

ECONOMICS IN THE LAKE CHAMPLAIN BASIN

Economic data demonstrate that good water quality has a strong, positive impact with the Lake Champlain Basin, especially for local economies that depend on seasonal tourist expenditures for their revenue.

Updated economic data and analysis are important as Basin partners facilitate efficient and equitable distribution of the costs and benefits throughout the plan implementation process.

Les aspects économiques

Les données économiques actuelles montrent qu'une bonne qualité de l'eau a un effet très positif l'ensemble du bassin du lac Champlain. Les communautés locales, dont les revenus sont tributaires des retombées économiques du tourisme saisonnier, en bénéficient particulièrement. Des données et des analyses économiques à jour sont importantes pour les partenaires. Ces informations leur permettront de répartir efficacement et équitablement les coûts et les bénéfices tout au long de la mise en place du plan.

GOAL

Promote healthy and diverse economic activity, and sustainable development principles within the Lake Champlain Basin while improving water quality and conserving the natural and cultural heritage resources on which the regional economy is based.

An important goal of *Opportunities for Action* is to promote water quality objectives in ways that are compatible with economic vitality, and to tailor pollution prevention and control programs to be both economically appropriate and environmentally effective. The summary information presented in this chapter is drawn largely from the economic analyses prepared for the LCBP in 1996 (Holmes & Associates and Artuso, 1993; 1996), and has been augmented with additional economic and population data for the Lake Champlain Basin that has more recently become available.

Sustainable development is an economic development concept that gives full consideration to the social, economic, quality of life, and environmental aspects of development decisions. To promote sustainable development, it is essential to work closely with economic development agencies, chambers of commerce, business and industry groups, real estate development interests, local governments, and environmental organizations to identify actions and programs that can lead to sustained economic activity, good wages, long-term employment, affordable housing and a cleaner environment. For a number of years, the Province of Québec has been incorporating sustainable development principles into all government programs. The LCBP has provided funding for projects—such as alternative manure management and composting demonstration projects— that promote new technologies, improve environmental conditions, and generate revenues within the local economy. The Plattsburgh Air Force Base redevelopment is a recent example of the close integration of environmental cleanup and long-term development activity. The Triangle of Excellence Program is a good example of regional cooperation. The program is a joint effort organized by the mayors of Burlington, Plattsburgh, and St. Jean-sur-Richelieu to promote regional cooperation and economic development. The Plattsburgh Chamber of Commerce is also working on regional cooperative efforts to link economic activity among Québec, northern New York, and the Hudson River area.

The LCBP has helped fund numerous recreational and historic preservation projects which help to stimulate the local economy, such as Lake Champlain Bikeways, the Birding Trail, and the Historic Landings Heritage Trail. The NYSDEC and VTDEC regularly schedule pollution prevention workshops to help businesses reduce costs while ensuring compliance with environmental regulations.

Many state and federal environmental issues, such as stormwater management, and TMDL requirements require careful efforts so that protection of water bodies from pollution is successful, and economic vitality and well-planned development may occur. The role of the LCBP in these efforts will be to promote environmentally sound decision-making, encourage interagency and regional cooperation, support alternative and innovative technology, and promote economic vitality, particularly in tourism and recreation, based on the appropriate use of the natural resources of the Basin.

THE ECONOMIC IMPORTANCE OF LAKE CHAMPLAIN

Recreation and Tourism

The Lake Champlain region has rapidly evolved towards a service-oriented economy, with one-third of total employment in the service industries in 1990. Recreation and tourism constitute a major portion of that service economy. A recent comprehensive study of tourism showed that tourists in

Vermont spent \$4 billion in 1998-99 (April 98 to March 99), 15% of the total state economy. Tourism also contributed 23% of the jobs in Vermont and 23% of total state personal income. Based on earlier socioeconomic research, about 68% of this sector of the Vermont economy occurs in the Lake Champlain Basin (Holmes & Associates 1993: 4-10). Accordingly, the Lake Champlain Basin portion of the Vermont tourism economy can be valued at about \$2.7 billion. Approximately 71% of the Lake Champlain Basin's economy occurs in Vermont, while 29% occurs in New York (Holmes & Associates and Artuso 1993: 4-13). It follows that the tourism economy of the Basin in New York equals approximately \$1.1 billion, and the total Basin-wide tourism economy reached about of \$3.8 billion in expenditures in 1998-99.

Two other statistics developed in earlier socioeconomic research on Lake Champlain allow us to approximate the economic impact of tourism in the Basin. One is that approximately 40% of tourism in the Basin occurs in the shoreland towns bordering Lake Champlain (Holmes & Associates and Artuso 1993: 4-14). The other is that Lake Champlain directly influences at least 15% of the tourism occurring in those shoreland towns (Holmes & Associates and Artuso 1996; Yellow Wood Associates 1995). Using the 1998-99 Vermont tourism data, it can be projected that \$1.5 billion of tourism expenditures are occurring in shoreland towns, and that \$228 million of those expenditures are being spent on Lake Champlain, related activities (e.g., boating, camping, fishing, motels, etc.). Those are tourism-related expenditures by visitors to the area. Local residents also use Lake Champlain

for recreation. A survey investigating the economic impact of the sea lamprey control program found that residents within thirty-five miles of Lake Champlain spent \$118 million in 1997 on water-based recreational activities on Lake Champlain. These dollars spent at local businesses by local residents are in addition to \$228 million in Lake Champlain-related expenditures made by visitors from outside the area. An additional component of the Lake Champlain-related tourism economy is the seasonal homeowners around the Lake. Seasonal residents around the Lake spent \$16 million on nondurable goods in 1995 (EFCA, 1995; Holmes & Associates and Artuso 1996: 80).

The international feel of Lake Champlain and the cooperative tourism efforts already underway, especially within the US-Canadian corridor along Missisquoi Bay and the Richelieu River, makes the Basin one of the more appealing tourist destinations in the Northeastern US. The Richelieu Valley region of Québec has been working to stimulate tourism interregionally by promoting outdoor activities, cultural heritage, and eco-tourism activities provided by the natural, historical, and cultural attractions around Lake Champlain and the Richelieu River Basin.

The natural and cultural resources of the Lake Champlain Basin provide a foundation that supports other components of the regional economy. Abundant and diverse natural resources are a major reason many Basin residents choose to live where they do. Sport fishing and hunting, as well as nonconsumptive uses such as boating, hiking, and cross-country skiing, all are made more attractive to local residents by excellent water quality, abundant

wildlife, and wildlife habitat. Whereas only a generation ago, railroads, airports, and highways were the key determinants for locating a new factory, economists are now finding that recreational opportunities, quality of life, good schools, and healthcare are key factors guiding the location of new industries.

While many types of recreation are available within the Basin, water-based recreation provides the primary attraction for visitors. Bike paths, scores of municipal and state parks, beaches, ski trails, boat launches, boat tours on the Lake, and portions of the Green Mountain National Forest and the Adirondack Park all are located in the Basin. Protection and enhancement of the environmental, cultural, and historic resources are clearly important to many recreational users, as these resources are the main focus of the recreational experience. Much of the challenge in recreation management lies in providing additional recreation opportunities in ways that do not significantly worsen water quality.

In 1988, the average expenditure by New York anglers on nondurable goods at Lake Champlain was \$19.61 per angler day, for a total of \$9.5 million in local expenditures. They spent an additional \$4.7 million *en route*. Holmes & Associates (1993) extrapolated the New York findings to Vermont and concluded that angler expenditures on nondurable goods at Lake Champlain approximated \$32 million annually. A more recent survey of fishing license holders in New York and Vermont estimated that Lake Champlain anglers spent \$100 million on nondurable goods (e.g., tackle, bait, refreshments) and \$105 million on durable goods (e.g., fishing rods, fishing boats) in 1997 (Gilbert 2000). Gilbert's data

indicates that during the open water season, more than one-third (42%) of 1997 open water fishing expenditures were associated with fishing for lake trout, 27% with fishing for land-locked salmon, 11% with bass, and 8% were associated with walleye fishing.

There are 98 fishing and fishing-related businesses within ten miles of Lake Champlain. In 1997, the owners of those businesses estimated that 78% (\$5.6 million) of their \$7.2 million in gross fishing based income was derived from anglers fishing Lake Champlain or its tributaries.

The plan recommends investigating the development of a joint New York and Vermont Lake Champlain fishing license agreement. An in-depth benefit-cost analysis of that proposal, which has not yet been undertaken, would be a positive development for anglers and the fishing economy around the Lake. Vermont and New York management agencies are continuing to discuss options for a reciprocal agreement and to study the potential impacts of various alternatives on vital fish and wildlife program revenues.

Economic Aspects of Clean Water

Approximately 200,000 people use Lake Champlain as a source of drinking water, including an estimated 4,149 households with private water systems drawing from the Lake. Human health concerns related to Lake Champlain have been elevated to a Highest Priority in this revised version of Opportunities for Action. The principal health risks posed by water pollution in the Champlain Basin involve drinking unhealthy

water, consuming fish that have accumulated high levels of toxic substances in their tissues, and swimming in water that has been contaminated by pathogens or toxins from bacteria.

There are 99 public water systems that draw water from Lake Champlain, comprised of 35 residential suppliers and 64 non-residential suppliers, such as motels, schools, businesses, campgrounds, restaurants, gas stations, etc., serving approximately 188,000 people (35% of the US population of the Basin).

Approximately 137,803 Vermont residents are served by 25 municipal and 6 commercial drinking water supply systems that draw their source water from Lake Champlain, indicating that almost one quarter (24%) of Vermont's population relies on Lake Champlain for drinking water. Although the vast majority use public water systems that are monitored and regulated, approximately 4,000 people draw their own water directly from the Lake. However, it is not recommended for drinking without treatment.

The Champlain Water District pumps approximately 11 million gallons of water per day from Lake Champlain. At a wholesale rate of \$1.11 per 1,000 gallons in 2001, Lake Champlain drinking water could be partially valued at \$12 million, considering only its wholesale value and accounting only for those individuals served by the 11 municipalities in the Champlain Water District. Using the same wholesale value for the other two thirds (62%) of Lake Champlain drinking water users, the total wholesale use value of Lake Champlain drinking water would be approximately \$36 million in 2001.

OBJECTIVES

(not listed in priority order)

- 1) Gather economic data to increase understanding of the relationship between the economy and the environment.
- 2) Encourage cost-benefit analyses to determine the most cost effective means of pollution prevention.
- 3) Encourage the use of federal, state, local, and private funding for brownfield redevelopment and other activities that return previously contaminated land to viable economic use.
- 4) Improve capacity for regional cooperation on cultural heritage-based economic initiatives.
- 5) Encourage natural resource agencies to work cooperatively on appropriate marketing of Lake Champlain's natural resources including fishing, hunting, hiking, camping, and paddling.
- 6) Fund projects to reduce the impact of sprawl on the water quality of the Lake and its tributaries.
- 7) Encourage the sustainable use of the Basin's natural, cultural, and historic resources.
- 8) Work to reduce the negative economic impacts of aquatic nuisance species in the Basin.

Overall, Lake Champlain compares very favorably to surface water sources throughout the nation, and the Lake seems to be a more cost-effective source of water than alternative sources. While nutrient levels and turbidity at the Champlain Water District water source are now below national averages, there would be direct adverse economic impacts in terms of increased drinking water filtration and treatment costs if Lake Champlain nutrient levels were to increase or if federal or state drinking water standards were to become more strict.

Swimmable Waters

While the actual number of swimmers is unknown, an estimated 968,000 visits to public and private commercial beaches on Lake Champlain occurred in 1993. Swimming and wading were the most popular recreational activities on Lake Champlain, accounting for 1.2 million user days and 38% of all Lake-related recreational activity for residents living within 35 miles of the Lake. In addition, swimming is an important recreation activity at more than 9,000 seasonal homes and other year-round homes lakeshore towns. Periodic high levels of fecal coliform have caused public beach closings in some areas of the Lake, curtailing swimming activities and resulting in adverse economic impact on the local economy.

There are 54 public and commercial beaches and 10 private beaches on Lake Champlain. Recent beach closings, primarily in Vermont, have been triggered by excessive coliform bacteria counts. These problems appear to be site specific, and the source of contamination is

typically in the vicinity of the beach or upstream in the watershed. There has been significant progress on eliminating combined sewer overflows, but work remains. In addition, controlling urban runoff, agricultural and natural sources, and animal wastes will contribute to success.

Beach users have many options when arriving at a closed beach. They can look for another beach on Lake Champlain, travel to another lake or cancel their beach trip. In the first case, the economic benefit of their beach trip-related expenditures is transferred to the other beach location. In other scenarios, the recreational expenditures are lost to Lake Champlain area businesses. As an example, one Vermont beach was closed for most of 1995 because of pathogens possibly related to a malfunctioning septic system. The beach had 500 to 2,000 users per day in 1993. Using a Vermont State Park day use expenditure estimate of \$26.82 per group, lost expenditures amounted to \$3,800 to \$15,340 per day. During the swimming season, local businesses may have lost about \$200,000 to \$350,000.

OVERVIEW OF THE LAKE CHAMPLAIN BASIN ECONOMY

Employment and Income

The diverse economy of the Lake Champlain Basin has helped it weather recessions between 1980 and 2000. In addition to tourism, major sectors of the Basin economy

include manufacturing, agriculture, retail and wholesale trade, healthcare, universities, prisons, and state government. Research for the LCBP in the 1990s found that employment in the service sector comprises 35% of Basin employment by industry, followed by trade (22%), and manufacturing (15%). The trend in the last twenty years has been towards an increase in the service and trade sectors and a decrease in the manufacturing sector. The most recent Economic Census for Vermont (US Census Bureau 1997) indicates that sales and receipts for all Vermont establishments totaled more than \$29 billion in 1997, and that manufacturing accounted for 27% of that total; retail trade, 20%; wholesale trade, 16%; and services, 13%.

Income from wages, especially in the rural portions of the Basin, lags behind the national average. In the Adirondack Park portion of the Lake Champlain Basin, average annual wages in 1992 were \$20,621, in contrast to \$32,411 for the State of New York and \$25,903 for the nation. In Vermont, nonmetropolitan earnings per job were \$24,774 in 1999, while metropolitan earnings were \$28,039. Nationally, the averages for nonmetropolitan earnings were \$24,408 and for metropolitan earnings were \$36,526.

Economic Dependence on Natural Resources

The more traditional rural industries of natural resource harvesting, resource extraction, and farming continue to make significant contributions to local economies. The 1990 US census data for Vermont indicated that 4.2% of employment was in the agriculture, forestry, and

fishing industry, totaling 12,000 people, while nationally the sector accounted for 2.7% of all employment (US Department of Commerce). In several locations around the Basin, primary businesses related to agriculture, mining, and forestry are the major employers. For example, the “agriculture, forestry, and fisheries” industry grouping accounts for more than 25% of all employment in the Vermont towns of Bridport, Shoreham, and Addison. The town of Willsboro, New York has approximately 11% of its employment in agriculture, forestry, and mining activities (US Department of Commerce 1990 Census; Holmes & Associates and Artuso 1996: 50-52). The term “primary employment” distinguishes direct harvesting and preliminary processing of natural resource commodities from “secondary employment,” which involves the subsequent transportation, processing, packaging, and marketing of the natural resource. While secondary employment is difficult to quantify, secondary agriculture-related employment is thought to comprise an additional 10% to 15% of total local employment.



Proctor Maple Research Center

The Lake Champlain Basin produces approximately one-third of the maple syrup in the United States.

Agriculture

In the ten counties of New York and Vermont that are predominately in the Basin, there were approximately 4,840 farms in 1987, with the distribution roughly being one-third in New York and two-thirds in Vermont.

According to the 1997 Census of Agriculture, the number of acres of farmland in Vermont decreased by one percent from 1992 to 1997, to 1.3 million acres, while the number of full-time farms decreased six percent to 3,300.

The total value of agricultural products sold from farms in the Basin in 1990 was \$415.5 million, with 58% of the total attributable to Vermont farms. Sales from farms in the Vermont sector of the Basin accounted for approximately 64% of all Vermont farm sales. By 1997, sales from Vermont farms totaled \$476 million and the sales per farm averaged \$82,000, indicating that the total value of Lake Champlain Basin agricultural products had risen to \$526 million. In New York,

Washington County accounts for 51% of the New York Basin farm acreage, while in Vermont, Addison and Franklin Counties account for 53% of the farm acreage.

Dairy products account for the majority of farm sales in both New York and Vermont Basin areas. Data for 1989 indicate that dairy products accounted for 72% of Vermont farm cash receipts, followed by beef and veal (13%), horses (6%), hay (3%), and maple syrup (3%). In 1990, dairy product sales in

the three New York Basin counties accounted for about 60% of total farm sales, while statewide, dairy product sales accounted for 53% of New York farm cash receipts.

According to the New York Soil and Water Conservation Committee, there are now 1,080 farms in the New York portion of the Basin. Of those, approximately 600 are considered to be commercial farms. At least 55 of those farms are classified as concentrated animal feeding operations (CAFOs) with 300 or more animal units or approximately 215 mature dairy cows. These CAFOs must develop and implement comprehensive nutrient management plans within five years. Over the past five years, New York has committed \$3 million in cost-share funds for agricultural environmental management in the New York portion of the Basin, with farm operators committing nearly \$1 million in matching funds. The costs of constructing manure storage structures continues to rise and now can exceed \$250,000.

Forest Products

Forest products include a wide diversity of commodities and manufactured items such as building materials, paper, maple syrup, and furniture. The importance of specific forest products-related industries to local economies varies from one part of the Basin to another. Maple syrup contributes significantly to local rural economies in the Basin. In 1999, Vermont remained the largest producing state in the nation, accounting for 31% of the total US maple production. Vermont's maple syrup production was valued at \$10.5 million in 1999, while production in New York portion of the Lake Champlain Basin was valued at

Don Meals



Dairy products account for the majority of farm sales in both New York and Vermont.

\$1 million. Maple candy and other maple items are value-added products that increase the economic impact of the maple syrup industry in local economies. Manufacturing of paper and paper products makes a significant economic impact on rural economies as well. For example, in 2000, International Paper's Ticonderoga Mill employed 690 people and had a payroll of \$36 million. Approximately 90% of all employees live in the New York towns in the vicinity of Ticonderoga. In 2000, the mill purchased more than \$30 million in goods and services in the Ticonderoga area of New York State. The mill also purchased \$20 million of fiber, wood chips, and bark from the Adirondack region, and 285 private truckers were involved in bringing wood to the mill. International Paper is the largest private landowner in New York State, owning and managing nearly 300,000 acres of forestland, most of it located within the Adirondack Park.

In Vermont, three counties each account for 14% of the volume of sawlogs: Caledonia, Orleans, and Windsor. Of those, only Orleans is considered a Basin county, and only about one-half of the county lies within the Basin. In the New York sector of the Basin, a significant amount of the land area is classified as commercial forestland: Clinton County (69%), Franklin County (61%), Essex County (48%), Warren County (59%), and Washington County (48%). According to recent research on the forest-based economy of the northern forest region of New York, Vermont, New Hampshire, and Maine, jobs in lumber, wood, and paper products have declined from 1987 to 1997. There is local evidence of that decline in the closing of several sawmills and plywood mills during 2000-2001 in the New York portion of the Basin, and related reductions in the

workforce in paper mills in the region. However, wood manufacturing of value-added products, such as furniture, is a growing and strong economic sector.

POPULATION CHANGE AND LAND USE

Population change can be an indicator of economic activity—or lack of economic opportunity—and can indicate high growth areas where land use planning is needed to protect water quality. Table 3 presents the total population in each of nine major watersheds around the Lake Champlain Basin.

The preliminary 2000 Census data indicates that the US population in the Basin numbers about 541,000 people. An estimated 30,000 people live in the Québec portion of the Lake Champlain Basin. About 63% of the 609,000 residents in Vermont live in the Lake Champlain Basin. Seventy-two percent of the population in the US portion of the Basin resides

in Vermont, and 28% reside in New York. Approximately 45% of the Lake Champlain Basin residents live in towns bordering the shore of Lake Champlain.

The Vermont portion of the Main Lake area, which includes the Winooski River Basin and contains the cities of Burlington and Montpelier, comprises almost one-half of the population in the Basin (47%). The other main population center is the Plattsburgh area of New York which includes the Saranac and Chazy River basins. Here, 15% of the population resides. Another population center is the Mallets Bay area north of Burlington, representing a portion of the Lamoille River Basin, with 12% of the population. The six percent increase in population between 1990 and 2000 was the lowest rate of increase of any of the past five decades (Table 4). The higher growth areas were Mallets Bay, Lake George, Missisquoi Bay, and the Inland Sea watershed areas. The watershed area including Plattsburgh experienced a 6% decline in population

Lake Champlain Basin Watershed/Lake Segment	Total Population						Percent (%) of 2000 Population
	1950	1960	1970	1980	1990	2000	
Missisquoi Bay	20,752	19,427	20,050	22,786	25,228	28,104	5
Inland Sea	11,922	12,516	13,427	14,123	16,200	17,921	3
Mallets Bay	23,534	23,833	34,135	46,832	56,237	65,295	12
Broad Lake, VT	151,393	163,893	194,040	216,256	236,698	254,228	47
South Lake, VT	14,290	16,152	16,123	18,012	19,925	21,228	4
South Lake, NY	23,219	22,641	24,572	25,057	27,607	28,666	5
Lake George	3,566	4,617	5,305	5,953	5,765	6,549	1
Broad Lake South, NY	29,568	31,851	31,175	34,241	36,113	37,987	7
Broad Lake North, NY	57,627	75,111	73,380	81,303	86,304	81,005	15
Total US Basin Population:	335,871	370,041	412,207	464,563	510,077	540,983	100

Table 3.
US population:
Lake Champlain
watershed areas,
1950-2000.

Source: US Department of Commerce, Bureau of the Census, 1950, 1960, 1970, 1980, 1990, 2000.
Watershed population analysis by Holmes & Associates for the Lake Champlain Basin Program (2001).

Since 1950, the Malletts Bay watershed area has experienced the most growth among the nine areas; at 177%, its growth rate was three times the average for the Basin. Other high growth areas of the Basin over the past 50 years are the Lake George watershed area and Broad Lake, Vermont watershed area (Table 4).

Also very important to the Basin economy are the seasonal homeowners and residents. According to the 1990 Census data, there were 38,530 seasonal homes in the Basin, or approximately 14.6% of all Basin housing units. Approximately 9,118 of the seasonal homes are located in the Lake Champlain shoreland areas, or 24% of all seasonal homes in the Basin. The 38,530 seasonal homes would equal a population increase of approximately 116,000 people if they were each occupied by three individuals, amounting to a seasonal increase in Basin population by about 20%. Considering shoreland seasonal homes only and a seasonal household size of three to six people, those 9,118 homes add 27,000 to 55,000 people to the Lake Champlain shoreland population in July and August. The year-round population of 19,030 for the Missisquoi Bay area in Québec more than doubles during the summer with the influx of 21,274 summer residents.

Associated with population growth are development and changes to the landscape, among the primary human impacts on water quality in the Basin. Quantifying the type and magnitude of change is an essential part of understanding the impacts, both positive and negative, of land use changes. In a project that combined federal, state, and local resources, the Lake Champlain Basin Program developed

a map of the landscape of the Basin using data from 1993. These efforts yielded a complete land use and vegetative cover inventory and a database that can be used to describe the relationship between land use and water quality in the Basin. For example, analysts have developed a numerical model that describes the rate at which phosphorus enters Lake Champlain as a function of the amount of urban, agricultural, and forested land in the Basin.

Satellite data has yielded important information about the Basin. The terrestrial part of the Basin is predominantly forested (about 64%), including deciduous trees (33%), mixed woods (16%), and conifers (14%). Agricultural landscape categories, including pasture and orchards, cover about 16% of the Basin. The open waters of Lake Champlain and smaller lakes and rivers comprise the next largest component of the landscape, approximately 10% of the surface area. Wetlands, a vital hydrological and ecological component of the Basin, comprise less than 4% of the surface. Lastly, the areas developed for transportation

and utilities, residential, commercial, and industrial, have grown to cover a little more than 5% of the landscape.

A major landscape issue facing the Basin is sprawled development, a cumulative process that results from the incremental growth of low-density residential and urban development, typically scattered along a highway. Sprawled development tends to begin at the edge of traditional community centers and extends outward into previously rural areas, requiring new or larger roads, water and sewer capacity, and utility lines. Although sprawl is not new to the Basin, the amount and rate of this form of development has made it a topic of concern and study in some parts of the Basin.

The effects of sprawled development in the Basin may result in a reduction of water quality from increased urban runoff and loss of wetlands. As the landscape becomes increasingly fragmented, wildlife habitat, farmlands, and forests become less productive. The discussion of both the positive and negative

Lake Champlain Watershed/Lake Segment	Percent (%) Change					
	1950-60	1960-70	1970-80	1980-90	90-2000	1950-2000
Missisquoi Bay	-6.4	3.2	13.6	10.7	11.4	35.4
Inland Sea	5.0	7.3	5.2	14.7	10.6	50.3
Malletts Bay	1.3	43.2	37.2	20.1	16.1	177.4
Broad Lake, VT	8.3	18.4	11.4	9.5	7.4	67.9
South Lake, VT	13.0	-0.2	11.7	10.6	6.5	48.6
South Lake, NY	-2.5	8.5	2.0	10.2	3.8	23.5
Lake George	29.5	14.9	12.2	-3.2	13.6	83.7
Broad Lake South, NY	7.7	-2.1	9.8	5.5	5.2	28.5
Broad Lake North, NY	30.3	-2.3	10.8	6.2	-6.1	40.6
Total Change:	10.2	11.4	12.7	9.8	6.1	61.1

Table 4. Population change: Lake Champlain watershed areas, 1950 to 2000.

Source: US Department of Commerce, Bureau of the Census, 1950, 1960, 1970, 1980, 1990, 2000. Watershed population analysis by Holmes & Associates for the Lake Champlain Basin Program (2001).

impacts of sprawl on the landscape, culture and economy of the Basin has taken on an increased importance in view of recent development trends.

ECONOMIC DATA FOR THE QUÉBEC PORTION OF THE MISSISQUOI BAY DRAINAGE BASIN

Recreation and Tourism around Missisquoi Bay

After agriculture, the economic engines in the Missisquoi Bay basin are recreation and tourism. It is easy to imagine the major impact the seasonal influx of vacationers can have on the economy of several municipalities. When a population doubles or even quadruples during a period of several months, it drives up annual sales of local businesses. However, there have yet to be any specific studies on the economic impact of seasonal population growth in the Missisquoi Bay drainage basin.

The area of the drainage basin offers a wealth of recreational, regional tourism, and destination tourism opportunities. Agricultural and forest areas are popular spots for skiing, hiking, and hunting, activities that are less directly affected by water quality. The same is not true, however, for other recreational activities such as swimming, fishing, and boating. These activities, which are practiced primarily on the shores and in the waters of the bay and its main tributaries, the Brochets and Missisquoi

ivers, are increasingly compromised by the degradation of water quality as a result of the excess concentration of phosphorous. Water quality at the bay's public beaches is usually very good, according to the safety standards of the Environment-Plage program of the Ministère de l'Environnement du Québec. In fact, of the five public beaches in Venise-en-Québec, four received an annual average rating of A (excellent) in 2000, and the other, a B rating (good). Even so, these beaches had to be closed in mid-summer recently because of a major blue-green algae bloom.

Wastewater and Drinking Water Infrastructure for Québec Municipalities around Missisquoi Bay

In the Québec portion of the Missisquoi Bay drainage basin, 50% of the population is connected to a sewerage system, 86% of which is served by a wastewater treatment plant. Seven municipalities already have a sewerage system with treatment plants and another is in the process of installing one. These systems serve 10,471 people at a total construction cost of \$23,616,800 (Canadian).

Eight municipalities in the basin have a drinking water supply system connected to a filtration plant. These systems serve roughly 10,000 people. The system furnishing water to the city of Bedford and the Philipsburg area of Saint-Armand has trouble maintaining water quality standards when the suspended solids or microscopic algae content in the bay are too high. Several drinking water warnings have had to be issued since the start-up of the filtration plant.

Employment, Income, and Agricultural Statistics for Missisquoi Bay

A general economic portrait emerges by calculating the averages of the indicators for the three regional county municipalities making up the basin area (Haut-Richelieu, Brome-Missisquoi and Memphrémagog). In 1999, the average annual per capita income in the Missisquoi Bay area was around \$22,000 (Canadian currency). The average labor force participation rate in 1996 was around 61.7%; the employment rate, 55.2%; and the jobless rate, 10.4%.

Agriculture and natural resources account for 5.6% of the labor market, manufacturing and construction for 29.9%, and transportation, trade, and services for 64.5%. Agriculture is the economic mainstay in the Missisquoi Bay drainage basin. According to Statistics Canada (1996 census), farms cover 45.5% of the basin area, 24.6% of which is under cultivation. Corn and fodder are the two main crops, accounting for 21.5% of the total farm area. This translates into 700 farms, including 400 in the Brochets sub-river basin. In terms of livestock production, there are 1.4 animal units (AU) per hectare (1 AU = 500 kg live weight), with beef cattle accounting for 46.2% of production; pigs, 43.4%; poultry, 6.8%; and other animals, 3.6%.

Population Change and Land Use in the Missisquoi Bay Region

The population of the Missisquoi Bay drainage basin is distributed over two Québec administrative regions (Montérégie and Estrie), three regional county municipalities, and 29 municipalities.

The total population in this area was 21,638 in 2000. The population grew by 3.8% between 1996 and 2000. Eastman is the only municipality in the entire basin to have experienced significant population growth (44%) between 1996 and 2000. There has been almost no change in the population of the other basin municipalities.

The population increases substantially during the summer, particularly in the three municipalities of Venise-en-Québec, Saint-Georges-de-Clarenceville, and Saint-Armand. The seasonal population is 7000 in the summer, with the population of Venise-en-Québec quadrupling, and that of Saint-Georges-de-Clarenceville doubling. This results in a veritable urban concentration in a narrow strip along the shores of the bay during a time of year when the environmental conditions in the bay are the most sensitive. Numerous cottages and several summer campgrounds are located in these municipalities. Tourism leads to a seasonal influx of people in other basin municipalities as well, such as Frelighsburg, Dunham, Sutton, and Eastman.

Only 5% of the area of the Missisquoi Bay drainage basin is urbanized, and there are no major agglomerations. Approximately 45% of the basin area is farmland, and the remaining 50% forest and water.

HIGH PRIORITY ACTIONS

(not listed in priority order)

1) Update Socioeconomic Data for the Lake Champlain Region

During the early 1990s, the LCBP developed an economic database for the Lake Champlain region based on the results of the 1990 census. The database provides important information on employment by industry and occupation, as well as economic activity generated by agriculture, forestry, mining, and other natural resource-based industries. The study also analyzed the regional tourism economy and the economic benefits generated by various recreational activities, such as fishing, hunting, hiking, and camping. Data on tourism from Québec and use of Lake Champlain by Québec boaters were also included in the report. This database now needs to be updated with information soon to be available from the most recent census data in New York, Vermont, and Québec.

Potential key LCBP partners: State and regional economic development agencies and tourism offices

Cost estimate: \$40,000 to \$50,000 per year for two years.

Potential funding sources: USEPA, NPS, NRCS, VTACCD, NYS Empire State Development

Timeframe: 2002-2003

Benchmark: Completion of database update

2) Support Cost-Benefit Analyses of Pollution Prevention Projects

The LCBP funds many demonstration and implementation projects to prevent pollution in the Basin. To provide essential information about pollution prevention strategies and to

guide funding priorities, it is important to assess the costs and benefits of potential actions to project or assess their effectiveness in various parts of the Basin.

Potential key LCBP partners: federal, state and local agencies, universities.

Cost estimate: \$5,000 to \$10,000 per project assessed

Potential funding sources: USEPA, NPS, NRCS, VTACCD, NYS Empire State Development

Timeframe: Ongoing

Benchmark: Completion of cost-benefit analysis for key actions

3) Support Cost-Benefit Analyses of Aquatic Nuisance Species Control Efforts

Management decisions about the control of aquatic nuisance species in the Basin would benefit from improved economic information about the available options, especially to guide the allocation of limited resources. To provide essential information about aquatic nuisance species management strategies, studies to assess the costs and benefits of potential actions and to project their effectiveness in various parts of the Basin should be supported and encouraged.

Potential key LCBP partners: Federal, state, and local agencies, universities.

Cost estimate: \$5,000 to \$10,000 per project assessed

Potential funding sources: USEPA, NPS, NRCS, VTANR, NYSDEC, VTACCD, NYS Empire State Development

Timeframe: Ongoing

Benchmark: Completion of cost-benefit analysis for key actions

4) Work with Federal, State, and Local Communities to Identify Brownfield Redevelopment Areas that May Be Eligible for Federal and or State Funding

The LCBP should take a proactive role to work with local communities to identify locations within the Basin which are in need of environmental cleanup and eligible for federal and state funding for brownfield redevelopment.

Potential key LCBP partners: USEPA, VTDEC, NYSDEC

Cost estimate: \$15,000

Potential funding sources: USEPA

Timeframe: Ongoing

Benchmark: Development of report that identifies eligible sites

5) Continue an Integrated Approach to Environmental, Cultural Resource, and Recreation Management

For more than a decade, the LCBP has worked on water quality, recreation management, and cultural heritage programs through a variety of funding sources. Regional tourism is directly tied to a clean environment, improved recreational access, and increased understanding of our cultural heritage resources. In 2001, the LCBP established a cultural resource and recreation advisory committee consisting of local officials, historic preservation experts, and state agency representatives to provide input and recommendations on regional recreation and cultural resource initiatives within the Basin. New and exiting opportunities exist to expand regional cooperation on cultural

heritage tourism and recreation management, which are detailed in other sections of this Plan. Successful implementation of these regional initiatives depends on water quality protection and improvement projects.

Potential key LCBP partners: Landowners, businesses, nonprofits organizations, local and county governments and tourism offices, regional commissions, chambers of commerce, housing and conservation boards, NPS, USEPA, NYSDEC, VTANR, NYSOPRHP, VTDHP, and Québec Societe de la Faune et des Parcs

Cost estimate: \$75,000 to \$150,000 per year

Potential funding sources: NPS, USEPA, VHCB, non profits organizations, USDA-NRCS, HPF, HUD, National Trust for Historic Preservation, USDA-FMHA

Timeframe: Ongoing

Benchmark: Synthesis of regional marketing goals and their integration into recreation and tourism plans (see Action Items 6 and 7 in chapter 4 and creation of an appropriate regional marketing effort for the Basin.

6) Update Land Use/ Land Cover Database

Satellite data and locally derived information has yielded important facts about the Basin. Sixty-four percent the landscape in the Basin is still forested, and agricultural lands cover approximately 16% of the Basin. The urban landscape currently represents only 5% of the total land use. However, urban areas contribute a far larger portion of phosphorus loadings to Lake Champlain than other land uses on an acre by acre basis. Continuing urbanization and sprawled development have the potential to add additional phosphorus loadings to the Lake and its tributaries unless specific mitigation measures are taken. The effects of sprawl potentially include not only reduction of water quality but also increasingly fragmented and less productive wildlife

habitat, farmlands, and forests. The most recent land use and land cover data for the Lake Champlain Basin was published by LCBP in 1993. In order to track changes in land use and its related impacts, more current land use data must be acquired to assist managers in setting priorities and implementing management programs, and this information must be made available to the public.

Potential key LCBP partners: USEPA, USGS, USACOE, VTDEC, NYSDEC, APA, universities, local/regional planning agencies

Cost estimate: \$100,000 to \$250,000

Potential funding sources: USEPA, USACOE

Timeframe: 2002-2003

Benchmark: Updated land use/ land cover report

CONCLUSION

The available economic data and analyses demonstrate that the priority actions for improving water quality will have a strong positive impact within the Lake Champlain Basin in all sectors of the economy. From clean drinking water to recreational, aesthetic, and cultural values, the public strongly endorses maintaining clean water and preventing pollution in the Basin. The positive economic importance of maintaining clean water is very significant, especially for local economies that depend on seasonal tourist expenditures for their annual revenue. Moreover, the economic cost of remediating polluted areas is far greater than the cost of maintaining clean water in the first place.

It is important to facilitate efficient and equitable distribution of the costs and benefits throughout the Plan implementation process. The economic analyses should provide guidance in that direction. Increased attention to the collection and analysis of economic data is recommended, and the continued inclusion of economic interests in the planning process for protecting Lake Champlain is essential.



LCBP

A father and daughter show off a great catch at the annual Vermont Fish and Wildlife Kid's Fishing Day.