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**Estimates of Select Economic Values of  
New Hampshire Lakes, Rivers, Streams and Ponds**

**Phase II Report**

**June, 2003**

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## EXECUTIVE SUMMARY

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New Hampshire has approximately 1,000 lakes and nearly 10,000 miles of rivers and streams. Besides serving as a wildlife habitat, these surface waters provide a variety of recreational and non-recreational uses: for boating, fishing, and swimming; for transportation, manufacturing, and generating electricity; and as a source of drinking water supplies.

Surface waters are valuable both as a natural and economic resource. Residents, in-state property owners, and tourists spend money on water-based recreational activities, and waterfront property owners pay a purchase and tax premium to be located there. Public water utilities depend on surface waters to serve customers and businesses. People also place value on the enjoyment of great ponds and rivers, beyond any dollar figure that they are generally willing to pay to preserve them now and for the future. Business people start and keep businesses here in part because of access to water-based recreational activities.

These activities generate economic wealth that clearly benefits New Hampshire. The magnitude of this economic activity in New Hampshire, however, has not been previously estimated. Information about the economic contribution of the State's surface waters in their current environmental condition, and the value that could be lost if these waters are degraded, will assist policy-makers in making fully informed choices when faced with decisions among multiple and sometimes competing uses of public waters.

The New Hampshire Lakes Association (NHLA) commissioned the Phase II Study on behalf of the Lakes, Rivers, Streams and Ponds Partnership. In addition to NHLA, members of the Steering Committee include the NH Rivers Council, NH Department of Environmental Services, NH Fish and Game Department, Squam Lakes Association, Lake Sunapee Protective Association, and Newfound Lake Region Association. Please contact NHLA for a list of organizations that have contributed funding to date.

The purpose of the Phase II Study is to provide estimates of the economic value from three recreational uses – fishing, swimming, and boating – and two non-recreational uses – public drinking water supplies and waterfront property ownership for New Hampshire lakes, rivers, streams and ponds. Although there are other significant economic values from surface waters, the Phase I Study suggested that these five uses provide both significant value and have data available to estimate the value.

*The economic value of commercial and industrial uses is generally not included in the Phase II Study, nor is the economic benefit of businesses locating in the Granite State due to access to lakes, rivers, streams and ponds. People's willingness to pay for clean New Hampshire surface waters, for keeping them available for future generations,*

and for the value of knowing they just exist, are not measured in the Phase II Study either, but probably exceed the actual use values examined here based on other studies that have attempted to measure such non-use values.

The key findings for the uses presented in the Phase II Study are summarized below. Please refer to the Glossary of Acronyms and Terms for definitions of economic terminology.

- The Total Sales generated by recreational uses (i.e., boating, fishing, swimming) of New Hampshire’s freshwaters, and by public drinking water supplies, range from \$1.1 billion to as much as \$1.5 billion annually.
- Annually, there are approximately 14.7 million visitor days spent by both residents and nonresidents in New Hampshire boating, fishing, and swimming. These visitor days represent roughly 65% of the State’s summer visitor days and roughly 25% of the State’s annual visitor days.<sup>1</sup>
- Days spent boating, fishing, and swimming collectively generate approximately:
  - \$320 million to \$340 million in annual Household Income;
  - 9,000 to 15,000 full- and part-time Jobs; and,
  - \$850 million to \$1.2 billion in annual Total Sales, which represents 8% to 12% of the total impact of visitor spending on the State’s economy.<sup>2</sup>
- Nearly 200,000 households and businesses rely on public drinking water from surface waters supplies. This generates approximately \$75 million to \$150 million in annual Household Income, 1,900 to 2,600 full- and part-time jobs, and \$276 million to \$300 million in annual Total Sales.
- A preliminary estimate suggests that waterfront property owners on lakes, rivers, streams and ponds pay an estimated \$247 million per year in property taxes.<sup>3</sup>

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<sup>1</sup> Based on New Hampshire visitor data prepared by the Institute for New Hampshire Studies, Plymouth State College, which defines “summer” as the months of June, July, and August.

<sup>2</sup> Based on New Hampshire visitor data prepared by the Institute for New Hampshire Studies, Plymouth State College.

<sup>3</sup> This report estimates the property tax payments made by waterfront property owners on lakes, rivers, streams and ponds; it does not estimate the economic impacts from these payments.

**Table ES.1<sup>4</sup>**  
**Annual Impacts of Select Surface Water Uses on New Hampshire's Economy**  
**(All Dollar Values are in Millions of 2002 Dollars)**

<b>Use</b>	<b>Participation</b>	<b>Total Sales</b>	<b>Household Income</b>	<b>Jobs (full- and part-time)</b>
Boating	3.6 million visitor days	\$328 - \$450	\$126 - \$128	3,400 - 5,700
Fishing	3.1 million visitor days	\$245 - \$352	\$84 - \$103	2,100 - 4,300
Swimming	8.0 million visitor days	\$269 - \$380	\$109 - \$111	3,800 - 5,000
Drinking Water	191 thousand customers	\$276 - \$301	\$75 - \$147	1,900 - 2,600
<b>TOTAL</b>		<b>\$1,118 - \$1,483</b>	<b>\$394 - \$489</b>	<b>11,200 - 17,600</b>

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<sup>4</sup> Because this report does not estimate the economic impacts from property tax payments made by waterfront property owners on lakes, rivers, streams and ponds, these property tax payments are not included in this table.

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~ SECTION 1 ~  
OVERVIEW

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New Hampshire has approximately 1,000 lakes and nearly 10,000 miles of rivers and streams. Besides serving as a wildlife habitat, these surface waters provide a variety of recreational and non-recreational uses: for boating, fishing, and swimming; for transportation, manufacturing, and generating electricity; and as a source of drinking water supplies.

Surface waters are valuable both as a natural and economic resource. Residents, in-state property owners, and tourists spend money on water-based recreational activities, and waterfront property owners pay a purchase and tax premium to be located there. Public water utilities depend on surface waters to serve customers and businesses. People also place value on the enjoyment of great ponds and rivers, beyond any dollar figure that they are generally willing to pay to preserve them now and for the future. Business people start and keep businesses here in part because of access to water-based recreational activities.

These activities generate economic wealth that clearly benefits New Hampshire. The magnitude of this economic activity in New Hampshire, however, has not been previously estimated. Information about the economic contribution of the State's surface waters in their current environmental condition, and the value that could be lost if these waters are degraded, will assist policy-makers in making fully informed choices when faced with decisions among multiple and sometimes competing uses of public waters.

To gather this information, the New Hampshire Lakes Association (NHLA) commissioned a study in several phases on behalf of the Lakes, Rivers, Streams and Ponds Partnership. In addition to NHLA, members of the Steering Committee include the NH Rivers Council, NH Department of Environmental Services, NH Fish and Game Department, Squam Lakes Association, Lake Sunapee Protective Association, and Newfound Lake Region Association. Please contact NHLA for a list of organizations that have contributed funding to date.

The Phase I Study reviewed efforts to estimate the value of surface waters in other states, identified what types of uses are likely to add significant economic value in New Hampshire, and surveyed what local data are publicly available from which estimates could be made. The Phase I Study identified five uses to be examined in-depth in the Phase II Study.

- ▶ Boating
- ▶ Swimming
- ▶ Fishing
- ▶ Public drinking water

▸ Waterfront property

*It is important to note that the economic value of commercial and industrial uses is generally not included in the Phase II Study.* Although the value of such uses may be equal to or greater than the uses estimated here, they are beyond the scope of the Phase II Study. The data for such a study may be largely in private hands, thus requiring the financial support and cooperation of additional private sector interests.

*Also not measured in the Phase II Study are non-use values.* People are generally willing to pay for clean lakes, rivers, streams and ponds even if they don't use those resources, and a number of efforts have been made in other studies to estimate just how much they are willing to spend. Although the non-use values of New Hampshire surface waters probably exceeds the actual use values examined here, estimating it is beyond the scope of the Phase II Study.<sup>5</sup>

This report estimates the economic impacts from the first four uses of New Hampshire surface waters listed above, along with the property tax payments made by waterfront property owners on lakes, rivers, streams and ponds.<sup>6</sup> With respect to the first four uses, the general methodology used here estimates: 1) the amount of Direct Sales that are made to residents, nonresidents, and tourists when they spend money (e.g., trip costs, equipment purchases, water utility bills) on each use, and 2) the participation levels by residents, nonresidents, and tourists for each use. These estimates form the basis for estimating economic value in terms of Total Sales, Household Income and full- and part-time Jobs.<sup>7</sup> The estimated economic values that provide the low and high ends of each range were derived by using a model called Impact Analysis for Planning, or IMPLAN,<sup>8</sup> and by using multipliers from the federal government's Regional Input-Output Modeling System, or RIMS II.<sup>9</sup>

The estimates reflect the economic value that results directly from the money that people spend on the above uses, as well as indirectly when their direct expenditures cycle through the New Hampshire economy and stimulate more sales, jobs and household income that is spent in the State. The estimates of participation levels, Direct Sales, Total Sales, Household Income, and Jobs were compared to estimates and data from other sources and studies in order to form a basis for either validating or adjusting the Phase II Study estimates. Below is a summary of the findings from the Phase II Study. In addition to the findings summarized in Table 1.1, a preliminary estimate of property taxes paid by waterfront property owners on lakes, rivers, streams and ponds is

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<sup>5</sup> In the study, "Great Ponds Play an Integral Role in Maine's Economy," the authors estimated that the economic benefits associated with uses of lakes and streams were almost \$2.9 billion and that their existence value was over \$6.7 billion (Boyle et al., April 1997).

<sup>6</sup> This report does not estimate the economic impacts from these property tax payments.

<sup>7</sup> Economic terminology is described in depth in the following chapters and is also defined in the Glossary of Acronyms and Terms.

<sup>8</sup> Additional information about IMPLAN is available in a later chapter of this report, "Description of IMPLAN," and at <http://www.implan.com>.

<sup>9</sup> Additional information about RIMS II is available in a later chapter of this report, "Description of RIMS II," and at <http://www.bea.doc.gov/bea/regional/rims>.

approximately \$247 million per year. This report does not estimate the economic impacts from these payments.

**Table 1.1<sup>10</sup>**  
**Annual Impacts of Select Surface Water Uses on New Hampshire's Economy**  
**(All Dollar Values are in Millions of 2002 Dollars)**

<b>Use</b>	<b>Participation</b>	<b>Total Sales</b>	<b>Household Income</b>	<b>Jobs (full- and part-time)</b>
Boating	3.6 million visitor days	\$328 - \$450	\$126 - \$128	3,400 - 5,700
Fishing	3.1 million visitor days	\$245 - \$352	\$84 - \$103	2,100 - 4,300
Swimming	8.0 million visitor days	\$269 - \$380	\$109 - \$111	3,800 - 5,000
Drinking Water	191 thousand customers	\$276 - \$301	\$75 - \$147	1,900 - 2,600
<b>TOTAL</b>		<b>\$1,118 - \$1,483</b>	<b>\$394 - \$489</b>	<b>11,200 - 17,600</b>

The succeeding chapters report the methodology, data, and detailed economic results for the uses of New Hampshire surface waters included in the Phase II Study.

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<sup>10</sup> Because this report does not estimate the economic impacts from property tax payments made by waterfront property owners on lakes, rivers, streams and ponds, these property tax payments are not included in this table.

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~ SECTION 2 ~  
**ECONOMIC VALUE OF BOATING  
IN NEW HAMPSHIRE**

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**Summary of Findings**

The Phase II Study finds that approximately 195,000 motorized and non-motorized boats and jet skis are in use on New Hampshire's waters for recreational purposes, including an estimated 102,000 boats and jet skis registered with the State and another 93,000 not registered with the State.<sup>11</sup> It is estimated that 112,000 households make more than 1 million boating<sup>12</sup> trips each year to locations throughout New Hampshire, and spend roughly 3.6 million visitor days boating,<sup>13</sup> excluding the trips and days when boats are used for fishing.

An estimated \$246 million in Direct Sales are made in New Hampshire each year to people who participate in pure boating, i.e., boating that is not associated with fishing.<sup>14</sup> People who boat in New Hampshire (not including allocations to fishing) spend \$144 million in-state on trip-related expenditures: \$67 million on food and lodging, \$21 million on transportation, and \$57 million on entertainment and other trip-related items. They also spend an estimated \$102 million annually in-state on equipment purchases, operation, maintenance, and other boating-related items such as magazines, membership dues, and instruction.

An estimated \$328 million to \$450 million in Total Sales are made in New Hampshire as a result of pure boating. Total Sales include the Direct Sales that are made when boaters spend money in New Hampshire on boating trips and equipment (the direct expenditures discussed above), as well as the additional sales that are made in the State when owners and employees of shops, hotels, restaurants, and other retail establishments respend money that they have as a result of having made Direct Sales to the boaters. The shop owners' and employees' expenditures occur in all sectors of the economy, as they go about conducting business and living in New Hampshire.

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<sup>11</sup> NH Registration is not required for non-motorized boats under 12 feet, boats registered in another state that use NH waters for fewer than 30 consecutive days, and US government boats.

<sup>12</sup> For the purposes of the Phase II Study, the term "boating" refers to the use of motorized and non-motorized boats and jet skis.

<sup>13</sup> Visitor days are the total number of days per year that all people spend boating in New Hampshire. For purposes of the Phase II Study, to estimate the number of visitor days spent boating, it was assumed that, on average, every household boating trip involves 2 people ("visitors") and lasts 1.7 days, (i.e., 1 trip equates to 3.4 visitor days).

<sup>14</sup> The total expenditures associated with all boating in New Hampshire, including boating for the purpose of fishing, are estimated at nearly \$439 million: \$257 million on trips and \$182 million on equipment and other boating-related items. As explained in the "Data, Assumption, and Methodology" section of this chapter, the expenditure figure used to estimate the economic value of boating is the adjusted figure (\$246 million) because some of the boating expenditures are already counted in the economic value of fishing (discussed in the following chapter).

Total Sales result in Household Income that is estimated at \$126 million to \$128 million. Household Income includes employee compensation (i.e., wages, salaries, and benefits), income received by self-employed individuals and private business owners, and other property-type income (e.g., rents, royalties, dividends), all of which is earned as a result of Total Sales. In addition, Total Sales associated with pure boating result in an estimated 3,400 to 5,700 full- and part-time Jobs in New Hampshire.

In sum, the estimated economic value of pure boating in New Hampshire is significant, as summarized in Table 2.1.

**Table 2.1**  
**Pure Boating**  
**Annual Economic Impact in New Hampshire**  
**(All Dollar Values are in Millions of 2002 Dollars)**

Direct Sales	\$246 Million
Total Sales	\$328-\$450 Million
Household Income	\$126-\$128 Million
Jobs	3,400-5,700 full and part-time

**Data, Assumptions, and Methodology**

The estimates of the economic value of pure boating in New Hampshire are based largely on the following sources:

- New Hampshire boat registration data from the New Hampshire Department of Safety;
- New Hampshire visitor data from the Institute for New Hampshire Studies;
- Boat usage data from the Squam Lakes Association;
- State-specific equipment expenditures from the National Marine Manufacturers Association; and
- Trip expenditure profiles of recreational boaters from other state studies.

The estimated number of households that boat in New Hampshire, and the estimated number of boating trips which these households make, are based on New Hampshire boat registration data, estimates of the number of out-of-state and/or unregistered boats used in New Hampshire, and information from an Ohio<sup>15</sup> survey about household watercraft ownership and trip frequency.

This Phase II Study estimates that boats registered in New Hampshire make up 52 percent of the total number of boats using the State’s waters, based on information from the American Sportsfishing Association, the Squam Lakes Association, and the National

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<sup>15</sup> Dr. Leroy J. Hushak, "Recreational Boating in Ohio, An Economic Impact Study," Published by the Ohio Sea Grant College Program, 1999.

Marine Manufacturers Association. The Phase II Study also estimates, based on data from New Hampshire, Maine and Ohio that, on average, 56% of all boating is pure boating, i.e., not associated with fishing. Accordingly, the Phase II Study estimate of the economic value of boating in the State reflects an adjustment to account for the fact that some boating is captured in the economic value of freshwater fishing.

There are two important data limitations relative to the Phase II Study boating participation estimates and the resulting economic value of pure boating. The first is that there was no readily available data on freshwater versus saltwater boating in New Hampshire. Thus, the Phase II Study estimate of participation in recreational boating on freshwater may be overstated to the extent that it also includes saltwater boating. On the other hand, the participation estimates may be understated in light of the second caveat, namely that boat rentals associated with pure boating were not explicitly counted. Rather, the participation estimates assume that all boats and jet skis, including those that are rentals, are used at the frequency rate estimated for boat-owning households. It is possible, however, that rented watercraft are used far more frequently than households' boats, and therefore generate more economic value.

The trip expenditures of recreational boaters in New Hampshire are based on a 1998/99 survey of boaters in Ohio, and include spending on items such as food, lodging, transportation, and entertainment, as well as boat fuel, launching fees, and regatta fees.<sup>16</sup> The average amount spent per household on a boating trip was estimated at \$137 (2002 dollars). In order to provide some assurance that it is reasonable to apply the Ohio estimate to New Hampshire, New Hampshire visitor data from the Institute for New Hampshire Studies was also reviewed. It suggests that this estimate is indeed reasonable for the Granite State. According to INHS survey data and trends, average traveler spending in New Hampshire in the summer of 2002 was estimated at \$156 per trip.<sup>17</sup> While the typical New Hampshire visitor may have a somewhat different spending profile from the typical New Hampshire boater, the boating-specific Ohio data compares favorably with the general New Hampshire visitor data.

Data from the National Marine Manufacturers Association suggests that the estimated purchases of boats, personal watercraft, motors, trailers, and accessories in New Hampshire would exceed \$100 million in 2002. Of this, the Phase II Study attributed more than \$56 million to the economic value of pure boating estimated in the Phase II Study, in accordance with the assumption that, on average, 56% of all boating is not associated with fishing. One check on the reasonableness of this allocation came from the independent data on freshwater fishing expenditures in New Hampshire collected as part of the "1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation."<sup>18</sup> This data indicates that approximately \$49 million per year is

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<sup>16</sup> The survey of boaters in Ohio found that the average one-way distance to the boating site was 38 miles; that, on average, roughly 80% of the boating trips taken by boat owning households were day trips; and that the average duration of all trips (day and overnight) was 1.7 days.

<sup>17</sup> Expense categories include eating and drinking, accommodations, recreation, food stores, retail stores, ground transportation, and air transportation and related services.

<sup>18</sup> U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, FHW/96-NH, issued in May 1998.

spent on boating equipment used for fishing. Thus, the Phase II Study assumes a total boating equipment expenditure level of roughly \$105 million, which is very close to the NMMA-based figure for New Hampshire.

Finally, annual spending in New Hampshire on other recreational boating expenses, such as equipment maintenance, winterization and storage; slips and moorings; yacht club fees; taxes; and insurance; are also based on the 1998/99 survey of boaters in Ohio. The average household expenditure per year was estimated at around \$726 (2002 dollars), of which \$407 was attributed in the Phase II Study to the economic value of pure boating. While there was no readily available data to confirm this estimated expenditure level, this amount seemed reasonable in light of the projected household spending on boating trips and equipment in New Hampshire each year.

Using IMPLAN, each type of Direct Sales (i.e., category of boating expenditure) discussed above was matched to one or more Standard Industrial Classification (SIC) codes, which represent sectors of the economy. Each SIC Code was then matched to an IMPLAN Sector Number. An extensive review of the SIC codes was conducted and a determination was made as to which codes were an appropriate match for the expenditure categories. In cases where it seemed possible that an expenditure could occur in more than one SIC Code, a portion of the expenditure was allocated to each of the qualifying codes.

Using RIMS II, each type of Direct Sale (e.g., on transportation) was matched with the appropriate sector of the economy (e.g., transportation sector) and then multiplied by that sector's RIMS II Multipliers for Total Sales, Household Income, and Jobs. As an example, the roughly \$21 million that boaters spend on transportation is expected to generate about \$38 million in Total Sales, based on a RIMS II Multiplier of 1.85 (i.e., approximately \$21 million  $\times$  1.85 = approximately \$38 million).

## **Findings in-depth**

### *Direct and Total Sales*

People who participate in pure boating in New Hampshire spend \$144 million in-state on trip-related expenditures: \$67 million on food and lodging, \$21 million on transportation, and \$57 million on entertainment and other trip-related items. They also spend an estimated \$102 million annually in-state on equipment purchases (e.g., boats, motors, trailers, and accessories), operation and maintenance (e.g., marina services, insurance), and other boating-related items such as magazines, membership dues, and instruction.

Of the roughly \$328 million to \$450 million in Total Sales that result from pure boating in New Hampshire, \$189 million to \$264 million is spurred by the trip-related expenditures described above, and the other \$139 million to \$186 million is spurred by the equipment expenditures, operation and maintenance expenses, and membership organizations described above.

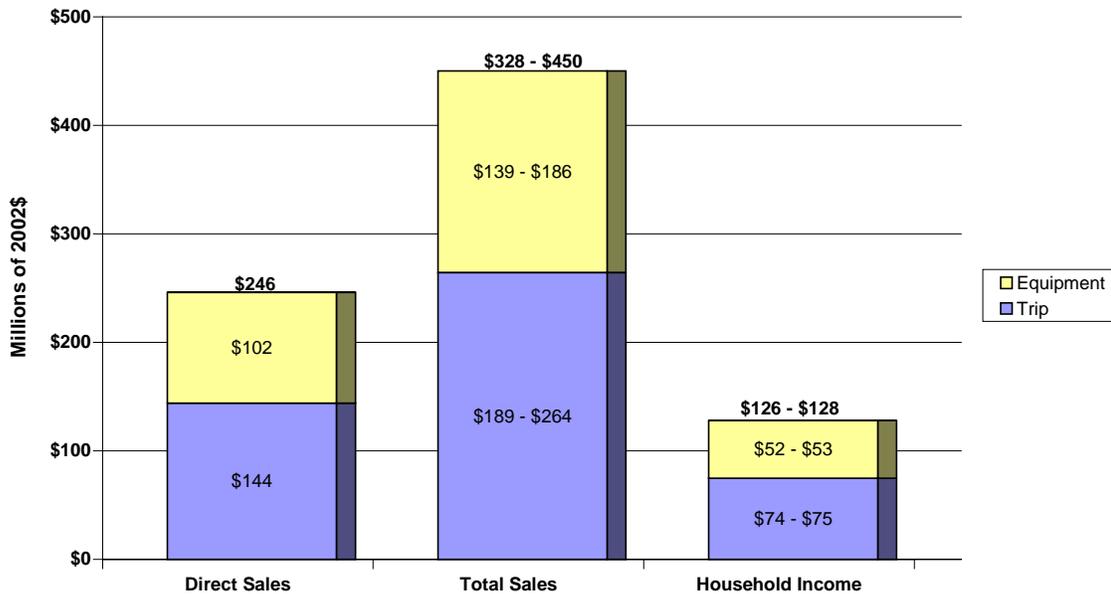
Household Income

Total Sales spurred by boaters' trip expenditures lead to roughly \$75 million in Household Income for New Hampshire employees and self-employed individuals. In addition, Total Sales related to boaters' equipment expenditures lead to roughly \$53 million in annual Household Income in New Hampshire.

Jobs

The Total Sales that result from pure boating in New Hampshire support 3,400 to 5,700 full- and part-time Jobs. Total Sales spurred by boaters' trip expenditures in New Hampshire support between 2,100 and 3,500 full- and part-time Jobs, while Total Sales spurred by their equipment expenditures support the remainder of the Jobs.

**Figure 2.1**  
**Pure Boating**  
**Annual Economic Impact from Equipment versus Trip Expenditures**  
**(All Dollar Values are in Millions of 2002 Dollars)**



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~ SECTION 3 ~

**ECONOMIC VALUE OF RECREATIONAL FRESHWATER FISHING  
IN NEW HAMPSHIRE**

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**Summary of Findings**

The Phase II Study estimates that approximately 237,000 people fish each year in New Hampshire's freshwaters. About half of these anglers are New Hampshire residents. In total, freshwater anglers make approximately 2.6 million trips per year to fishing locations throughout New Hampshire and collectively fish more than 3.1 million days. Residents make about 80% of the total trips and represent about three-quarters of the total fishing-days. New Hampshire residents are estimated to freshwater fish in-state an average of 20 days during the year, while nonresidents fish an estimated average of 7 days. The estimated time and money spent on freshwater fishing includes those instances when boats are used for fishing.

The in-state Direct Sales associated with fishing are considerable, totaling approximately \$193 million.<sup>19</sup> The Phase II Study estimates that freshwater anglers spend almost \$66 million annually in New Hampshire on trip-related expenditures: nearly \$31 million on food and lodging, roughly \$17 million on transportation, and another almost \$19 million on other trip-related items such as rental fees, bait and ice. They also spend an estimated \$127 million annually in-state on equipment, such as, rods and reels, camping gear, clothing, boating expenses allocated to fishing, and other fishing-related items such as magazines, membership dues, and fishing licenses.

An estimated \$245 million to \$352 million in Total Sales are made in New Hampshire as a result of fishing. Total Sales include the Direct Sales that are made when anglers spend money in New Hampshire on trips and equipment (the direct expenditures discussed above), as well as the additional sales that are made in the State when owners and employees of shops, hotels, restaurants, and other retail establishments respend money that they have as a result of having made Direct Sales to the anglers. The shop owners' and employees' expenditures occur in all sectors of the economy, as they go about conducting business and living in New Hampshire.

Total Sales result in Household Income that is estimated at \$84 million to \$103 million. Household Income includes employee compensation (i.e., wages, salaries, and benefits), income received by self-employed individuals and private business owners, and other property-type income (e.g., rents, royalties, dividends), all of which is earned as a result of Total Sales. In addition, Total Sales associated with fishing result in an estimated 2,100 to 4,300 full- and part-time Jobs in New Hampshire.

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<sup>19</sup> As explained in the "Data, Assumptions, and Methodology" section of this chapter, the expenditure figure used to estimate the economic value exclusively of fishing is an adjusted figure to take into account that not all of the freshwater angler trip expenditures can be counted entirely toward fishing. Because some anglers both fish and hunt during the same trip, some of the trip expenditures were counted toward hunting.

In sum, the estimated economic value of freshwater fishing, including fishing that occurs in conjunction with boating, in New Hampshire is significant, as summarized in Table 3.1.

**Table 3.1**  
**Recreational Freshwater Fishing**  
**Annual Economic Impact in New Hampshire**  
**(All Dollar Values are in Millions of 2002 Dollars)**

Direct Sales	\$193 Million
Total Sales	\$245-\$352 Million
Household Income	\$84-\$103 Million
Jobs	2,100-4,300 full- and part-time

### **Data, Assumptions, and Methodology**

The estimates of the economic value of recreational freshwater fishing in New Hampshire are based on state-specific data collected as part of the “1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.”<sup>20</sup> This Survey contains participation and expenditure data on both freshwater and saltwater anglers, in some cases broken down between residents and nonresidents. To the extent that detailed data unique to freshwater fishing was not reported in the Survey, the Phase II Study made estimates using the Survey’s information on all types of fishing.

Using IMPLAN, each type of Direct Sale (i.e., category of expenditure) reported in the 1996 Survey was matched to one or more Standard Industrial Classification (SIC) codes, which represent sectors of the economy. Then, each SIC Code was matched to an IMPLAN Sector Number. An extensive review of the SIC codes was conducted and a determination was made as to which codes were an appropriate match for the expenditure categories. In cases where it seemed possible that an expenditure could occur in more than one SIC Code, a portion of the expenditure was allocated to each of the qualifying codes.

Furthermore, the estimated trip expenditures (food, lodging, and transportation) by freshwater anglers were reduced by more than \$4 million, because some anglers both fish and hunt during the same trip. Thus, some of the trip expenditures were counted toward hunting and thus not included in this Phase II Study. The 1996 National Survey found that approximately 68% of the New Hampshire residents who fished in-state (both freshwater and saltwater) fished exclusively, while the other 32% fished and hunted. In comparison, 99% of the nonresidents who fished in New Hampshire fished exclusively, and a mere 1% both fished and hunted. For those anglers who both fished and hunted, 50% of their trip costs were allocated to the economic value of fishing in this Phase II

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<sup>20</sup> U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, Bureau of the Census, FHW/96-NH, issued in May 1998.

Study.<sup>21</sup> The economic values estimated in the Phase II Study reflect the effects of freshwater fishing expenditures made by both residents and nonresidents.

A more recent version of the 1996 National Survey was conducted in April and September of 2001 and January of 2002. Preliminary results for each state, including New Hampshire, were released in June of 2002. The preliminary findings, which apply to freshwater and saltwater anglers in the aggregate, include data on participation and broad expenditure categories. The preliminary data suggest that the number of people who fish in-state has remained relatively constant since 1996. Data from the New Hampshire Fish and Game Department indicates that the number of fishing licenses issued between 1997 and 2001 dropped by 1.6 percent. In comparison, New Hampshire visitor data from the Institute for New Hampshire Studies (INHS) indicates that the number of summer trips grew by an average of 1.6 percent per year between 1997 and 2001. In light of this information, the Phase II Study used the participation data from the 1996 Survey for freshwater fishing. As a check on these estimates, they were compared to estimates of summer tourism in New Hampshire from INHS. According to the National Survey, nonresidents make an estimated 516,000 freshwater fishing trips in New Hampshire each year, accounting for roughly 6 percent of all INHS-estimated nonresident visitor trips during the summer, and spend an estimated 771,000 days freshwater fishing, which is about 4 percent of all INHS-estimated nonresident visitor days during the summer.

The preliminary 2001 data also suggest that since 1996, trip expenditures have declined slightly, equipment expenditures have decreased dramatically, and “other fishing-related expenditures” have increased moderately. Given that participation levels are not estimated to have changed much during the period, it is questionable whether or not equipment purchases really dropped by more than 70 percent, as reported in the 2001 preliminary data, largely driving overall expenditures estimated in the National Survey to drop by more than 50 percent. In comparison, spending by summer visitors in New Hampshire rose an average of nearly 5 percent per year between 1997 and 2001. It is possible that national events at the time of the Survey, including the terrorist attacks and the slowing economy, swayed participants to provide more cautious and conservative responses. Because of the uncertain and preliminary nature of the 2001 data, this Phase II Study used expenditure data from the 1996 Survey, without making any adjustments for real growth or decline. However, if the equipment expenditures estimated for 2001 are indeed accurate, the economic value of freshwater fishing in New Hampshire would be significantly less than reported in Table 3.1.

Using RIMS II, each type of Direct Sale (e.g., on transportation) was matched with the appropriate sector of the economy (e.g., transportation sector) and then multiplied by that sector’s RIMS II Multipliers for Total Sales, Household Income, and Jobs. As an example, the roughly \$17 million that anglers spend on transportation is expected to generate about \$31 million in Total Sales, based on a RIMS II Multiplier of 1.85 (i.e., approximately \$17 million  $\times$  1.85 = approximately \$31 million).

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<sup>21</sup> A simplifying assumption was made that anglers who both fished and hunted participated in the two activities equally, i.e., 50%/50%.

## **Findings in-depth**

### *Direct and Total Sales*

The Phase II Study estimates that freshwater anglers spend almost \$66 million annually in New Hampshire on trip-related expenditures: nearly \$31 million on food and lodging, roughly \$17 million on transportation, and another almost \$19 million on other trip-related items such as rental fees, bait and ice. They also spend an estimated \$127 million annually in-state on equipment, such as, rods and reels, camping gear, clothing, boating expenses allocated to fishing, and other fishing-related items such as magazines, membership dues, and fishing licenses.

Of the \$245 million to \$352 million in Total Sales that are spurred by recreational freshwater fishing in New Hampshire, \$89 million to \$122 million is spurred by anglers' trip-related expenditures, for example at eating and drinking establishments, lodging facilities, and gas stations. Another \$156 million to \$230 million is spurred by anglers' equipment expenses on fishing equipment and clothing, boating and camping gear, and other items such as membership organizations, magazines, and books.

### *Household Income*

Total Sales spurred by anglers' trip expenditures lead to \$35 million to \$37 million in Household Income for New Hampshire employees and self-employed individuals. In addition, Total Sales related to angler's equipment expenditures lead to \$49 million to \$66 million in annual Household Income in New Hampshire.

### *Jobs*

The Total Sales that result from freshwater fishing in New Hampshire support 2,100 to 4,300 full- and part-time Jobs. Total Sales spurred by anglers' trip expenditures in New Hampshire support about 1,100 to 1,600 full- and part-time Jobs, while Total Sales spurred by anglers' equipment expenditures support the remainder of the Jobs.

**Figure 3.1**  
**Recreational Freshwater Fishing**  
**Annual Economic Impact from Equipment versus Trip Expenditures**  
**(All Dollar Values are in Millions of 2002 Dollars)**



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~ SECTION 4 ~  
**ECONOMIC VALUE OF SWIMMING  
IN NEW HAMPSHIRE**

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**Summary of Findings**

The Phase II Study estimates that almost 8 million days are spent swimming in New Hampshire's freshwaters each year, more than twice the time spent either freshwater fishing or pure boating.<sup>22</sup> Of this, New Hampshire residents spend nearly 6 million days swimming in New Hampshire when they are not vacationing, and another roughly 0.4 million days when they are on vacation. In addition, out-of-state visitors spend almost 1.6 million days swimming in freshwater in New Hampshire.

The in-state Direct Sales associated with swimming are estimated at nearly \$206 million on an annual basis, a substantial sum considering that swimming is not an equipment-intensive activity like boating or fishing. These Direct Sales only reflect trip expenditures, as equipment expenditures are assumed to be negligible for the purposes of the Phase II Study. This Phase II Study estimates that more than half of the expenditures associated with swimming are made by out-of-state visitors, who spend approximately \$54 million annually in New Hampshire on food and lodging, more than \$23 million on transportation, and close to \$42 million on entertainment and shopping, for a total of almost \$119 million in Direct Sales. In addition, the Phase II Study finds that non-vacationing State residents who swim in New Hampshire's freshwaters spend roughly \$63 million in-state on swimming outings: nearly \$33 million on food and another \$30 million on transportation. Finally, vacationing residents spend more than \$24 million in the Granite State in conjunction with the days they swim, including almost \$13 million on food and lodging, close to \$2 million on transportation, and nearly \$10 million on entertainment and shopping.

An estimated \$269 million to \$380 million in Total Sales are made in New Hampshire as a result of swimming. Total Sales include the Direct Sales that are made when swimmers spend money in New Hampshire on trips (the direct expenditures discussed above), as well as the additional sales that are made in the State when owners and employees of shops, hotels, restaurants, and other retail establishments respend money that they have as a result of having made Direct Sales to the swimmers. The shop owners' and employees' expenditures occur in all sectors of the economy, as they go about conducting business and living in New Hampshire.

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<sup>22</sup> As explained in the "Data, Assumptions, and Methodology" section of this chapter, this participation figure that was used to estimate the economic value exclusively of swimming does not include an estimated 82,000 swimming days that are assumed to occur in conjunction with boating days. To avoid the risk of double counting, the Phase II Study presumes that the economic value of these swimming days is already counted in the economic value of pure boating.

Total Sales result in Household Income that is estimated at \$109 million to \$111 million. Household Income includes employee compensation (i.e., wages, salaries, and benefits), income received by self-employed individuals and private business owners, and other property-type income (e.g., rents, royalties, dividends), all of which is earned as a result of Total Sales. In addition, Total Sales associated with swimming result in an estimated 3,800 to 5,000 full- and part-time Jobs in New Hampshire.

In sum, the economic value of freshwater swimming in New Hampshire is significant, as summarized in Table 4.1.

**Table 4.1**  
**Freshwater Swimming**  
**Annual Economic Impact in New Hampshire**  
**(All Dollar Values are in Millions of 2002 Dollars)**

Direct Sales	\$206 Million
Total Sales	\$269-\$380 Million
Household Income	\$109-\$111 Million
Jobs	3,800-5,000 full and part-time

**Data, Assumptions, and Methodology**

The estimates of the economic value of swimming in the State are based largely on survey data from a 1997/1998 New Hampshire assessment of outdoor recreation<sup>23</sup> and on visitor data from the Institute for New Hampshire Studies. Data from the New Hampshire Department of Resources and Economic Development (DRED) on attendance at State parks was used for benchmarking purposes.

The estimated number of total days that New Hampshire residents spend freshwater swimming is based on data from a 1997/1998 survey of New Hampshire registered drivers on their outdoor recreational activities, including swimming in lakes and rivers. Respondents indicated how often in the preceding year they swam in freshwater by choosing one of five specified ranges, for example, “4 to 6 times.” The Phase II Study assumes that the survey respondents’ swimming habits are representative of all New Hampshire residents. Thus, more than 70 percent of State residents are estimated to swim in lakes and rivers at least once a year, and more than 25 percent swim more than ten times a year.<sup>24</sup> According to the Phase II Study estimates, each New Hampshire resident spends, on average, 5 days per year swimming in freshwater. This

<sup>23</sup> Dr. Robert Robertson, “DRAFT Assessment of Outdoor Recreation in New Hampshire, 1997,” July 2002.

<sup>24</sup> The "New Hampshire Public Access Needs Assessment Statewide Summary Report," prepared for the New Hampshire Fish and Game Department, October 1998, found that about 86% of New Hampshire households surveyed by telephone had visited a lake, pond or river in New Hampshire within the last 5 years and 58% reported swimming as an activity they do (Part 1, Table 4). The Report also found that about 73% of New Hampshire households surveyed by mail swam 3 or more times in the preceding year and over 57% swam 5 or more times (Part 2, Table 3).

estimate is nearly identical to the resident participation rate implicit in the study of Maine's freshwater resources.<sup>25</sup>

It was important to estimate what portion of the total resident swimming days occurs when residents are on vacation in the State because their spending is likely to be higher on those days, which has a higher impact on the economy. To make this estimate, the Phase II Study relied on visitor survey data from the Institute for New Hampshire Studies regarding the percentages of visitors who reportedly go to the beach and visitors who reportedly go to regions of the State other than the Seacoast, where beaches are presumably on freshwater.

The estimate of the number of days which out-of-state visitors spend swimming in New Hampshire was made using two different approaches. The first approach adopted the assumption used in the Maine study that the ratio of resident and nonresident swimming days averages 7:1.<sup>26</sup> The second approach looked at the percentages of nonresident New Hampshire visitors who reportedly go to the beach and to regions of the State other than the Seacoast. A simple average of the two estimates from these approaches was then taken. The result of 1.6 million swimming days seems reasonable in that it is less than 9 percent of the total number of days which nonresident visitors were expected to spend in New Hampshire in the summer of 2002.

The participation levels used to estimate the economic value of swimming were reduced to reflect the fact that some swimming occurs in conjunction with boating. While the Maine study did not make any such adjustment, the Ohio study found that, on average, 4% of boating time was spent swimming.<sup>27</sup> To avoid the risk of double counting in the Phase II Study, the estimated number of swimming days was reduced by approximately 82,000 days, the equivalent of 4% of the estimated boating days in New Hampshire. In reducing the total estimated number of swimming days by roughly 1%, the Phase II Study presumes that the economic value of these swimming days is already counted in the economic value of pure boating.

The Phase II Study also considered the possibility that New Hampshire visitors who report going to the beach may go to the Seacoast to swim more often than visitors who go to other regions for freshwater swimming. According to available data from DRED on attendance at State parks with swimming, coastal parks had roughly three times higher attendance than inland parks. While the difference in attendance can not be attributed entirely to swimming because other activities may have also attracted visitors, it does suggest that visitors may participate at somewhat higher rates in saltwater swimming. On the other hand, the survey of New Hampshire residents on their outdoor recreational activities found that roughly 58% of respondents swam in the ocean, compared to more than 71% who swam in freshwater.

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<sup>25</sup> Boyle et al., "Great Ponds Play an Integral Role in Maine's Economy," April 1997, at 15.

<sup>26</sup> Boyle et al., "Great Ponds Play an Integral Role in Maine's Economy," April 1997, at 15.

<sup>27</sup> Dr. Leroy J. Hushak, "Recreational Boating in Ohio, An Economic Impact Study," Published by the Ohio Sea Grant College Program, 1999, page 38.

Data from DRED on attendance at State parks was used for the purpose of benchmarking the estimated 8 million swimming days. Freshwater swimming is reportedly an option at 18 out of the 68 State parks in New Hampshire.<sup>28</sup> While there are no State parks that offer freshwater swimming as the sole recreational activity, total day use attendance at the four parks where activities are limited to freshwater swimming, picnicking, and hiking was 89,287 during the period July, 1999 through June, 2000.<sup>29</sup> Given the countless number of freshwater locations throughout the State where people can swim, it seems quite plausible that total participation in swimming is roughly one hundred times greater than it was at the four State parks.

The daily expenditures of swimmers in New Hampshire are based on estimated visitor spending profiles from the Institute for New Hampshire Studies. According to INHS survey data and expected trends, *average* traveler spending in New Hampshire in the summer of 2002 could have totaled around \$75 per day<sup>30</sup> for a wide range of possible purchases, from those made at food stores, eating and drinking establishments, and retail stores, to those made on lodging, recreation, ground transportation, and air travel. The Phase II Study assumes that all of these costs are incurred by out-of-state visitors who go swimming in New Hampshire, and that all of these costs, except air travel, are incurred when vacationing residents go swimming. It is presumed, however, that residents who are not on vacation only spend money at food stores and on transportation, an estimated \$10.55 per day of swimming.

Using IMPLAN, each type of Direct Sale (i.e., category of swimming expenditure) discussed above was matched to one or more Standard Industrial Classification (SIC) codes, which represent sectors of the economy. Then, each SIC Code was matched to an IMPLAN Sector Number. An extensive review of the SIC codes was conducted and a determination was made as to which codes were an appropriate match for the expenditure categories. In cases where it seemed possible that an expenditure could occur in more than one SIC Code, a portion of the expenditure was allocated to each of the qualifying codes.

Using RIMS II, each type of Direct Sale (e.g., on transportation) was matched with the appropriate sector of the economy (e.g., transportation sector) and then multiplied by that sector's RIMS II Multipliers for Total Sales, Household Income, and Jobs. As an example, the roughly \$55 million that swimmers spend on transportation is expected to generate about \$102 million in Total Sales, based on a RIMS II Multiplier of 1.85 (i.e., approximately \$55 million  $\times$  1.85 = approximately \$102 million).

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<sup>28</sup> "New Hampshire State Parks Map and Guide," Division of Parks and Recreation.

<sup>29</sup> Attendance was reportedly zero for the months of October 1999 through April 2000; thus, attendance occurred during months when swimming could have occurred.

<sup>30</sup> This estimate reflects an average across all travelers, from those who incur virtually no costs (e.g., they travel a short distance and stay with relatives or camp) to those who incur considerable costs (e.g., they travel a long distance, stay at a hotel, and eat all their meals out). Actual spending may vary from this estimated average, which assumes projections for summer 2002 of 21.3 million visitor days in NH made by residents and nonresidents, an average of \$156 per trip, and an average of 2.08 days per trip based on New Hampshire visitor data and expected trends.

## **Findings in-depth**

### *Direct and Total Sales*

The in-state Direct Sales associated with freshwater swimming are estimated at nearly \$206 million on an annual basis. The Phase II Study estimates that these swimmers spend nearly \$80 million annually in New Hampshire on food, nearly \$20 million on lodging, more than \$55 million on transportation, and close to \$52 million on entertainment and shopping.

All of the roughly \$269 million to \$380 million in Total Sales that result from freshwater swimming in New Hampshire are spurred by trip-related Direct Sales. As much as \$183 million in Total Sales is spurred by swimmers' spending on food and lodging, as much as \$102 million is spurred by their spending on transportation, and as much as \$94 million is spurred by their spending on entertainment and shopping.

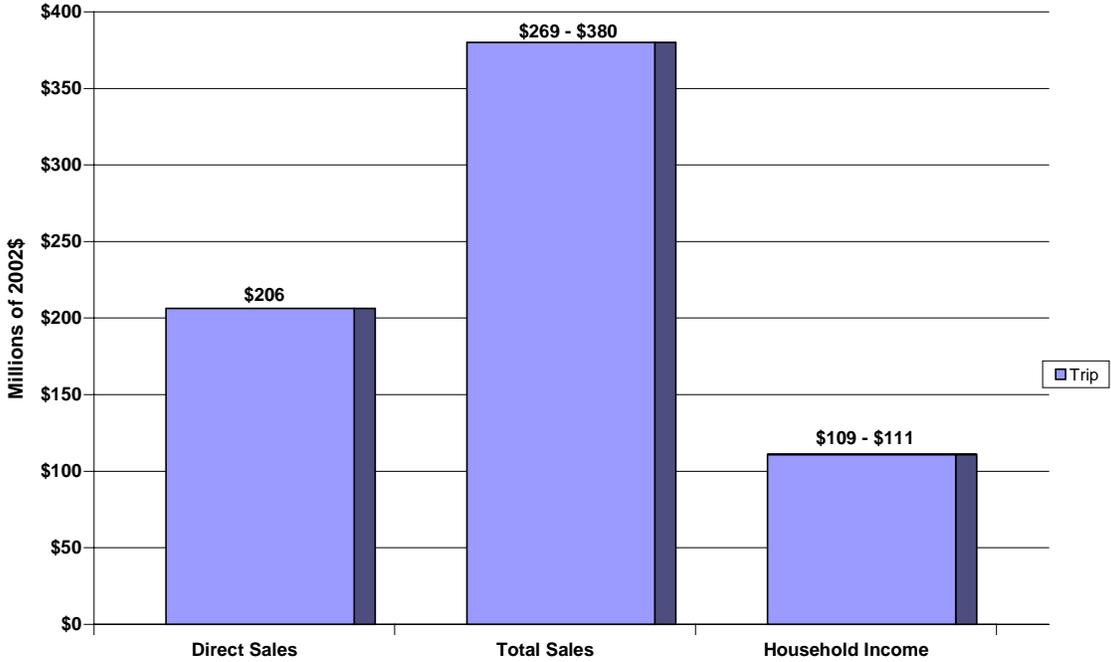
### *Household Income*

Total Sales spurred by swimmers' trip expenditures lead to the entire \$109 million to \$111 million in Household Income for New Hampshire employees and self-employed individuals. Of this, Total Sales spurred by swimmers' food and lodging expenditures lead to roughly \$51 million in Household Income, Total Sales spurred by transportation expenditures lead to roughly \$31 million in Household Income, and Total Sales spurred by swimmers' entertainment and shopping expenditures lead to roughly \$27 million in Household Income.

### *Jobs*

The Total Sales that result from swimming in New Hampshire support about 3,800 to 5,000 full- and part-time jobs. As many as 2,800 of these jobs result from Total Sales spurred by swimmers' food and lodging expenditures, as many as 1,000 result from Total Sales spurred by their transportation expenditures, and as many as 1,200 result from Total Sales spurred by their entertainment and shopping expenditures.

**Figure 4.1**  
**Freshwater Swimming**  
**Annual Economic Impact from Trips Expenditures**  
(All Dollar Values are in Millions of 2002 Dollars)



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~ SECTION 5 ~  
**ECONOMIC VALUE OF WATER UTILITIES  
USING SURFACE WATERS IN NEW HAMPSHIRE**

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**Summary of Findings**

The Phase II Study estimates that 416,000 people, or about 166,000 households, in fifty New Hampshire towns, are supplied with drinking water from 41 municipal and investor-owned utilities that use surface waters as their predominant source for supplies.<sup>31</sup> In addition to using approximately 55 supply sources to serve about one third of the State's estimated population, these utilities also provide water for fire protection and serve as many as 24,000 businesses and industries.<sup>32</sup>

The Phase II Study assesses only the economic value of "public water service," i.e., service from municipal and investor-owned utilities which use surface water sources as their predominant source for supplies. Because of the unavailability of data, the Phase II Study does not include a variety of water uses that might add significantly to the total value of water in New Hampshire. Small public water systems that serve, for example, mobile home parks, small housing developments, schools, and institutions, are not included. Private residential, commercial, and industrial users of freshwater supplies, such as lakeside camps, golf courses, ski areas, and agricultural operations that draw water directly from nearby sources, are likewise excluded. Moreover, New Hampshire government data suggests that commercial and industrial facilities may use 8.7 to 11.9 trillion gallons of surface water each year, but estimating the associated economic value of this use is beyond the scope and budget of the Phase II Study.<sup>33</sup>

It is estimated that Direct Sales associated with public water service total more than \$151 million annually. Of this, households spend almost \$55 million and businesses and fire protection services spend nearly \$97 million. The majority of these Direct Sales, almost \$130 million, are paid to municipal utilities and the rest to the three investor-owned regulated utilities which use surface water sources.

An estimated \$276 million to \$301 million in Total Sales are made in New Hampshire as a result of public water service. Total Sales include the Direct Sales that

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<sup>31</sup> The extent to which certain of these utilities may use wells and other sources of supply to supplement surface water supplies was not determined within the scope of the Phase II Study. As such, the estimated economic value of water utilities using surface waters in New Hampshire may be higher than the actual economic value.

<sup>32</sup> The New Hampshire Department of Environmental Services estimated in 1999 that large public water systems (i.e., typically serving at least 500 people) using *all* types of water sources, not just surface supplies, served approximately 65 percent of the state's population.

<sup>33</sup> The New Hampshire Department of Environmental Services runs the Water User Registration and Reporting Program. The Department's estimates cited here reflect water withdrawn from surface water sources net of water returned to surface water supplies. Their estimates also exclude municipal and investor-owned water suppliers.

are made when household and businesses spend money in New Hampshire on public water service (the direct expenditures discussed above), as well as the additional sales that are made in the State when these utilities and their employees respend money that they have as a result of having made Direct Sales to their customers. The utilities' and employees' expenditures occur in all sectors of the economy, as they go about conducting business and living in New Hampshire.

The estimated value of public water service relying on New Hampshire's surface water is significant, as summarized in Table 5.1.

**Table 5.1**  
**Water Utilities Using Surface Waters**  
**Annual Economic Impact in New Hampshire**  
**(All Dollar Values are in Millions of 2002 Dollars)**

Direct Sales	\$151 Million
Total Sales	\$276-\$301 Million
Household Income	\$75-\$147 Million
Jobs	1,900-2,600 full and part-time

**Data, Assumptions, and Methodology**

The estimates of the number of people/households and businesses taking public water service and the costs associated with this service are based largely on data from the following sources:

- the New Hampshire Department of Environmental Services (DES);
- the New Hampshire Public Utilities Commission (PUC); and
- the US Census Bureau.

To estimate the number of total people taking public water service, the Phase II Study started with readily available 1999 data from DES on the populations served by municipal utilities using surface water, and then estimated these populations for 2002. Current customer count data were obtained, however, from Manchester Water Works. These two data sources, along with Census Bureau data, indicated that, on average, the estimated population served by a municipal utility is about two-thirds of the town's total population. This percentage was used to estimate the populations served by the few municipal utilities using surface water for which there was no readily available data from DES. To convert the estimated populations served by all of the municipal utilities into estimated number of households, Census Bureau data was used.

For the three investor-owned regulated utilities, namely Pennichuck Water Works, Hanover Water Works, and Pittsfield Aqueduct Company, Inc.,<sup>34</sup> data on the number of households they served in 2000 and 2001 were publicly available. This data was converted into population estimates based on the number of utility customers in each town and the average number of people per household in each town, and then estimated for 2002. These population figures were converted back into estimates of the number of households served by the three utilities in 2002, based on Census Bureau data about the average number of people per household in each town.

The Phase II Study estimates that a typical household spends \$329 annually on public water service. This estimate is based on the simple average of two rates. The first is the 1998 statewide average household fee of \$278, based on a DES survey of 100 “large water systems,”<sup>35</sup> adjusted in the Phase II Study to current dollars to account for inflation. The second is the 2001 rate of \$345, equal to the simple average of the household rates charged by forty-eight New Hampshire-regulated water utilities,<sup>36</sup> again adjusted to current dollars. While the large majority of these regulated utilities do not use surface water sources, their rates serve as a reasonable proxy for utilities that do.

The estimate of what businesses spend annually on public water service and what taxpayers (towns) pay annually for fire protection services is based on the assumption that, for every \$1 spent by households, businesses and fire protection services spend \$1.77. To estimate this relationship, the Phase II Study looked at the revenues collected from the different types of customers by four utilities for which data was publicly available (Hanover Water Works, Pennichuck Water Works, Pittsfield Aqueduct Company, Inc., and Manchester Water Works) and took the simple average. Next, the applicability of this simple average to the municipal utilities in the Phase II Study was verified to ensure that the four utilities in the sample did not have unusually high concentrations of businesses in their service areas relative to those in areas served by municipal utilities. The number of households was compared to the number of jobs in each town served by a municipal utility using surface water, and, on average, the ratio of households to jobs was found to be roughly 1:1.7. In comparison, the towns served by the four utilities in the sample have an average ratio of about 1:1.4. These ratios suggest that the four utilities in the sample do not have unusually high concentrations of businesses in their service areas relative to the areas served by municipal utilities. Therefore, it seemed reasonable to assume that for every \$1 spent by households on public water service, businesses and fire protection services spend \$1.77.

The estimate of the number of businesses and industries receiving public water service is also based on data on the four utilities mentioned above. The Phase II Study

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<sup>34</sup> Pennichuck Corporation is a holding company with five wholly owned operating subsidiaries. The Company is comprised of three private water utilities, including Pennichuck Water Works, Inc. and Pittsfield Aqueduct Company

<sup>35</sup> Defined by the New Hampshire Department of Environmental Services as systems that typically serve communities with over 500 people, provide fire flow capability, and generally are municipally owned.

<sup>36</sup> The rates are based on typical household consumption of 8,800 cubic feet per year.

found that, on average, for every business customer they served, they provided service to nearly seven households.

One set of estimates of the economic value of public water service from investor-owned utilities was estimated by using the water utility SIC code and corresponding Sector Number in IMPLAN. The model includes a typical profile of how these utilities tend to spend the money they collect from their customers. Included in this profile are three categories of expenses, namely property taxes, income taxes, and profits, that investor owned utilities pay but municipal utilities do not. Therefore, to estimate the economic value of public water service from municipal utilities, we modified IMPLAN so that money that would have been spent on taxes and profits was redirected proportionally to the remaining expense categories.

The other set of estimates of the economic value of public water service was made using RIMS II. The type of Direct Sale (i.e., public water service) was matched with the appropriate sector of the economy (i.e., water supply and sewerage systems) and then multiplied by that sector's RIMS II Multipliers for Total Sales, Household Income, and Jobs. As an example, the roughly \$151 million that is spent on public water service is expected to generate about \$301 million in Total Sales, based on a RIMS II Multiplier of 1.99 (i.e., approximately \$151 million  $\times$  1.99 = approximately \$301 million).

### **Findings in-depth**

#### *Direct and Total Sales*

It is estimated that Direct Sales associated with public water service total more than \$151 million annually. Of this, households spend almost \$55 million and businesses and fire protection services spend nearly \$97 million.

Of the roughly \$276 million to \$301 million in Total Sales that results from expenditures on public water service in New Hampshire, between \$99 million and \$109 million results from households' expenditures and between \$177 million and \$192 million results from businesses' expenditures.

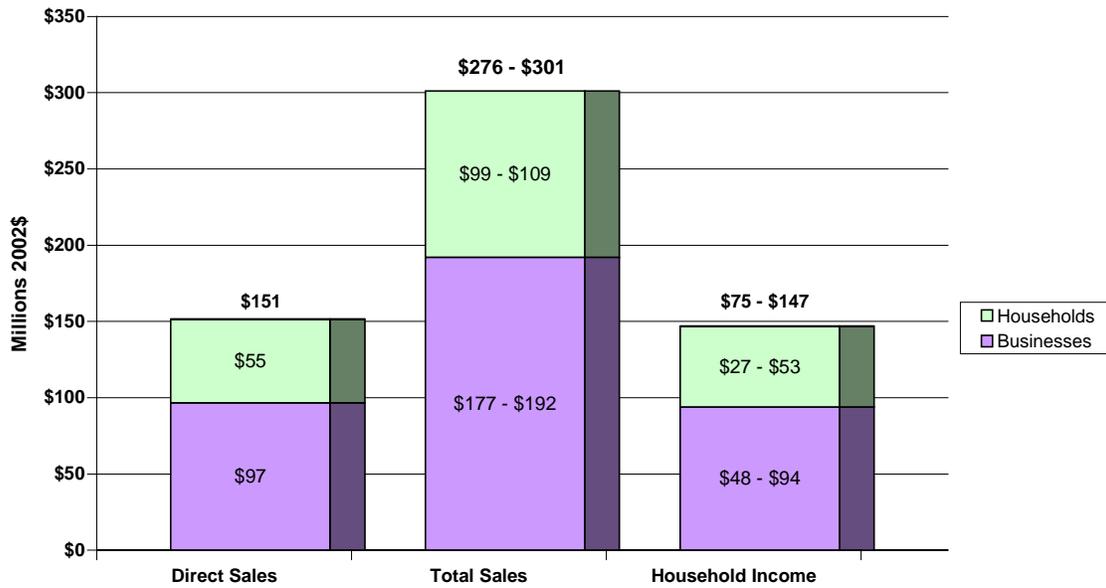
#### *Household Income*

Total Sales spurred by expenditures on public water service lead to \$75 million to \$147 million in Household Income for New Hampshire employees and self-employed individuals. Of this, Total Sales spurred by households' expenditures lead to between \$27 million and \$53 million in Household Income, and Total Sales spurred by businesses' expenditures lead to between \$48 million and \$94 million in Household Income.

Jobs

The Total Sales that result from public water service from surface waters support about 1,900 to 2,600 full- and part-time Jobs. The Total Sales spurred by households' expenditures on public water service support about 700 to 950 full- and part-time jobs, while those spurred by businesses' expenditures support about 1,200 to 1,650 full- and part-time jobs.

**Figure 5.1**  
**Water Utilities Using Surface Waters**  
**Annual Economic Impact from Household versus Business Expenditures**  
(All Dollar Values are in Millions of 2002 Dollars)



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~ SECTION 6 ~  
**PROPERTY TAX PAYMENTS  
BY WATERFRONT PROPERTY OWNERS**

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**Summary of Findings**

The appeal of waterfront views and ready access to the water commands a premium for properties on lakes, rivers, streams and ponds; and waterfront properties are a significant part of the tourist economy. The owners of these properties not only spend money on the recreational activities already addressed in earlier chapters of this report, but they also spend money independently of these activities here in New Hampshire because they have been drawn to the State's freshwaters. Some of these expenses include, but are not limited to, property taxes, dock maintenance, and flood insurance. In addition, the impact of New Hampshire's surface waters on property development and values, and the real estate and other economic impacts associated with property ownership, are considerable.

In order to estimate the overall economic impact associated with waterfront property ownership, an extensive study would be necessary to identify: 1) the total value of the properties in New Hampshire that are located on and near the State's lakes, rivers, streams and ponds; 2) the portion of that value that is associated with the waterfrontage; and 3) the additional direct and indirect economic activity generated from that ownership. Due to limitations in the available data and given the scope of the Phase II Study, it was not possible to estimate the unique economic activity associated with waterfront property ownership or the overall economic value of property with access to waterfronts. However, a preliminary estimate of property taxes, calculated by estimating the average assessed value per foot of privately-owned waterfront on lakes, rivers, streams and ponds, reveals that waterfront property owners pay about \$247 million per year in property taxes.

Future research and refinement of the property tax estimate, along with estimates of the total unique economic activity generated by waterfront property owners, is recommended. For example, the estimated tax revenues from waterfront property could be developed from either highly accurate town-by-town data or a statistically valid survey of select properties. In addition, research could help determine what portion of the property taxes might be attributable solely to the value that is created from the waterfront location. These areas of research would improve the precision of the preliminary estimate presented in this Phase II Report.

**Data, Assumptions, and Methodology**

The preliminary estimated taxes that freshwater waterfront property owners pay in New Hampshire are based on several pieces of data:

- 1) New Hampshire Department of Environmental Services' approximation of freshwater frontage in the State,
- 2) an estimated statewide average assessed value per foot of frontage,
- 3) the State's average tax rate per \$1,000 of equalized valuation; and
- 4) assumptions and findings from the Maine study.

DES' approximation of freshwater frontage in the State was developed using GIS data that the Department obtained from the New Hampshire Office of State Planning and the University of New Hampshire. Frontage was estimated on a town-by-town basis for lakes, rivers, streams and ponds coded as fourth order or higher. Land was categorized as either developed or undeveloped, broken down between private and public/conservation. "Development" was determined by DES by selecting shoreline arcs that intersect a 300-foot buffer of the New Hampshire Department of Transportation road centerlines. Thus, "developed frontage" is somewhat underestimated because islands that are known to be developed but do not have roads were coded as "undeveloped."

DES' research found that lakes accounted for about 27% of the total freshwater frontage in New Hampshire, and rivers and streams accounted for the remainder. It also found that about 32% of the land was categorized as "developed private," versus 47% "undeveloped private" and 21% public/conservation.

The statewide average assessed value per foot of frontage was estimated using information from the Maine study and the Departments of Revenue Administration in New Hampshire and Maine. The Maine study found that the average value per foot of lakefront property in 1996 was \$657. Growing that rate to 2002 using the Consumer Price Index (CPI) yielded an estimated per foot value of approximately \$754. The CPI is a lower, yet reasonable rate of growth, compared for example to some reported growth rates in property values, given that the Maine study's estimate of \$657 was based on lakefront property only, not riverfront, and historical development patterns on both lakes and rivers may yield lower estimated values than those for lakes only.

Based on the pieces of data discussed above, and using the statewide average tax rate per \$1,000 of equalized valuation of \$19.21,<sup>37</sup> the owners of developed private waterfront property pay an estimated \$247 million per year in property taxes. Including undeveloped land would significantly increase the estimate.

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<sup>37</sup> The 2001 statewide average tax rate per \$1,000 of equalized valuation was used as a proxy for 2002.

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~ SECTION 7 ~  
**DESCRIPTION OF IMPLAN AND RIMS II**

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The ranges of economic values (i.e., Total Sales, Household Income and full- and part-time Jobs) that result from each of the freshwater uses were estimated by using a model called Impact Analysis for Planning, or IMPLAN, and by using multipliers from the federal government's Regional Input-Output Modeling System, or RIMS II.

IMPLAN is an economic impact assessment model used to estimate local economic effects of changes in public policies or economic conditions. The IMPLAN model used in the Phase II Study is specific to New Hampshire's economic and labor market conditions. Thus, when information is entered into IMPLAN about the amount of money that boaters, for example, spend in New Hampshire on food, the model can estimate how much these food-related Direct Sales will generate in terms of Total Sales, Household Income, and Jobs based on data and equations embedded in the modeling software.

IMPLAN does not generate results that include iterative, or feedback, effects. For example, it is not sophisticated enough to predict that new restaurants will open up in New Hampshire if boater spending on food exceeds a certain level. Therefore, IMPLAN is not well suited to generating future forecasts. Nonetheless, it is widely used in the planning and consulting profession to estimate static, present-day economic impacts.

IMPLAN does account for the fact that when consumers purchase goods from retail establishments in New Hampshire, the price they pay includes the production price, transportation costs, and markups earned by wholesalers and retailers located both inside and outside of the State. Thus, IMPLAN assigns a consumer's direct expenditures to the appropriate market segments. For example, if a boater spends \$25 on a life-vest at a store in New Hampshire, IMPLAN would assign for example, \$10 to the manufacturer of the vest, \$5 to the transportation providers, \$5 to the wholesaler, and \$5 to the retailer (these numbers are for illustrative purposes only). In addition, IMPLAN accounts for the fact that when the market players who are located outside of New Hampshire are paid, a portion of the consumer's original spending will "leak" out of the State's economy, and will not generate the level of economic activity in New Hampshire that retained money will generate. Furthermore, IMPLAN accounts for the differences in the labor intensity and wages across businesses and industries where consumers spend their money. For example, businesses that serve tourists are apt to be relatively labor-intensive and pay relatively low wages compared to manufacturing industries that are likely to be relatively capital intensive and pay relatively high wages. These differences are reflected in the economic impacts estimated by IMPLAN. Additional information about IMPLAN is available at [www.implan.com](http://www.implan.com).

RIMS II Multipliers are used to estimate the Total Sales, Household Income, and Jobs that will result from a given amount of Direct Sales in a given industry (or group of

industries) in a given region. RIMS II multipliers are continually updated by the U.S. Bureau of Commerce, and are available for any region and any industry (or group of industries). The Phase II Study used New Hampshire-specific multipliers to estimate the impact that Direct Sales associated with boating, freshwater fishing, swimming, and public water service are likely to have on Total Sales, Household Income, and Jobs throughout the State's economy. As an example, the roughly \$17 million that freshwater anglers spend on transportation is expected to generate about \$31 million in Total Sales, based on a RIMS II Multiplier of 1.85 (i.e., approximately  $\$17 \text{ million} \times 1.85 =$  approximately \$31 million); about \$9.5 million in Household Income, based on a RIMS II Multiplier of 0.56 (i.e., approximately  $\$17 \text{ million} \times 0.56 =$  approximately \$9.5 million); and about 300 full and part-time Jobs, based on a RIMS II Multiplier of .000018 (i.e., approximately  $\$17 \text{ million} \times 0.000018 =$  approximately 306 jobs).

Economic impacts are straightforward to estimate using RIMS II Multipliers and are reliable because the multipliers reflect the federal government's ongoing analyses of inter-industry relationships in all regions of the country. The RIMS II Multipliers implicitly take into account many of the same factors that IMPLAN does, as discussed above, and are therefore widely used in both the private and public sectors to estimate static, present-day economic impacts. Additional information about RIMS II Multipliers is available at [www.bea.doc.gov/bea/regional/rims](http://www.bea.doc.gov/bea/regional/rims).

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## **GLOSSARY OF ACRONYMS AND TERMS**

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### **Acronyms**

DES – NH Department of Environmental Services

DRED – NH Department of Resources and Economic Development

IMPLAN – Impact Analysis for Planning

LSPA – Lake Sunapee Protective Association

NHLA – New Hampshire Lakes Association

NHRC – New Hampshire Rivers Council

NLRA – Newfound Lake Region Association

PUC – NH Public Utilities Commission

RIMS II – Regional Input-Output Modeling System

SLA – Squam Lakes Association

### **Economic Terms**

Direct Sales – Direct Sales reflect all of the money that is spent by a given group of consumers (e.g., boaters, freshwater anglers, swimmers, public water service customers) when they spend money in a given region (e.g., New Hampshire) on goods and services (e.g., related to trips, equipment, accessories, public water service).

IMPLAN – IMPLAN is an economic impact assessment model used to estimate local economic effects of changes in public policies or economic conditions. The model is specific to a region's economic and labor market conditions. When information is entered into IMPLAN about the amount of money that is spent by a given group of consumers on a good or service, the model can estimate how much that money will generate in terms of Total Sales, Household Income, and Jobs based on data and equations embedded in the modeling software.

Household Income – Household Income includes employee compensation (i.e., wages, salaries, and benefits), income received by self-employed individuals and private business owners, and other property-type income (e.g., rents, royalties, dividends).

Jobs – Jobs represent full-time and part-time workers including both wage and salary employees and the self-employed.

RIMS II Multipliers – RIMS II Multipliers are used to estimate the Total Sales, Household Income, and Jobs that will result from a given amount of Direct Sales, i.e., that will result when a given amount of money is spent by a given group of consumers on a good or service. RIMS II Multipliers are industry- and region-specific, and are continually updated by the U.S. Bureau of Commerce.

Total Sales – Total Sales include: 1) the Direct Sales that are made when a given group of consumers spends money in a given region on goods and services, and 2) the additional sales that are made in that same region when owners and employees of local shops, hotels, restaurants, other retail establishments, and public water service utilities respense money that they have as a result of having made Direct Sales to the given group of consumers. The shop owners', the utilities', and their employees' expenditures occur in all sectors of the economy, as they go about conducting business and living in the given region (e.g., New Hampshire).

Visitor Days – Visitor days are the total number of days per year that all people spend participating in a given freshwater recreational use. Visitor days reflect both the number of participants, referred to as visitors, and the average intensity or frequency of each participant's use, measured in terms of days per year. For example, if 100 people go swimming each year and, on average, each person swims 5 days per year, then the number of visitor days equals 500 per year ( $= 100 \times 5$ ).

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