Beacon Hill Institute

BHI *P*olicy *S*tudy

August 2012

The Economic Impact of the Treaty Harvests on the Local Economy of Mille Lacs Lake

David Tuerck, PhD

Paul Bachman, MSIE

THE BEACON HILL INSTITUTE AT SUFFOLK UNIVERSITY

8 Ashburton Place
Boston, MA 02108

Tel 617-573-8750, Fax 617-994-4279
E-mail: bhi@beaconhill.org, Web: www.beaconhill.org

Contents

Executive Summary 3
The Performance of the Local Economy 7
Measuring Economic Impact 12
Results 18
Conclusion 20
Appendix 21
About the Authors 23

Table of Tables

Table 1: Compound Annual Growth Rates for Variables in the Local Economy 8
Table 2: Growth of Economic Variables 10
Table 3: Change in Employment and Income by Industry 2001-2009 11
Table 4: Compound Annual Growth Rate of Earnings by Sub-Industries 12
Table 5: BHI Competitiveness Sub Indexes for Mille Lacs & Cass 14
Table 6: Regression Results of BHI Sub-Index and Per Capita Personal Income 16
Table 7: Demographic Characteristics of Mille Lacs and Cass Counties 21
Table 8: Economic Characteristics of Mille Lacs and Cass Counties 22

Executive Summary

In 1837 the United States and various Chippewa Bands of Chippewa Indians (the Chippewa Bands) signed a treaty that granted the tribe specific hunting, fishing and gathering rights.

The legal standard applied by the treaty grants the Chippewa Bands "certain hunting, fishing, and gathering rights on the ceded land 'during the pleasure of the President of the United States,' with the actual share dependent on conservation and public safety issues and limited by weather the Chippewa Bands have achieved a moderate standard of living.[1] In an 1850 Executive Order, President Taylor revoked the Chippewa Bands' harvest rights.

A subsequent 1855 Treaty set aside land for a tribal reservation and the Chippewa Bands agreed to "fully and entirely relinquish and convey to the United States, any and all right, title, and interest, of whatsoever nature the same may be, which they may now have in, and to any other lands in the Territory of Minnesota or elsewhere."[2] This text was widely interpreted as abolishing the Chippewa Bands' harvest rights.

In 1990, the Chippewa Bands sued the DNR and the state and state officials to reinstate their harvest rights. The harvest rights were upheld by the Federal District Court and several appears. The United States Supreme Court upheld the 1837 treaty rights of in a 1999 decision.[3]

Since the Supreme Court decision, the Minnesota Department of Natural Resources (DNR) has put by agreement allotted the Chippewa Bands a quota of the fishing and hunting harvest. As a result, game fishing on Mille Lacs has come under special restrictive regulations, especially for the most popular game-fish in the state – the Walleye. These regulations include a narrow size or "slot" limit – and number of fish that can be caught. In addition, new changes in the restrictions are currently being considered by DNR.

The special fishing restrictions have discouraged game fishing on Mille Lacs Lake, which in turn has hurt the local economy, especially those industries most linked to the restrictions due to the 1837 Treaty.

The Minnesota organization Proper Economic Resource Management (PERM) commissioned the Beacon Hill Institute at Suffolk University (BHI) to estimate the economic effects of the

[1]Mille Lacs Band of Chippewa Indians v. State of Minnesota et al. 124 F.3d 904. Submitted June 12, 1997, http://www.law.cornell.edu/supct/html/97-1337.ZS.html.
[2] Ibid
[3] Ibid

regulatory restrictions on the local economy. Our major findings for Mille Lacs County in 2012:

- personal income is lower by $10.4 million, and $1.5 million in the accommodation and food service industry;
- employment is lower by 97 jobs;
- labor income is lower by $1.4 million;
- value-added is lower by $2.8 million and total output is down by $5.6 million.
- The economic damage caused by the harvest treaty has reduced state and local tax collections by $433 thousand.

Introduction

In 1837 the United States and various Bands of Chippewa Indians (the Chippewa Bands) signed a treaty that granted the tribe specific hunting, fishing and gathering rights.

The legal standard applied by the treaty grants the Chippewa Bands "certain hunting, fishing, and gathering rights on the ceded land 'during the pleasure of the President of the United States,' with the actual share dependent on conservation and public safety issues and limited by whether the Chippewa Bands have achieved a moderate standard of living.[4] In an 1850 Executive Order, President Taylor revoked the Chippewa Bands' harvest rights.

A subsequent 1855 Treaty set aside land for a tribal reservation and the Chippewa Bands agreed to "fully and entirely relinquish and convey to the United States, any and all right, title, and interest, of whatsoever nature the same may be, which they may now have in, and to any other lands in the Territory of Minnesota or elsewhere."[5] This text was widely interpreted as abolishing the Chippewa Bands' harvest rights.

In 1990, the Chippewa Bands sued the DNR and the state and state officials to reinstate their harvest rights. The harvest rights were upheld by the Federal District Court and several appears. The United States Supreme Court upheld the 1837 treaty rights of in a 1999 decision.[6]

As a result of the Court decision, the Minnesota Department of Natural Resources (DNR) agreed to co-manage the Mille Lacs Lake fish populations with the Chippewa Band. The agreement established the "1837 Treaty Fisheries Technical Committee" to manage the fisheries. The committee estimates the total the catchable Walleye population and allocates a 24 percent exploitation rate that can be harvested from the lake. From this total, the Committee allocates a quota to the Chippewa Band and the rest to anglers, both local and tourists.

The initial five-year plan set the Chippewa Bands walleye quota at 40,000 pounds in 1998 and allowed it to rise to 100,000 pounds in 2002.[7] The Chippewa Bands quota held steady at 100,000 pounds from 2002 to 2007. Since 2007, the Chippewa Bands quota has steadily increased each year and reached 142,500 pounds in 2011. The Chippewa Bands' harvest has risen steadily from 31,000 pounds in 1998 to over 124,000 pounds in 2011. Moreover, the Chippewa Band's portion

[4]Mille Lacs Band of Chippewa Indians v. State of Minnesota et al. 124 F.3d 904. Submitted June 12, 1997, http://www.law.cornell.edu/supct/html/97-1337.ZS.html.
[5] Ibid
[6] Ibid
[7] The treaty rights were extended to several Wisconsin bands.

of the total harvest has risen along with its quota and can exceed 50% of the total take for all other anglers during slow years.[8]

The treaty management system, and subsequent allocation quota, has forced the DNR to place higher catch restriction on angling in Mille Lacs Lake than other Minnesota lakes. The Walleye restrictions for most Minnesota lakes are a possession limit of six with only one being over 20 inches. However, for Mille Lacs Lake, the restrictions may change during the season. For example, DNR published new Walleye regulations on November 23, 2011 that ban anglers from taking any fish that are between 18 inches and 28 inches in length, limit the bag catch to four fish and allow only one fish over 28 inches long. In addition, Anglers were prohibited from fishing between the hours of 10:00 pm and 6:00 am from May 16, 2011 to June 13, 2011.[9]

The restrictive catch regulations have discouraged anglers from fishing and vacationing in and around Mille Lacs Lake. The subsequent drop in overnight and day visitors has implications for the local economy.

The fishing restrictions imposed on Minnesotans that result from the steep allocation of natural resources to the Chippewa Chippewa Bands have two effects on the local economy. First, the restrictions lower the availability, or supply, of game fish in the Lake Mille Lacs, which in turn causes the price of game-fish and other harvest markets to increase in the absence of market controls. However, the DNR, in effect, imposes a price ceiling by selling fishing licenses at a fixed price and also enforces a quantity restriction on the catch. As a result, a gap has opened up between the quantity demanded and the supplied in the respective markets.

The game-fishing and other restrictions produce a displacement effect that causes game anglers and others to seek alternative sources of fishing. Individuals seek alternative locations to fish that have less restrictions or perceived impact from tribal harvest.

As a result of these two effects, the local economy experiences fewer visitors for the purpose of game-fishing. The absence of these visitors affects the local economy as those industries closely tied to game-fishing and other harvest activities see fewer customer visits. These businesses would include bait-and-tackle shops, sporting goods stores, boat rental businesses, restaurants, hotels, motels and other tourist or recreation-based industries.

In this report, the Beacon Hill Institute (BHI) estimates the economic impact of the treaty harvest on the local economy. In the following sections of the report, BHI defines the local economy, measures its performance and estimates the economic impact of the harvest treaty fishing restrictions.

[8] "Mille Lacs Walleye Harvest," *StarTribune, Newspaper of the Twin Cities*, News Graphics, Internet, http://www.startribune.com/newsgraphics/117248128.html (accessed March, 2012).
[9] Minnesota Department of Natural Resources, Minnesota Fishing Regulations 2011, http://files.dnr.state.mn.us/rlp/regulations/fishing/fishing2011.pdf (accessed December 2011: 25)

The Performance of the Local Economy

Mille Lacs Lake is bisected by Mille Lacs and Aitkin counties, while the Crow Wing County borders on its western shore. These counties serve as our first iteration in our attempt to define the local economy. However, Crow Wing County contains a short border with Mille Lacs Lake. Minnesotalakes.com does not list Mille Lacs Lake as a "top fishing lake" in Crow Wing County and list 19 other lakes that "specialize" in Walleye fishing.[10] Both Aitkin and Mille Lacs contain large portions of the Mille Lacs shore and have businesses in Mille Lacs Lake region.

The Aitkin County Visitors Information directory list only 14 out of 100 businesses, or 14 percent, that are located in the Mille Lacs Lake area.[11] Mille Lacs Tourism Council lists 167 businesses, not including churches, schools and government offices.[12] Moreover, Aitkin County contains seven other lakes listed as "specializing" in Walleye fishing, while Mille Lacs County only contains one other lake.[13] Thus, anglers that are discouraged by the catch restrictions for Mille Lacs Lake could choose to fish in other lakes within Aiken County and thus not harm the local economy.

Due to its limits on fishing, Mille Lacs Lake faces competition from a significant number of other lakes that can serve as alternatives to Mill Lacs Lake for walleye fishing. Therefore, anglers that are discouraged from fishing at Mille Lacs due to the catch restrictions can easily migrate to one other lake within the county without imposing a loss to the county economy. As a result, we exclude Aitkin and Crow Wing counties and define our local economy as Mille Lacs County.

Next, we need to examine if the local economy has been impacted by treaty harvest expanded the fishing restrictions. One could conduct formal and informal surveys of local businesses in the industries listed above to ascertain how businesses have been affect by the harvest restrictions. However, informal surveys might not represent the population and include bias of some anglers. A formal survey may struggle to get enough completed surveys to be statistically significant.

---

[10] Crow Wing County Minnesota Lakes at http://www.minnesotaslakes.com/crow_wing_county_fishing.htm (accessed February 2012).
[11] Aitkin County Visitors Information, http://www.co.aitkin.mn.us/Tourism/VisitorDataSearch.aspx (accessed January 2012).
[12] Mille Lacs Tourism Council, http://business.millelacs.com/list/QuickLink/.htm, (accessed February 2012).
[13] Aitkin County Minnesota Lakes at http://minnesotaslakes.com/LakePages_LOL/MinnesotasLakes_Aitkin_County.htm (accessed February 2012)

We use the 1999 Supreme Court decision as our point in time from which to measure the local economy under the treaty harvest regime. In doing so we compare the performance of the local economy in the nine years prior to the Court (1990 – 1999) ruling and the nine years after the ruling (2000-2009). Table 1 displays growth rates in several economic indicators for each time period.[14]

Table 1: Compound Annual Growth Rates for Variables in the State and Local Economies

Mille Lacs County	**1990-1999**	**2000-2009**	**2000-2007**
Per capita personal income	5.7%	2.6%	2.4%
Personal Income	9.1%	2.0%	3.2%
Wage and salary disbursements	7.3%	-1.1%	1.9%
Nonfarm proprietors' income	3.5%	-1.2%	-0.3%
Total full-time and part-time employment	0.6%	-3.3%	-3.5%
Average earnings per job	4.8%	3.6%	3.9%
Average wage and salary disbursements	4.3%	2.7%	2.9%
Number of nonfarm proprietors	6.6%	2.3%	5.6%
Average nonfarm proprietors' income	5.7%	2.6%	2.4%
Minnesota	1990-1999	2000-2009	2000-2007
Per capita personal income	5.0%	2.6%	3.6%
Personal Income	6.2%	3.4%	4.4%
Wage and salary disbursements	5.1%	2.2%	3.2%
Nonfarm proprietors' income	9.7%	0.6%	2.9%
Total full-time and part-time employment	2.1%	0.4%	0.9%
Average earnings per job	2.3%	3.1%	3.9%
Average wage and salary disbursements	4.2%	2.6%	3.1%
Number of nonfarm proprietors	4.1%	2.8%	3.3%
Average nonfarm proprietors' income	2.3%	3.1%	3.9%

In all categories, the growth rate of income and employment slowed dramatically in the 2000 to 2009 period from the 1990 to 1999 period, with some variables registering negative growth over the later period. We also present the data for the period from 2000 to 2007 to remove the effects of the deep national recession from the December 2007 to June 2009. This data also shows a marked decline in the growth of per capita incomes and employment from the earlier period.

However, we cannot simply attribute the underperformance of the later periods to the fishing treaty harvest and subsequent fishing restrictions on anglers. The earlier period included the information technology boom of the 1990s and later periods included the early 2000s recession, when the Internet bubble burst and, in the 2000 to 2009 period, the recent and deep recession. Thus we are not making a fair or apples to apples comparison. We need a reasonable baseline economic performance trend to which we can compare the performance of the local economy.

[14] The Bureau of Economic Analysis, CA30 Regional Economic Profiles, Local Area Personal Income and Employment and Annual State Personal income and Employment http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1&isuri=1&acrdn=5, (accessed December 2011).

We could use data from a longer period before 1999 that includes other periods of recession and slow growth. However, data becomes less available at the county level and the structural changes to the U.S. and Minnesota economies that have taken over the past decades make the comparison less compelling. We could also use the performance of the state economy over that period as a baseline.

The bottom portion of Table 1 displays the performance of the state economy over the same period. In the 1990-1991 period Mille Lacs economy outperformed the state economy in all categories except employment growth and wage and non-farm proprietor's income. In the next two periods the Mille Lacs county economy underperformed or equaled the performance of the state economy in every category except "average earnings per job" in the 2000-2009 period and in the "number of nonfarm proprietors" in the 2000-2007 period. This is a dramatic turnaround in relative economic performances of the state and Mille Lacs economies between the two periods.

However, the state economy includes the Minneapolis/St. Paul metropolitan area, which is far different from the economy on Mille Lacs County. We need to find an area that has similar economic and demographic characteristics to Mille Lacs County. In addition, the area should have fishing lakes and should not suffer fishing restrictions similar to Mille Lacs Lake.

Cass County appears to be a good candidate for our benchmark. Cass County contains 24 lakes that "specialize" in Walleye fishing.[15] While some lakes in Cass County do contain similar restrictions as Mille Lacs Lake, such as Leech Lake, many other contain special regulations, such as Lake Winnibigoshish. Cass County has a similar population and other demographic and economic characteristics as Mille Lacs County. Table 7 and Table 8 of the Appendix show detailed demographic and economic data for the Mille Lacs and Cass counties.[16]

Now that we have defined the benchmark economic, we can compare the economic performance of Mille Lacs County to that of Cass Counties. Table 2 shows the relative performance of the two areas, prior to and after the Supreme Court decision.[17]

During the 1990 to 1999 period, the Cass economy registered higher growth rates than Mille Lacs for all categories. The largest difference was the growth of the number of proprietors and

[15] Cass County Minnesota Lakes at http://www.minnesotaslakes.com/cass_county_mn_fishing.html (accessed February 2012)

[16] U.S. Census Bureau, FactFinder2, DP-1: Profile of General Population and Housing Characteristics, QT-P11: Households and Families, DP-03: Selected Economic Characteristics http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t, (accessed November 2011).

[17] The Bureau of Economic Analysis, CA30 Regional Economic Profiles, Local Area Personal Income and Employment, http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1&isuri=1&acrdn=5, (accessed December 2011).

their income, as the number Cass area increased the number proprietors by 38 percentage points higher than the Mille Lacs. As expected, total proprietors' income in Cass outgrew Mille Lacs areas by a similar margin. For other economic variables, such as personal income, wages and salaries and employment Cass experienced higher growth rates than Mille Lacs.

Table 2: Growth of Economic Variables

Mille Lacs	1990-1999	2000-2009	Difference
Per capita personal income	55.6%	22.7%	-59.1%
Wage and salary disbursements	100.9%	17.1%	-83.1%
Nonfarm proprietors' income	75.3%	-8.2%	-110.9%
Total full-time and part-time employment	31.8%	-9.0%	-128.4%
Number of nonfarm proprietors	5.0%	-23.4%	-565.1%
Cass			
Per capita personal income	75.0%	33.9%	-54.7%
Wage and salary disbursements	105.3%	27.3%	-74.1%
Nonfarm proprietors' income	133.0%	-24.7%	-118.6%
Total full-time and part-time employment	57.1%	3.3%	-94.3%
Number of nonfarm proprietors	86.3%	7.6%	-91.2%

*2001 due to a data anomaly.

The second column is Table 2 displays the same variables for the time period from 2000 to 2009. We expect to see the growth rates for all of the variables to show a decline from the previous period, due to the reasons listed above. We also expect to see the Cass economy to outperform the Mille Lacs economy, similar to the prior period. Our expectations are met for all of the variables listed in the table.

We should also expect that the difference in the performance of economies of the two areas should remain relatively constant over the periods due to their similar economic and demographic characteristics. This is not the case. It is clear from the table that the Mille Lacs area suffered a much steeper decline in its economic performance than the Cass region during the 2000 to 2009 period. However, it is not clear that is overall decline in economic performance of Mille Lacs economy relative to the Cass economy includes those industries that would be affected by the treaty harvests. We need to dig further into the data to analyze those industries that would most likely be affected by the fishing restrictions imposed by the treaty harvest.

Table 3 contains data from the Bureau of Economic Analysis (BEA) for employment and earnings by major industry group using the U.S. Census Bureau North American Industrial Classification System (NAICS).[18] The table reports percentage change in employment and earnings from 2001 to 2009. The BEA does not report data for all industries to avoid disclosure of confidential information for specific companies that may have a dominant position in the industry at the county level.

We are not able to make a comparison with the earlier period (1991-1999) due to the Census Bureau's change over from the Standard Industry Classification System (SICS) in 1997. The

[18] Ibid

industrial groupings do not match up well. Nevertheless, the data allows us to compare those industries that likely would be affected by the treaty harvest and those that likely would not.

The table shows a similar pattern between the performance of the Mille Lacs economy and the Cass economy as in Table 2. Employment growth in Mille Lacs underperforms Cass by a relatively small margin in the construction, wholesale, retail, finance and real estate industries, while outperforming Cass in the information sector. With the possible exception of the retail sector, one would not expect any of these industries to be effected by the treaty harvest fishing restrictions. Employment growth in Mille Lacs underperforms Cass by a relatively wide margin in the all other industries. Of these, the arts, entertainment, recreation, accommodation and food services industries would be expected to suffer due to the lack of tourism in Mille Lacs County.

Table 3: Change in Employment and Income by Industry 2001-2009

	Employment (percent change)		Earnings (percent change)	
Industry	**Mille Lacs**	**Cass**	**Mille Lacs**	**Cass**
Construction	-0.8	5.6	-14.9	-16.0
Manufacturing	-54.3	-7.7	-42.1	7.1
Wholesale trade	-11.4	7.6	38.9	30.5
Retail trade	-9.3	-24.3	10.8	3.7
Information	164.2	36.8	186.0	27.5
Finance and insurance	12.0	47.3	12.7	40.4
Real estate and rental and leasing	20.9	43.7	82.5	71.6
Educational services	80.1	NA	265.5	151.3
Arts, entertainment, and recreation	-28.0	4.2	-25.7	23.5
Accommodation and food services	-2.9	37.8	10.3	19.5
Other services, except public admin	-19.0	3.5	-24.6	-16.0

In terms of earnings growth, several industries in Mille Lacs move from underperforming Cass to the outperforming them, including construction, wholesale and real estate. They join retail, information, and education which continue to outperform Cass. As with employment, earnings growth in Mille Lacs continues to lag Cass by a wide margin in the manufacturing, arts, entertainment and recreation and accommodation and food service industries, while finance and insurance lags by a similar degree as employment.

Table 4 displays Compound Annual Growth Rates (CAGR) for income in sub-industries for the retail, arts, entertainment and recreation and accommodation and food service industries. These sub-industries should be particularly sensitive to changes in the tourist patterns. We use CAGR because the BEA data are sporadic over the years, with more data points that are missing

not shown to avoid disclosure of confidential information. All of the Mille Lacs sub-industries experienced slower growth rates over the period.

Table 4: Compound Annual Growth Rate of Earnings by Sub-Industries

Industry	Mille Lacs	Cass
Sporting goods, hobby, book and music stores (2001-2009)	2.3	3.6
Amusement, gambling, and recreation(2003-2009)	0.1	5.4
Accommodation (2002-2009)	-14.0	2.8
Food services and drinking places (2001-2009)	0.9	1.7

Our analysis of the Mille Lacs economy demonstrates that the county has experienced a dramatic slowdown in the period since the treaty harvest fishing restrictions were implemented from the period before. Over the same period, the Mille Lacs economy has performed worse than our benchmark economies of Cass County. Furthermore, tourist industries, such as accommodations and amusements, have performed significantly worse than the benchmark. Now that we have demonstrated that the Mille Lacs economy has experienced slower growth, (and negative growth in the case of the accommodation business), we can now estimate that portion which is due to the treaty harvest restrictions.

Measuring Economic Impact

The entire underperformance of the Mille Lacs economy relative to the Cass economy cannot be attributed to the treaty harvest. There are many other factors that may contribute to the relative underperformance of the Mille Lacs economy, despite the many similarities between the two areas. For example, Cass has a higher portion of their population with a bachelor's degree or higher and their workers face a shorter commute than Mille Lacs (see Tables 7 and 8 in the appendix). We need to identify these areas that affect the economic performance. BHI has a tool that makes this job easier: The Beacon Hill Institutes State Competitiveness Index.

Since 2001, BHI's State Competitiveness Report has identified the qualities that allow some areas to excel in income generation and the qualities that inhibit other areas from attaining the same level of competitiveness. The indexes are designed to measure the long-term competitiveness of an area, and use a similar approach to the one taken in BHI's earlier studies of state competitiveness.

We consider an area to be competitive if it has in place the policies and conditions that ensure and sustain a high level of per capita income while sustaining growth in Gross Domestic Product State. To achieve this, an area should be able both to attract and incubate new businesses and provide an environment that is conducive to the growth of existing firms. Competitiveness may be thought of as a catch-all term that covers what Harvard University

Professor Michael Porter calls "the microeconomic foundations of prosperity." The areas of the United States all face the same macroeconomic conditions set at the top – national fiscal, monetary, and trade policy. Where they differ from one another is in their microeconomic policies such as tax and regulatory regimes, their provision and emphasis on education, and their attractiveness to business. These policies matter. As Porter puts it, "wealth is actually created at the microeconomic level … in the ability of firms to create valuable goods and services using productive methods."

The BHI Competitiveness Index is based on a set of 43 indicators divided into eight subindexes –government and fiscal policy, security, infrastructure, human resources, technology, business incubation, openness, and environmental policy.[19] We utilize the BHI Competitiveness Index to account for the differences in economic performance of our areas of interest and our benchmark areas. However, we encounter a data deficit at the county level. We were only able to gather partial data for fiscal policy, security, infrastructure and human resources. Nevertheless, these data allow us to account for a portion of the underperformance of the Mille Lacs economy relative to Cass, allowing a more accurate estimate of the economic effects of the treaty harvest. We collected data for 15 of the 24 possible components of each of our four sub-indexes. Table 5 displays the components and the differences between Mille Lacs and Cass.

In the human resources category, the table lists the portions of the local population that match a particular category for each area of interest and the margin of error.[20] In four of the seven categories, the difference between Mille Lacs and Cass is within the margin of error, and thus there is no statistical difference between the two figures. However, Cass has a higher percentage of its population with a bachelor's or graduate degree (21.3 percent) than Mille Lacs (13.9 percent) and the differences fall outside the margins of error for the two figures. However, Mille Lacs has a higher percentage of grade-ten students passing the statewide standardized test scores and a higher percentage of adults in the labor force.

[19] For a detailed explanation see http://www.beaconhill.org/CompetitivenessHomePage.html.
[20] U.S. Census Bureau, FactFinder2, DP-1: Profile of General Population and Housing Characteristics, QT-P11: Households and Families, http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t, (accessed November 2011).

Table 5: BHI Competitiveness Sub Indexes for Mille Lacs & Cass Counties

Human Resources	Mille Lacs	Error	Cass	Error
% of population without health insurance (-)	14.0%	1.2%	13.6%	1.1%
% of population with high school diploma (+)	39.6%	1.6%	36.8%	1.2%
Unemployment rate (-)	9.4%	1.1%	8.3%	1.2%
% of students enrolled in college 1000 (+)	15.2%	2.3%	12.1%	2.5%
% of adults in the labor force (+)	63.0%	1.6%	56.0%	1.5%
% of population with bachelor degree or higher (+)	13.9%	1.0%	21.3%	0.9%
% of tenth graders passing math scores (+)	49.8	NA	47.0	NA
Security				
% Change in crime index 2002 -2005 (-)	20.7%	NA	7.2%	NA
Murder index per 100,000 people 2000-2005(-)	7.3	NA	9.1	NA
Property Crime Index (-)	3,657.0	NA	3,561.7	NA
Government & Fiscal Policy				
Local taxes per capita /income per capita % (-)	3.7%	NA	3.9%	NA
Local government employees per 100 residents (-)	0.130	NA	0.137	NA
Infrastructure				
Travel time to work (-)	28.10	1.50	21.80	0.80
Retail Electricity prices (cents per KWh) (-)	10.66	NA	11.27	NA
Monthly Rent for a 2 bedroom apartment (-)	$866	$147	$803	$217

The security index captures the fact that an area will be more attractive to business if crime is low.[21] Mille Lacs has seen its overall crime index increase by 20.7 percent from 2000 to 2005 (the last year data is available) while Cass has seen its crime index increase by only 7.2 percent. However, over the same period Cass has averaged 9.1 murders per 100,000 inhabitants compared to only 7.3 for Mille Lacs. Finally, Mille Lacs experiences a higher level of property crime, than does Cass. The Security Index shows that, on balance, Cass has a lower overall crime level than does Mille Lacs and this contributes to its economic outperformance.

The government & fiscal policy sub-index contains two components for which data is available at the county level.[22] For both components, Mille Lacs retains a very slight edge over Cass, which makes Mille Lacs more competitive. As a result, the sub-index actually indicates that Mille Lacs economy should perform slightly better than the Cass based on its fiscal and government policies.

[21] The Disaster Center, United States: Uniform Crime Report -- State Statistics from 1960 – 2010, http://www.disastercenter.com/crime/ (accessed January 2012).
[22] U.S. Census Bureau, Federal, State and Local Governments, Government Employment and Government Finance Statistics, http://www.census.gov/govs/ (accessed November 2011).

For the infrastructure sub-index, we were able to collect data for three components: travel time to work, monthly rent on a two bedroom apartment and retail electricity prices.[23] For two of the three components, Cass has a competitive advantage over Mille Lacs. Commute time and monthly rent contributes to the economic outperformance of Cass, while electricity prices favor Mille Lacs.

Now that we have accounted for some of the difference between the performance of Mille Lacs and Cass, we can quantify the differences due to each sub-index. We used regression analysis to quantify the effect that each sub-index from our metro competitiveness index has on state real personal income per capita across all fifty states. Specifically, we regressed the natural logarithm of state real personal income per capital on the natural logarithm of each sub-index. Table 6 contains the results of our regression analysis and the application of those results to differences in the components of BHI competitiveness sub-indexes between Mille Lacs and Cass.

The regression coefficients are all positive and statistically significant. The R-Squared value indicates the portion of the variation in state real personal income per capita that the sub-index explains. As expected, the human resources sub-index has the largest effect on state real personal income per capita and explains the highest portion of the variation in income across states. The coefficients for the other three sub-indexes are similar and they explain roughly the same variation in state real personal income per capita.

The last two columns of Table 6 show the percentage difference in the sub-index components between the two regions and the change in personal income (PI) attributed to the difference in the sub-index. The fiscal and government policy and human resources sub-indexes show Mille Lacs to be nearly competitive as Cass, while Cass is significantly more competitive for the security and infrastructure sub-indexes. The net result is that the four competitiveness indexes account for 4.4 percent of the difference in personal income between the two regions.

[23] Rent: U.S. Census Bureau, FactFinder2, 2006-2010 American Community Survey 5-Year Estimates, B25068: Bedrooms By Gross Rent; Commute: DP-03: Selected Economic Characteristics, http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t, (accessed November 2011); Electricity Prices: U.S. Department of Energy, Energy Information Administration, Electric Power Monthly, Table 5.6A: Average Retail Price of Electricity to Ultimate Customers by State, http://www.eia.gov/electricity/monthly/, (accessed November 2011)

Table 6: Regression Results of BHI Sub-Index and Per Capita Personal Income

Sub Index	Coefficient	p-value	R squared	% difference	Change in PI
Fiscal Policy	0.38381	0.019	0.0275	0.1%	0.01%
Security	0.32101	0.002	0.0242	9.4%	1.26%
Infrastructure	0.37719	0.007	0.0242	15.4%	2.35%
Human Resources	0.61482	0.000	0.2328	3.0%	0.78%
Total			0.3087		4.40%

There are two ways we can measure the difference between the growth of personal income Mille Lacs and Cass in the two periods: 1990-1999 and 2000 to 2009. First, we compare the gap between total growth in personal income in the prior period, at 35 percent and the in the recent period, at 49.4 percent, for a total difference of 14.4 percent. Second, we can also compare the slowdown in the growth of personal income over the two periods. In Mille Lacs, personal income growth slowed by 59.1 percent between the two periods, while in Cass growth slowed by 54.7 percent, a difference of 4.4 percent.

Next we subtract the percentage of the difference accounted for by the BHI Competitiveness sub-indexes, or 4.4 percent, which gives us zero percent. The R-squared value also tells us that the competitiveness sub-indexes account for 30.87 percent of the variation in per capita personal income between the states, which means that unobserved variables account for 69.13 percent of the variation. We use this percentage to reduce the difference in the growth of personal between Mille Lacs and Cass over the two periods, which leaves us with 3.1 percent and 0.0 percent respective of our two methods. We then average the two percentages to arrive at our estimate of the difference in the growth of real personal income per capita that we attribute to the treaty harvest restrictions, or 1.5 percent.

Next we translate the 1.5 percent difference in the growth of real personal income per capita into a dollar figure. In 2009, Mille Lacs real personal income per capita was $27,391; if it were 1.5 percent higher it would have been $27,813 a difference of $422 per person. We multiply that figure by the population of Mille Lacs, which gives us a total change in real personal income of $11.134 million. Now we can see how this lower level of real personal income affects Mille Lacs economy.

Although there are varied methods of measuring economic impacts, the idea is quite simple. The loss of initial income or spending in an economy has a "ripple" effect whose influence flows through to other sectors and households in the community. In essence, the loss of initial income in one sector brings about spending reduction in other sectors. This process lowers income and employment as it reverberates through the local business community. Depending on the size of the initial shock, these ancillary effects can be quite large. For example, the loss of Boeing in the Greater Seattle economy would extend far beyond its initial outlay in wages and purchases. In

other words, each expenditure has what economists call 'a multiplier effect' that represents the recycling of money and income in an economy. By determining the multiplier for each category of expenditures, it is possible to simulate the initial spending and trace its influence through an economy. By measuring the change in economic indicators (i.e. employment) we can calculate the ultimate economic impact.

In the case of the impact of the treaty harvest rights, the loss of personal income reduces spending and the initial reduction in spending ripples through the economy. We used proprietary software called Minnesota, IMPLAN to model the effect of this loss of personal income on the Mille Lacs economy.

IMPLAN provides regional industry multipliers, which enable the user to provide detailed analyses of the direct, indirect and induced economic impacts on the local economy of a change in final demand for certain industries or households. IMPLAN multipliers are designed to model a variety of scenarios and are traditionally used to model a shock to a regional economy. Examples of uses of the model include opening or closing military bases, new energy facilities, new sports stadiums, opening or closing manufacturing plants and airport or port facilities. All these scenarios are modeled by estimating changes in final demand by industry or household income group and entering them into the IMPLAN model for the region.

Any systematic analysis of economic impacts must account for the inter-industry relationships within a region. IMPLAN accounts for inter-industry relationships through the use of a regional transaction table that is algebraically manipulated to produce a set of regional multipliers.

The loss of personal income by local households exerts a negative shock to the local economy, i.e. the change in final demand. We entered these changes into IMPLAN and used them to calculate the impact on output, value added and labor income by industry in the local economy. IMPLAN is available at the county level and can be used for a multiple county region as long as the counties are contiguous, like Mille Lacs.

IMPLAN captures the direct effects of changes in final demand and local purchases made by local companies as a result of this increase in final demand. Because IMPLAN is based on regional industry multipliers it will also capture the ancillary effects arising from the income earned from the local companies' input purchases. This allows BHI to provide a complete analysis of the treaty harvest restrictions' economic impact on the Mille Lacs area, as local companies' transactions ripple through the local economy.

IMPLAN is based on a national transaction table that is regionally adjusted through the use of Regional Purchase Coefficients (RPC). RPCs represent the portion of local demand purchased from local producers. Once the transaction table is regionalized, a coefficient matrix is derived

by dividing each industry column by the column total. This coefficient matrix is also called the A matrix. Through the algebraic manipulation performed below, the regional multipliers are derived:

$$X = (I - A) -1Y,$$

where

X = Industry output,
I = Identity matrix,
A = A matrix,
Y = Final Demand.

Our analysis accounts for changes Y, in the form of loss of spending by local citizens and fishermen. After we apportioned these changes in final demand to household groups as documented above, we use IMPLAN to determine how output and value added changes throughout the economy.

Results

The income losses presented above create additional indirect and induced economic impacts in the economy. As is detailed below, we present the impact of the treaty harvest on the regional economy using two economic indicators: value-added and employment. Value-added represents a measure of the economic activity that ultimately sticks in the local economy. It consists of employees' wages, proprietors' income, indirect business taxes and corporate profit. It is the portion of output that is created locally. For example, a consumer buys a t-shirt from a souvenir shop in Mille Lacs County, and pays $5. Of this, $3.50 will go to the wholesaler, who is located outside of Mille Lacs County, $0.80 is earned as income for the local proprietor of the souvenir shop, $0.45 goes to the cashier behind the counter and $0.25 is collected in taxes. It is only appropriate to count the $1.50 ($0.80+0.45+0.25) that remains in Mille Lacs County as local economic activity, the rest is said to have "leaked" out of the economy. Employment represents the total change in jobs as a result of the direct, indirect, and induced impacts of the loss of personal income and subsequent spending. In addition, we report the loss in tax revenues for the state and local governments.

As a result of the loss of personal income and spending in Mille Lacs, $3.9 million in value-added is lost in Mille Lacs County. In addition to the loss in value added, labor income falls by $2.0 million. This represents true economic activity, dollars that would stay in the local economy but are lost. The total change in employment as a result of the personal income amounts to 70 jobs lost.

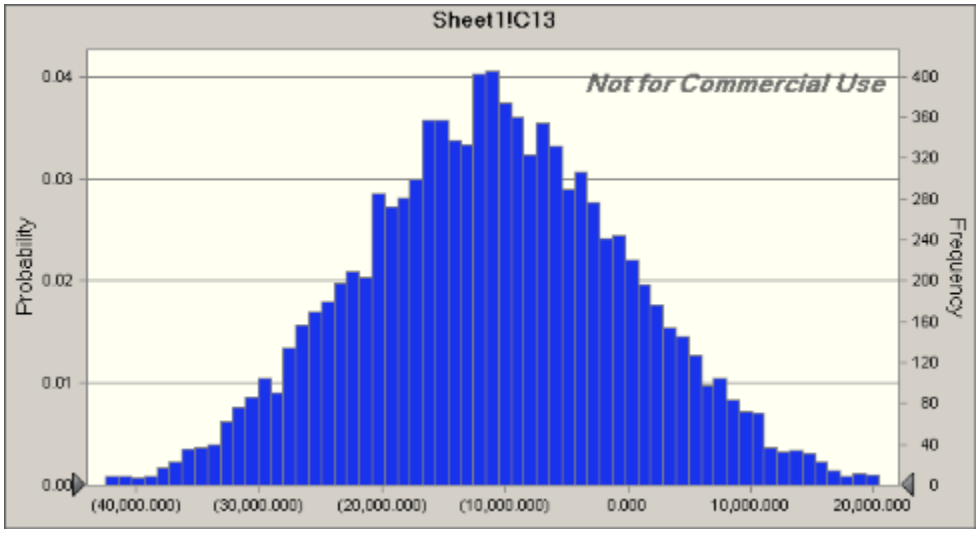
The negative economic impact of the treaty harvest rights also affects tax collections for the state and local governments. Taxes levied on employee wages and salaries lose $13,000 in revenue, while household taxes – namely personal income and property taxes— drop by $62,000 and corporate income taxes and fees drop by $18,000. State and local sales tax fall by $389,000, by far the largest loss of revenue.

Robustness of the Results

Our analysis of the economic impact of the treaty harvest rights on Mille Lac is based on the comparison with the benchmark economy Cass. We account for differences in economic performance between the two areas using measures of competitiveness. We can test how robust our results are to the competiveness measures.

The analysis was programmed using Crystal Ball, an add-in program to Microsoft Excel to undertake a "Monte Carlo analysis," which sets a distribution of outcomes for each of the main variables, and then simulates the results. This gives a better sense of what outcomes are plausible (rather than merely possible).

For instance, we account for the larger drop in the growth of real personal income per capita using the regression results for the security variable listed in Table 6. However, what if the interaction between the regression coefficients and the variables differ from the actual value? We can test the sensitivity of our results by assigning a normal distribution to the variables. We then drew 10,000 random samples from the distribution, and computed the variables of interest (security, fiscal policy, human resources, infrastructure, etc.). This allowed us to compute a distribution of outcomes, like the one shown in the figure below.



The most important feature of this risk analysis is that it allows us to compute confidence intervals for our target variables. Thus the 90 percent confidence interval for the real personal income per capita variable is -$29.6 million to $7.6 million; in other words, we are 90 percent confident that the true result lies inside this band. It is also clear that the net economic impact of the treaty harvest is negative. In other words, our conclusion that treaty harvest harms the Mille Lacs economy is robust.

Conclusion

Since the 1999 Supreme Court ruling upholding the fishing harvest rights of the Mille Lacs Chippewa Band of Chippewa's, Minnesota DNR has increased the Chippewa Band's allocation of fish on Lake Mille Lacs to over 142,000 pounds of fish, a staggering amount. As a result, the sustainable harvest has been unstable and precarious. However, the DNR has instituted strict fishing quotas that only apply to Lake Mille Lacs. These restrictions have hurt industries most dependent on tourists, as frustrated anglers have sought out other lakes in the region. These industries comprise 14.7 percent of the local economy, and have suffered the brunt of the real damage, as these restrictions do not operate in a vacuum. Policymakers should take notice and action to correct the situation.

Appendix

Table 7: Demographic Characteristics of Mille Lacs and Cass Counties

	Mille Lacs				Cass			
TOTAL HOUSEHOLDS	10,143	221	10,143	221	13,192	650	13,192	650
Family households (families)	6,669	216	66%	1.90	9,106	459	69%	1.70
With own children under 18 years	2,856	174	28%	1.60	3,149	252	24%	1.30
Married-couple family	5,469	207	54%	2.00	7,548	358	57%	1.70
With own children under 18 years	2,071	149	20%	1.40	2,218	169	17%	1.00
Male householder, no wife present, family	399	107	4%	1.00	597	116	5%	0.80
With own children under 18 years	220	66	2%	0.60	371	88	3%	0.60
Female householder, no hus Chippewa	801	128	8%	1.30	961	105	7%	0.70
With own children under 18 years	565	116	6%	1.10	560	98	4%	0.70
Nonfamily households	3,474	224	34%	1.90	4,086	329	31%	1.70
Householder living alone	2,857	195	28%	1.70	3,478	269	26%	1.60
65 years and over	1,135	130	11%	1.20	1,217	125	9%	0.80
Households with people under 18	3,087	177	30%	1.60	3,809	331	29%	1.80
Households with people over 65	2,713	150	27%	1.30	3,750	195	28%	1.10
Average household size	2.50	0.05		0.05	2.15	0.10		0.15
Average family size	3.01	0.07		0.07	2.53	0.14		0.22
SCHOOL ENROLLMENT								
Population 3 years and over enrolled in	6,095	204	6,095	204	5,383	300	5,383	300
Nursery school, preschool	411	100	7%	1.60	376	74	7%	1.30
Kindergarten	370	85	6%	1.40	274	50	5%	0.90
Elementary school (grades 1-8)	2,747	108	45%	2.00	2,640	86	49%	3.10
High school (grades 9-12)	1,639	79	27%	1.50	1,439	225	27%	3.10
College or graduate school	928	164	15%	2.30	654	151	12%	2.50
EDUCATIONAL ATTAINMENT								
Population 25 years and over	17,402	54	17,402	54	20,242	66	20,242	66
Less than 9th grade	687	116	4%	0.70	543	93	3%	0.50
9th to 12th grade, no diploma	1,496	157	9%	0.90	1,431	139	7%	0.70
High school graduate (includes	6,888	281	40%	1.60	7,450	248	37%	1.20
Some college, no degree	4,469	238	26%	1.40	4,617	232	23%	1.10
Associate's degree	1,443	161	8%	0.90	1,895	148	9%	0.70
Bachelor's degree	1,759	214	10.1%	1.20	3,146	201	15.5%	1.00
Graduate or professional degree	660	116	3.8%	0.70	1,160	133	5.7%	0.70
Percent high school graduate or higher	87.46%	1	87.5%	-	90.25%	0	90.2%	-
Percent bachelor's degree or higher	13.90%	3	13.9%	1.00	21.27%	1	21.3%	0.90
RESIDENCE 1 YEAR AGO								
Population 1 year and over	25,712	98	25,712	32	28,323	105	28,323	48
Same house	22,176	432	86.2%	1.70	25,418	340	89.7%	1.20
Different house in the U.S.	3,524	431	13.7%	1.70	2,888	342	10.2%	1.20
Same county	1,365	264	5.3%	1.00	1,309	223	4.6%	0.80
Different county	2,159	323	8.4%	1.30	1,579	263	5.6%	0.90
Same state	1,922	315	7.5%	1.20	1,349	254	4.8%	0.90
Different state	237	58	0.9%	0.20	230	75	0.8%	0.30
Abroad	12	9	0.0%	0.10	17	13	0.1%	0.10
PLACE OF BIRTH								
Total population	26,071	***	26,071	***	28,654	***	28,654	***
Native	25,740	94	99%	0.40	28,388	64	99%	0.20
Born in United States	25,674	93	98%	0.40	28,293	77	99%	0.30
State of residence	21,213	361	81%	1.40	22,210	323	78%	1.10
Different state	4,461	351	17%	1.30	6,083	316	21%	1.10
Foreign born	331	94	1.27%	0.40	266	64	0.93%	0.20
LANGUAGE SPOKEN AT HOME								
Population 5 years and over	24,238	30	24,238	30	26,904	15	26,904	15
English only	23,064	205	95.16%	0.90	26,019	127	96.71	0.5
Language other than English	1,174	208	4.84%	0.90	885	128	3.29%	0.5
Spanish	328	119	1.35%	0.50	124	52	0.46%	0.20
Other Indo-European languages	323	99	1.33%	0.40	232	65	0.86%	0.20
Asian and Pacific Islander languages	433	141	1.79%	0.60	238	49	0.88%	0.20

Table 8: Economic Characteristics of Mille Lacs and Cass Counties

	Mille Lacs				Cass			
Population 16 years and over	20,287	78	20,287	X	23,285	86	23,285	
In labor force	13,556	292	67%	1.50	14,027	287	60%	1.2
Civilian labor force	13,531	287	67%	1.50	13,990	289	60%	1.2
Employed	12,257	287	60.40%	1.50	12,827	305	55%	1.3
Unemployed	1,274	159	6%	0.80	1,163	178	5%	0.8
Not in labor force	6,731	317	33%	1.50	9,258	293	40%	1.2
Percent Unemployed	9%	1.10			8%	1.20		
COMMUTING TO WORK								
Workers 16 years and over	12,076	299	12,076	X	12,571	308	12,571	x
Car, truck, or van -- drove alone	9,432	374	78%	2.30	9,123	373	73%	2.7
Car, truck, or van -- carpooled	1,300	187	11%	1.60	1,312	192	10%	1.5
Other means	208	96	2%	0.80	217	63	2%	0.5
Worked at home	656	130	5%	1.00	1,132	149	9%	1.1
Mean travel time to work (minutes)			28.10	1.50	0	0	21.80	0.80
OCCUPATION								
Management, professional, and related	12,257	287	12,257	X	12,827	305	12,827	X
Service occupations	3,125	263	25%	2.00	3,943	266	31%	1.70
Sales and office occupations	2,286	227	19%	1.80	2,573	177	20%	1.30
Farming, fishing, and forestry occupations	2,778	263	23%	2.00	2,857	200	22%	1.60
Construction, extraction and maintenance	85	30	1%	0.20	343	195	3%	1.50
Production, transportation	1,449	175	12%	1.50	1,512	151	12%	1.20
INDUSTRY								
Agriculture, forestry, mining	232	44	2%	0.40	610	196	5%	1.5
Construction	1,118	138	9%	1.20	1,408	140	11%	1.1
Manufacturing	1,948	173	16%	1.30	1,004	131	8%	1.0
Wholesale trade	354	106	3%	0.90	270	72	2%	0.6
Retail trade	1,533	222	13%	1.80	1,637	160	13%	1.2
Transportation and warehousing, utilities	667	171	5%	1.40	425	80	3%	0.6
Information	143	61	1%	0.50	197	49	2%	0.4
Finance and insurance, real estate	494	108	4%	0.90	624	103	5%	0.8
Professional, management administrative	651	130	5%	1.00	845	122	7%	0.9
Educational, health care, social assistance	2,657	242	22%	2.00	2,556	213	20%	1.5
Entertain, accommodation, food services	1,234	171	10%	1.40	1,819	176	14%	1.3
Other services	571	133	5%	1.10	784	131	6%	1.0
Public administration	655	125	5%	1.00	648	126	5%	1.0
CLASS OF WORKER								
Private wage and salary workers	9,707	303	79%	1.70	11,448	457	69%	2.0
Government workers	1,710	202	14%	1.60	3,230	299	20%	1.6
Self-employed	823	113	7%	0.90	1,828	211	11%	1.1
INCOME AND BENEFITS (IN 2009 $)								
Total households	10,143	221	10,143	X	13,192	650	13,192	X
Less than $10,000	832	128	8.2%	1.20	1,367	200	8.3%	1.1
$10,000 to $14,999	708	116	7.0%	1.10	1,345	252	8.2%	1.4
$15,000 to $24,999	1,230	154	12.1%	1.50	2,114	262	12.8%	1.3
$25,000 to $34,999	1,036	147	10.2%	1.40	2,316	245	14.0%	1.1
$35,000 to $49,999	1,710	161	16.9%	1.50	2,678	292	16.2%	1.2
$50,000 to $74,999	2,209	155	21.8%	1.50	3,393	273	20.6%	1.5
$75,000 to $99,999	1,359	157	13.4%	1.50	1,594	177	9.7%	0.9
$100,000 to $149,999	837	115	8.3%	1.10	1,151	188	7.0%	1.0
$150,000 to $199,999	136	59	1.3%	0.60	240	60	1.5%	0.3
$200,000 or more	86	44	0.8%	0.40	305	66	1.8%	0.4
Median household income (dollars)	45,817	1,782			39,623	1,915		
Mean household income (dollars)	53,868	1,770			51,960	1,972		
With Social Security	3,282	194	32%	1.70	5,957	362	36%	1.7

About the Authors

David G. Tuerck, PhD, is Executive Director of the Beacon Hill Institute for Public Policy Research at Suffolk University where he also serves as Chairman and Professor of Economics. He holds a Ph.D. in Economics from the University of Virginia and has written extensively on issues of taxation and public economics.

Paul Bachman, MSEP, is Director of Research at BHI. He manages the Institute's research projects, including its STAMP model and other projects. He has published studies on state and national tax policy and on state labor policy. He also produces the institute's state revenue forecasts for the Massachusetts legislature. He holds a Master of Science in International Economics from Suffolk University.

The authors would like to thank Frank Conte, Director of Communications at the Beacon Hill Institute, for editorial assistance.

The Beacon Hill Institute at Suffolk University in Boston focuses on federal, state and local economic policies as they affect citizens and businesses. The institute conducts research and educational programs to provide timely, concise and readable analyses that help voters, policymakers and opinion leaders understand today's leading public policy issues.

THE BEACON HILL INSTITUTE
FOR PUBLIC POLICY RESEARCH
Suffolk University
8 Ashburton Place
Boston, MA 02108
Phone: 617-573-8750 Fax: 617-994-4279
bhi@beaconhill.org
http://www.beaconhill.org