, research by Dr. Daniel J. Stynes of Michigan State University documented non-resident property owners spending between $5,000 and $10,000 annually (1994).

The Walloon Lake Association supported Stynes' with some of the best data I've seen in the state. In both 1991 and 1998, the association conducted a survey of expenditures by its members and published the data in the "Wallooner." Responses to their surveys were very high (56% in 1991 and 41% in 1998). The association reported average spending "times 1,150 members is 14.8 million dollars each year." That spending ($12,870 per member) does not include travel expenditures which could be substantial. In part, travel contributes to a local economy. Sixteen percent of Walloon Lake Association members resided in the area year 'round. Non-resident owners visited about 12 weeks annually.

In *Economic Impacts of Tourism* and other works by Dr. Stynes, methods of approximating the impact of importing new money to a local economy are developed. In some ways, the following discussion is similar to what happens when businesses create new jobs.

For our example, the money "imported" into the local economy is generated from two sources. First, purchases of goods and services comes from tourism and other recreational users. Secondly, money spent in the area by non-resident property owners. A certain portion of the imported money leaks out of the local economy. "Leakage" is part of the new money which is used to acquire goods and services from another economic region. Because "leakage" does not stay within the local economy it has been removed from all calculations of impact.

Remaining money, new to the local economy, isn't spent once; it circulates. Here is how. Assume $100,000 is collectively used by visitors to purchase various goods and services. Some of the visitors may buy a pizza, and locally produced bait for fishing, and magazines to read if things get boring, and gasoline and lunch and maybe even a boat. Of that $100,000 perhaps $30,000 is sent to the companies that made the boat, magazines and other items. The $70,000 remainder is money that has a local fiscal impact. It creates and sustains jobs. It is used to pay wages and buy other goods and services. This economic impact is termed a secondary or "indirect effect." Employee purchases with wages paid from the initial money causes a third or "induced" economic impact.

One method of quantifying initial purchases by tourists and visitors to estimate economic impact is widely used and documented. Known as the "Travel Cost Method," the procedure involves surveying visitors to determine how much and where they spent money. The expenditures are multiplied by the number of parties making such expenditures and by the number of days for which expenditures was made. This, too, is shown in the chart along with a "multiplier" for "circulation."

VALUE OF ECOSYSTEM – VALUING AN EXISTING SYSTEM AND BUILDING A NEW LAKE FROM SCRATCH

Some values associated with the ecosystem of the hypothetical lake are shown in the table for illustrative purposes. The reader is cautioned that the author is not competent to professionally address the topic of compuring all of the values shown. Nevertheless, effort has been made to properly research the material presented. There is substantial disagreement between economists over appropriate measures of value as they relate to an ecosystem and how values should be aggregated. Here, values are separated by function. For example, value is calculated for commercial harvesting of wildlife including fish. However, the value of recreational fishing (both catch-and-release and catch-and-keep) is included as part of the overall value of the ecosystem shown under the Contingent Valuation Method. Similarly, periodic flooding causes a quantified amount of annual spring clean up ($25,000). Wetland improvements might eliminate those expenses, so a value of the potential savings is shown but nor included as part of the "total value" of the lake. Some economists regard the Travel Cost Method as more reliable than the Contingent Valuation Method. For illustrative purposes, results of both methods are used in the chart. Other procedures to calculate the ecosystem value exist. Market values can be determined for commercial fish harvests but for simplicity, harvest values shown are derived from a Michigan law which declares a value of $10 for game fish and $5 for rough fish and relate to a small commercial fishery. Similarly, this hypothetical ecosystem supports bird hunting and commercial trapping, so values are shown for those harvests. Bird watching and other potential components of ecosystem value not shown but easily recognized, are considered part of the value derived with the contingent value calculation.

We spoke of harvested fish, but what about the continually existing biomass of fish in the water? It is one example of an internal component. When there is prosecution under environmental laws for a fish kill, damage based upon the value

continued on page 9

continued from page 8

of the kill is determined. Thus, biomass has value. It is included in the Contingent Valuation calculation. Estimates of fish biomass in Michigan's lakes was hard to come by, but they do exist. For purposes of this illustration, it was assumed that the complete biomass of fish within the lake was 80 pounds per acre and that the division between game and rough fish was 50/50. It was also assumed that natural reproduction rates replaced harvested fish. These component values highlight the idea that just as there are internal and external value influences in private property, public property has internal and external value components.

The value of the wetlands is listed with real estate. Technically, the wetlands are not part of the lake as defined by law. They are created by the lake and an important part of its ecosystem. Fortunately, in the recent past there has been a good deal of research in the area of wetland valuation in Michigan. As stated earlier, the cost of actually producing wetlands can be determined by examining records of developers meeting environmental regulations and from other sources. In addition, some recent, sound studies by economists have provided benchmarks for valuing Michigan's wetlands. For our hypothetical situation, sales and other market indicators of value were judged sufficient that wetland values could be included with the table along with other real property values.

Costs to create a 300-acre lake were examined. Within the recent past, man-made lakes have been built around the country and within this state. Costs to build a new lake varied widely and could not be narrowed down enough to use in calculations for this example. Nevertheless, the range of costs to excavate a lake and let water naturally fill the excavation ran from around $25,000 to $100,000 per acre. Applying that range of cost to the example creates an indicated range of value between $7.5 million and $30 million. Damming a river was a different story. Costs associated with building new dams that could contain a 300-acre lake were available. I found engineering estimates in the state to build a new dam to contain a river and create a lake similar to that depicted in this example. Considering inflation adjustments, the new dam would cost about $5 million to $6 million.

In addition to determining costs of digging out a lake or damming a water flow, economists and experts in natural resource values have developed methods to estimate the value of an existing ecosystem. From among the methods used, I used what is known as a contingent value method. The basic procedure is to survey a population and employing best practices of the profession, determine a population's willingness to pay to maintain a natural resources which exists. From a total population of potential contributors, an estimate is made of how many people would really contribute money and how much money it is that they would contribute. This contingent "value" cannot be extracted from market transactions. Economists King and Mazzorta describe the valuation procedure saying:

"It is not necessary for ecosystem services to be bought and sold in markets in order to measure their value in dollars. What is required is a measure of how much purchasing power (dollars) people are willing to give up to get the service of the ecosystem, or how much people would need to be paid in order to give it up ..."

Examples of people giving money in this way may be found in the state of Michigan's solicitation of contributions for specific purposes. For example, some people voluntarily contribute money when purchasing an automobile license plate to support programs for a bird known as a "loon." The attractiveness of a contingent valuation technique rests in part on the fact that it is clear a natural resource would have value to people who may never use it. People place value on protecting wildlife habitat. They want to preserve natural resources for some future date when they or their children or grandchildren may want to use it. People will contribute money for things they value.

In order to use real market information for this hypothetical example, maps of a geographic area covered by various forms of advertisement from an actual community were used. In addition, records of land ownership and (private and public)

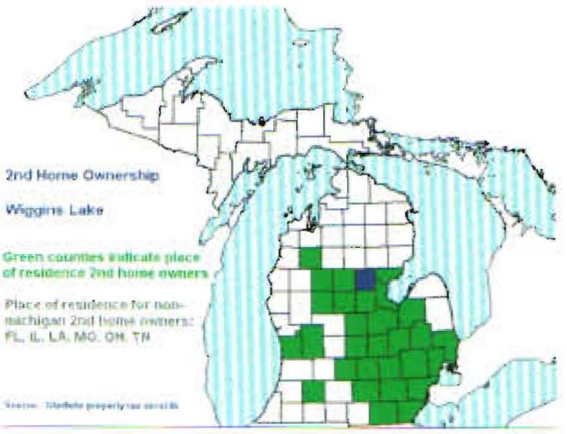

Figure 2: Residence of Second Home Owners

records of the point of origin of visitors to a real lake, were examined. The lake is a good fishing lake with public access and several master angler records. The map above illustrates county of origin for owners of property around a 300-acre lake in Gladwin County (highlighted in dark color). Using that situation for this example, the population base from which citizens would be asked to contribute consisted of approximately 3 million people. Based upon work by economists and personal research, it was hypothesized one out of every 100 people in that population would contribute 10 dollars annually to preserve and maintain this hypothetical lake. Thus, the contingent value survey yielded a current use/non-use value for the lake (less values listed elsewhere) of $300,000.

Jobs Sustained or Created

Businesses receiving initial direct sale money use it to pay their employees and to pay other businesses from which they've acquired goods and services. One example would be the pizza maker who pays a dry cleaner money to clean aprons and company shirts. Money spent by the visitor to buy a pizza supports wages at the pizzeria and employees at the dry cleaners. If any of those employees use their wages to buy goods or services locally, then another job will be supported. Not every job is supported 100 percent by this money, but according to experts the end result is 25 to 30 jobs supported by every million dollars of applicable cash flow. That rule is applied in this article.

A similar pattern can be found in money new to the local economy from taxes. Non-residents who earned outside of the local economy buy property and pay taxes.

continued on page 10

continued from page 9

Day and overnight visitors pay hotel taxes and gasoline taxes and a variety of other taxes. Some non-property taxes such as hotel and gasoline taxes are returned to the local economy to fix roads or pay for tourism projects.

An examination of the data contained in the table illustrates the following full-time job impact of cash flows in this hypothetical study. Tax collections resulting from non-resident property owners amount to a little over a half million dollars per year. That translates into 12 to 15 jobs. Direct expenditures (minus leakage) by non-resident home owners and tourists and visitors create an estimated secondary effect of about $3.3 million. This translates into another 85 to 102 jobs. So, an initial estimate of jobs supported directly by money imported and shown as a specific impact of the lake in this example lies between 97 and 117 full-time jobs. In a job-scarce market, one can see the importance of such facts and data.

It may be useful to examine the concept of flood protection as used in this example. The value estimate was based upon a real situation wherein a local government unit typically expended money in the spring to clean up debris and other material from annual spring flooding. Not shown in this example is the lost value of real estate, individual lives and nature destroyed if a dam were used to create the lake and the dam should break. In circumstances where a lake is created by a dam, such calculations are warranted and the value of the protection will often be very large.

Remember the chart is illustrative and its conclusions are hypothesized. Hopefully it will be thought provoking and the reader will be able to use it as a beginning point for a further inquiry.

Conclusion

The "present value" of all the components shown in the table is over $93 million. This is far more than the cost to dig a lake or construct a dam ($5 million to $30 million). Interestingly, the major portion of that value is not found in enhanced real estate values (e.g. property located close to the lake). Instead, the major value component is the present value of the cash flow created by second homeowners. This is followed by cash flows from taxes and tourism. In this example, the annual "enhanced" value from cash flows to the local economy account for about two of every three dollars of identified value. This pattern should be expected when a desirable natural feature exists for public use. Had this been a private lake, the major component of value could have been second home expenditures and enhanced nearby property values.

Much as investors view bare land and decide which future use would provide the greatest revenue, proper management of our natural resources can yield superlative financial returns. Given the difficult economic times facing our state and the importance of tourism to its economy, it might be time to fully consider how value is generated from a natural feature and explore the contributive value of components. These value relationships are seldom contemplated in analyses for levying special assessments. That void is what drove this research.

Summary

- ❑ Definitions of value may vary, but there is general agreement on the types of value associated with a natural feature such as a lake.
- ❑ Natural features have value internally and affect property values at some distance.
- ❑ Real estate values consist of two parts: the contributory value of internal components and outside influences on value (externalities).
- ❑ Publicly accessible lakes may attract tourists, non-resident property owners and other users.
- ❑ When a lake is open to the public, it usually creates cash flows new to the local economy.
- ❑ Cash flows new to a local economy sustain existing jobs and create new jobs.
- ❑ Non-public lakes may increase real estate values and generate new (higher) tax cash flows from second homes.
- ❑ There now exists a body of research reliably documenting value components external and internal as discussed herein.
- ❑ Value influences from a lake are almost never limited to only adjacenr and nearby properties.
- ❑ Methods of valuing an ecosystem are becoming more sophisticated.
- ❑ Natural features, like new businesses, can be economic development engines.
- ❑ For illustrative purposes, the table below assumes commercial harvesting of wildlife and treasts the fiscal value of the harvest as a separate and unique value.
- ❑ There can be significant issues of "double counting" and other errors when valuing an ecosystem – the table is designed to illustrate components of value and does not scrutinize for methodological conflicts.

Illustrative Component Values of a 300 Acre Lake with 75 acres of wetlands and significant use by public

Component	Current Measure	Annual Cash Flow (20yr term; 2% int)	Present Value
Enhanced *Market Value* – Residential	$25,000,000		$25,000,000
Enhanced *Market Value* - Business	$5,000,000		$5,000,000
Mkt Value of Wetlands (75acres@$3000/acre)	$225,000		$225,000
New real estate values because of lake $100,750/acre		**Total**	**$30,225,000**
Enhanced Taxable Value - 22 Mill Levy	$15,000,000	$330,000	$5,304,000
Non-Homestead Tax (additional 18Mills)	$8,333,333	$150,000	$2,502,000
Business Taxable Value - 18 mill levy	$2,500,000	$45,000	$750,000
New property taxes because of lake $29,187/acre		**Total**	**$8,756,000**
2nd Home Expenditures	400*$8000	$3,200,000	$53,371,000
Visitor Expenditures day trips	400 *$35*1.25	$17,500	$292,000
Visitor Overnight trips	100*$95*1.25	$11,875	$198,000
Total present value of new cash flows from lake $179,537/acre		**Total**	**$53,861,000**
Value of commercial rough fish harvest ($50/lb)	200 days @ 5 lbs/day $5,000	$5,000	$81,757
Value of commercial game fish harvested ($10/lb)	200 days @ 5 lbs/day $10,000	$10,000	$163,514
Value of commercially harvested for bearing animals	$1000	$1,000	$16,351
Value of commercially harvested birds	(150@$10ea) = $1500	$1,500	$24,527
Commercial harvest from lake $954/acre		**Total**	**$286,149**
Statutory Value non-harvested Game Fish Biomass remaining in lake (Part of Public Trust Value)	400lbs acre @ $10 $120,000		
Statutory Value biomass non-harvested Rough Fish (Part of Public Trust Value)	400lbs acre @ $5 $60,000		
Annual cost to expect spring flooding	$25,000		
Existence Value of Lake (Pop of Service area x 3 x Contingent Value Method	$10 per person year (1%contribution rate)		$300,000
Value of public use and services per acre $1,000		**Total Value**	**$300,000**
Value from use (all items could be added exactly $1,1427 per acre			$93,423,149