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NATIONAL MARINE SANCTUARIES CONSERVATION SCIENCE SERIES

Proposed Lake Ontario National Marine Sanctuary

Study Area Profile

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About the National Marine Sanctuaries Conservation Series

The Office of National Marine Sanctuaries, part of the National Oceanic and Atmospheric Administration, serves as the trustee for a system of underwater parks encompassing more than 600,000 square miles of ocean and Great Lakes waters. The 14 national marine sanctuaries and two marine national monuments within the National Marine Sanctuary System represent areas of America's ocean and Great Lakes environment that are of special national significance. Within their waters, giant humpback whales breed and calve their young, coral colonies flourish, and shipwrecks tell stories of our nation's maritime history. Habitats include beautiful coral reefs, lush kelp forests, whale migration corridors, spectacular deep-sea canyons, and underwater archaeological sites. These special places also provide homes to thousands of unique or endangered species and are important to America's cultural heritage. Sites range in size from less than one square mile to almost 583,000 square miles. They serve as natural classrooms and cherished recreational spots, and are home to valuable commercial industries.

Because of considerable differences in settings, resources, and threats, each national marine sanctuary has a tailored management plan. Conservation, education, research, monitoring, and enforcement programs vary accordingly. The integration of these programs is fundamental to marine protected area management. The National Marine Sanctuaries Conservation Series reflects and supports this integration by providing a forum for publication and discussion of the complex issues currently facing the National Marine Sanctuary System. Topics of published reports vary substantially and may include descriptions of educational programs, discussions on resource management issues, and results of scientific research and monitoring projects. The series facilitates integration of natural sciences, socioeconomic and cultural sciences, education, and policy development to accomplish the diverse needs of NOAA's resource protection mandate. All publications are available on the Office of National Marine Sanctuaries website (http://www.sanctuaries.noaa.gov).

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Table of Contents

List of Figures

List of Tables

Abstract

Study area profiles provide information on the local community and economy of national marine sanctuaries. The majority of the data is sourced from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, and other federal and state agency data sets, such as the National Park Service and state natural resource agencies. Further, some data on local, marine-dependent recreation businesses may be gleaned from the internet. These reports are used to understand the communities that are closest to the sanctuaries, identify how they may depend on marine resources, and determine who may be impacted by a new sanctuary or regulatory/policy changes. Information in these reports includes population, population density, population growth, other socio-demographic data, unemployment rates, income by place of work/residence, visitation to existing parks and facilities (museums, lighthouses, and aquariums), and data on marine recreation businesses.

Key Words

Lake Ontario, national marine sanctuary, study area profile, environmental impact statements, visitation, demographics, population, local and regional economies

1. INTRODUCTION

Eastern Lake Ontario and the Thousand Islands region of the St. Lawrence River represent a diverse array of important events in our nation's history, including military conflicts, maritime innovation, and American expansion to the west. The eastern corridor is one of the most historically significant regions in the Great Lakes and the country. Lake Ontario has dominated maritime trade and transportation for centuries, beginning with the canoes and boats of early Indigenous peoples. During the colonial period, Lake Ontario was a strategic theater of conflict among European powers and the young American republic. Military actions occurred in the region during the French and Indian War, Revolutionary War, and the War of 1812. Later, this region was critical to the development of the American West and the nation's industrial core.

Study area profiles analyze the dependencies of local communities/economies on resources in national marine sanctuaries and assess how people can adapt to policy/management changes that are estimated to impact their levels of use. Profiles include a county or collection of counties where the majority of economic impacts (e.g., sales/output, income, and employment) and social impacts that are associated with use of sanctuary resources take place. A standard profile includes information on population, population density, demographics of the study area population (e.g., sex, race/ethnicity, and age), poverty rate, unemployment rate, income by place of work/industry, employment by industry, income by place of residence, and per capita income. All of these measurements are available from existing sources and can be easily updated.

The study area consists of both primary and secondary counties. Primary counties are adjacent to the sanctuary and/or share coastline with the sanctuary boundary. After the primary counties are identified, secondary counties are determined using commuter flow data from the 5-Year American Community Survey. If a large number of people in a county commute to or from primary counties, that county is considered a secondary county. Specifically, if total flows to or from a non-primary to a primary county represented 10% or more of the primary county’s labor force, the non-primary county was labeled as a secondary county. The primary counties in this analysis are Jefferson, Oswego, Wayne, and Cayuga Counties, and the secondary counties are Onondaga, Ontario, Monroe, and St. Lawrence Counties (Figure 1.1). Although St. Lawrence County borders the proposed sanctuary and would thus ordinarily qualify as a primary county, ONMS categorized it as a secondary county in this analysis because the proposed sanctuary boundary would only overlap with one mile of the county.

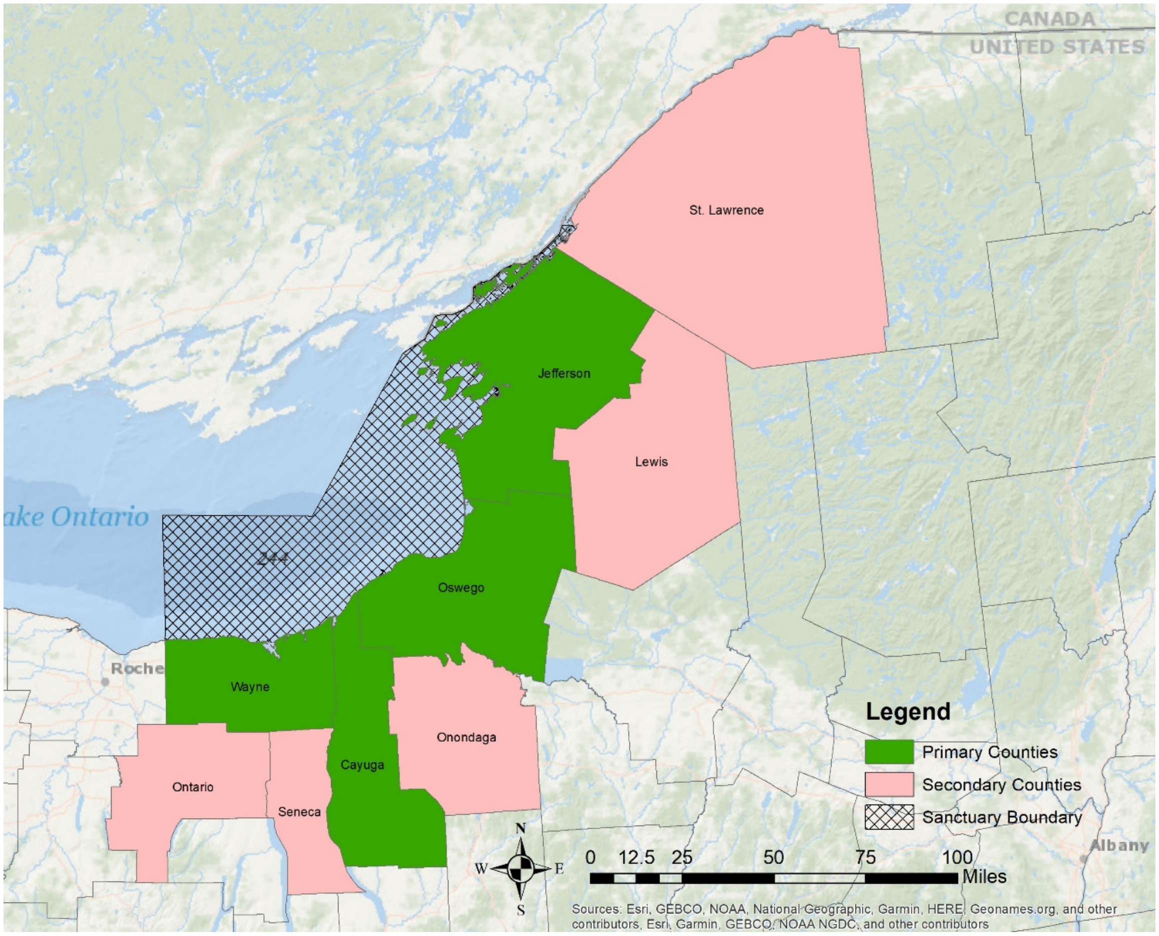

Figure 1.1 Proposed Lake Ontario National Marine Sanctuary study area counties.

2. POPULATION AND KEY MEASUREMENTS ON ECONOMIC STATUS OF THE STUDY AREA

Population is an important factor for estimating the potential short-term impacts (both positive and negative) of the designation of a new national marine sanctuary. This chapter focuses on the population of the study area, those closest to the proposed Lake Ontario National Marine Sanctuary. The local population is a beneficiary of the ecosystem services generated from sanctuary resources. Thus, the population suffers losses when the conditions of and/or access to resources declines or benefits when the condition of and/or access to resources improves. This section presents the total population by county, population density by county, population growth for the study area, and projected population growth for the study area. Per capita income, poverty rates, and unemployment rates were used as key indicators of the economic status of the study area. Status and trends of selected measures in the study area were compared to those of the United States and the state of New York.

Population

The study area population was over 1.1 million people in 2018, which is approximately 5.8% of New York's total population (U.S. Census Bureau, 2020). The most populated county in the study area is Onondaga, with a population of over 464,000 people. The least populated county is Lewis, with a population of approximately 27,000 people (Table 2.1). In addition to providing information on the number of people likely to be impacted by the designation of a national marine sanctuary, population also indicates pressure on resources. For example, an increasing population can cause increasing pressure on natural resources, whereas decreasing population can reduce the pressure on resources. Understanding how population may change informs discussions around resource pressures, expected use and the total marginal benefits, and/or costs from changes in resource conditions.

Population Growth

From 1970–1980 and 1980–1990, the population in the study area grew at a rate of 2.0% and 4.6%, respectively (Woods & Poole Economics, Inc., 2011). This was faster than the population growth in New York but slower than the United States for the same time periods. Since then the population has grown slower than both New York and the United States and has even declined in population from 2010 to 2018. (Table 2.1) (U.S. Census Bureau, 2020).

The projected population growth from 2018 to 2020 the population in the study area is expected to grow more than both the United States and New York (U.S. Census Bureau, 2020; Centers for Disease Control and Prevention [CDC], 2020; Woods & Poole Economics, Inc., 2011). From 2020 to 2030, the population in the study area is expected to grow faster than the population in New York but slower that the population in the United States. From 2030–2050, the population in the study area is expected to grow slower than that of the United States. There are no data for New York as a whole during this time period (Table 2.2). Population growth, like population, is a driver of past and expected pressures on resources.

Population Density

Population density is also an indicator of the extent of the pressure that the study area's population might exert on resources in the sanctuary. The total population density in the study area is lower than that of New York but higher than that of the United States. There is some variation in population density among counties in the study area; Lewis is the least dense (22.0 people per square mile) and Onondaga is the most dense (596.4 people per square mile) (Table 2.1) (U.S. Census Bureau, 2020). Understanding population density may help to inform managers and other decision makers about the best locations for visitor centers, interactive exhibits, and/or signage to reach the most people.

Table 2.1 Selected socioeconomic measures for description of the study area. Source: U.S. Census Bureau, 2020; U.S. Bureau of Labor Statistics, 2020

Location	2018 Population	Population Change (%) 2010–2018	Population Density[1] 2018	Per Capita Income (2018)	Percent in poverty (2018)	Unemployment Rate (2019)
Cayuga County	77,868	-3.2%	112.59	$42,231	13.7%	4.3%
Jefferson County	114,448	-0.5%	90.22	$46,924	16.7%	5.6%
Lewis County	26,719	-1.1%	20.96	$43,971	12.3%	5.5%
Onondaga County	464,242	0.1%	596.41	$52,886	12.2%	3.9%
Ontario County	109,472	3.0%	169.97	$53,498	13.7%	3.9%
Oswego County	119,104	-2.5%	125.16	$40,538	8.5%	5.4%
St. Lawrence County	109,558	-2.0%	40.87	$37,940	16.1%	5.5%
Seneca County	34,612	-2.0%	106.92	$38,593	15.1%	3.8%
Wayne County	90,856	-3.0%	150.47	$46,048	12.6%	4.0%
All Study Area Counties	1,146,879	-0.7%	124.43	$47,359	13.0%	4.4%
New York	19,618,453	2.0%	416.29	$68,668	13.7%	4.0%
USA	322,903,030	6.2%	91.42	$54,446	13.1%	3.6%

1. Number of people per square mile of land area

Table 2.2 Population growth, 1970–2018. Source: CDC, 2020 (state projections); U.S. Census Bureau, 2020 (national projections)

Population Growth (Percent Change)	Study Area	New York	United States
1970 to 1980	2.03%	-3.82%	11.48%
1980 to 1990	4.64%	2.59%	9.78%
1990 to 2000	-0.30%	5.44%	13.15%
2000 to 2010	1.33%	2.11%	9.92%
2010 to 2018	-0.74%	0.72%	5.77%

Table 2.2b Projected population growth, 2018–2060. Source: CDC, 2020 (state projections); U.S. Census Bureau, 2020 (national projections)

Projected Population Growth (Percent Change)	Study Area	New York	United States
2018 to 2020	2.0%	0.2%	1.67%
2020 to 2030	1.9%	-0.5%	6.75%
2030 to 2040	0.5%	--	5.19%
2040 to 2050	-0.8%	--	4.12%
2050 to 2060	--	--	4.00%

Gender

Gender distribution in the study area has remained relatively constant from 2010–2018; the percent of males in the study area has fluctuated from 49.5% to 49.7% during this time period (U.S. Census Bureau, 2020). The study area has had a higher percent of males than New York and the United States from 2010–2018 (Figure 2.1). Gender is important to understand because there is a correlation between gender and participation in many activities related to outdoor recreation, such as fishing and diving. Bowker et al. (2006) found that race (Black), ethnicity (Hispanic), immigrant status, age, and urban dwelling were negatively correlated with wildland visitation. Income, gender (male), and education had a positive correlation with wildland recreation participation and use. An additional study found find that gender, age, and whether or not a person was a first time visitor to ski slopes influenced perceptions on crowding and ultimately customer satisfaction (Zehrer & Raich, 2016). Further, perceived crowding by anglers and boaters was also found to negatively influence overall trip satisfaction (Kainzinger et al., 2015). These past studies support the need to understand the demographics of the community to determine how the characteristics of a community may influence use.

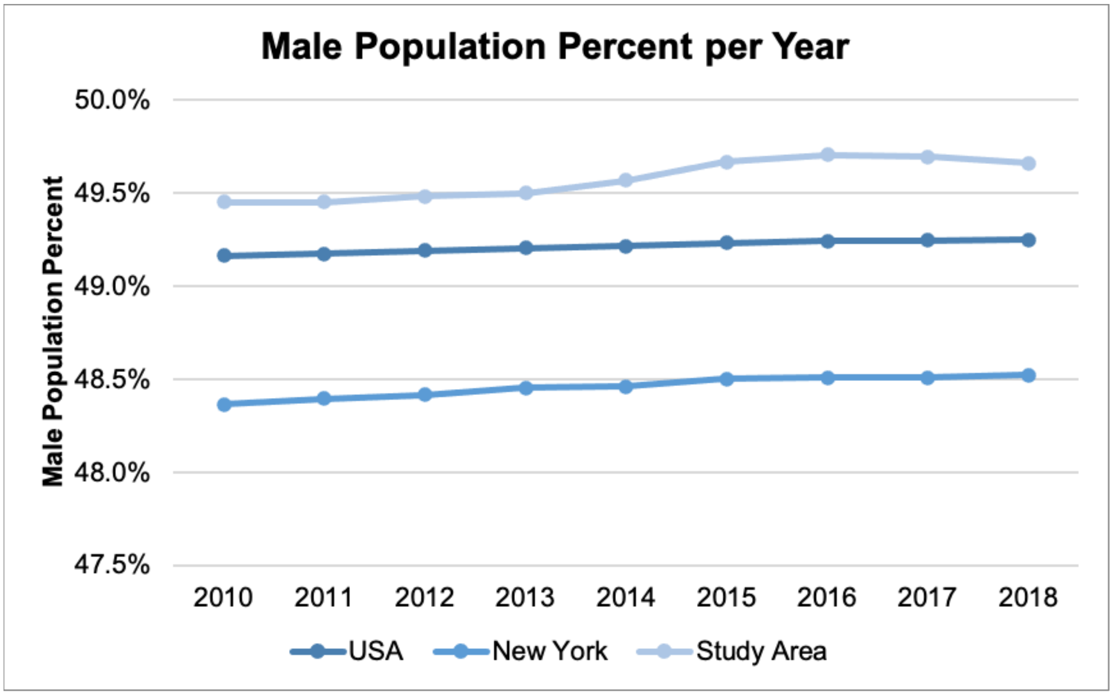

Figure 2.1 Changes in male population percentage in the study area versus the USA and New York. Source: U.S. Census Bureau, 2020

Race/Ethnicity

In 2018, the proportion of the study area population self-identified as "White" was higher than that of the United States and New York (U.S. Census Bureau, 2020). The percentage of people self-identified as "Black" was lower in the study area than that in the United States and New York. The study area had a lower percentage of Hispanics and Asians than both New York and the United States in 2018. The race/ethnicity distribution in the study area has not changed much over time, however the percentage of Whites has fallen slightly while the percentage of Hispanics and African Americans has risen slightly (Figure 2.2 and Figure 2.3). Race and ethnicity are important for resource managers to know because they affect both participation rates and attitudes/perceptions toward the definition of crowding (U.S. Fish and Wildlife Service & U.S. Census Bureau, 2016). Scott et al. (2004) found:

> *"Hispanics, African-Americans, and other minorities were significantly more likely than Anglos to report their use of outdoor recreation facilities was blocked by information and access constraints, intrapersonal constraints, and economic constraints. In addition, Hispanics were more likely than African-Americans and other minorities to report their use of outdoor recreation areas was constrained by lack of information and access. Ethnic and racial groups in the study did not differ significantly in terms of time commitments and lack of interest."*

Knowing the demographics of a sanctuary region may help managers to develop strategies or implement programs to increase access, expand knowledge, and/or reduce economic constraints that may limit participation rates in outdoor recreational activities. Such strategies could be particularly beneficial, since all groups reported having time and interest to partake in recreation.

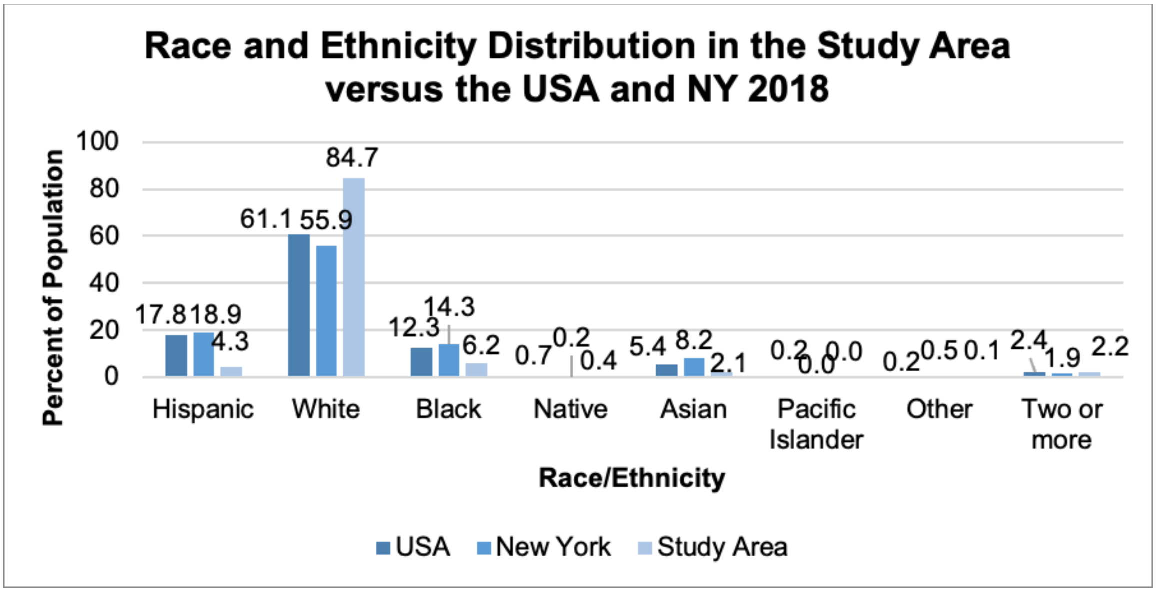

Figure 2.2 Race and ethnicity in the study area versus the USA and New York, 2018. Source: U.S. Census Bureau, 2020

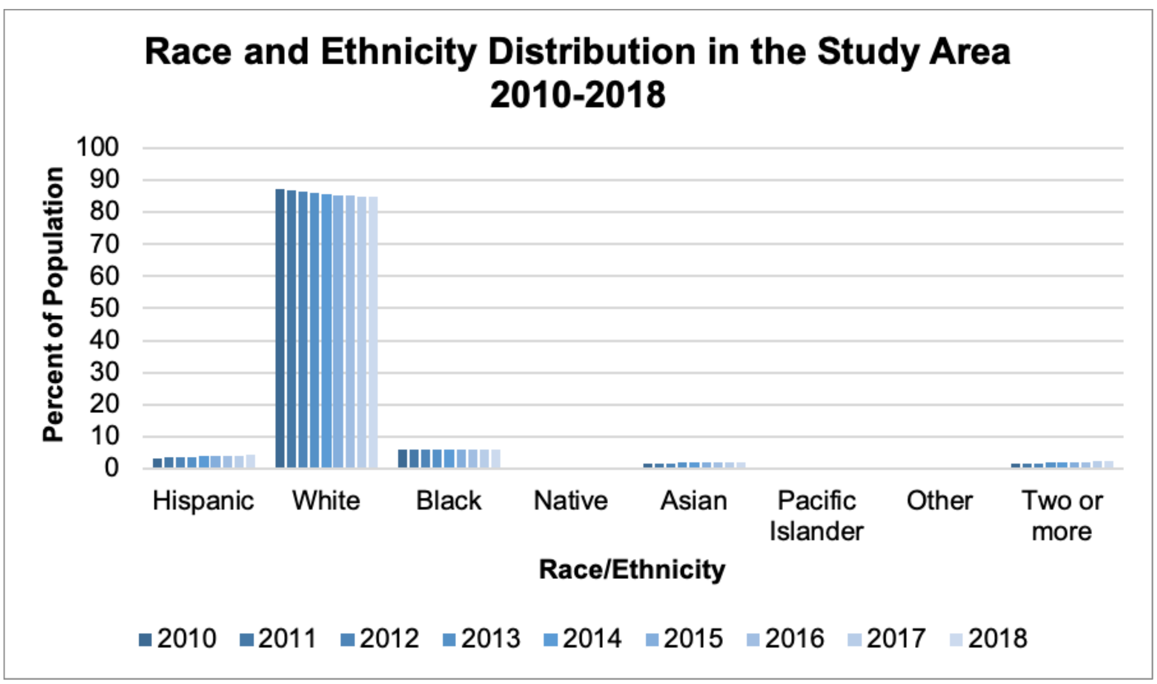

Figure 2.3 Race and ethnicity in the study area 2010–2018. Source: U.S. Census Bureau, 2020

Age

The age distribution in the study area is similar to the distribution in New York and the United States (U.S. Census Bureau, 2020). The percentage of people between the ages 25–34, 55–64, and 65–74 has risen from 2010–2018, and the percent of people between 5–14, 15–24, 35–44, and 45–54 has fallen in the study area (Figure 2.4 and Table 2.3). Knowing age distributions is helpful for resource managers, as age is correlated to rates of participation in various activities (such as fishing and diving).

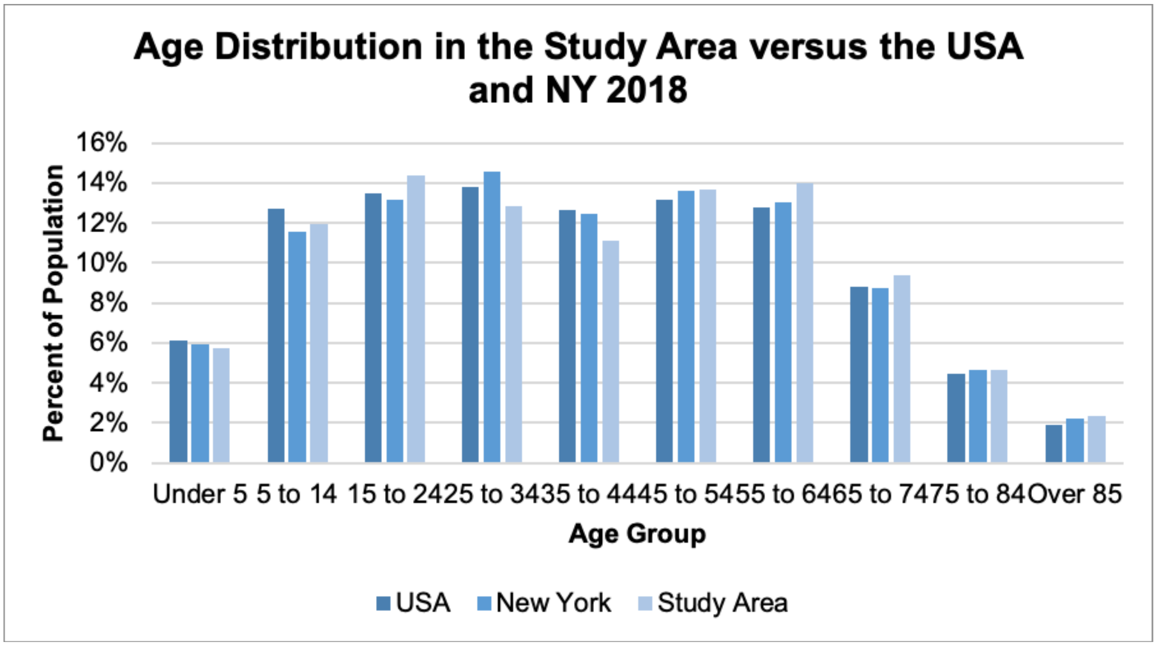

Figure 2.4 Age distributions in the study area versus the USA and New York, 2018. Source: U.S. Census Bureau, 2020

Table 2.3 Age distribution in the study area, 2010–2018. Source: U.S. Census Bureau, 2020

Age Category	2010	2011	2012	2013	2014	2015	2016	2017	2018
Under 5	6.0%	6.0%	6.0%	6.0%	5.9%	5.9%	5.8%	5.8%	5.8%
5 to 14	13.1%	12.8%	12.6%	12.5%	12.4%	12.3%	12.2%	12.1%	11.9%
15 to 24	15.4%	15.4%	15.3%	15.2%	15.0%	15.0%	14.8%	14.6%	14.4%
25 to 34	11.4%	11.5%	11.8%	12.1%	12.3%	12.5%	12.6%	12.8%	12.8%
35 to 44	13.5%	13.0%	12.5%	12.1%	11.8%	11.5%	11.3%	11.2%	11.1%
45 to 54	15.3%	15.3%	15.3%	15.1%	15.0%	14.6%	14.3%	14.0%	13.7%
55 to 64	11.8%	12.2%	12.5%	12.8%	13.1%	13.3%	13.5%	13.7%	14.0%
65 to 74	6.8%	7.0%	7.3%	7.5%	7.9%	8.2%	8.6%	9.0%	9.4%
75 to 84	4.8%	4.7%	4.7%	4.6%	4.6%	4.5%	4.5%	4.6%	4.6%
Over 85	1.9%	2.0%	2.1%	2.1%	2.1%	2.2%	2.3%	2.3%	2.3%

3. ECONOMIC PROFILE

This section looks at the total personal income both generated within the study area (income by place of work) and received by residents of the study area (income by place of residence). The U.S. Bureau of Economic Analysis maintains the national income accounts for both these measures. Many people commute to places of work and generate income outside the county where they live. People also receive interest, dividends, and capital gains from investments. Retirees receive pensions and social security payments. The unemployed receive unemployment compensation. Income by place of work as a percent of income by place of residence is usually a good indicator of whether an area has a significant retirement community. If income by place of residence is substantially higher than income by place of work, that may indicate there is a large retirement community. Sources of income not tied to the status of work in the local economy can make the economy more resilient and less subject to changes in local employment opportunities.

The labor force, total employment, and their respective growth rates are good indicators of a healthy or stagnant economy, as well as opportunities for employment. These are important elements in assessing whether people can adapt to changes in resource management/policy decisions that may displace them from resource use.

Economic measures related to proprietors (small business owners) were also analyzed. These included proprietors' income, proprietors' employment, and the proportion of the study area's income and employment accounted for by proprietors. This is usually a good indicator of small businesses, which are often connected to resource use in national marine sanctuaries (e.g. commercial fishing operations and recreation-tourist related businesses).

This section also explores personal income and employment by industry sector, which are important for economic impact analyses of resource management/policy decisions. Linking spending in the local economy related to resource to economic sectors allows for the use of input-output models such as IMPLAN. The IMPLAN model can estimate the multiplier impacts on the local economy and assess the proportion of the local economy affected by resource use in the sanctuary.

Per Capita Income

Per capita income measures the average income earned per person in a given area in a specified year and is an indicator for the health and economic status of a community. Per capita income in the study area in 2018 was $47,359 compared to the state's per capita income of $68,688 and the U.S. per capita income of $54,446 (Bureau of Economic Analysis, 2020). From 2010 to 2018, per capita income in the study area increased, which is a similar trend to both New York and the U.S.; however, per capita income in the study area was consistently lower than the New York and the U.S. (Bureau of Economic Analysis, 2020).

Table 3.1 Changes in per capita income in the study area versus the U.S. and New York. Source: Bureau of Economic Analysis, 2020

Year	USA	New York	Study Area
2010	$46,692	$56,395	$42,962
2011	$47,707	$57,489	$43,300
2012	$48,778	$59,040	$43,713
2013	$48,345	$58,736	$43,333
2014	$49,915	$60,188	$43,707
2015	$51,890	$62,657	$45,234
2016	$52,176	$64,058	$45,181
2017	$53,152	$67,247	$46,742
2018	$54,446	$68,668	$47,359

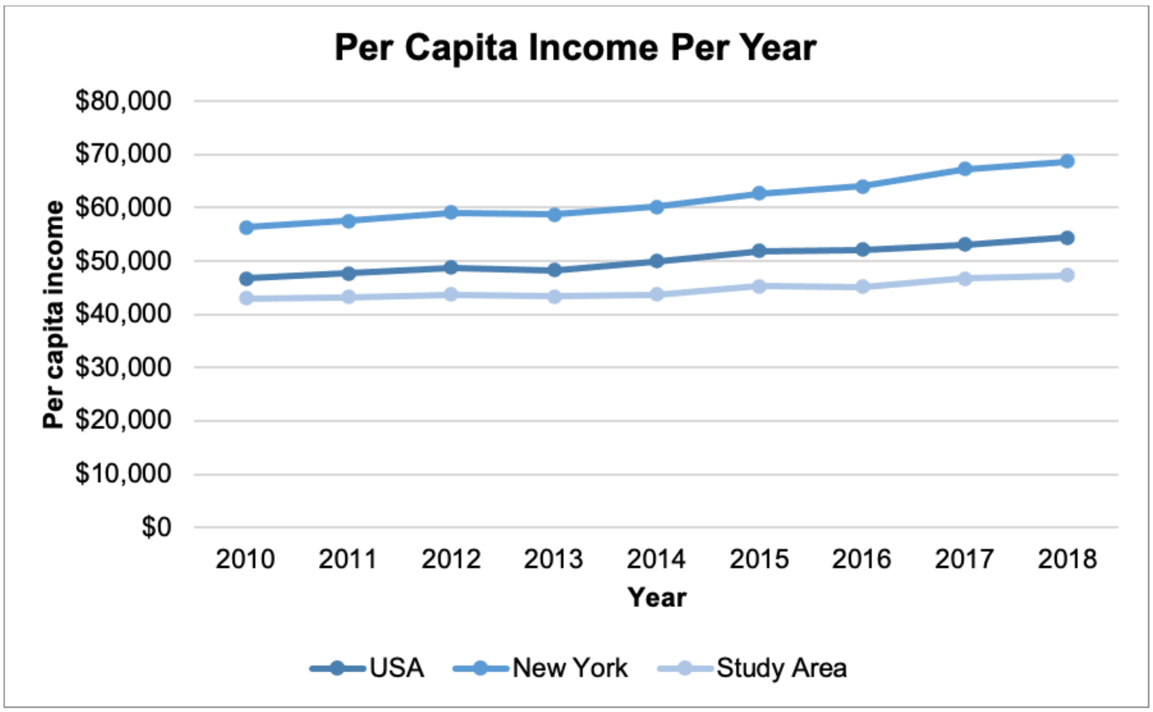

Figure 3.1 Changes in per capita income per year in the study area versus the U.S. and New York. Source: Bureau of Economic Analysis, 2020

Income

The Bureau of Economic Analysis maintains two metrics of personal income in their Regional Economic Information System: income reported by place of work and income reported by place of residence. Income by place of work is the income generated where a person works, regardless of where they live, and is reported by economic sector (e.g., farm, manufacturing, retail, wholesale). Income by place of residence is the income generated where a person lives, regardless of where they work, and reflects the total amount of income received by those who live in the study area. For example, if a person works in the study area, but lives outside the study area, their income would be reported in the study area for place of work, but would be reported outside of the study area for place of residence. In addition to the income from workers who live in the study area, income by place of residence also includes income from investments, pensions, social security payments, and other transfer payments.

Information on income by place or work and place of residence comes from the Census of Inter-county Commuters. The Bureau of Economic Analysis uses this information to form the “residence adjustment,” which can be either positive or negative depending on whether people living in and working outside the study area are earning more or less than people living outside and working inside the study area. When a community is largely composed of people who live within but work outside the region, economists often refer to it as a “bedroom community.” Income by place of work as a percentage of total income by place of residence serves as an indicator of two key study area economic traits: whether it is an economy with a significant bedroom community and/or whether there is a large retirement community. When the percentage of income by place of work is low relative to income by place of residence, economists may then look at the resident adjustment and the amount of transfer payments in pensions and social security payments to further describe the nature of the local economy.

In 2018, income by place of work as a percent of income by place of residence was 68.5% in the study area, meaning that more than half of the income of the study area was from inside the study area (Bureau of Economic Analysis, 2020). Income by place of work as a percent of income by place of residence was lower in the study area than in New York from 2010 to 2018. Income by place of work as a percent of income by place of residence has declined in the study area and in New York from 2010–2018 (Table 3.2, Table 3.3, and Figure 3.2). Understanding where people live versus where they earn their living is important in understanding the reach of any economic impacts as a result of a policy change and how resilient a specific county might be to these changes.

Table 3.2 Total personal income by place of residence and by place of work, 2018. Source: Bureau of Economic Analysis, 2020

County	Residence	Work	Work as a Percent of Residence
Cayuga	$3,257,880	$1,702,378	52.3%
Jefferson	$5,243,969	$3,960,012	75.5%
Lewis	$1,162,912	$461,622	39.7%
Onondaga	$24,423,221	$19,470,390	79.7%
Ontario	$5,877,518	$3,765,391	64.1%
Oswego	$4,779,332	$2,416,468	50.6%
St. Lawrence	$4,099,269	$2,491,294	60.8%

County	Residence	Work	Work as a Percent of Residence
Seneca	$1,323,745	$866,148	65.4%
Wayne	$4,147,274	$2,045,956	49.3%
All Counties	$54,315,120	$37,179,659	68.5%

Table 3.3 Total personal income by place of residence and place of work, 2010–2018. Source: Bureau of Economic Analysis, 2020

	Income by Place of Residence		Income by Place of Work		Work as a Percent of Residence	
Year	NY	Study Area	NY	Study Area	NY	Study Area
2010	$1,094,072,178	$49,641,495	$844,193,153	$35,425,426	77.2%	71.4%
2011	$1,120,944,527	$50,146,973	$851,735,305	$35,123,915	76.0%	70.0%
2012	$1,155,681,434	$50,744,916	$873,117,460	$35,499,200	75.6%	70.0%
2013	$1,152,887,158	$50,393,575	$883,193,759	$35,743,626	76.6%	70.9%
2014	$1,183,059,369	$50,881,082	$900,633,886	$35,689,857	76.1%	70.1%
2015	$1,231,926,721	$52,629,620	$930,270,422	$36,672,475	75.5%	69.7%
2016	$1,258,185,671	$52,423,380	$948,417,777	$36,229,736	75.4%	69.1%
2017	$1,317,433,636	$54,025,971	$984,352,679	$36,991,459	74.7%	68.5%
2018	$1,341,931,964	$54,315,120	$1,005,027,169	$37,179,659	74.9%	68.5%

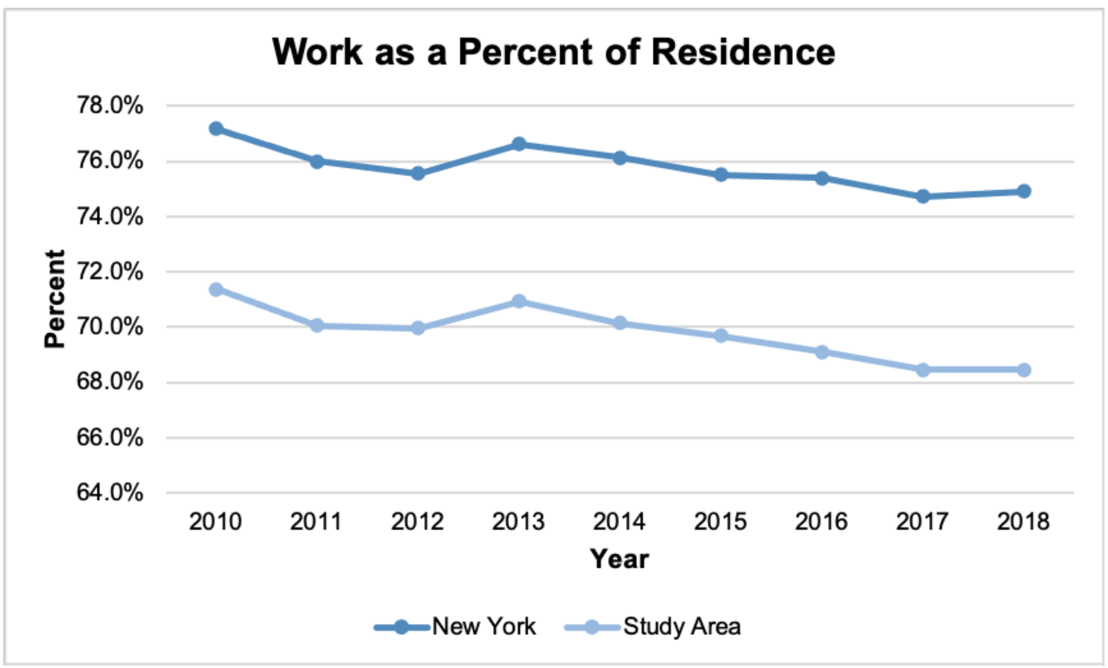

Figure 3.2 Income by place of work as a percent of income by place of residence in the study area and NY, 2010–2018. Source: Bureau of Economic Analysis, 2020

Proprietor's Income and Employment

In 2018, proprietors employed 121,000 people, which makes up 24.2% of total employment in the study area (Bureau of Economic Analysis, 2020). Proprietors also earned $3.6 billion in 2018, which is 9.7% of income by place of work in the study area. The study area has had a consistently lower percent of both employment and income from proprietors from 2010–2018 than New York as a whole. In the study area, proprietors' employment as a percent of total employment has slowly risen from 2010–2018, while the percent of income from proprietors has not changed much during this time period (Table 3.4, Figure 3.3, and Figure 3.4). This means that over the study period, small businesses have been increasing how many people they employ relative to other sources of employment (larger businesses and government, for example).

Table 3.4 Proprietors' income and employment. Source: Bureau of Economic Analysis, 2020

	Proprietors' Income (Thousands)		Proprietors' Employment		Proprietors' Income as a Percent of Income by Place of Work		Proprietors' Employment as a Percent of Total Employment	
Year	New York	Study Area	New York	Study Area	New York	Study Area	New York	Study Area
2010	$102,035,535	$3,390,857	2,296,831	109,940	12.1%	9.6%	26.2%	21.2%
2011	$107,886,978	$3,536,160	2,486,065	113,818	12.7%	10.1%	28.5%	22.3%
2012	$122,355,751	$3,681,642	2,500,068	114,733	14.0%	10.4%	28.4%	22.5%
2013	$122,272,508	$3,719,273	2,567,908	116,073	13.8%	10.4%	28.8%	22.7%
2014	$111,768,918	$3,587,455	2,645,253	116,912	12.4%	10.1%	29.6%	23.2%
2015	$109,315,807	$3,333,500	2,712,683	117,586	11.8%	9.1%	30.0%	23.5%
2016	$123,571,240	$3,260,570	2,747,735	116,124	13.0%	9.0%	30.2%	23.3%
2017	$135,015,340	$3,685,291	2,787,366	117,988	13.7%	10.0%	30.6%	23.8%
2018	$136,599,168	$3,609,640	2,890,706	121,161	13.6%	9.7%	31.7%	24.2%

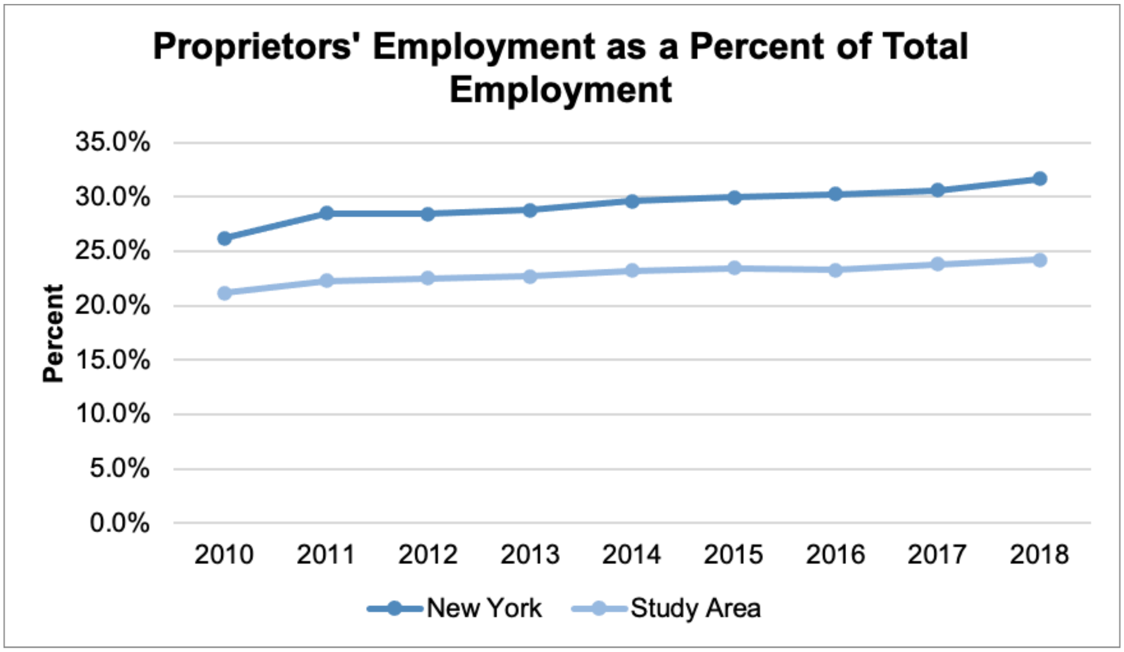

Figure 3.3 Proprietors' employment as a percent of total employment in the study area versus New York, 2010–2018. Source: Bureau of Economic Analysis, 2020

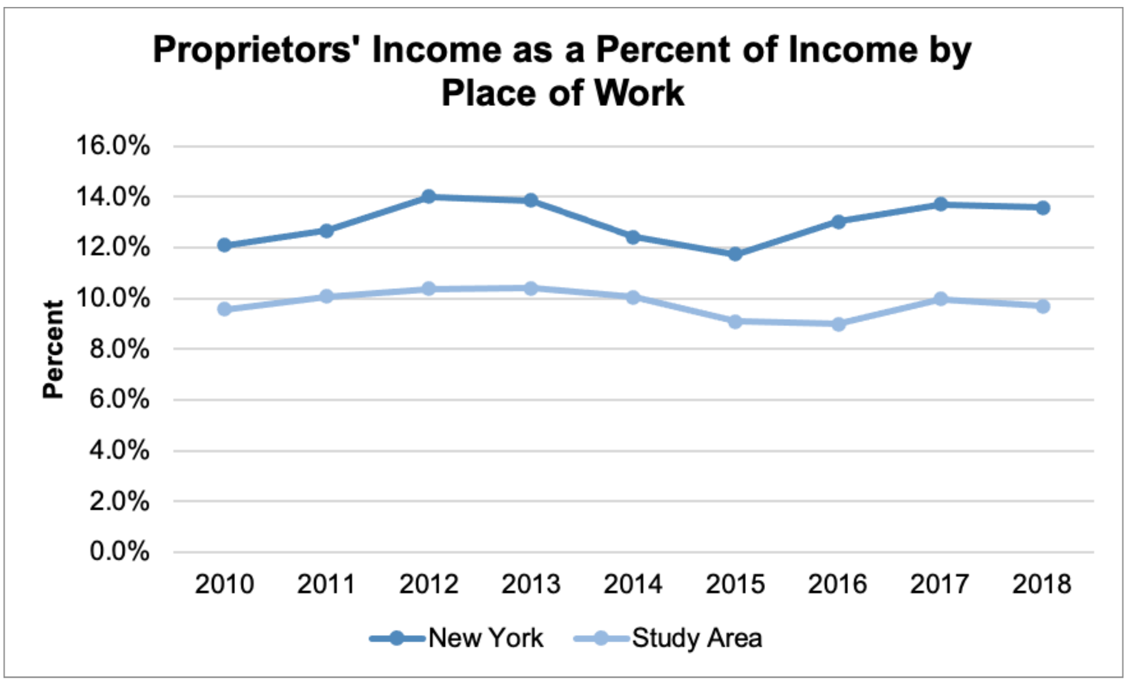

Figure 3.4 Proprietor's income as a percent of total income in the study area versus New York, 2010–2018. Source: Bureau of Economic Analysis, 2020

Personal Income by Industry

In 2018, the study area had a much higher proportion of personal income generated in "manufacturing" and "government and government enterprises" than New York and a lower proportion in "finance and insurance" and "professional, scientific, and technical services" (Figure 3.5)(Bureau of Economic Analysis, 2020). The sectors that are the most relevant to the sanctuary are "forestry, fishing, and related activities" and "arts, entertainment, and recreation" (more information on what is included in these sectors can be found on the Bureau of Economic Analysis website). These two sectors account for about 0.8% of the personal income in the study area and about 2.0% of the personal income for New York.

Employment by Industry

Compared to New York, the study area had a higher proportion of employment in "manufacturing," "government and government enterprises," and "retail trade" and a lower proportion in "finance and insurance" and "professional, scientific, and technical services" in 2018 (Figure 3.6) (Bureau of Economic Analysis, 2020). "Forestry, fishing, and related activities" and "arts, entertainment, and recreation" accounted for about 2.5% of the employment in the study area and about 3.1% of the employment in New York.

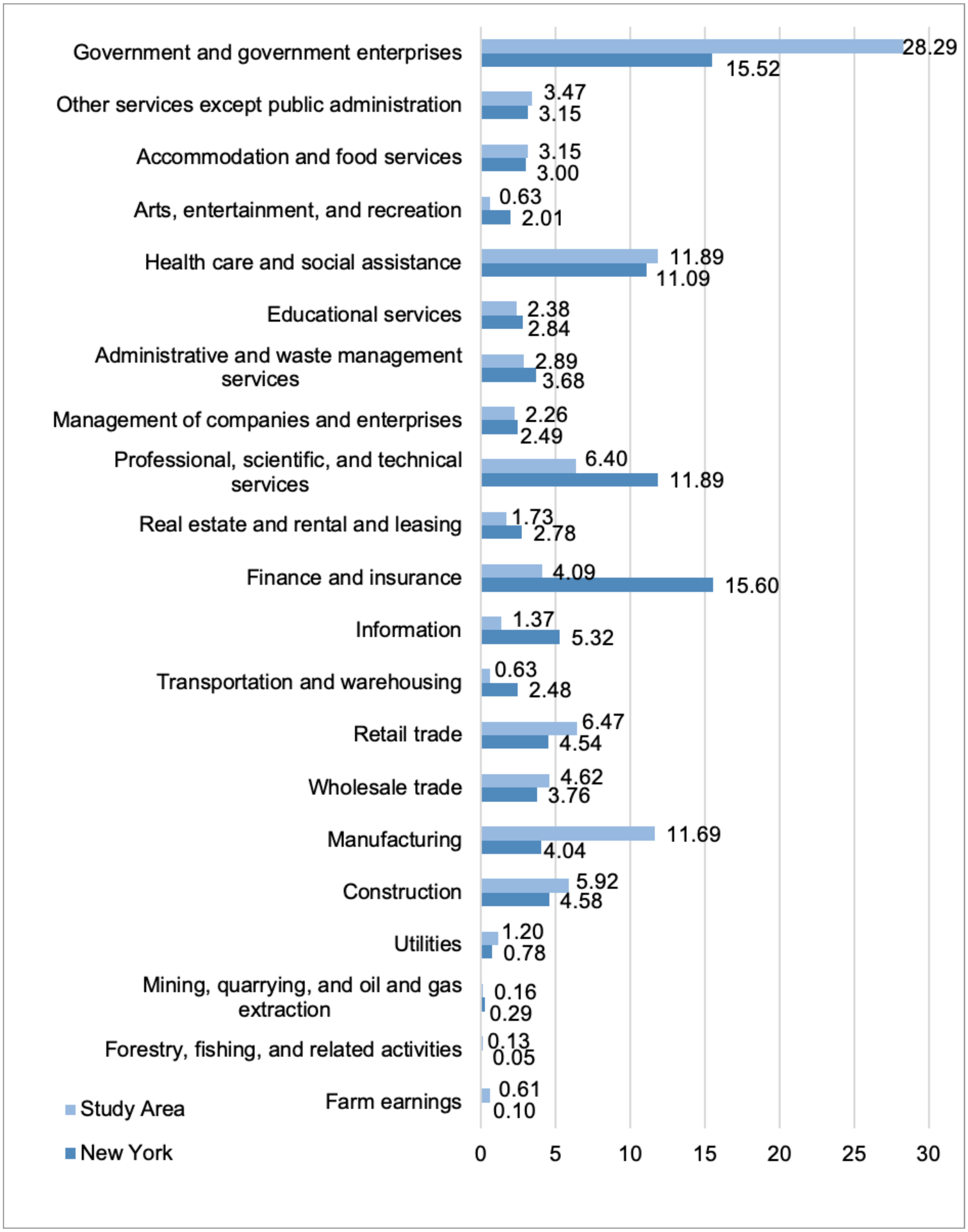

Figure 3.5 Percent of personal income by industry for the study area versus New York, 2018. Source: Bureau of Economic Analysis, 2020

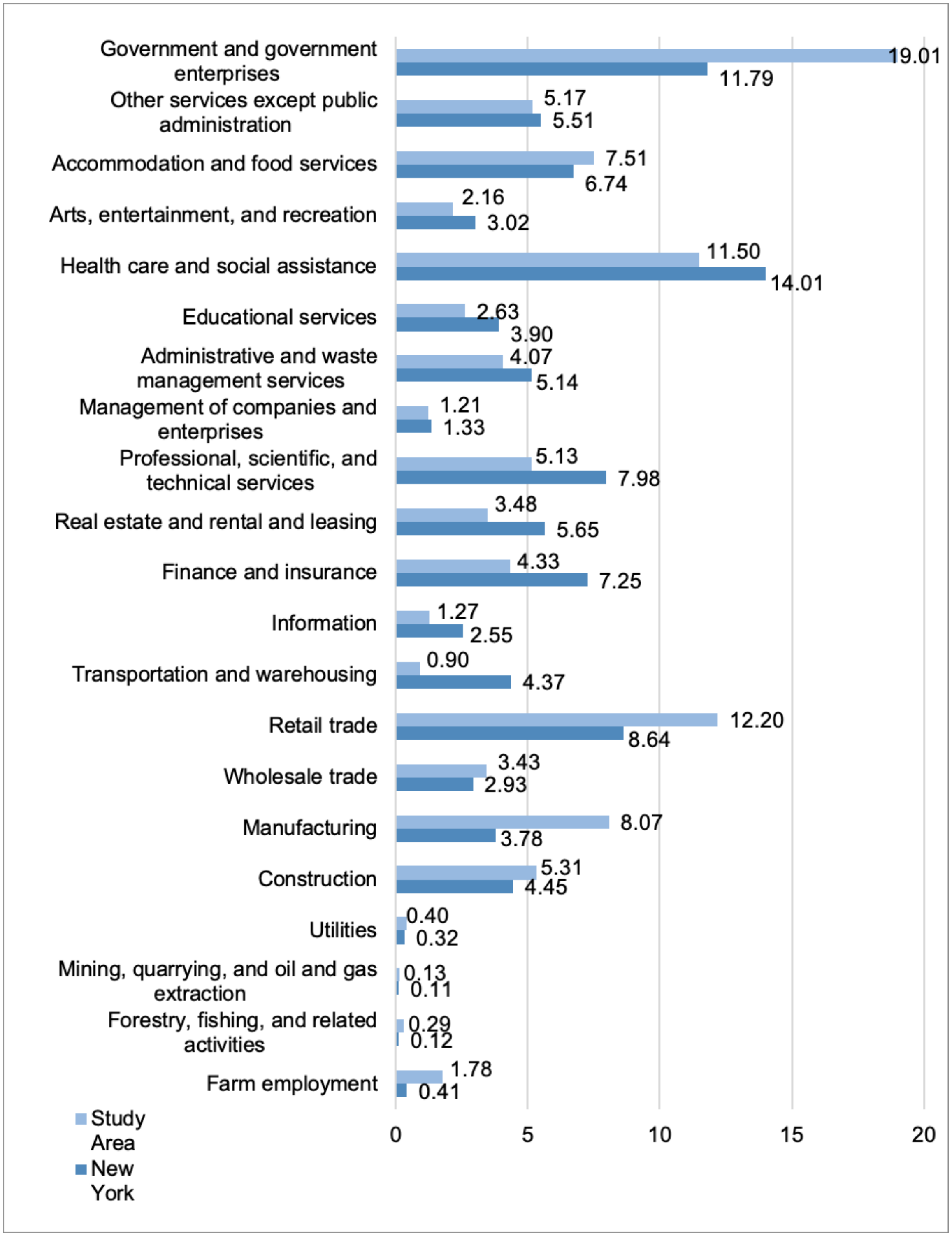

Figure 3.6 Percent of employment by industry for the study area versus New York, 2018. Source: Bureau of Economic Analysis, 2020

Unemployment Rates

Another indicator of study area economic health is the unemployment rate. In 2010, the unemployment rate in the study area was 8.7%, which was lower than the United States but higher than New York. Since 2011, the unemployment rate has fallen and has been similar to the United States and New York (Table 3.5 and Figure 3.7) (U.S. Bureau of Labor Statistics, 2020).

Table 3.5 Changes in in unemployment rate in the study area versus the U.S. and New York. Source: U.S. Bureau of Labor Statistics, 2020

Year	United States	New York	Study Area
2010	9.6%	8.6%	8.7%
2011	9.0%	8.3%	8.5%
2012	8.2%	8.5%	8.6%
2013	7.5%	7.7%	7.7%
2014	6.3%	6.3%	6.3%
2015	5.6%	5.3%	5.6%
2016	4.8%	4.9%	5.1%
2017	4.4%	4.7%	5.2%
2018	3.9%	4.1%	4.5%
2019	3.6%	4.0%	4.4%

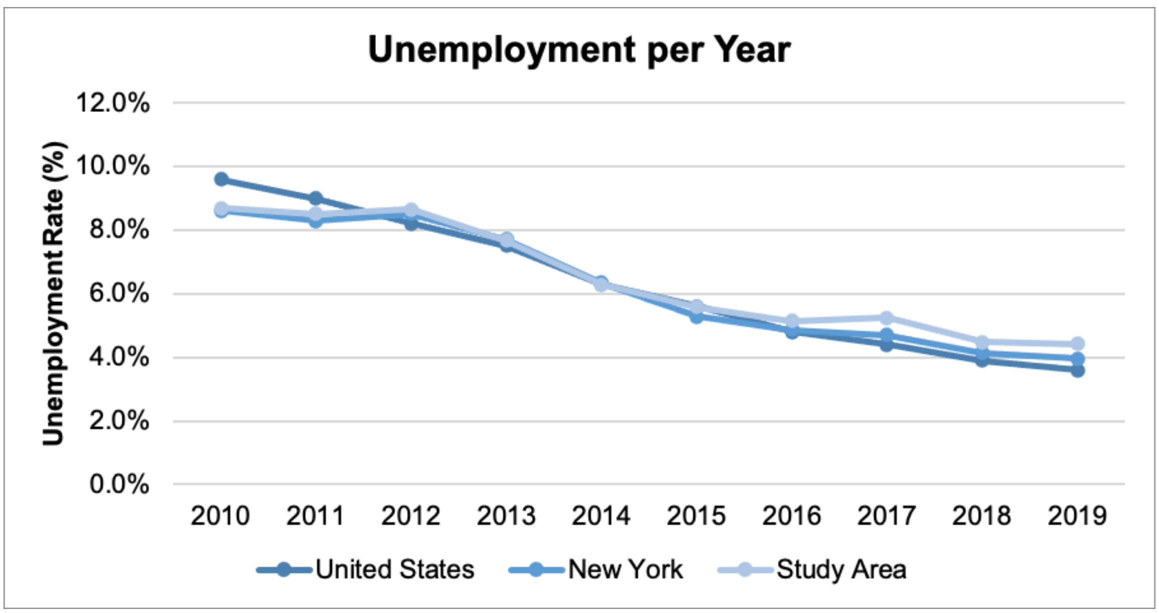

Figure 3.7 Changes in in unemployment rate in the study area versus the U.S. and New York. Source: U.S. Bureau of Labor Statistics, 2020

Labor Force

In 2018, there were over 523,000 people in the study area labor force, which was approximately 5.5% of the New York labor force (U.S. Bureau of Labor Statistics, 2020). From 2010–2019, the labor force in the study area and in New York decreased; the labor force in the study area decreased faster than the labor force in New York (Table 3.6, Table 3.7, and Figure 3.8).

Table 3.6 Labor force in the study area and New York, 2010–2019. Source: U.S. Bureau of Labor Statistics, 2020

Year	New York	Study Area
2010	9,595,362	569,015
2011	9,517,370	558,216
2012	9,612,240	558,129
2013	9,659,165	554,655
2014	9,529,422	537,459
2015	9,558,753	530,806
2016	9,551,938	526,348
2017	9,549,078	522,780
2018	9,521,874	523,277
2019	9,514,386	523,564

Table 3.7 Labor force growth in the study area and New York, 2010–2019. Source: U.S. Bureau of Labor Statistics, 2020

Year	New York	Study Area
2010-2011	-0.81%	-1.90%
2011-2012	1.00%	-0.02%
2012-2013	0.49%	-0.62%
2013-2014	-1.34%	-3.10%
2014-2015	0.31%	-1.24%
2015-2016	-0.07%	-0.84%
2016-2017	-0.03%	-0.68%
2017-2018	-0.28%	0.10%
2019-2019	-0.08%	0.05%
2010-2019	-0.84%	-7.99%

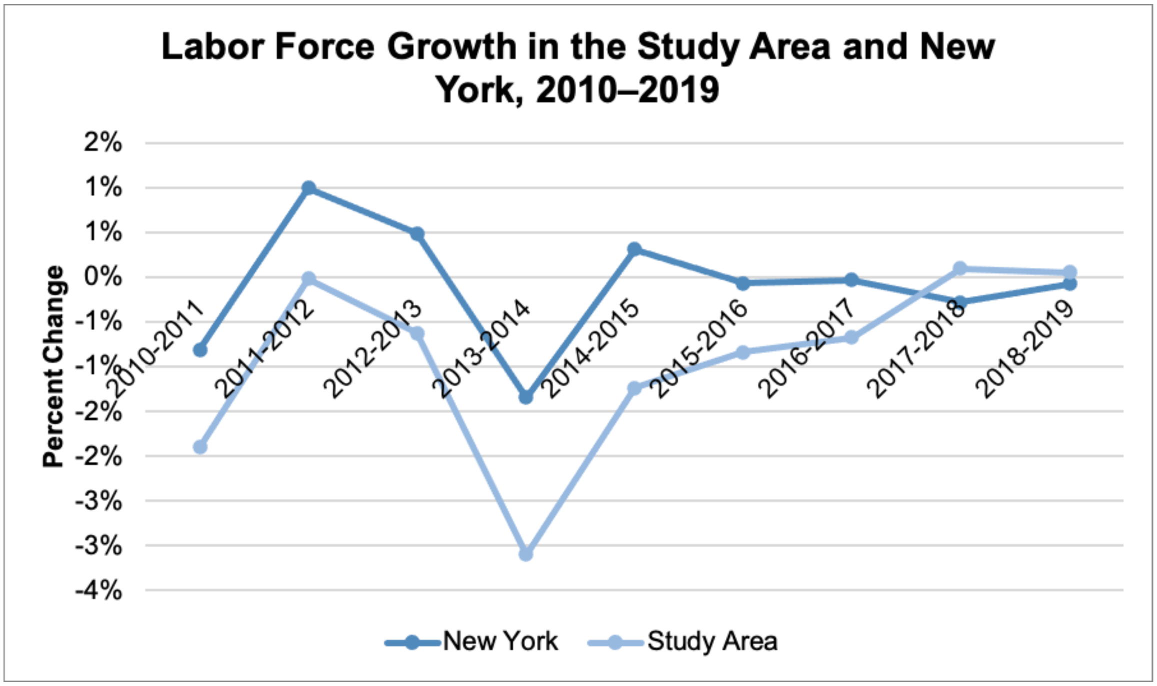

Figure 3.8 Labor force growth in the study area and New York, 2010–2019. Source: U.S. Bureau of Labor Statistics, 2020

Employment

In 2019, about 500,000 people were employed in the study area, which was approximately 5.5% of all employment in the New York (U.S. Bureau of Labor Statistics, 2020). From 2010–2019, employment fell in the study area and rose in New York (Table 3.8 and Figure 3.9).

Table 3.8 Total employment, 2010–2019. Source: U.S. Bureau of Labor Statistics, 2020

Location	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cayuga County	36,480	35,899	35,884	35,989	35,352	35,088	34,836	34,077	34,370	34,411
Franklin County	20,249	19,744	19,712	19,640	19,019	18,671	18,666	18,554	18,591	18,648
Jefferson County	45,638	44,154	43,648	43,868	43,045	43,456	42,804	42,071	42,010	41,470
Lewis County	11,592	11,197	11,043	11,087	10,932	10,952	10,951	10,831	10,976	10,999
Onondaga County	217,970	214,674	214,624	215,866	212,105	211,509	211,142	209,472	211,006	211,875
Ontario County	52,176	51,805	51,971	52,396	51,895	52,464	52,680	52,384	53,202	53,210
Oswego County	52,618	51,752	51,585	51,569	50,595	50,145	49,847	49,308	49,855	50,082
St. Lawrence County	44,802	43,824	43,627	44,069	43,413	40,687	40,489	40,431	40,950	40,902
Seneca County	15,078	14,829	14,946	14,817	14,639	14,914	14,747	15,343	15,471	15,414
Wayne County	43,227	42,533	42,536	42,482	41,655	41,931	41,789	41,495	41,958	42,070
Study Area	519,581	510,667	509,864	512,143	503,631	501,146	499,285	495,412	499,798	500,433
New York	8,769,725	8,728,058	8,793,387	8,913,785	8,925,697	9,054,569	9,088,262	9,100,978	9,127,703	9,137,554

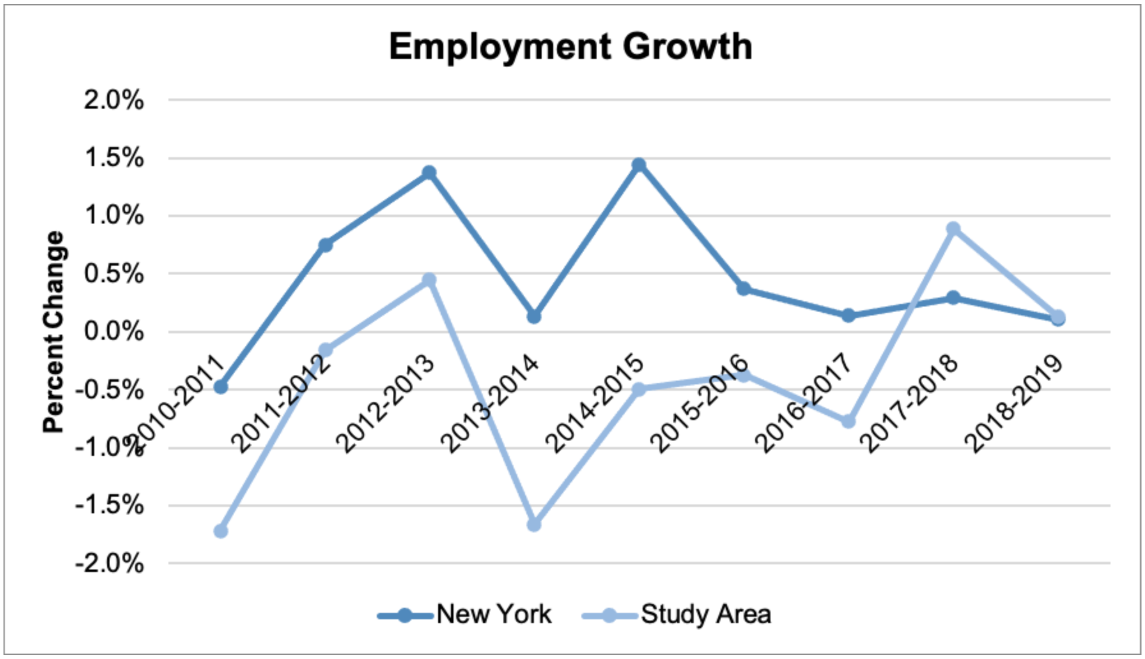

Figure 3.9 Employment growth in the study area and New York, 2010–2019. Source: U.S. Bureau of Labor Statistics, 2020

4. HUMAN USES IN THE SANCTUARY

An important factor in determining the economic contribution of a national marine sanctuary to a region is use. If people are using the sanctuary, it means they are contributing to the regional economy by spending money within the region on food, housing, travel, and other commodities. If people are visiting the sanctuary region, then their spending represents “new” money being spent in the study area and can drive economic development. While increasing visitation might help to drive economic development, it may also make a region’s economic health more dependent on tourism associated with the sanctuary. Trends in visitation can also provide information about trends in the quality of sanctuary resources. If resources are improving, visitation is likely to increase; if they are declining, people may be less likely to visit. Additionally, as name recognition of a place increases, it is likely to attract more visitors.

There are no direct visitation numbers for the proposed Lake Ontario National Marine Sanctuary; however, there are many national parks and state parks within the study area that monitor annual visitation. In this section, visitation for these parks is used as a proxy for the potential number of visitors to the proposed sanctuary and direct reach the sanctuary may have through signage, visitor centers, and interactive exhibits. Even if these visitors do not directly visit the sanctuary, they are likely benefiting from the resources that the sanctuary helps protect. Therefore, the region’s potential economic dependence on the sanctuary may be assessed by examining visitation at nearby parks.

Another way to measure the study area’s economic dependence on the sanctuary is by looking at the number of landmarks/museums constructed due to the existence of the sanctuary’s resources. Shipwrecks are the resources with the greatest notoriety within the proposed sanctuary; this section assesses the importance of shipwrecks in the region by inventorying maritime museums and lighthouses. No visitation numbers are readily available for these locations; however, a count of them is sufficient for assessing the economic importance of resources located within the proposed sanctuary to the region.

State Parks

There are 57 state parks in the study area, which attracted an average of 3.9 million visits annually from 2003 to 2018 (Office of Parks, Recreation and Historic Preservation, 2020). The parks with the highest average levels of visitation were Green Lakes State Park in Onondaga County and Fair Haven Beach State Park in Cayuga County. Park visitation increased from 2003–2018, with the highest number of visits (4.5 million) occurring in 2018. It is important to note that the number of visits to these parks does not represent the number of unique people that visited them, as it is possible for the same person to visit more than once (Figure 4.1).

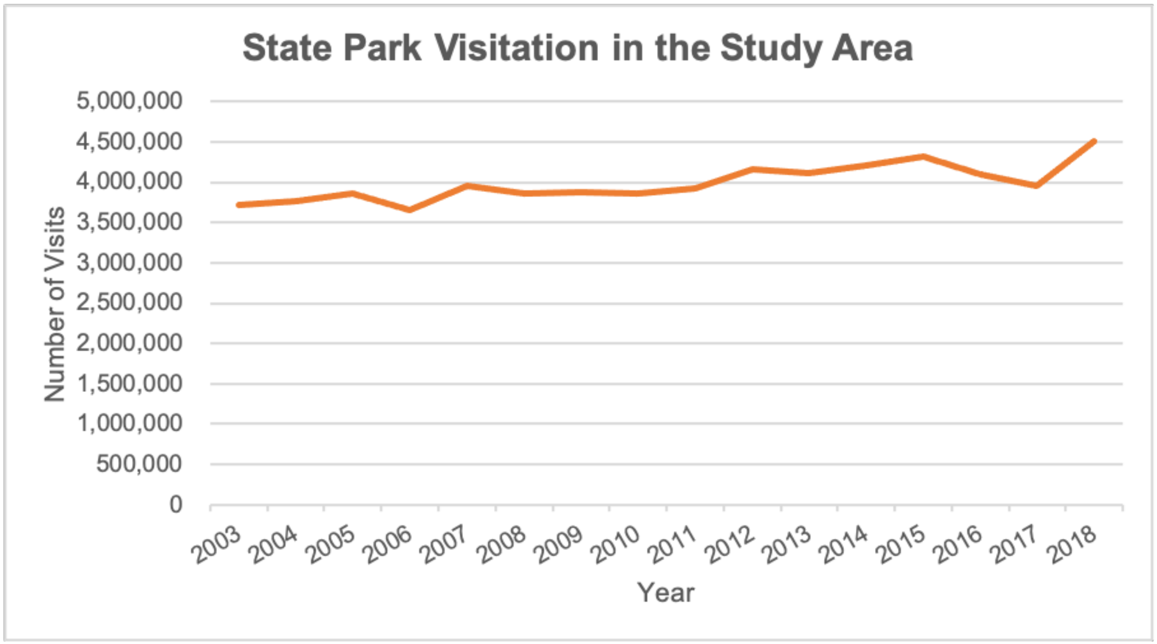

Figure 4.1 State park visitation in the study area. Source: Office of Parks, Recreation and Historic Preservation, 2020

Museums and Landmarks

There are two lighthouses and three maritime museums in the study area. The lighthouses are located in Wayne County and Jefferson County, respectively, and there is one maritime museum located in each of the following counties: Jefferson County, Onondaga County, and Oswego County (Table 4.1). Only lighthouses and museums that fall within the predetermined study area were included.

Table 4.1 Maritime museums and lighthouses in the study area.

Type of Landmark	Name	County
Museum	Antique Boat Museum	Jefferson
Museum	Erie Canal Museum	Onondaga
Museum	H. Lee White Marine Museum	Oswego
Lighthouse	Sodus Bay Lighthouse Museum	Wayne
Lighthouse	Tibbetts Point Lighthouse	Jefferson

Recreational Fishing

Recreational fishing is a popular activity in Lake Ontario (New York Department of Environmental Conservation, 2019). In 2018, there were almost 55,000 recreational fishing trips that took a total of 168,000 anglers onto the water. The total number of trips and total number of anglers in Lake Ontario has decreased from 2009 to 2019, while the number of anglers per trip has increased.

The New York Department of Environmental Conservation divides their data into four statistical areas, as shown in Figure 4.2. As two eastern statistical areas align closely with the proposed sanctuary boundary, it is reasonable to use them as a proxy for how many fish are caught there. Overall, these two statistical areas account for 33,000 trips and 100,000 anglers in Lake Ontario, which represents about 60% of all recreational fishing use in the region (Table 4.2).

The top species caught in Lake Ontario in 2018 were chinook salmon, brown trout, smallmouth bass, rainbow trout, lake trout, and yellow perch. From 2009 to 2018, chinook salmon accounted for the largest catch, followed by yellow perch, brown trout with, rainbow trout, and lake trout. Total catch for these species has generally declined from 2009 to 2018 (Table 4.3) (New York Department of Environmental Conservation, 2019).

In 2008 and 2009, boaters spent an average of 337,000 angler-hours in the U.S. portion of the St. Lawrence River (NYDEC, 2010 Survey of the Recreational Boat Angler Fishery on the U.S. Portion of the St. Lawrence River, 2008-2009). Around 80% of fishing effort was focused in the Thousand Island region. About 72% of anglers were New York residents and over 51% of these anglers lived within the study area. In 2009, anglers on the St. Lawrence River caught 1.3 million yellow perch, 97,000 smallmouth bass, 27,000 pan fish, 19,000 largemouth bass, 18,000 northern pike, and 16,000 walleye. NYDEC compared these results to surveys conducted in the 1980s and found few differences between them, which suggests that the fishery has not changed much in the past 25 years.

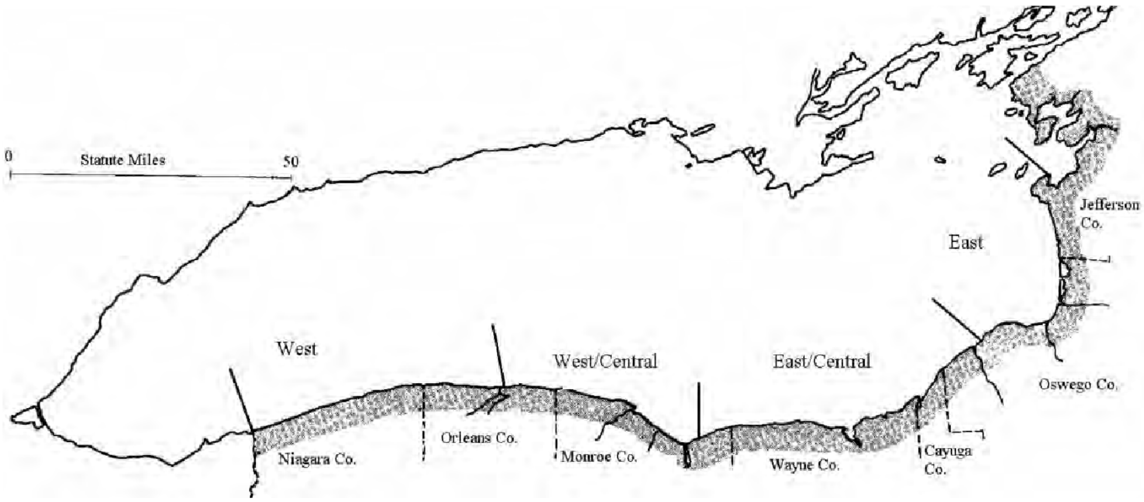

Figure 4.**2** New York Department of Environmental Conservation Lake Ontario statistical areas. Source: New York Department of Environmental Conservation, 2019

Table 4.2 Number of trips and anglers in Lake Ontario, 2009–2018. Source: New York Department of Environmental Conservation, 2019

Year	Total Number of Trips	Total Number of Trips in the Eastern Half of Lake Ontario	Study Area Trips as a Percent of Total Trips	Average Number of Anglers per Trip[1]	Total Number of Anglers	Total Number of Anglers in the Eastern Half of Lake Ontario
2009	76,837	45,687	59.5%	2.89	222,059	132,035
2010	62,104	38,824	62.5%	2.83	175,754	109,872
2011	60,943	37,805	62.0%	2.81	171,250	106,232
2012	56,182	34,625	61.6%	2.85	160,119	98,681
2013	54,606	32,356	59.3%	2.96	161,634	95,774
2014	58,554	37,670	64.3%	2.97	173,905	111,880
2015	53,154	33,204	62.5%	2.96	157,336	98,284
2016	46,340	30,130	65.0%	2.99	138,557	90,089
2017	39,964	25,065	62.7%	3.03	121,091	75,947
2018	54,662	32,672	59.8%	3.07	167,812	100,303

1. Anglers per trip was not calculated for the eastern half of Lake Ontario, therefore this estimate is used for both geographic areas.

Table 4.3 Top five species groups caught in Lake Ontario, 2009–2018. Source: New York Department of Environmental Conservation, 2019

Year	**Chinook Salmon**	**Yellow Perch**	**Brown Trout**	**Rainbow Trout**	**Lake Trout**	**Total**
2009	101,427	102,442	33,484	54,501	11,241	303,095
2010	61,960	61,816	32,604	46,249	11,753	214,382
2011	97,899	65,394	49,661	36,533	24,336	273,823
2012	88,851	35,836	39,507	32,975	22,206	219,375

Year	Chinook Salmon	Yellow Perch	Brown Trout	Rainbow Trout	Lake Trout	Total
2013	62,570	15,345	27,793	34,611	35,533	175,852
2014	76,626	17,966	44,487	37,462	33,108	209,649
2015	58,870	17,384	20,780	17,509	52,294	166,837
2016	60,435	18,176	20,871	16,639	36,336	152,457
2017	96,226	19,459	17,092	22,556	15,444	170,777
2018	173,691	11,782	39,763	18,047	12,205	255,488
Total	878,555	365,600	326,042	317,082	254,456	2,141,735

Diving

There are a total of 18 dive shops within feasible traveling distance to eastern Lake Ontario and the Saint Lawrence River. The number of dive shops and feasible traveling distance was determined based upon correspondence with locals with knowledge of dive operations in the region near the proposed sanctuary. Four of these 18 dive shops are located in Canada and fourteen are located in the U.S. According to prices posted on dive operator websites, dive charters to Lake Ontario can range between $30 and $140 (prices in Canadian dive shops were converted to U.S. dollars). Of the 18 dive shops, 15 offered dive courses/lessons alongside dive charters. Two of the dive shops (both located in the U.S.) did not, and the remaining dive shop did not have a website. Some of these dive shops could be affected by sanctuary regulations depending on how they are accessing wrecks during their dive charters.

Commercial Fishing

Commercial fishing in eastern Lake Ontario is very limited; it is concentrated in the embayments and nearshore open waters of the eastern basin. Commercial fishing gear includes gill nets, trap nets, and fyke nets; however, only gill nets were actively fished in 2018. Commercial fishers generally target yellow perch, however, harvest of cisco was also reported in 2018. In 2018, there were two active licenses for commercial fishers in eastern Lake Ontario (New York Department of Environmental Conservation, 2019). Yellow perch accounted for the highest amount of commercial catch, with 38,987 pounds caught in 2018 for a value of $71,134 (Table 4.4 and Table 4.5) (New York Department of Environmental Conservation, 2019).

Table 4.4 Reported[1] commercial fish catch in pounds from the New York waters of eastern Lake Ontario, 2000–2017. Source: New York Department of Environmental Conservation, 2019

Year	Number of Active Commercial Fishers	Yellow Perch	Brown Bullhead	White Perch	Rock Bass	Sunfish	Black Crappie	Whitefish	Cisco
2000	7	59,928	5,709	383	280	3,571	308	-	-
2001	6	40,323	5,875	442	15	16	-	-	-
2002	6	37,223	4,435	-	-	-	-	-	-
2003	6	6,153	5,815	-	-	-	-	-	-
2004	3	37,066	1,200	-	-	-	-	-	-
2005	3	6,354	1,040	-	-	-	-	-	-
2006	3	4,274	500	-	-	-	-	-	-
2007	3	34,343	535	-	-	-	-	-	-
2008	3	14,428	735	-	-	-	-	-	-
2009	3	41,338	31	-	20	-	-	-	347[2]
2010	2	44,008	75	546	-	-	-	16	465
2011	3	77,238	105	3,736	-	-	-	-	613
2012	3	59,989	105	1,130	-	-	-	18	44
2013	3	20,589	-	1,820	-	-	-	-	12
2014	2	44,143	63	815	22	-	-	-	20
2015	2	46,473	-	859	-	-	-	11	52
2016	2	67,405	-	494	-	-	-	210	1,806
2017	2	67,435	-	-	-	-	-	-	509
2018	2	38,987	30	150	-	-	-	-	201

1. Reported catch does not include documented illegal and/or unreported harvest.
2. Known harvest in previous years was not reported.

Table 4.5 Approximate value of the 2018 commercial catch from the New York waters of eastern Lake Ontario (2018$). Source: New York Department of Environmental Conservation, 2019

Species	Pounds	Value	Value per Pound[1]
Yellow Perch	38,987	$71,134	$1.82
White Perch	150	$75	$0.50
Brown Bullhead	30	$15	$0.50

1. Estimated (weighted mean value) as price fluctuates throughout the year

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National Marine Sanctuaries

America's Underwater Treasures