The Economic Impact of Canal Cruising in the Hennepin Canal State

Park, Illinois: A Scenario Analysis

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Abstract— Hennepin Canal State Park boasts healthy visitor numbers: in 2009, it attracted 1.25mil visitors and since 2004, visitor levels to the park have increased at the rate of 2% per annum (compound annual growth rate (CAGR) = 2%). This is in spite of the overall negative growth in visitor numbers for the state parks in Illinois (-1.25% CAGR for the period 2004-2009).

Key issue is whether to expand Hennepin Canal State Park's services to include canal cruising or boating. To address this question, plausible future scenarios for the park were constructed. These are:

Positive: In order to benefit from the increases in visitor numbers, a state park has to provide quality services. Since customer attraction is a function of product mix and quality, only state parks with a vast product line (for example, trail-based recreation, water-based recreation, etc.) will survive. Hence, the industry concentration will be low. Developments in virtual technology will not impact visitor numbers.

Negative: Increased competition from businesses in the leisure and recreational sectors, developments in virtual technology, and declining US market for state parks will decrease park revenues. Also, developments in virtual technology will make customers indifferent to the variety (product mix) of state park services. However, due to state funding (cf. Senate Bill 1566), industry concentration will be high.

If canal cruising is enabled, given the positive scenario, it will generate \$42.68mil in revenues during the first year of its operation. The impact of this revenue would be 1,284 full-time jobs mostly in the hospitality sector and the retail trade.

In the case where developments in virtual technology, and declining US market for state parks make customers indifferent to the variety of services (negative scenario), introduction of canal cruising will still bring in revenues totaling \$31.8mil in the very first year, and create 959 full-time jobs in the region.

Finally, economic benefit assessment is only one part of the "knowledge" about the consequence of facilitating canal cruising. Research is needed to gauge social and ecological consequences of the decision.

1.Introduction

The state of Illinois offers for the outdoor enthusiasts 44 state parks, 22 recreation areas, and 118 natural areas. In all, the state hasabout 480,000 acres for outdoor recreation, including six forests and 65 fish and wildlife areas (NASPD, 2012).

This paper focuses on the Hennepin Canal State Park which spans five counties: Bureau, Henry,

Lee, Rock Island, and Whiteside, and 5348.5 acres of land and water. The state park boasts healthy visitor numbers: in 2009, it attracted 1.25mil visitors and since 2004, visitor levels to the park have increased at the rate of 2% per annum (compound annual growth rate (CAGR) = 2%). This is in spite of the overall negative growth in visitor numbers for the state parks in Illinois (-1.25% CAGR for the period 2004-2009; see Table 1). The Friends of Hennepin Canal, a non-profit organization that is working to restore the state park's waterways, believes that facilitating boat travel in the park would further strengthen the park's ability to attract visitors (see Appendix 1 for a brief history of Hennepin Canal). What are the benefits of facilitating boat travel or canal cruising in the state park?

State Park	Land & Water Acreage	Water Acreage	Visitor 1	Numbers	CAGR (2004-2009)
			2004	2009	
Hennepin Canal	5348.5	2084	1,135,262	1,251,714	2%
Other IL State Parks	127,793.17	10,481.6	32,773,984	29,993,834	-1.25%

Table 1 State Park Visitor Statistics

Note: CAGR computed by solving for r in the equation: $ln\left(\frac{\# of visitorsin 2009}{\# of visitorsin 2004}\right) = ln \mathbb{P}(e^{r*5}).$

Source:http://dnr.state.il.us/orep/realty/lwr.htm

2. Analytical framework

The question aboutbenefits of boat travel in Hennepin Canal calls for strategic thinking; the focus is on fundamental analysis of the forces that impact the "go" or "no go" decisionabout canal cruising. Scenario construction is a tool for such an analysis (Linneman and Klein, 1985). A scenario is a script of a plausible future with an emphasis on causal connections. Often, two or more scenarios are used to confineor bound the range within which the future is likely to evolve.

The first step in constructing scenarios is to define the general scope, time frame, and key issues. For the boating decision, the scope of the study is global, and the timeframe is long range, about 5-10 years. Given this context, seven trends were identified, organized hierarchically, and interrelated (Table 2).

T1, or trend 1, is the belief that competition for customers will increase in the coming years. This is based on two factors: (i) the aging of the US population (domestic market), and (ii) increased international visitor arrivals. The aging of the US population or the maturing of the US market is likely to reduce demand for outdoor recreation including residents' visits to state parks; the predictions are that the 65+ population would grow from the present 41.3mil (13%) to 54mil (17%) by 2020 (US Census Bureau, 2012). Since age is negatively associated with state park patronage or visits (Nerg et al 2012), reduction in visitor population would necessitate state parks to compete fiercely for a share of the dwindling pool of domestic customers. Regarding international visitors, although the numbers are trending upwards: from 55.9mil in 2007 to 59.8mil in 2010, a gravity model (Huff, 1964) conceptualization reveals that the Hennepin Canal State Park will compete aggressively with other state parks for new visitors. Specifically, the gravity model suggests that Hennepin will compete with Rock Cut, Starved Rock, Castle Rock, and Matthiessen state parks^① (see Appendix 2 for the results of the

⁽ⁱ⁾ The gravity model is defined as: $M_x = \frac{\frac{S_x}{D_{lx}}}{\sum_{i=1}^{N} \frac{1}{D_{ix}}}$, where M_x is the market share of x^{th} state park; S = size of the park (land and water

gravity model).

Label	Trend	Impact
T_{I}	Increased competition from other state parks	-
T_2	Maturing US market	-
T_3	Increased international tourism	+
T_4	Declining park revenues	-
T_5	Consumer emphasis on quality product	+
T_6	Increased product differentiation	?
T_7	Developments in virtual-reality technology	-

Table 2General Trends: Inputs for Scenario Planning

Global National State Park T_4 T_6 T_7

Moving on to T4, the Illinois Department of Natural Resources (DNR), the manager of state parks, has seen its budget slashed from \$102mil in 2002 to \$45mil in 2012 (Garcia, 2012). It is believed that DNR faces \$750mil worth of deferred maintenance projects; since 2002, sewers, roads, and other park infrastructure have been left to crumble①. In general, declining park revenues (T4) will impact provision of a quality product (T5). The only bright sidefor the state parks is that the recent economic downturn has lowered consumer expectations – the slope of the price-value function or demand line has flattened (Bohen, Carlotti, and Mihas, 2009).

A consequence of low product quality (T5) would be the consumer preferring virtual travel to actual visit to a state park (T7). There is evidence in the literature that as a social primate species, we modulate our behavior with signals from family, friends and social groups with whom we identify because in our evolutionary past those attributes helped individuals to survive (Reicher et al 2012). Applied to the problem at hand, young adults, and households with \$75,000+ annual income are more likely to modulate from visiting the park (influences from parents and grandparents, for example), to virtual reality (social norms of the 'techie' group to which they belong)⁽²⁾. Other than social norms, benefits such as, "that one can spend more time enjoying the park scenery" could also be used as explanations for switching to virtual mode of visits (behavior). For example, the Sistine Chapel in Italy has a virtual display based on the reasoning, "that no matter how much time you spend touring the

acreage), and D is the distance in miles between Chicago, i, and the park (see Appendix 2).

⁽⁰⁾ On a positive note, on November 28, 2012, the Illinois Senate passed Bill 1566 to provide DNR \$32mil annually (Prairie State Outdoors, 2012). However, capturing this revenue will take time because it is based on a \$2 surcharge to license plate renewals.

[®] According to PEW Research, young adults, and households who earn \$75,000+ annually own the most information-technology gadgets such as laptops and tablets (<u>http://pewresearch.org/pubs/1879/gadgets-generations-cell-phones-laptops-desktop-comupter</u>). This suggests that these clusters view "technology users" as a reference group.

chapel, there are details you will surely miss." Other benefits include: you can look at the ceiling for as long as you want without straining your neck; you don't have to share the view with any crowds, etc. (see http://www.italytravel.com/2012/11/pay-a-virtual-visit-to-the-sistine-chapel/).

Continuing on with the building blocks of scenario analysis, in addition to trends, it is also essential to list out key uncertainties (Table 3). One uncertainty is change in industry concentration or number of competitors for Hennepin Canal (U1). Note that declining park revenues (T4) are associated with increased competition from other state parks. However, if Governor Quinn follows the lead of his predecessor - Governor Rod Blagojevich closed seven state parks for cost-saving purposes - then, industry concentration could become less^①. This will be a positive for Hennepin since it will have the resources to service customers' needs including facilitating canal cruising (U_2) . Moving on to U_3 , uncertainty in virtual technology could impact the success of the state park. For example, consider the predictions of Ian Peterson, the futurologist, that hotel rooms of the future will be made from electronic enhancing surfaces and fabrics that would produce scents, ambient sounds and visual displays (see http://www.news.caterer.com/article/view/hotel/801486957/future-hotel-rooms-will-have-virtual-invisi ble-technology-says-study/). These types of technological developments could affect park visitor numbers either upward or downward; on the one hand, it could be argued that there would be a 'zone of tolerance' for technological developments including virtual reality, and at some point, the consumer may feel overwhelmed by the technology and would shun it opting instead for real experience. On the other hand, it could be that virtual reality is all that matters for the consumer[®]. Thus, the outcome of technological change is indeterminate. Table 3 lists all the uncertainties and the associated outcomes. In addition, the bottom of the Table shows the extent to which the uncertainties are independent.

Label	Uncertainty	Outcome	Impact
		(1) Less	+
U_1 Change in industry concentration	Change in industry concentration	(2) More	-
17	I coul of commission designed has constant on a	(1) Low	-
U_2	Level of service desired by customers	(2) High	+
		(1) Much	?
I	Technological change	(2) Medium	0
U_3		(3) Little	+

Inter-correlations: SubjectiveEstimates

	U_1	U_2	U_3
U_1	1	-0.8	0
U_2		1	?
U_3			1

⁽⁰⁾ If we assume that dwindling visitor numbers results in park closures, then Hennepin Canal has little to fear since it averages around 1.25mil visitors per annum.

[®] Interestingly, researchers at the University of Washington are exploring the hypothesis that the universe that we live in is a creation of a super computer in the future (Beane et al 2012).

3. Developing scenarios and linking them to strategy

Having discussed the trends and uncertainties related to the canal cruising decision, we now turn to developing the scenarios. One systematic approach is to derive two clusters: one with positive elements and another with the negative ones. In our case, the positive scenario would comprise elements {T3, T5, U11, U22, U33}, and the negative scenario, elements {T1, T2, T4, T7, U12, U21}.

The scenarios are:

Positive: In order to benefit from the increases in visitor numbers, a state park has to provide quality services. Since customer attraction is a function of product mix and quality, only state parks with a vast product line (for example, trail-based recreation, water-based recreation, etc.) will survive. Hence, the industry concentration will be low. Finally, virtual technology may not have reached the standards described by the IBM's Bernie Myerson^①; in other words, virtual technology will not replace park visits.

Negative: Increased competition from businesses in the leisure and recreational sectors, developments in virtual technology, and declining US market for state parks will decrease park revenues. Also, developments in virtual technology will make customers indifferent to the variety (product mix) of state park services. However, due to state funding (cf. Senate Bill 1566), industry concentration will be high.

In order to link the scenarios to the decision to facilitate canal cruising in Hennepin, we utilize decision theory concepts (Luce and Raiffa, 1957). In line with the theory's terminology, we postulate the value of the decision as follows:

$$V_{ij} = f(A_i, S_j)$$
, where

 A_i = the *i*th course of action available to the decision maker (*i* = 1: facilitate canal cruising in Hennepin Canal, 2: do not expand products to include boat travel in the canal);

 $S_j = j^{\text{th}}$ state of nature that can occur (j = 1: positive scenario will occur, and 2: negative scenario will be the nature), and

 V_{ii} = the value of the result of the interaction of the *i*th course of action and the *j*th state of nature.

Figure 1 shows the decision model. To calculate the monetary payoffs associated with each cell, V_{ij} , we combine average visitor expenditure data with number of visitors: ([Average expenditure per trip] **x** [Total number of visitors]). Visitor expenditure data were sourced from the 2012 *Statistical Abstracts of the US*. Total number of visitors to the state park was calculated using the predictive equation:

 $VN_t = VN_0 * e^{kt}$ where, VN = Visitor numbers at time t or 0, t>0. Appendix 2 highlights the V_{ij} computations.

	State of Nature, S _j	
Course of Action	S ₁ : Positive Scenario	S ₂ : Negative Scenario
<i>A₁</i> : Facilitate canal cruising		
	$V_{11} = f(A_1, S_1)$	$V_{12} = f(A_1, S_2)$
A_2 : Do not invest in canal	$V_{21} = f(A_2, S_1)$	$V_{22} = f(A_2, S_2)$
cruising		

[®]Bernie Myerson, Vice President of Innovation at IBM, argues that by 2018 computers will gain all the five senses: touch, see, hear, taste, and smell (see http://money.cnn.com/gallery/technology/innovation/2012/12/17/ibm-5-in-5-computers-senses/).

4.Results

In decision situations, it is essential that we establish a criterion to determine the preferred Vij. In this paper, the focus is on establishing the benefits associated with the decision, not choice among the alternatives. Therefore, we use input-output analysis (IO analysis; see Athiyaman, 2011) to determine the benefits associated with the expansion of Hennepin Canal's product line (canal cruising).

Briefly, IO analysis provides insights into the links between industries assessed from end-users viewpoint: consumers, government, investors, and foreign buyers. For example, a consumer's purchase of an automobile would involve the automobile manufacturer / seller, steel industry, and a variety of other suppliers to the automobile industry. Although the consumer doesn't purchase steel directly, her need for automobile may be regarded as the driving force behind at least some steel production. This inter-industry analysis is what that interest community/economic developers. Specifically, they are interested in measuring the total impact upon industry output, including employment, resulting from a given change in investment.

Benefits of Canal Cruising - Positive Scenario

Assuming that canal cruising is enabled in five years or so (around 2018), it will generate \$42.68mil in revenues during the first year of its operation. The impact of this revenue would be 1,284 full-time jobs mostly in the hospitality sector (accommodation, and food services) and the retail trade; 80% of all jobs created will be in hospitality and retail. In all, the total impact of canal cruising would be around \$107mil for the region comprising of Bureau, Henry and Whiteside counties (Table 4).

Table 5 Benefits of C	Canal Cruising given	Positive Scenario:	Results of IO Analysis
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(i)	Economic	Impact
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Industry	Total Impact (\$)
Traveler accommodations	34,828,267
Food services and drinking places	18,041,569
Scenic and sightseeing transportation	984,385
Automotive equipment rental and leasing	15,969,652
Automotive repair services	3,710,400
Toll highways	261,604
Gasoline service stations	5,860,110
Retail trade services, excluding gasoline service stations	19,919,502
All other industries	6,980,367
Total	106,555,857

Industry	Employment Generated
Traveler accommodations	376
Food services and drinking places	364
Scenic and sightseeing transportation	7
Automotive equipment rental and leasing	96
Automotive repair services	43
Toll highways	3
Gasoline service stations	50
Retail trade services, excluding gasoline service stations	278

(ii) Employment by Industry

All other industries	68
Total	1,284

Benefits of Canal Cruising - Negative Scenario

In the case where developments in virtual technology, and declining US market for state parks make customers indifferent to the variety (product mix) of state park services, introduction of canal cruising will still bring in revenues totaling \$31.8mil in the very first year, and create 959 full-time jobs in the region (Table 5). The reason: Hennepin draws customers from other state parks (see Appendix 2).

Table 6 Benefits of Canal Cruising given Negative Scenario: Results of IO Analysis

(1)Economic Impact	
Industry	Total Impact (\$)
Traveler accommodations	25,995,693
Food services and drinking places	13,466,162
Scenic and sightseeing transportation	734,741
Automotive equipment rental and leasing	11,919,690
Automotive repair services	2,769,429
Toll highways	195,260
Gasoline service stations	4,373,965
Retail trade services, excluding gasoline service stations	14,867,845
All other industries	5,210,121
Total	79,532,906

(ii) Employment by Industry

Industry	Employment Generated
Traveler accommodations	280
Food services and drinking places	272
Scenic and sightseeing transportation	5
Automotive equipment rental and leasing	71
Automotive repair services	32
Toll highways	2
Gasoline service stations	37
Retail trade services, excluding gasoline service stations	208
All other industries	51
Total	959

5.Discussion

The Renaissance Hennepin Canal Project, an initiative of the Friends of Hennepin Canal Organization, is working to restore three locks: L22, L23, and L24 (see Figure 2). The project is based on the belief, "that if you build it, they will come".

Our empirical analysis shows positive benefits for facilitating canal cruising in Hennepin; in other

words, if canal cruising is facilitated, visitors will come. We estimate the total economic impact of the project to be in the range of \$79.5mil to \$106.5mil. Furthermore, the project is expected to create 950 to 1300 jobs mainly in the hospitality sector. To minimize prediction errors, if not to eradicate them, we used scenarios to validate trend extrapolations and bound them between competing scenarios. In sum, our empirical analysis reveals that the canal cruising project will benefit the region in economic terms. Appendix 3 contains all the IO outputs for the region.



Fig.1 Renaissance Hennepin Canal: Scope of the Project

6.Scenarios

Positive: In order to benefit from the increases in visitor numbers, a state park has to provide quality services. Since customer attraction is a function of product mix and quality, only state parks with a vast product line (for example, trail-based recreation, water-based recreation, etc.) will survive. Hence, the industry concentration will be low. Finally, virtual technology will not replace park visits.

Negative: Increased competition from businesses in the leisure and recreational sectors, developments in virtual technology, and declining US market for state parks will decrease park revenues. Also, developments in virtual technology will make customers indifferent to the variety (product mix) of state park services. However, due to state funding (cf. Senate Bill 1566), industry concentration will be high.

7.Summary and conclusion

What are the benefits of facilitating canal cruising in Hennepin? Given that the key issue is whether to expand Hennepin Canal State Park's services to include canal cruising or boating, we developed scenarios (scripts of plausible futures) using a set of seven trends.

Trend one (T1) is about intensifying competition among state parks. The causes of this competition are (i) the aging of the US population (T2), and (ii) increasing international visitors (T3). These three trends are likely to result in decreased revenues (T4) which in turn would impact on providing quality products to customers (T5). In summary, analyses of the trends, uncertainties in technological change (for example, virtual reality), unpredictable customer service expectations and so forth, resulted in two,

opposing scenarios about the future (see the sidebar for scenarios).

We took the two scenarios and juxtaposed it with the canal-cruising decision - whether to facilitate canal cruising or not. This enabled us to compute the economic benefits of canal cruising: the total economic impact ranges from \$79.5mil and \$106.5mil, and 900 to 1300 new jobs.

In conclusion, we realize that the Friends of Hennepin Canal have incurred "sunk costs" in the course of pursuing the Renaissance Hennepin Canal Project (cf. expenses to carry out the Historic Structure and Condition Report). Often, these stimulate the organization to persist in the same direction rather than lose the time and effort that have already been expended. We want to alert the Friends of Hennepin Canal about this behavior that produces temporary comfort at the expense of bad long-run consequences for the organization. Put another way, economic benefit assessment is only one part of the "knowledge" about the consequence of facilitating canal cruising. Research is needed to gauge social and ecological consequences also.

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Appendix 1: History of the Canal

The Hennepin Canal is more than just a fun place. It played a very important role in the history of the United States and to commerce and industry. In fact, the entire canal is listed on the National Register of Historic Places. Thoughts of constructing a canal that connected the Illinois and Mississippi River date back to 1834. But financial problems in the state held back many public works projects. Pressure for a transportation shortcut that was cheaper than rail continued though, and Congress authorized preliminary surveys on the project in 1871. Construction finally got under way in 1892 and the first boat went through in 1907, reducing the distance from Chicago to Rock Island by 419 miles. There was a problem, however. As this canal was under construction, the Corps of Engineers was widening the locks on both the Illinois and Mississippi Rivers. With lock chambers twenty and forty feet narrower than the rivers it connected, the canal was obsolete before the Marion made her initial

voyage. By the 1930s it was used primarily for recreational traffic. The Hennepin and its sister canal, the I & M, tied the Illinois, Des Plaines and Mississippi river systems into a transportation network connecting Lake Michigan to the Gulf of Mexico. The I& M was completed nearly 60 years earlier and helped make Chicago one of the nation's greatest cities. The Hennepin Canal, which at one time was known as the Illinois and Mississippi Canal, was open to boat traffic until 1951. There was no cost to use the canal. Ice made from the canal's frozen waters was sold during the winters to help pay the canal's maintenance costs. The Hennepin was the first American canal built of concrete without stone cut facings. Although the Hennepin enjoyed limited success as a waterway, engineering innovations used in its construction were a bonus to the construction industry. Some of the innovations pioneered on the Hennepin Canal were probably used on the Panama Canal. Both used concrete lock chambers and both used a Feeder canal from a manmade lake to water the canals because both needed water to flow 'uphill.' There are 33 locks on the canal. Thirty-two are still visible. The first one, on the Illinois River, has been under water since the 1930's. Fourteen of the locks had Marshall Gates, which are unique to the Hennepin, and are raised and lowered on a horizontal axis, much like a rural mailbox. Five of the locks have been restored to working condition, although they are not used. One of these is a Marshall Gate lock. All of the gates from the remaining locks have been replaced with concrete walls, creating a series of waterfalls. The Hennepin originally had nine aqueducts — concrete troughs which carried the canal and its traffic across larger rivers and streams. Today, six remain the other three are replaced by pipes that carry the canal flow under the creek or river the aqueduct crossed over.

Source: http://www.friends-hennepin-canal.org/what-is-the-hennepin-canal/canal-history/

Appendix 2: Payoff Computations, Vij

The decision model in Figure 1 requires four values: payoffs or monetary value associated with facilitating boat travel given that the state of nature is positive (V_{11}) , facilitating boat travel under a negative outlook or state of nature (V_{12}) , withholding investments in canal cruising given a positive state of nature (V_{21}) , and withholding investments in canal cruising under a negative environment (V_{22}) . For V_{11} , we apply a 0.02 ACGR to the 2009 Hennepin visitor numbers, and add to it a share of competitors' market. To elaborate, the application of ACGR to Hennepin is shown below:

Forecast Year	2009 Visitor Numbers	Prediction Equation	Forecast Number of Visitors
2015	1,251,714	$1,251,714* e^{(.02*6)}$	1,411,349
2018	1,251,714	$1,251,714* e^{(.02*9)}$	1,498,622

To these 'base' forecast numbers we add the number of "switchers"–visitors to other state parks in the region who would switchto Hennepin because of the canal-cruising opportunity. To obtain this number, we used predictions from the gravity model, and weighted it by the proportion of visitors who would participate in boating/water sports (11.4% according to a report published by the outdoor industry association;see

http://www.outdoorindustry.org/pdf/OIA_Outdoor_Recreation_Economy_State_Technical_Report.pdf) and applied the results to the forecast number of visitors to the state parks (Table A2.1).

(1) Step 1. Gravity model s predictions (see 14	ootnote 2 on page 2 for		-
State Park	Total Acreage (S)	Distance from Chicago	Gravity
		(<i>D</i>)	(M_x)
Apple River Canyon	1802.41	133	0.04865
Arglye Lake	1724.304	252	0.024564
Buffalo Rock	298	86	0.012439
Castle Rock	2013.626	93	0.077728
Delabar	89.13	227	0.00141
Hazel and Bill Rutherford's Wildlife Prairie	1826.477	160	0.040981
Hennepin Canal	5348.553	106	0.18114
Illini	507.639	80	0.02278
Johnson Sauk Trail	1360.83	142	0.034403
Jubilee College	3184.522	167	0.068456
Lake Le-Aqua-Na	717.431	120	0.021463
Lowden	207.5	88	0.008465
Matthiessen	1935.27	95	0.073131
Mississippi Palisades	2406.54	138	0.062603
Morrison-Rockwood	1163.8	124	0.033693
Prophetstown	53.5	121	0.001587
Rock Cut	2993.958	71	0.151381
Rock Island Trail	420.111	154	0.009793
Starved Rock	2812.073	91	0.110935
White Pines Forest	385	96	0.014397

Table A2.1Estimates of "Switchers" to Hennepin Canal

(i) Step 1: Gravity model's predictions (see Footnote 2 on page 2 for the model)

(ii) Step 2: Number of visitors to other state parks who would switch to Hennepin: Forecasts

State Park	2015		2018	
	Total #	Switchers	Total #	Switchers
Rock Cut	1,311,830	22,639	1,392,949	24,039
Starved Rock	2,321,478	29,359	2,465,030	31,174
Castle Rock	130,105	1,153	138,151	1,224
Matthiessen	332,643	2,773	353,213	2,945
Jubilee College	116,079	906	123,257	962
Mississippi Palisades	455,709	3,252	483,889	3,453
Apple River Canyon	260,425	1,444	276,528	1,534
Hazel and Bill Rutherford's Wildlife Prairie	135,293	632	143,659	671
Johnson Sauk Trail	290,847	1,141	308,832	1,211
Morrison-Rockwood	414,871	1,594	440,526	1,692
Arglye Lake	363,530	1,018	386,009	1,081
Illini	773,427	2,009	821,253	2,133
Lake Le-Aqua-Na	239,156	585	253,944	621
White Pines Forest	348,850	573	370,421	608
Buffalo Rock	178,219	253	189,239	268

Rock Island Trail	71,277	80	75,684	84
Lowden	298,314	288	316,761	306
Prophetstown	244,640	44	259,767	47
Delabar	225,825	36	239,789	39

Note: Computations are based on weights discussed in the text. For example, switchers from Rock Cut to Hennepin for 2015 would be, 1311830 (total number of visitors)*.151381 (gravity from step 1 above)* .114 (proportion who participate in water-based recreation) = 22,639.

Thus, to estimate total visitors to Hennepin, we add CAGR predictions to the total number of switchers. Table A2.2 highlights the payoffs for all the cells of the decision matrix for the two time periods: 2015 and 2018.

Table A2.2Predicted Payoffs

	Prediction Year	
Cell	2015	2018
V ₁₁	\$853.2mil	\$905.9mil
<i>V</i> ₁₂	\$702mil	\$676.2mil
V ₂₁	\$813mil	\$836.2mil
V ₂₂	\$668.9mil	\$644.3mil

Note: Payoffs from canal cruising is calculated as the difference between:

- cells V11 V21 for positive scenario, and
- cells V12 V22 for the negative scenario

Per visitor expenditure in the Hennepin region is estimated to be \$576. This was allocated to the various industries as follows: Lodging: \$215; Food: \$112; Transportation: \$119, and other expenses: \$130.

Appendix 3: Economic Impact (IO Tables)

(i) Direct Impact for Counties

County	Positive Scenario	Negative Scenario
Bureau	\$1,707,243	\$1,274,280
Henry	\$9,987,370	\$7,454,537
Whiteside	\$30,986,455	\$23,128,178

(ii) Direct	Impact:	Industry	y-wise	Details
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Spending categories	Positive Scenario	Negative Scenario
Food	\$8,280,127	\$6,180,257
Lodging	\$15,920,038	\$11,882,659
Transportation	\$8,834,981	\$6,594,398
Other trip costs	\$9,645,921	\$7,199,681
Total	\$42,681,067	\$31,856,994

(iii) Total Output Impact by Industries

Industry	Positive Scenario	Negative Scenario
Traveler accommodations	\$34,828,267	\$25,995,693
Food services and drinking places	\$18,041,569	\$13,466,162
Scenic and sightseeing transportation	\$984,385	\$734,741
Automotive equipment rental and leasing	\$15,969,652	\$11,919,690
Automotive repair services	\$3,710,400	\$2,769,429
Toll highways	\$261,604	\$195,260
Gasoline service stations	\$5,860,110	\$4,373,965
Retail trade services, excluding gasoline service stations	\$19,919,502	\$14,867,845
All other industries	\$6,980,367	\$5,210,121
Total	\$106,555,857	\$79,532,906

(iv) Value Added

Industry	Positive Scenario	Negative Scenario
Traveler accommodations	\$18,908,229	\$14,113,034
Food services and drinking places	\$9,761,442	\$7,285,905
Scenic and sightseeing transportation	\$365,936	\$273,133
Automotive equipment rental and leasing	\$10,491,964	\$7,831,164
Automotive repair services	\$2,915,252	\$2,175,934
Toll highways	\$173,254	\$129,316
Gasoline service stations	\$4,004,764	\$2,989,142
Retail trade services, excluding gasoline service stations	\$13,167,358	\$9,828,068
All other industries	\$4,086,591	\$3,050,217
Total	\$63,874,790	\$47,675,912