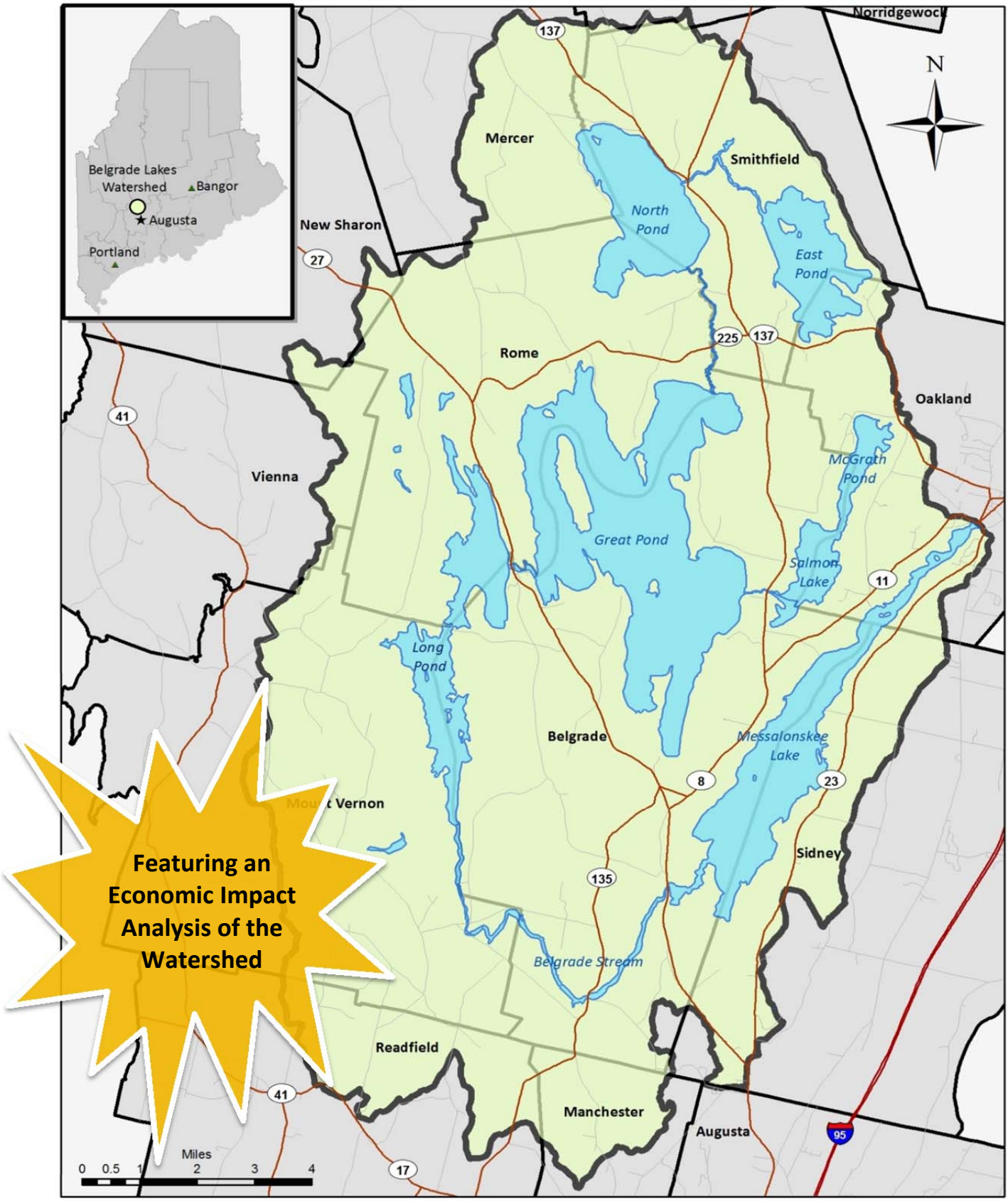
2014 Statistical Abstract for the Belgrade Lakes Watershed



Featuring an Economic Impact Analysis of the Watershed

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Acknowledgements

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Current information on the University of Maine’s *Sustainability Solutions Initiative* (SSI) EPSCoR grant can be found at http://www.umaine.edu/epscor/. Additional information about Colby’s *Belgrade Lakes Watershed Sustainability Project* can be found at http://web.colby.edu/epscor/. In all cases the accuracy and presentation of the information presented here remain the sole responsibility of the authors and does not necessarily reflect the opinions or recommendations of the administration at Colby College or any other member of the SSI team.

A watershed is: "…that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."[1]

– John Wesley Powell, scientist geographer (1834–1902)

Table of Contents

Tables and Charts

Maps

[1] "What is a Watershed?" US Environmental Protection Agency. http://water.epa.gov/type/watersheds/whatis.cfm.

Creating a Statistical Abstract for the Belgrade Lakes Watershed

A statistical abstract is a collection of data presented in tables, charts, and maps from a variety of sources to provide a snap-shot of important regional characteristics in a consistent format. Statistical abstracts are typically constructed according to geo-political boundaries (e.g., cities, school districts, counties, states, or countries) and include demographic, cultural, and economic information. This document takes a non-traditional approach in reporting information according to the boundaries of a physical land form known as the Belgrade Lakes Watershed. The defining characteristic of this ecosystem is seven interconnected water bodies which provide a unique context in which to tie the socio-economic linkages that inherently define the communities that exist within the Belgrade Lakes Watershed to their physical environment through a compilation of relevant economic, demographic, and scientific information. This abstract is constructed in this fashion to provide the residents of the Watershed communities with a resource to better understand the environment in which they live in the context of factors that define and drive economic activity in the region. The intended audience for this abstract includes stakeholder groups, community service providers, economic development agents, and policy makers.

In the simplest of terms, a watershed is an area of land defined by how water drains into and from it. The boundaries of a watershed are defined according to the topography of the land that surrounds it. Higher elevations mark the edges of a watershed and the slopes leading away from the boundaries indicate the direction water flows – either into or out of the watershed. One of the unique features of the Belgrade Lakes Watershed is that it includes seven interconnected water bodies, as well as several bogs, streams, and smaller ponds. As illustrated by the map on the cover of this abstract, water flows from East Pond into North Pond, which in turn empties into Great Pond. Water also flows into Great Pond from McGrath Pond via Salmon Lake. Great Pond drains into Long Pond and from there water enters the Belgrade Stream to flow into Messalonskee Lake (also known locally as Snow Pond). From here, water that reaches Messalonskee Lake from North Pond flows into the Kennebec River Watershed.

In constructing this abstract we began by using the work of our Colby colleagues on the *Belgrade Lakes Watershed Sustainability Project* who examined topographical maps, retrieved geographic information systems (GIS) data, and applied the results of their own field work to map the Belgrade Lakes Watershed boundary. We then identified thirteen cities and towns in Central Maine that are "touched" by the Watershed. Next we used geographic data from the US Census Bureau to separate out the "blocks"[2] within each city or town that lie within the physical boundaries of the Watershed. Occasionally, the Watershed boundary would pass through a Census block and in these instances we would employ satellite imagery and GIS mapping to estimate the fraction of the population in that block living in the Watershed. The table at right provides a listing of the cities and towns that lie either partially or completely within the Belgrade Lakes Watershed. The accompanying population weights were applied in the set of tables in the next section to define the demographic characteristics for the Belgrade Lakes Watershed.

City/Town "touched" by the Belgrade Lakes Watershed	Percent of Population Living in the Watershed
Augusta	0.04%
Belgrade	100%
Mercer	26.73%
Manchester	9.17%
Mount Vernon	62.18%
New Sharon	0%
Norridgewock	0%
Oakland	32.60%
Readfield	21.58%
Rome	100%
Sidney	23.46%
Smithfield	72.36%
Vienna	0%

[2]A Census block is the most detailed sub-unit of measurement of the population reported by the US Census Bureau in the decennial census. In a large city, like Boston or Los Angeles, a "block" might literally be a city block. In rural areas, however, Census blocks are often irregular in shape and defined by roads, highways, or streets.

Demographic Profile of the Belgrade Lakes Watershed

Table 1 provides a look at key demographic characteristics for residents of the Belgrade Lakes Watershed and the surrounding communities applying the population weights described above for both the 2000 and 2010 Census as reported by the US Census Bureau.[3] Totals for Maine and Kennebec and Somerset counties are included for comparison purposes. Although the city of Waterville lies outside the Watershed boundary, we have also included it in Table 1 because of its importance as a source of economic activity for the Belgrade Lakes region.

Some of the demographic features for the Belgrade Lakes Watershed revealed in Table 1 include:

- The Belgrade Lakes Watershed population declined by 5.3%, while the overall population in Maine and both Kennebec and Somerset counties increased from 2000 to 2010. In fact, Table 1 shows that the population in each of the towns touched by the Watershed increased from 2000 to 2010. A hint as to what might account for this difference in trends can be found in the fact that the number of seasonal homes as a percent of the Belgrade Lakes Watershed's total housing stock increased during this period. In addition, Map 1 (on page 7) illustrates the change in population from 2000 to 2010 for each Census block in the Watershed. A close examination of this map indicates that a significant number of the Census blocks that border the lakes show a decline in population while many of the blocks away from the lakes experienced either an increase or no change in population. This would seem to confirm anecdotal reports that lake-front property is being purchased by people whose primary residence lies outside the Belgrade Lakes Watershed.
- The increase in the number of housing units in the Belgrade Lakes Watershed from 2000 to 2010 was below that of any in the surrounding communities or for the State as a whole.
- A much higher percentage of homes in the Belgrade Lakes Watershed are seasonal homes as compared to Maine in general or Kennebec and Somerset.
- The increase in the number of seasonal homes in Belgrade Lakes Watershed during this period was relatively small compared to most of the surrounding areas.
- The number of "families" (two or more people related to by birth, marriage, or adoption) living in the Belgrade Lakes Watershed showed a greater decline than in any of the surrounding communities, the state of Maine, or the two counties touched by the Watershed; with the greatest declines coming among larger-sized households.
- The number of single mothers living in the Belgrade Lakes Watershed declined from 2000 to 2010, but rose or remained unchanged in each of the surrounding communities.
- Map 2 (on page 8) provides an illustration of the intensity of resource use, in terms of housing density, in the Watershed in 2010. The greatest stresses on ecosystem services in the region will occur where the number of housing units (both seasonal and year-round) per square kilometer is the greatest.

[3]Due to formatting constraints, data for Readfield and Manchester are not reported separately, but are included in the Belgrade Lakes Watershed total.

Table 1: Decennial Census Profile of the Belgrade Lakes Watershed

Variable	Belgrade Lakes Watershed			State of Maine			Kennebec County			Somerset County		
	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change
Total Population	10,523	9,970	-5.3%	1,274,923	1,328,361	4.2%	117,114	122,151	4.3%	50,888	52,228	2.6%
Males	49.2%	49.6%		48.7%	48.9%		48.5%	48.7%		49.0%	49.6%	
Females	50.8%	50.4%		51.3%	51.1%		51.5%	51.3%		51.0%	50.4%	
Total Housing Units	6,447	6,576	2.0%	651,901	721,830	10.7%	56,364	60,972	8.2%	28,222	30,569	8.3%
Total Occupied Housing Units	4,082	4,071	-0.3%	518,200	557,219	7.5%	47,683	51,128	7.2%	20,496	21,927	7.0%
One-person Household	766	839	9.5%	139,969	159,533	14.0%	13,170	14,744	12.0%	5,035	5,888	16.9%
Two-person Household	1,623	1,783	9.8%	190,804	213,695	12.0%	17,258	19,392	12.4%	7,740	8,753	13.1%
Three-person Household	724	655	-9.5%	82,223	84,340	2.6%	7,654	7,843	2.5%	3,437	3,275	-4.7%
Four-person Household	654	529	-19.1%	69,418	64,010	-7.8%	6,477	5,959	-8.0%	2,846	2,547	-10.5%
Five or more person Household	316	266	-16.0%	35,786	35,641	-0.4%	3,124	3,190	2.1%	1,438	1,464	1.8%
Vacant Housing Units	2,365	2,505	5.9%	133,701	164,611	23.1%	8,681	9,844	13.4%	7,726	8,642	11.9%
Seasonal Homes	2,179	2,234	2.6%	101,470	118,310	16.6%	5,770	6,188	7.2%	5,906	6,532	10.6%
Seasonal Homes as Percentage of Total Housing Units	33.8%	34.0%		15.6%	16.4%		10.2%	10.1%		20.9%	21.4%	
Families	3,072	2,954	-3.8%	340,685	350,621	2.9%	31,328	32,368	3.3%	14,117	14,353	1.7%
Average Family Size	2.8	2.7	-4.9%	2.9	2.8	-2.4%	2.9	2.8	-2.4%	2.9	2.8	-2.4%
Single Mothers	221	196	-11.6%	32,352	33,634	4.0%	3,303	3,325	0.7%	1,392	1,361	-2.2%
White Population	10,329	9,772	-5.4%	1,236,014	1,264,971	2.3%	114,129	117,501	3.0%	49,868	50,733	1.7%
Black/African American Population	17	27	59.3%	6,760	15,707	132%	404	687	70.0%	121	192	58.7%
AIAN Population	24	28	18.1%	7,098	8,568	20.7%	469	586	24.9%	208	241	15.9%
Asian Population	44	28	-37.0%	9,111	13,571	49.0%	690	892	29.3%	171	295	72.5%
Other Race Population	27	18	-32.2%	3,293	4,603	39.8%	230	417	81.3%	66	77	16.7%
Two or more races	83	98	18.1%	12,647	20,941	65.6%	1,192	2,068	73.5%	454	690	52.0%
Hispanic/Latino Population	55	82	48.7%	9,360	16,935	80.9%	852	1,504	76.5%	234	409	74.8%

Source: US Census Bureau, 2000 and 2010 Census, Summary File 1 data. AIAN denotes American Indian and Alaska Native.

Table 1: Decennial Census Profile of the Belgrade Lakes Watershed (continued)

Variable	Belgrade Lakes Watershed			Augusta *(0.04% in Watershed)*			Waterville *(0% in WS)*			Oakland *(32.6% in WS)*		
	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change
Total Population	10,523	9,970	-5.3%	18,560	19,136	3.1%	15,605	15,722	0.7%	5,959	6,240	4.7%
Males	49.2%	49.6%		47.3%	48.6%		45.9%	46.8%	2.5%	48.9%	48.5%	3.8%
Females	50.8%	50.4%		52.7%	51.4%		54.1%	53.2%	-0.8%	51.1%	51.5%	5.6%
Total Housing Units	6,447	6,576	2.0%	9,480	9,756	2.9%	6,819	7,065	3.6%	2,847	3,024	6.2%
Total Occupied Housing Units	4,082	4,071	-0.3%	8,565	8,802	2.8%	6,218	6,370	2.4%	2,352	2,543	8.1%
One-person Household	766	839	9.5%	3,277	3,503	6.9%	2,398	2,481	3.5%	556	579	4.1%
Two-person Household	1,623	1,783	9.8%	2,919	3,005	2.9%	2,024	2,090	3.3%	813	988	21.5%
Three-person Household	724	655	-9.5%	1,149	1,109	-3.5%	862	866	0.5%	428	471	10.0%
Four-person Household	654	529	-19.1%	832	756	-9.1%	605	568	-6.1%	366	337	-7.9%
Five or more person Household	316	266	-16.0%	388	429	10.6%	329	365	10.9%	189	168	-11.1%
Vacant Housing Units	2,365	2,505	5.9%	915	954	4.3%	601	695	15.6%	495	481	-2.8%
Seasonal Homes	2,179	2,234	2.6%	155	177	14.2%	67	66	-1.5%	317	343	8.2%
Seasonal Homes as Percentage of Total Housing Units	33.8%	34.0%		1.6%	1.8%		1.0%	0.9%		11.1%	11.3%	
Families	3,072	2,954	-3.8%	4,610	4,490	-2.6%	3,371	3,274	-2.9%	1,650	1,793	8.7%
Average Family Size	2.8	2.7	-4.9%	2.8	2.8	-0.4%	2.8	2.8	-1.4%	3.0	2.8	-5.0%
Single Mothers	221	196	-11.6%	643	649	0.9%	553	565	2.2%	179	185	3.4%
White Population	10,329	9,772	-5.4%	17,856	18,001	0.8%	14,951	14,765	-1.2%	5,856	6,037	3.1%
Black/African American Population	17	27	59.3%	93	201	116%	122	180	47.5%	9	27	200%
AIAN Population	24	28	18.1%	89	127	42.7%	88	88	0.0%	14	24	71.4%
Asian Population	44	28	-37.0%	250	291	16.4%	161	189	17.4%	33	56	69.7%
Other Race Population	27	18	-32.2%	31	78	152%	70	128	82.9%	5	26	420%
Two or more races	83	98	18.1%	241	438	81.7%	213	372	74.6%	42	70	66.7%
Hispanic/Latino Population	55	82	48.7%	160	341	113%	160	374	134%	31	84	171%

Source: US Census Bureau, 2000 and 2010 Census, Summary File 1 data. AIAN denotes American Indian and Alaska Native.

Table 1: Decennial Census Profile of the Belgrade Lakes Watershed (continued)

Variable	Belgrade Lakes Watershed			Belgrade *(100% in Watershed)*			Rome *(100% in Watershed)*			Smithfield *(72.36% in WS)*		
	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change
Total Population	10,523	9,970	-5.3%	2,978	3,189	7.1%	980	1,010	3.1%	930	1,033	11.1%
Males	49.2%	49.6%		48.2%	49.5%		48.5%	51.5%		50.0%	49.2%	
Females	50.8%	50.4%		51.8%	50.5%		51.5%	48.5%		50.0%	50.8%	
Total Housing Units	6,447	6,576	2.0%	2,007	2,198	9.5%	941	1,038	10.3%	608	727	19.6%
Total Occupied Housing Units	4,082	4,071	-0.3%	1,178	1,265	7.4%	386	439	13.7%	372	451	21.2%
One-person Household	766	839	9.5%	223	248	11.2%	69	106	53.6%	66	104	57.6%
Two-person Household	1,623	1,783	9.8%	487	518	6.4%	174	209	20.1%	167	213	27.5%
Three-person Household	724	655	-9.5%	210	226	7.6%	53	52	-1.9%	64	65	1.6%
Four-person Household	654	529	-19.1%	168	185	10.1%	56	46	-17.9%	50	45	-10.0%
Five or more person Household	316	266	-16.0%	90	88	-2.2%	34	26	-23.5%	25	24	-4.0%
Vacant Housing Units	2,365	2,505	5.9%	829	933	12.5%	555	599	7.9%	236	276	16.9%
Seasonal Homes	2,179	2,234	2.6%	774	818	5.7%	538	560	4.1%	218	243	11.5%
Seasonal Homes as Percentage of Total Housing Units	33.8%	34.0%		38.6%	37.2%		57.2%	53.9%		35.9%	33.4%	
Families	3,072	2,954	-3.8%	877	935	6.6%	290	299	3.1%	285	314	10.2%
Average Family Size	2.8	2.7	-4.9%	2.9	2.9	-1.4%	2.9	2.7	-6.3%	2.8	2.6	-7.7%
Single Mothers	221	196	-11.6%	66	66	0%	25	18	-28.0%	17	17	0.0%
White Population	10,329	9,772	-5.4%	2,939	3,135	6.7%	963	995	3.3%	915	1,008	10.2%
Black/African American Population	17	27	59.3%	3	6	100%	1	2	100%	1	1	0.0%
AIAN Population	24	28	18.1%	3	4	33.3%	8	4	-50.0%	2	2	0.0%
Asian Population	44	28	-37.0%	6	2	-66.7%	1	1	0.0%	4	5	25.0%
Other Race Population	27	18	-32.2%	5	0	-100%	0	7		4	1	-75.0%
Two or more races	83	98	18.1%	22	42	90.9%	7	1	-85.7%	4	16	300%
Hispanic/Latino Population	55	82	48.7%	14	16	14.3%	3	6	100%	9	10	11.1%

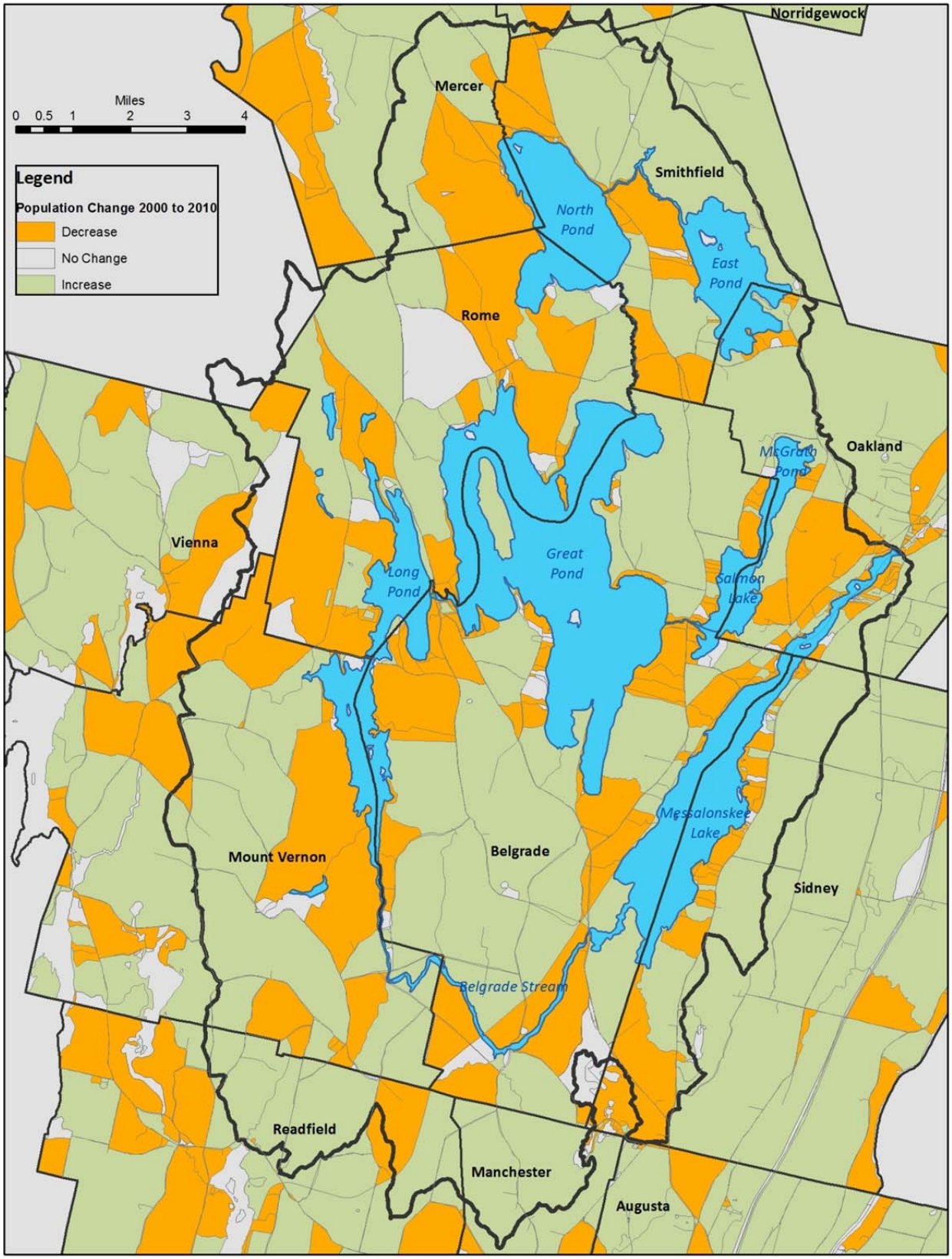
Source: US Census Bureau, 2000 and 2010 Census, Summary File 1 data. AIAN denotes American Indian and Alaska Native.

Table 1: Decennial Census Profile of the Belgrade Lakes Watershed (continued)

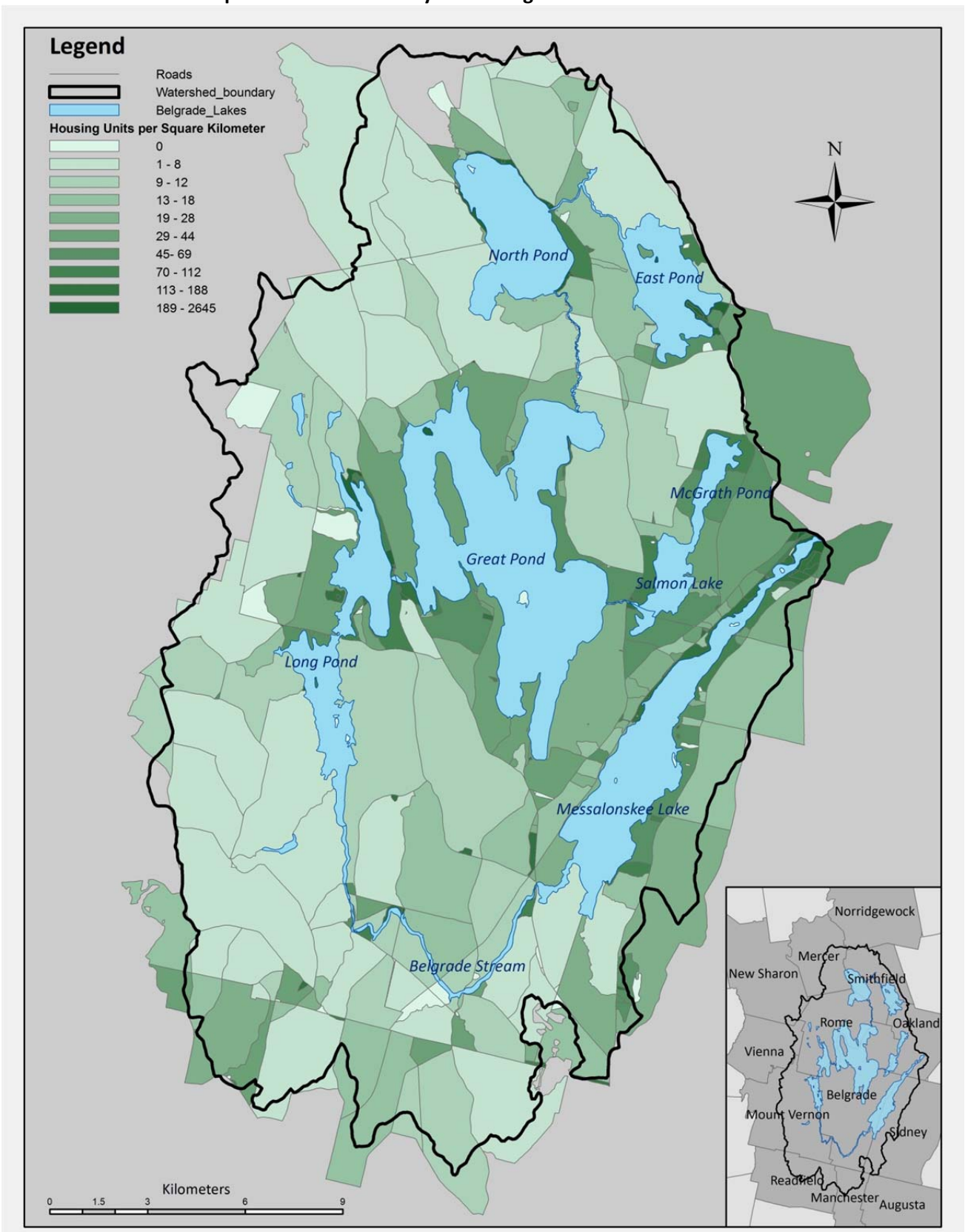
Variable	Belgrade Lakes Watershed			Mercer *(26.73% in Watershed)*			Mount Vernon *(62.18% In WS)*			Sidney *(23.46% In WS)*		
	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change	2000	2010	% Change
Total Population	10,523	9,970	-5.3%	647	664	2.6%	1,524	1,640	7.6%	3,514	4,208	19.7%
Males	49.2%	49.6%		47.8%	48.9%		50.3%	49.3%		49.7%	50.4%	
Females	50.8%	50.4%		52.2%	51.1%		49.7%	50.7%		50.3%	49.6%	
Total Housing Units	6,447	6,576	2.0%	366	399	9.0%	956	1,107	15.8%	1,518	1,850	21.9%
Total Occupied Housing Units	4,082	4,071	-0.3%	256	287	12.1%	603	693	14.9%	1,314	1,607	22.3%
One-person Household	766	839	9.5%	51	69	35.3%	119	152	27.7%	235	283	20.4%
Two-person Household	1,623	1,783	9.8%	102	132	29.4%	248	321	29.4%	469	657	40.1%
Three-person Household	724	655	-9.5%	45	41	-8.9%	96	97	1.0%	273	277	1.5%
Four-person Household	654	529	-19.1%	38	28	-26.3%	102	87	-14.7%	231	258	11.7%
Five or more person Household	316	266	-16.0%	20	17	-15.0%	38	36	-5.3%	106	132	24.5%
Vacant Housing Units	2,365	2,505	5.9%	110	112	1.8%	353	414	17.3%	204	243	19.1%
Seasonal Homes	2,179	2,234	2.6%	91	87	-4.4%	320	371	15.9%	166	167	0.6%
Seasonal Homes as Percentage of Total Housing Units	33.8%	34.0%		24.9%	21.8%		33.5%	33.5%		10.9%	9.0%	
Families	3,072	2,954	-3.8%	179	199	11.2%	449	487	8.5%	989	1,196	20.9%
Average Family Size	2.8	2.7	-4.9%	2.9	2.7	-8.5%	2.9	2.7	-5.6%	3.0	2.9	-3.3%
Single Mothers	221	196	-11.6%	8	11	37.5%	35	35	0%	71	86	21.1%
White Population	10,329	9,772	-5.4%	628	653	4.0%	1,488	1,611	8.3%	3,471	4,124	18.8%
Black/African American Population	17	27	59.3%	1	1	0%	4	1	-75.0%	2	6	200%
AIAN Population	24	28	18.1%	2	4	100%	8	6	-25.0%	6	14	133%
Asian Population	44	28	-37.0%	9	3	-66.7%	3	2	-33.3%	10	13	30.0%
Other Race Population	27	18	-32.2%	4	0	-100%	6	2	-66.7%	6	7	16.7%
Two or more races	83	98	18.1%	3	3	0%	15	18	20.0%	19	44	132%
Hispanic/Latino Population	55	82	48.7%	4	2	-50.0%	6	12	100%	15	28	86.7%

Source: US Census Bureau, 2000 and 2010 Census, Summary File 1 data. AIAN denotes American Indian and Alaska Native.

Map 1: Change in Population in the Belgrade Lakes Watershed, 2000 to 2010



Map 2: Household Density in the Belgrade Lakes Watershed



Demographic Characteristics for the Belgrade Lakes Region

Starting in 2010, much to the consternation of researchers and policy makers who depend heavily on Census data to track information regarding income, poverty, education, and behavioral characteristics about the US population, the US Census Bureau stopped administrating the traditional "long form" questionnaire to a representative sample population every ten year. Instead, data is now collected through annual surveys with smaller sample sizes and is reported in the form of 5-year averages via the American Community Survey. This data is not reported on the Census block level, thus we cannot compare it to the Census data from 2000 for relative changes from the Census blocks that make up the Belgrade Lakes Watershed. Furthermore, this data is more reliable for urban areas. Due to smaller sample sizes, estimates for demographic characteristics for rural areas like Central Maine will be less reliable and, therefore, interpretations of these estimates should be treated with some caution.

Table 2 reports summary statistics for what we have labeled the "Belgrade Lakes Region," calculated by aggregating across the communities reported in the US Census' American Community Survey that have 23% or more of their population in the Watershed. As noted above, the data in Table 2 are averages for the period 2007 – 2011. Some highlights include the following:

- The Belgrade Lakes Region has a higher percentage of households with incomes above $150,000 than either Kennebec or Somerset Counties as a whole and slightly more than the state average. Among the communities in the region, more than 7% of households in Belgrade, Rome, and Oakland have incomes over $150,000 – much higher than the state average.
- Median household income in the Belgrade Lakes Region is 16.8% higher than the state median.
- Households in Sidney and Mount Vernon have median incomes higher than those in the other towns in the Belgrade Lakes Region.
- Although the Belgrade Lakes Region has a poverty rate that is below Maine as a whole, Smithfield's estimated poverty rate is higher than the state-wide average.
- The fraction of households in the Region receiving supplemental assistance for food (formerly known as the "Food Stamps" program) is lower than the state-wide average.
- The fraction of the population over 25 years of age with an advanced educational degree in the Belgrade Lakes Region is above the average for Maine. The difference between the Region as a whole and Somerset County is particularly large.
- The percentage of people who work outside of home in the Belgrade Lakes Region (47.4%) is slightly higher than that of the state in general (45.6%), and even higher than the percentage in Somerset County (39.8%).
- Average commuting times for work appear to be somewhat lower on average for people working outside the home in the Belgrade Lakes Region than for the state as a whole. People in the towns of Mercer reportedly have the longest estimated commuting times on average.

Table 2: Demographic Characteristics of the Belgrade Lakes Region

Estimates for the Period 2007 – 2011

Statistic		Belgrade Lakes Region	Maine	Kennebec County	Somerset County
Total Population		17,545	1,328,543	122,008	52,228
Total Households		7,067	551,601	51,043	21,795
Household Income Level	Less than $10,000	4.0%	6.9%	6.4%	9.8%
	$10,000-$14,999	3.5%	6.5%	5.8%	8.3%
	$15,000-$24,999	8.9%	12.1%	12.4%	16.3%
	$25,000-$34,999	12.2%	11.4%	13.0%	12.3%
	$35,000-$49,999	14.5%	15.0%	15.2%	15.0%
	$50,000-$74,999	25.0%	19.8%	20.8%	18.7%
	$75,000-$99,999	15.8%	12.5%	12.3%	10.0%
	$100,000-$149,999	10.4%	10.4%	9.7%	7.2%
	$150,000-$199,999	3.1%	3.0%	2.8%	1.4%
	$200,000 or more	2.9%	2.4%	1.7%	1.2%
Median Household Income		$55,939	$47,898	$46,904	$37,875
Per capita Income		$27,908	$26,195	$25,023	$21,105
Income Below Poverty Level		7.5%	12.8%	12.2%	18.5%
Households Received Food Stamps/SNAP program		10.3%	14.6%	16.1%	22.1%
Population over 25		12,409	934,144	85,451	37,384
Education Level	No High School	2.0%	3.6%	3.6%	4.4%
	Some High School	4.8%	6.1%	5.6%	8.9%
	High School Graduate	33.0%	34.5%	36.5%	42.4%
	Some College	20.3%	19.7%	20.2%	20.2%
	College Graduate	29.1%	26.4%	25.2%	19.6%
	Graduate Degree	7.8%	6.9%	6.3%	3.1%
	Professional Degree or Certification	2.9%	2.8%	2.6%	1.3%
Number of people working outside the home		8,315	606,262	55,484	20,786
Travel to Work	Less than 5 minutes	5.6%	5.8%	4.9%	7.8%
	5 to 19 minutes	41.5%	44.4%	44.5%	43.7%
	20 to 39 minutes	38.5%	33.4%	35.4%	29.0%
	40 to 59 minutes	7.4%	10.1%	8.5%	10.2%
	60 to 89 minutes	4.3%	4.2%	4.9%	6.1%
	90 minutes or more	2.8%	2.1%	1.8%	3.2%

Source: US Census Bureau, American Community Survey data.

Table 2: Demographic Characteristics of the Belgrade Lakes Region (continued)

Estimates for the Period 2007 – 2011

Statistic		Belgrade	Mount Vernon	Oakland	Rome	Sidney	Mercer	Smithfield
Total Population		3,170	1,438	6,229	990	4,151	610	957
Total Households		1,313	628	2,484	456	1,518	255	413
Household Income Level	Less than $10,000	3.4%	4.9%	6.2%	3.1%	1.1%	4.3%	2.4%
	$10,000-$14,999	5.2%	4.9%	1.7%	6.6%	1.8%	6.7%	7.8%
	$15,000-$24,999	10.5%	8.6%	11.2%	10.1%	5.8%	4.0%	3.6%
	$25,000-$34,999	14.7%	14.1%	10.4%	12.3%	9.6%	15.3%	18.6%
	$35,000-$49,999	11.3%	11.7%	17.5%	11.8%	12.8%	19.3%	16.0%
	$50,000-$74,999	25.1%	26.3%	18.4%	32.2%	34.0%	21.5%	22.8%
	$75,000-$99,999	9.7%	18.2%	16.9%	10.3%	18.7%	22.4%	16.0%
	$100,000-$149,999	12.9%	8.9%	10.4%	4.2%	11.7%	1.2%	11.2%
	$150,000-$199,999	3.2%	2.1%	3.1%	2.9%	3.6%	5.5%	1.7%
	$200,000 or more	4.2%	0.5%	4.2%	6.6%	1.0%	0.0%	0.0%
Median Household Income		$54,816	$57,125	$53,975	$52,581	$64,500	$53,750	$51,016
Per capita Income		$28,546	$26,880	$28,922	$32,687	$26,319	$24,443	$24,901
Income Below Poverty Level		11.0%	7.8%	6.6%	6.8%	4.0%	10.5%	14.7%
Households Received Food Stamps/SNAP program		6.9%	8.6%	13.7%	13.6%	6.1%	14.1%	12.8%
Population over 25		2,313	1,064	4,262	768	2,803	472	727
Education Level	No High School	0.8%	2.6%	2.0%	2.9%	2.0%	5.5%	1.8%
	Some High School	4.5%	5.5%	4.1%	3.5%	5.4%	8.5%	6.2%
	High School Graduate	30.5%	29.7%	33.7%	33.3%	32.2%	39.2%	41.1%
	Some College	19.2%	25.2%	17.6%	18.8%	25.4%	13.1%	19.4%
	College Graduate	30.5%	28.4%	30.3%	28.0%	27.4%	28.2%	27.2%
	Graduate Degree	11.4%	6.4%	8.0%	10.7%	6.3%	2.8%	2.3%
	Professional Degree or Certification	3.1%	2.2%	4.4%	2.9%	1.2%	2.8%	1.9%
Number of people working outside the home		1,413	634	3,018	471	2,126	245	408
Travel to Work	Less than 5 minutes	2.4%	13.3%	7.8%	2.3%	2.9%	2.0%	8.6%
	5 to 19 minutes	32.2%	17.9%	59.5%	12.6%	42.5%	14.3%	21.3%
	20 to 39 minutes	49.1%	51.4%	23.1%	64.8%	39.5%	51.5%	51.7%
	40 to 59 minutes	7.5%	9.1%	4.4%	10.8%	8.2%	18.8%	12.5%
	60 to 89 minutes	6.6%	6.3%	2.9%	4.9%	4.3%	4.9%	2.2%
	90 minutes or more	2.3%	2.1%	2.5%	4.7%	2.5%	8.6%	3.7%

Source: US Census Bureau, American Community Survey data.

Property Taxes in the Belgrade Lakes Region

Table 3 reports tax data for households in the Belgrade Lakes Watershed, culled from property tax records. Only the towns that managed an accessible digital tax database are shown. The areas around Long Pond and Great Pond generally attract more seasonal home owners as shown by the lower percentage of Maine-resident owned property in the cities of Belgrade and Rome. The lack of year-round home ownership also explains the low number of tax exemptions in this area. The Watershed's suitability for vacationing may be reflected in its high land values and lower building values. With the exception of Rome, the percentage of residents in towns within the watershed that are not Mainer residents is directly proportionate to the percentage of property tax that their contributions constitute. This implies that non-Maine homeowners pay similar if not identical amount of property tax as their in-state resident counterparts.

Table 4 details the trend in mill rates from 2002 to 2011 for the individual towns and counties in Belgrade Lakes Region. Also included for comparison is a weighted average of mill rates for the entire state and for the communities in Kennebec and Somerset counties. Mill rate is the amount of property tax a home owner has to pay for every $1,000 of property value. Although both the Kennebec and Somerset County have higher average mill rates than the state of Maine, individual cities in the Belgrade Watershed, like Belgrade, Rome and Sidney, have much lower mill rates than the state of Maine. These low rates may be due to the lower public utility costs, but is primarily related to the high property tax from the high land values that already make significant contributions to the local governments' budget.

Table 3: Summary of Tax Data from the Belgrade Lakes Watershed

	Belgrade	Manchester	Sidney	Smithfield	Oakland	Rome
Residential Properties in the Belgrade Lakes Watershed	2,645	97	624	515	1,049	1,585
% of Residential Properties Owned by Maine Residents	77.7%	97.9%	87.2%	83.1%	88.6%	61.5%
Average Land Value	$92,881	$47,058	$89,947	$63,682	$81,149	$100,079
Average Building Value	$81,472	$117,458	$117,112	$79,321	$107,816	$55,747
Average Exemption	$3,208	$8,722	$11,335	$52,412	$6,158	$1,815
% of Property Tax Paid by Non-Maine Homeowners	34.7%	4.0%	18.5%	22.8%	13.7%	69.3%

Table 4: Mill Rate Trends in the Belgrade Lakes Region

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Maine*	14.97	13.9	12.99	11.77	11.23	11.33	11.7	12.23	12.78	13.4
Kennebec County*	18.31	17.16	15.9	13.86	12.66	12.25	12.58	13.03	13.54	14.07
Somerset County*	16.68	16.39	15.9	14.44	13.77	13.47	14.19	14.62	14.97	15.35
Mercer	12.73	12.32	12.34	12.84	14.7	13.54	12.71	13.07	14.47	14.71
Oakland	17.49	16.4	14.47	12.78	11.42	11.81	11.68	11.6	12.2	13
Sidney	10.22	9.72	10.28	8.36	8.13	7.88	8.04	8.8	9.14	9.37
Belgrade	11.56	10.77	10.68	8.62	8.75	8.96	9.24	9.97	10.02	10.72
Rome	11.75	11.32	9.28	8.37	7.29	6.76	7.81	7.14	7.31	7.58
Mount Vernon	13.89	12.44	11.65	10.48	9.42	8.9	9.49	10.68	11.61	12.52
Smithfield	14.88	14.08	12.82	12.06	12.87	12.91	13.77	14.37	13.8	13.42

*Weighted averages for all communities in Maine, Kennebec, and Somerset counties.
Source: Maine Department of Revenue Service https://www.maine.gov/revenue/propertytax/municipalservices/fullvaluerates.pdf .

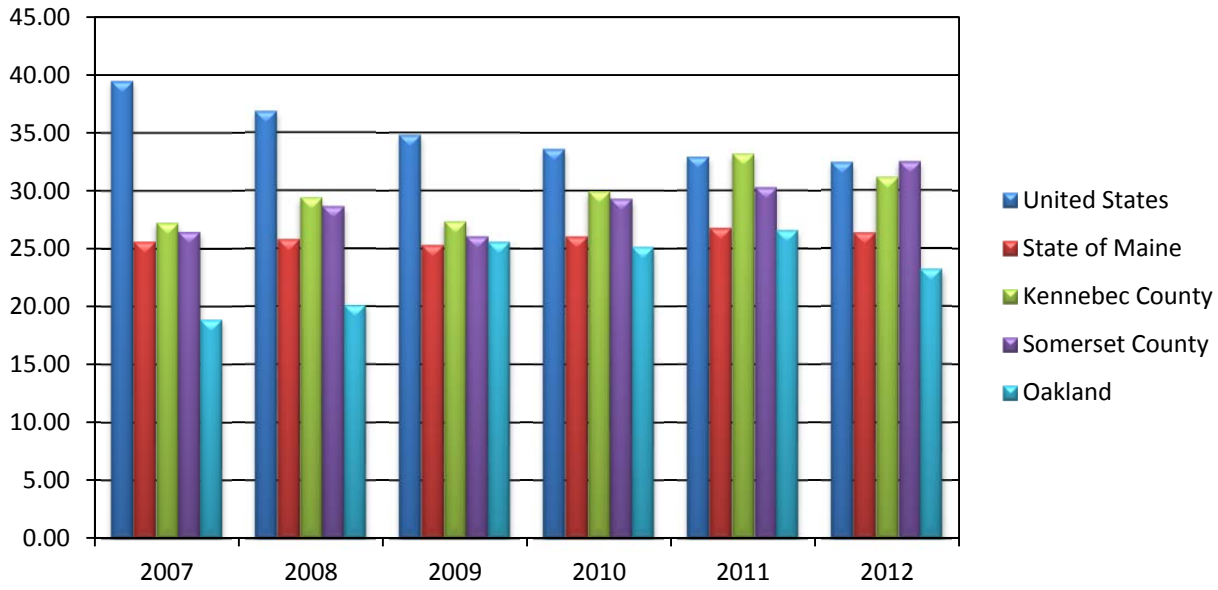
Crime in the Belgrade Lakes Region

Crime rates are defined as the number of offenses that occur per 1,000 residents in a specific geographic region. In Maine, crime rate are reported in aggregate fashion the county sheriff or at the state level by the state police. In addition, towns with their own police departments report crime data for their communities. The Belgrade Lakes Watershed lies primarily within Kennebec and Somerset counties. Within the Belgrade Lakes Watershed, only Augusta and Oakland have their own police departments reporting crime data. As noted above, only a very small portion of Augusta (approximately 0.04% of the population) lies within the Belgrade Lakes Watershed.

Chart 1 shows a comparison of county-level data to the state of Maine and the United States. Crime rates in Maine have been always lower than for the nation as a whole. Reported crime rates in Kennebec and Somerset counties have been consistently above the rate for Maine since 2007. The crime rate for Oakland, however, has been noticeably lower than that reported for both the state of Maine and the nation.

Table 5 provides a comparison of more detailed crime statistics for the counties and towns in the Belgrade Lakes region.

Chart 1: Crime Rates for the US, Maine, and the Belgrade Lakes Region



Source: State of Maine Department of Public Safety. http://www.maine.gov/dps/cim/crime_in_maine/2011contents.htm

Table 5: Crime Statistics for the Belgrade Lakes Region

Reported Crimes	State of Maine					Kennebec County					Somerset County				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Murder	31	26	24	25	24	3	1	1	3	1	1	2	1	2	1
Rape	373	374	389	391	368	46	55	51	55	56	18	22	19	20	26
Robbery	332	398	416	370	421	17	28	29	37	44	9	8	10	5	14
Aggravated Assault	813	742	760	843	803	71	58	66	103	101	25	20	21	24	24
Burglary	6,516	6,711	7,343	7,826	7,429	629	630	812	894	830	348	387	411	382	406
Larceny	24,582	23,900	24,490	24,826	24,812	2,663	1,433	2,594	2,830	2,639	989	841	975	1,075	1,161
Motor Vehicle Theft	1,173	1,018	985	1,074	990	105	83	83	113	106	75	46	51	70	44
Arson	188	143	245	260	226	17	28	22	22	26	12	13	14	5	17
Total Crime	34,008	33,412	34,652	35,615	35,073	3,551	3,316	3,658	4,057	3,803	1,477	1,339	1,502	1,583	1,693
Rate Per 1000 population	*25.83*	*25.34*	*26.09*	*26.81*	*26.39*	*29.41*	*27.37*	*29.98*	*33.22*	*31.17*	*28.67*	*26.09*	*29.35*	*30.31*	*32.52*

Reported Crimes	Oakland					Augusta					Waterville					Skowhegan				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Murder	0	0	0	0	0	3	0	0	1	0	0	0	0	0	1	1	1	0	1	0
Rape	3	3	1	3	5	8	11	12	15	16	12	10	10	17	15	7	10	6	10	14
Robbery	0	3	0	0	0	4	12	13	15	27	8	3	11	11	9	2	2	4	2	5
Aggravated Assault	1	1	2	1	3	43	30	32	38	44	12	13	8	19	18	6	6	5	5	6
Burglary	29	30	22	23	22	184	166	221	252	240	93	90	84	85	154	50	57	58	53	105
Larceny	89	117	130	135	108	980	81	964	1,030	914	624	660	559	570	589	327	265	282	348	419
Motor Vehicle Theft	3	5	2	4	7	40	32	20	23	31	10	8	14	11	15	11	5	9	16	15
Arson	0	0	0	0	0	13	5	11	4	12	1	8	2	5	3	4	2	1	1	6
Total Crime	125	159	157	166	145	1,275	1,127	1,273	1,378	1,284	760	792	688	718	804	408	348	65	436	570
Rate per 1000 population	*20.15*	*25.61*	*25.18*	*26.61*	*23.26*	*69.51*	*61.75*	*68.76*	*72.02*	*67.17*	*47.61*	*49.31*	*42.8*	*45.67*	*51.18*	*46.62*	*40.17*	*42.39*	*50.77*	*66.57*

Source: State of Maine Department of Public Safety. http://www.maine.gov/dps/cim/crime_in_maine/2010contents.htm.

Public School Enrollment Trends for the Belgrade Lakes Region

Table 6 shows recent data trends on public school enrollment and eligibility ("Eligible") for free and reduced-fee lunch programs for school districts that students of Belgrade Lakes Region attend.

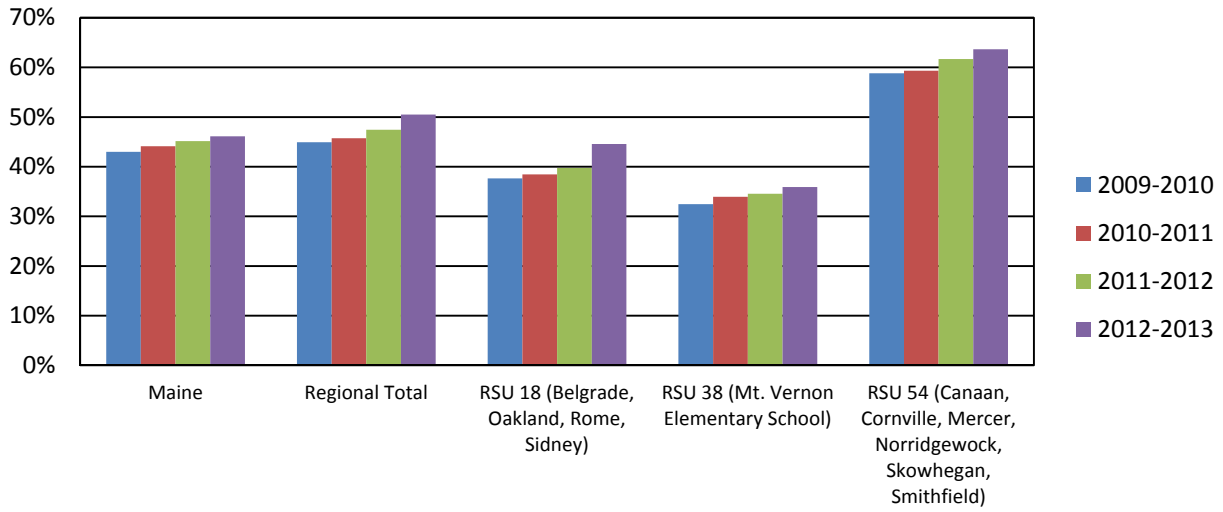
Chart 2 illustrates an increase in eligibility for free and reduced fee lunch across the region and the state of Maine.

Table 6: Public School Enrollment Trends

	Academic Year								
	2010-2011			2011-2012			2012-2013		
	Enrollment	% Chg	Eligible	Enrollment	% Chg	Eligible	Enrollment	% Chg	Eligible
Maine	189,433	-1.14%	44.1%	187,651	-0.94%	45.2%	185,806	-0.98%	46.1%
Regional Total	6,991	-2.37%	45.7%	6,949	-0.60%	47.5%	6,823	-1.81%	50.5%
RSU 18 Belgrade, Oakland, Rome, Sidney	3,001	-3.19%	38.5%	2,982	-0.63%	39.7%	2,886	-3.22%	44.6%
RSU 38 Mt. Vernon	1,278	-0.54%	34.0%	1233	-3.52%	34.6%	1,253	1.62%	35.9%
RSU 54 Canaan, Cornville, Mercer, Norridgewock, Skowhegan, Smithfield	2,712	-2.31%	59.3%	2,734	0.81%	61.7%	2,684	-1.83%	63.6%

Source: State of Maine Department of Education; http://www.state.me.us/education/sfs/reports_tab.html.

Chart 2: Eligibility for Free and Reduced-Fee Lunch Programs

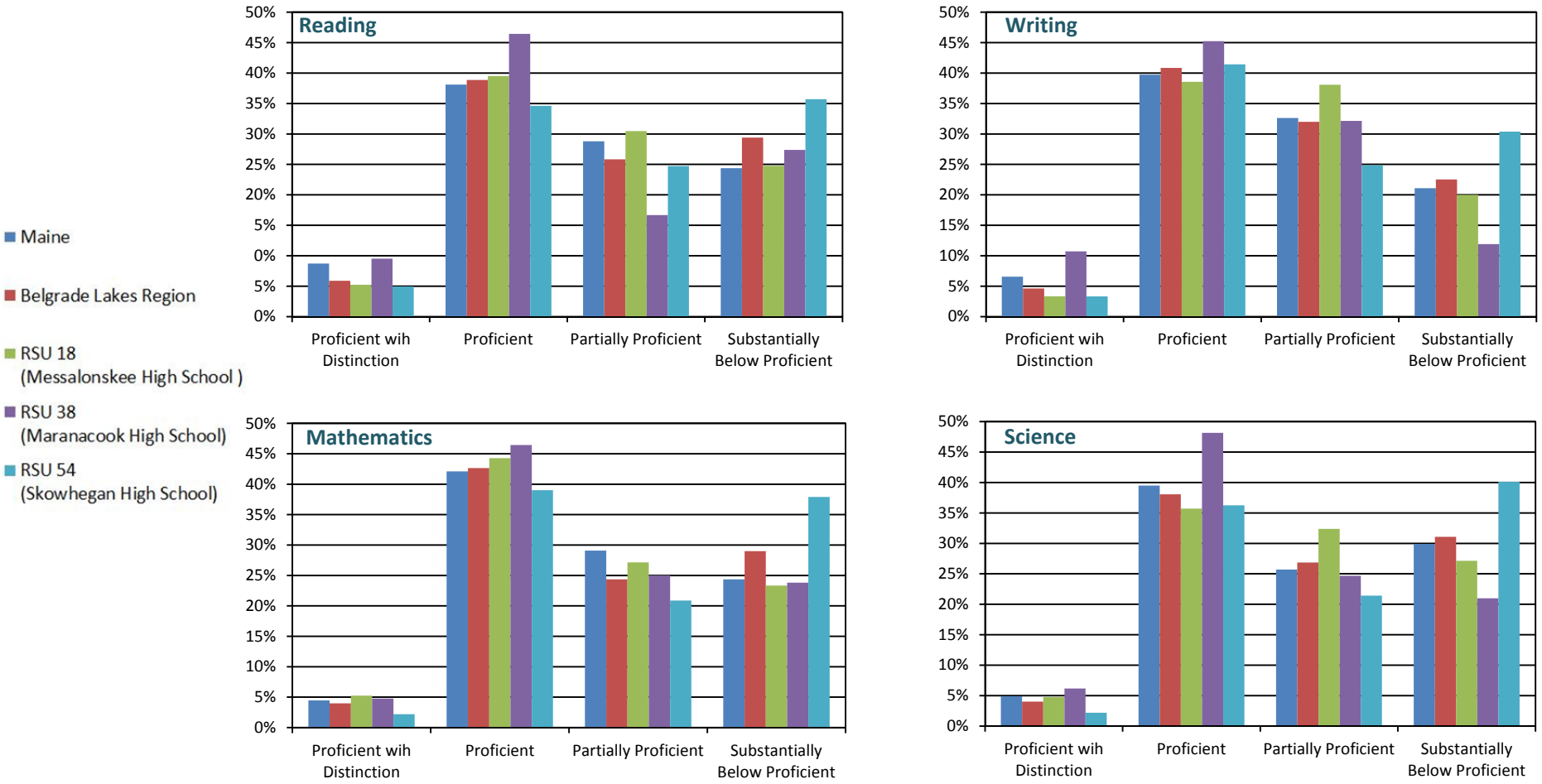


Source: State of Maine Department of Education; http://www.state.me.us/education/sfs/reports_tab.html.

2012 Standardized Test Scores for the Belgrade Lakes Region

Every Maine high school student is required to take the Maine High School Assessment (MHSA), usually in their third year in high school. The MHSA, which includes the SAT and a science supplement, is used as an assessment of high school performance and a benchmark for educational expectations and increased readiness for post-secondary education. Chart 3 shows the distribution of achievements in each subject area. The percentage of students in the Belgrade Lakes Region who are at least proficient is similar to that on the state level for all subjects. RSU 38 (Maranacook High School) appears to perform slightly better than the averages for the state and the other school districts in the Belgrade Lakes region.

Chart 3: Distribution of Proficiency for Maine High School Assessment in 2012



Source: Maine Department of Education http://www.maine.gov/education/mhsa/school_reports.htm .

High School Dropout and Graduation Rates in the Belgrade Lakes Region

A dropout is defined as a student from any high school grade level who withdraws from school for any reason besides death or expelled, and does not enroll in another education program. The graduation rate is calculated for all students, including transfer students, who graduate high school within four years excluding alternate diploma programs like the GED.

Chart 4 illustrates the dropout rate trends from 2007 to 2012. After 2008, the Belgrade Lakes Region showed consistently higher percentage dropout rates than the state of Maine.

Chart 5 displays the graduation rate by high school and demographics. The Belgrade Lakes region generally has a higher graduation rate in every subgroup with the exception of students who participate in the free and reduced-fee lunch. Also, note that students who are not participating in the free or reduced fee lunch tend to have graduation rates that are at least 10 percentage points higher.

Chart 4: Dropout Rate Trends

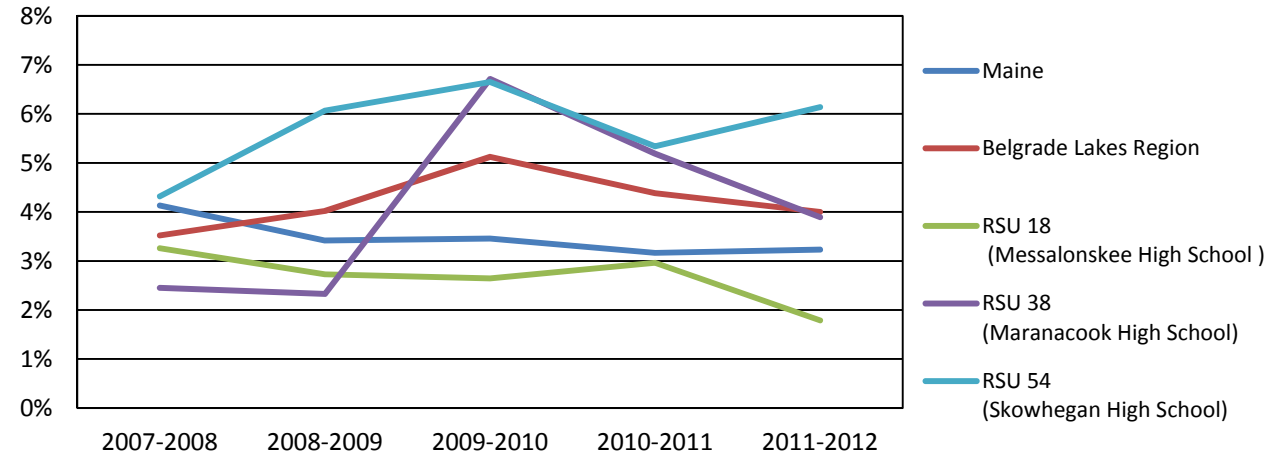
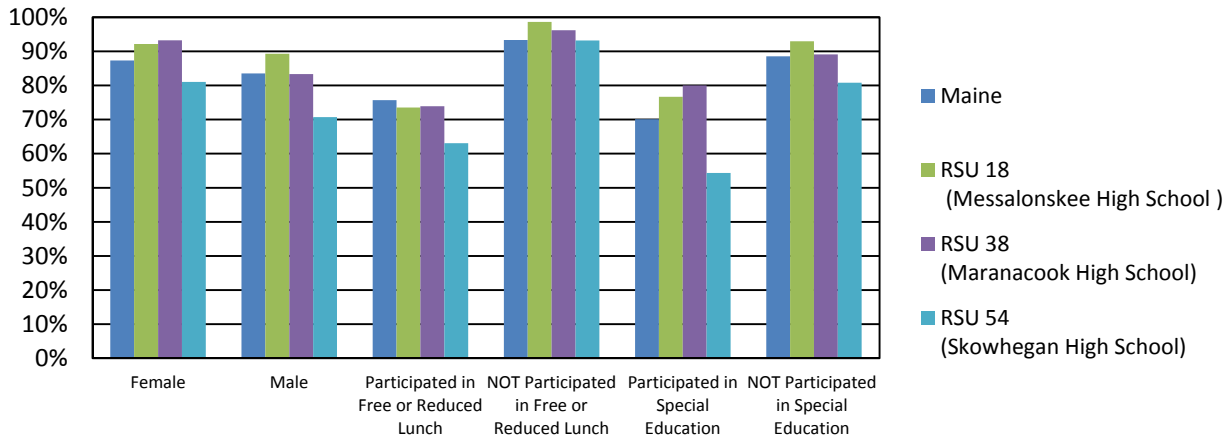
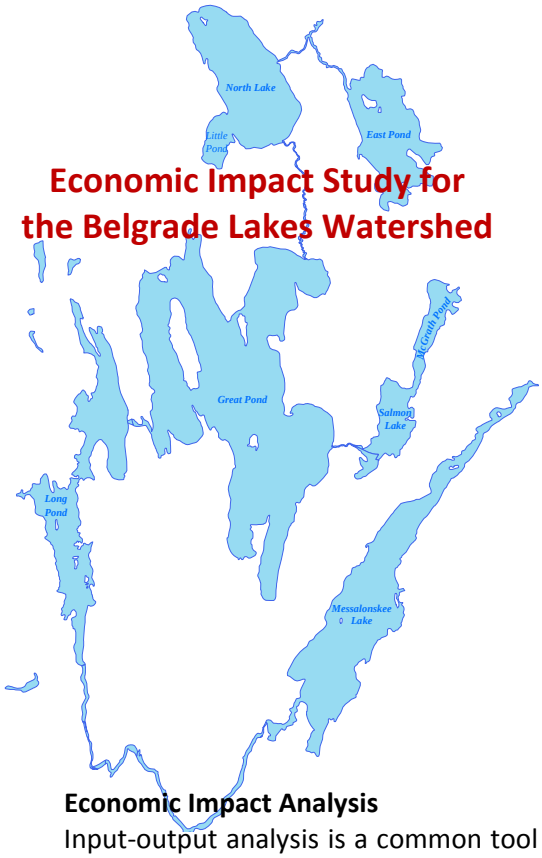


Chart 5: Graduation Rates by Subgroups in 2012



Source: Maine Department of Education http://www.maine.gov/education/gradrates/gradrates.html



Economic Impact Study for the Belgrade Lakes Watershed

Ecosystem services generated by lake watershed environments can be important drivers of local and regional economic activity. An economic impact analysis is a common method used by economists and policymakers to estimate the direct and ripple effects of expenditures in an area. In this analysis of the Belgrade Lakes Region, we use data collected from an economic survey that was distributed to year-round and seasonal residents of the Belgrade Lakes Watershed. This survey was designed to explore social and economic dimensions of the area as well as capture information on spending, income, and general knowledge about the health of the lakes in the watershed. Using an Impact Analysis for Planning (IMPLAN) modeling framework, we quantify the direct, indirect and induced effects of spending by seasonable residents and visitors to the Belgrade Lakes Watershed. Our hope is that this information may help to better inform decisions by policymakers that affect ecosystem services and conservation land-use practices in this lake watershed environment.

Economic Impact Analysis

Input-output analysis is a common tool that has been applied in numerous economic impact studies to assess the value of different environmental and natural resource based environments as well as economic development opportunities more generally. This form of analysis is especially useful in describing current and potential contributions of outdoor recreational activities to the local economy. Impact Analysis for Planning (IMPLAN) is a widely used input-output modeling computer software program originally developed by the U.S. Forest Service that estimates the linkages between different sectors of the economy, and is able to assess the direct, indirect and induced effects produced from them.

Unlike traditional input-output models, IMPLAN is built using social accounting matrices (SAM), which can capture non-market transactions such as tax payments that can also be considered as an important source of economic flow. SAMs can be utilized to measure the economic impacts of a given change in an economy and its relative distribution in terms of the direct, indirect and induced effects. In this particular study, they are being applied to estimate the economic impact of current spending in the Belgrade Lakes Watershed. When applied in this form, they are referred to as a multiplier model, in that they reflect the region's unique economic structure and trade situation.

In essence we are employing a 'follow the money' paradigm as we attempt to estimate the economic impacts of measurable expenditures by seasonal and year-round residents of the Belgrade Lakes Watershed. Using the IMPLAN framework we can estimate the total impact by calculating direct, indirect, and induced effects across our identified categories of spending. Direct effects are the impacts that occur as a result of changes in production and output in those sectors of the economy that are directly related to the influx of spending. Indirect effects come from economic interactions among industrial sectors as a result of purchasing or supplying inputs from one sector to another. Finally, induced effects occur through the linkages between an affected sector of the economy and households based on labor supplied and wages paid in order to capture implicit relationships with respect to

resulting changes in household spending. Induced effects on household consumption expenditures can be attributed to both the direct and indirect effects. The aggregate value of these three differentiated effects provides an estimate of the total economic impact of the expenditures that were captured in the survey of residents and visitors in the Belgrade Lakes Watershed.

Methods

The foundation for this economic impact analysis of the Belgrade Lakes Watershed was a collection of data through both in-person and mailed versions of a comprehensive survey of expenditures. In-person surveys were conducted for a random sample of seasonal visitors at the Maine Lakes Resource Center in the town of Belgrade Lakes, shoppers at the local farmers market, and patrons at the local general store. The town of Belgrade Lakes is one of the central hubs of economic activity for visitors of the Belgrade Lakes Watershed and as such provided a useful location for collecting information on the area.

Seasonal residents were targeted for the in-person survey and are defined for our purposes as individuals who either own or rent a seasonal camp/home and do not live in the Watershed year-round. Data collection occurred during the summer of 2013 and our research team conducted a total of 89 in-person surveys. The first section of the survey contained questions used to profile seasonal visitors in terms of length of stay, number of years visiting the area, location of year-round and seasonal residences, education status, household income, and connection to place. The next section collected information relating to household expenditures. These questions ranged from typical spending on food and dining to spending on various outdoor recreational activities. The final section included questions to assess public awareness of environmental issues affecting the seven lakes in the Watershed.

We also mailed a more detailed version of our survey to a random sample of 2,053 households with physical addresses located within the Belgrade Lakes Watershed boundary. Using property tax records, we employed geographic information systems (GIS) methods to extract those addresses located within our study area to form a comprehensive mailing list from which we randomly selected households. We had an 18% response rate, with 365 of the mailed surveys returned and useable for our modeling efforts. The mailed survey captured data on the spending behavior of both year-round and seasonal residents of the Watershed. This household survey included all of the same questions as the in-person survey in addition to more extensive questions on communication, television, heating, electricity, education, and healthcare expenditures.

Results

Figure 1 on the next page provides an overview of the annual household incomes of our survey respondents. The average household income for respondents with a primary address inside the Belgrade Lakes Watershed was $97,818. The average household income of respondents that have a primary address outside of the Watershed was $136,975. The majority of respondents (58%) had a total annual household income of between $50,000 and $150,000

In terms of the education level of our respondents, Figure 2 displays the highest level of education achieved by members of their household. This graph reveals that 87% of survey respondents indicated having a member of their household with a college degree or higher.

Figure 1. Household Income of Survey Respondents

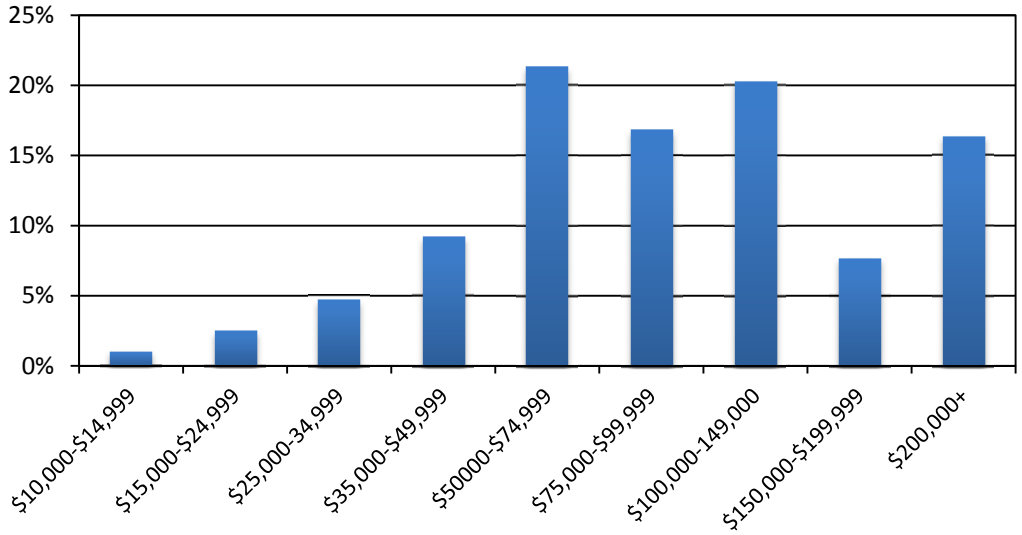
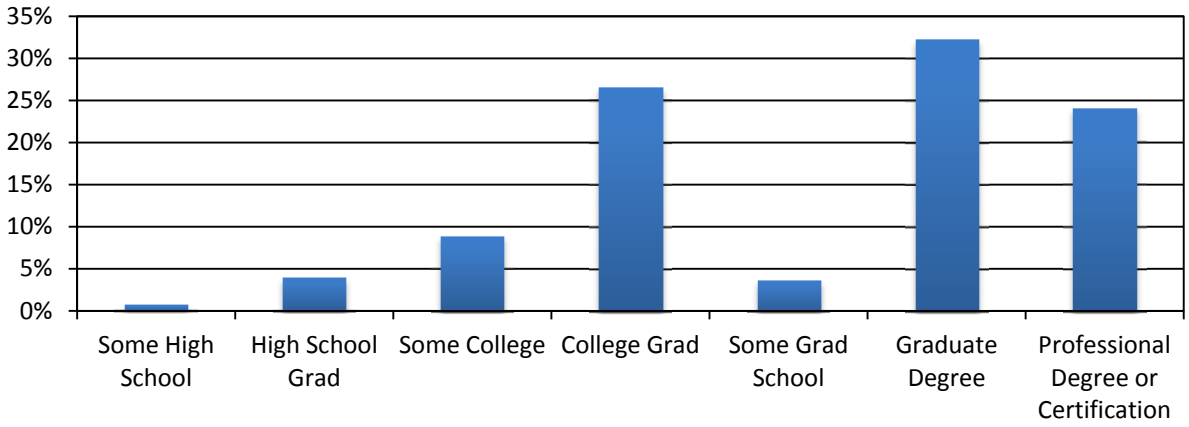
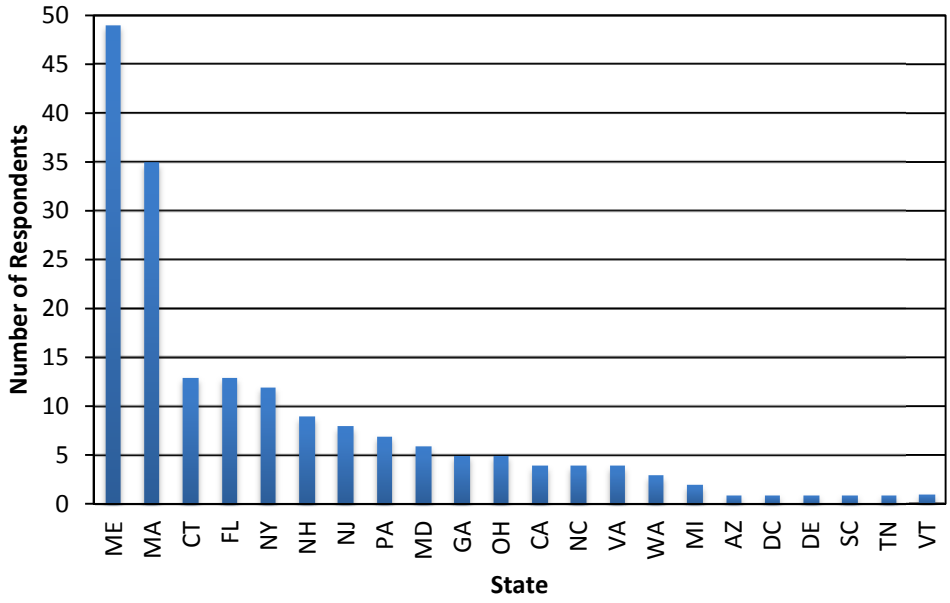


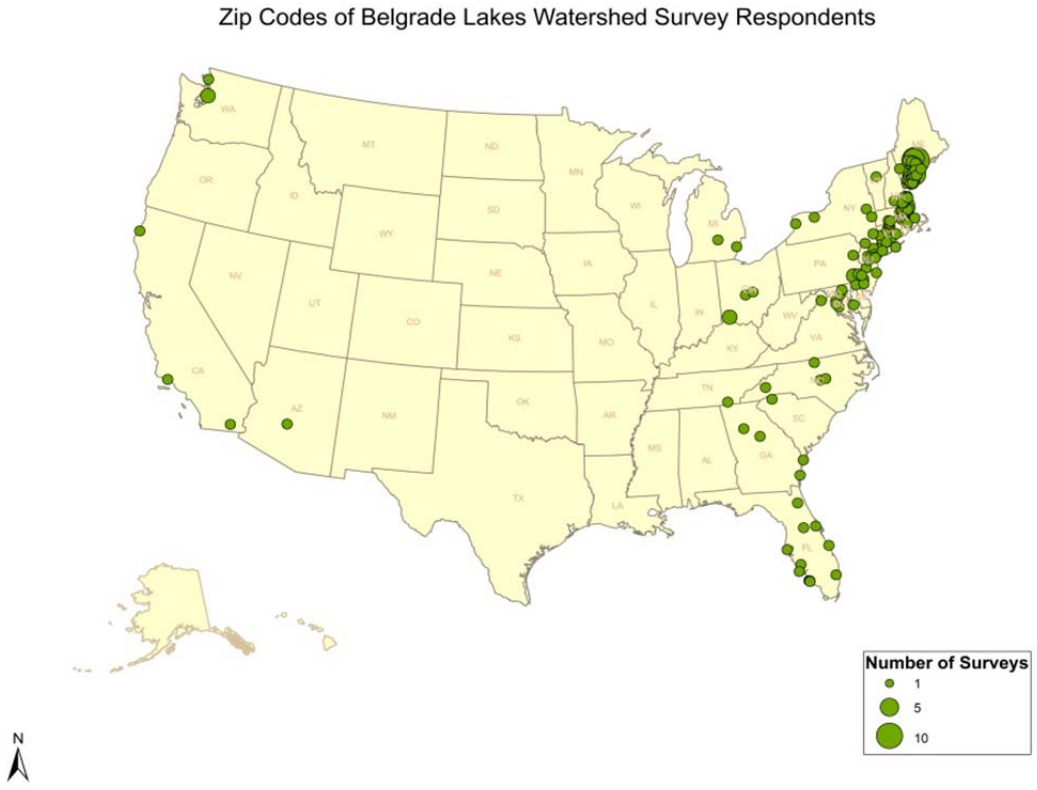
Figure 2. Highest Level of Education Achieved by Member of Household



The bar chart and map shown in Figure 3 on the following page illustrates the geographic distribution of our survey respondents. Approximately 58% of the survey respondents were from New England. Florida (7%) and New York (6%) were also well-represented states of origin.

Figure 3. Geographic Distribution of Survey Respondents





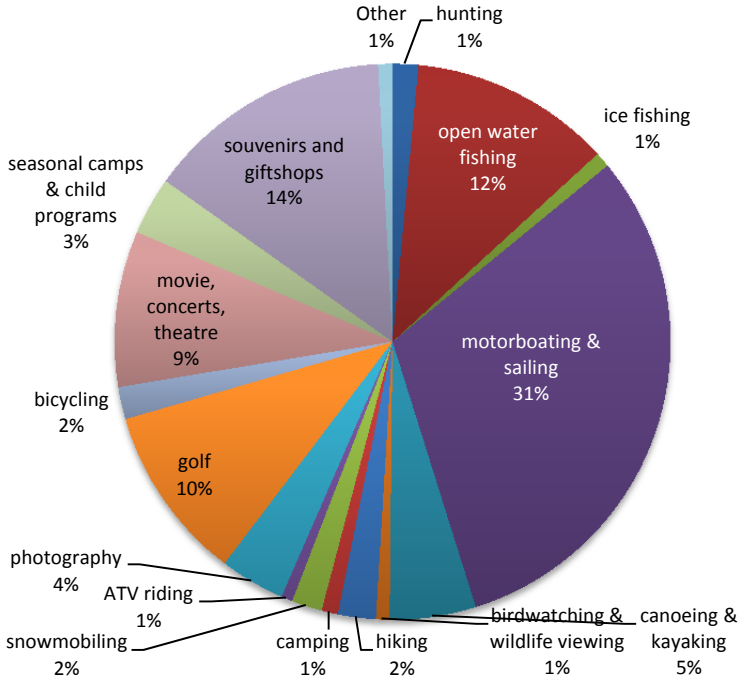
The table on the following page details the distribution of the 356 returned mailed surveys in terms of the relative proportion that were completed from towns located in the Watershed or by households that own property in the Watershed, but live primarily outside of this region. The majority of mailed survey respondents (72%) were from inside of the Belgrade Lakes Watershed.

Distribution of Responses for Mailed Household Survey

Area	Number of Respondents	Percent of Total Responses
Belgrade	84	24%
Belgrade Lakes	14	4%
Oakland	70	20%
Sidney	48	13%
Smithfield	25	7%
Other Towns in the Watershed	14	4%
Outside of Watershed	101	28%
Total	356	100%

Figure 4 highlights the distribution of reported spending on major outdoor recreational activities represented in the Belgrade Lakes Watershed. Not surprisingly, the majority of expenditures are related to motor boating, which is the most common activity in the area. Other areas where respondents indicated spending a lot of money included golfing, open water fishing, and souvenirs and gift shops. These activities have well-developed markets in the Watershed and, in general, there are a lot more costs associated with these activities. For example, the major costs associated with motor boating include paying for storage, maintenance, fuel, and buying permits. In comparison, people do not have to pay for biking, hiking, or wildlife viewing, so people often consider these activities as having no cost. In the survey, we recorded expenditures associated with these lower cost activities in terms of how much they pay for food and fuel during the time when they are participating in these activities.

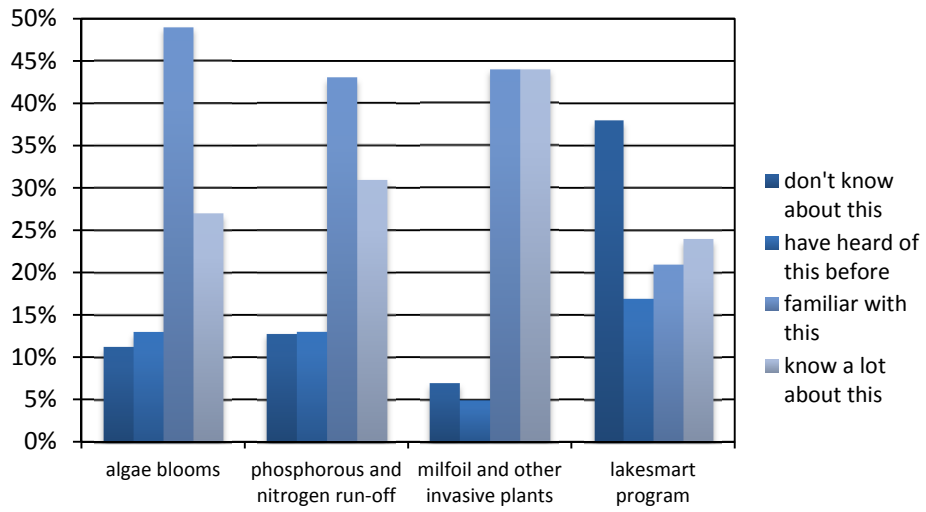
Figure 4. Distribution of Spending on Outdoor Recreation and Other Activities



One of the most significant cultural characteristics of the Belgrade Lakes Watershed is the deep sense of place shared by both year-round and seasonal residents. In fact, 45% of all respondents indicated some form of connection to place whether they lived in the area all their life, have had multiple generations of people living in or visiting the area, or have been visiting the area since they were young. Approximately 23% of survey respondents indicated that they had multiple generations of people who have been living in the area. Also, the majority of survey respondents (86%) have been visiting the Belgrade Lakes Region for 10 or more years and 9% have been visiting for 5-10 years. An important indicator of peoples' connection to the environment is their involvement in the local lake associations. In this study, 54% of survey respondents were members of a lake association in the Watershed. It is interesting to note, however, that according to our results only 71% of survey respondents that were lake association members have actually attended a lake association meeting or event, implying that not everyone that pays membership dues is actively involved in this aspect of the community.

Figure 5 summarizes the responses to the question on how well people know some of the key lake related issues important in the Watershed. One critical insight from this graph is that while the majority of respondents are familiar with or know a lot about some of the major lake related issues such as algal blooms, phosphorous and nitrogen run-off, and invasive species, they are less aware of the best management practices espoused by the LakeSmart program, a state funded conservation initiative aimed at reducing some of these ecosystem threats.

Figure 5. Awareness of Belgrade Lakes Watershed Issues



Our analysis of the expenditure data collected through the in-person survey reveals interesting trends related to general spending behavior. Average expenditures by seasonal residents in this model were highest in the categories of property taxes, property maintenance, grocery shopping, and motor boating and sailing. Average spending on local food and average weekly rental fees are also high, indicating that these are major areas of spending for seasonal residents of the Watershed.

The total economic impact (output) of the expenditures for 349 seasonal residents to the Watershed is estimated to be approximately $1.8 million. The results indicate that the expenditures generated by seasonal residents captured in our in-person model ultimately support 27.5 full and part-time jobs. Total output is the accumulation of total revenues, sales, or the total value of the output generated from the direct and secondary effects of the initial economic stimulus. The total value added column in the table

below shows the value of revenues generated from expenditures in the impacted industries. Labor income represents all sources of income, including wages and benefits and proprietor income that are produced as a result of the initial change in expenditures.

Impact Results for In-Person Survey Model

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	21.4	$600,984.52	$1,009,343.14	$1,144,464.45
Indirect Effect	2.5	$64,337.33	$118,405.49	$209,656.50
Induced Effect	3.6	$139,865.10	$254,204.52	$415,971.83
Total Effect	27.5	$805,186.95	$1,381,953.15	$1,770,092.79

The results of our IMPLAN model also reveal the major industrial sectors that are affected by these expenditures in terms of output and employment. The most greatly impacted industries in the Belgrade Lakes Watershed include food and beverage retail stores, food service and drinking places, and real estate establishments. These results are consistent with the fact that much of the spending information collected in the survey was related to the food service industry. Also one of biggest sources of spending for seasonal renters are rental fees, and those expenditures are allocated towards local real estate establishments and related industries. Personal and household goods repair and maintenance is another significantly impacted industry, which makes sense because seasonal residents invest in the upkeep of their properties.

We estimated the total economic impact (Output) of the expenditures generated by 705 seasonal and year-round residents to the Watershed to be approximately $6.8 million. These expenditures also support a total of 68 full and part-time jobs in this region. The combined impact of the aggregated spending behavior of both year-round and in-person survey respondents is substantially higher, because the sample size is twice that of the in-person sample, and the mailed survey includes more expenditure information. Because more household spending information is captured in this model it provides a more comprehensive assessment of the total economic value generated by the Watershed.

IMPLAN Model Results (Total Combined Impact)

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	47.3	$2,038,248.58	$2,831,482.19	$4,602,662.39
Indirect Effect	8.4	$259,568.21	$458,994.75	$801,995.86
Induced Effect	12.5	$483,623.11	$880,275.06	$1,440,075.37
Total Effect	68.2	$2,781,439.90	$4,170,752.00	$6,844,733.62

The most impacted industry in terms of both total employment and total output generated is the personal and household goods repair and maintenance industry. As previously mentioned, both the in-

person and mailed surveys collected a lot of annual expenditure information pertaining to property maintenance and repairs, landscaping, and snowplowing. Other significantly impacted industries in the total expenditure model include food and beverage retail stores, food services and drinking places, as well dry-cleaning and laundry services. The mailed survey contained more detailed questions about spending on laundry, which is pertinent to a lot of seasonal camp owners that may not have the capability to do laundry at their camp. Real estate establishments are heavily impacted by spending on rental commissions and other associated fees. An additional set of economic sectors related to health care services are presented in the impact statement for the total model, a reflection of the health care spending information collected in the mailed survey.

Conclusions

Based on the results of our input-output analysis, it is evident that both year-round and seasonal residents of the Watershed greatly contribute to the value of the Belgrade Lakes Region. The total economic impact of the 445 households that we captured in our survey was $6.8 million, including multiplier effects. The property maintenance and repair sector is the most impacted in terms of the total number of jobs and output generated by this economic activity. It is important to note that this figure is not a comprehensive assessment of the value of the Watershed, as the total economic value of ecosystem services were not factored into this study. Other factors, such as real estate sales, charitable giving and philanthropic activity, and summer camp tuition are only indirectly accounted for in our analysis. Instead, this study provides a glimpse of the economic value that is generated by annual household expenditures of people who live or spend time in the Watershed.

The results of our demographic questionnaire highlight that both year-round and seasonal residents are deeply invested in this region based on family ties or how many years they have been visiting this area. Based on the consistent population of seasonal visitors, there is great potential to expand seasonal ventures that cater specifically to this population. In particular, regional planners may consider combining environmental conservation initiatives with expanding outdoor recreation activities in the Watershed. Also, more private business can focus on sustainable landscaping, for example, which is increasingly becoming an important factor for homeowners.

The people that live in this area contribute to the inherent value of this region, and so it is important that the state provides the necessary resources to maintain the health of this fragile ecosystem. The Belgrade Lakes economy is deeply linked to its environment, which is why it so important that the health of the lakes is prioritized for the benefit of current and future generations.

Employment in the Belgrade Lakes Watershed

The information in this section of the abstract comes from the Maine Department of Labor. Among businesses within the thirteen towns touched by the Belgrade Lakes Watershed, we selected the ones that are located in the Belgrade Lakes Watershed using their physical addresses on a geographic information system.

Table 7 provides a snapshot of industries physically located within the Belgrade Lakes Watershed. In 2012 there were 199 employers located within the boundaries of the watershed and an average total employment of 1,884 workers. The industry with the largest number of employers in the Watershed was the construction industry. The second largest sector – Accommodation and Food Services – which also had the highest average number of employees in 2012, represents the tourism industry.

Table 7: 2012 Employment by Industry in the Belgrade Lakes Watershed

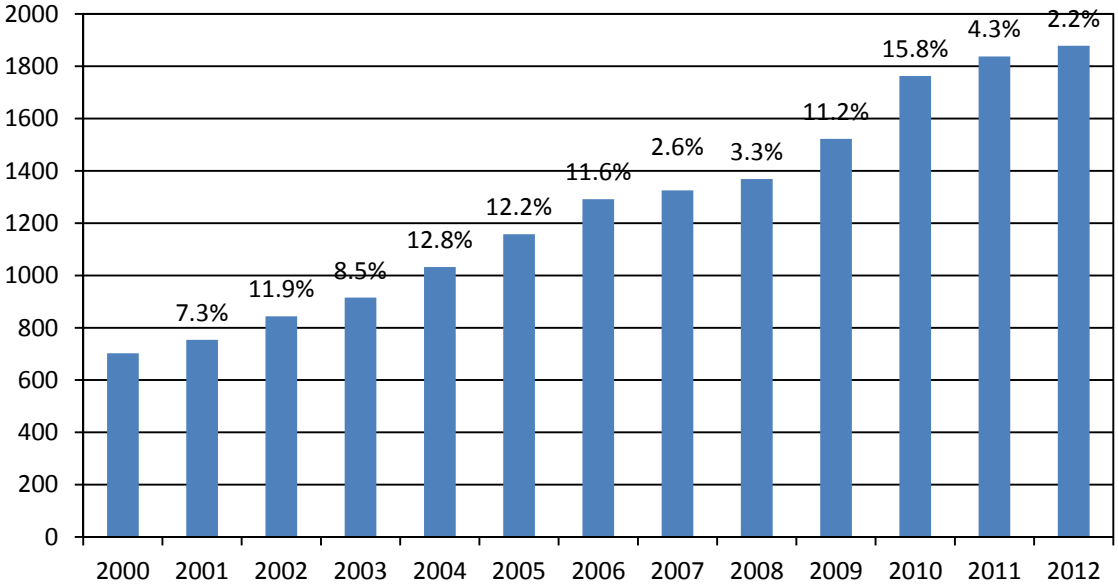
Industry	Employers	Employees
Accommodation and Food Services	20	331
Administrative Services	15	87
Arts, Entertainment, and Recreation	N/A	61
Construction	42	160
Educational Services	12	291
Finance, Insurance, and Real Estate	7	30
Health Care	15	278
Manufacturing	13	114
Professional Services	14	33
Retail Trade	17	249
Transportation and Warehousing	9	40
Wholesale Trade	5	67
Industries with fewer than 5 employers in the Belgrade Lakes Watershed	26	145
TOTALS	199	1,884

Source: Maine Department of Labor and authors' calculations.

Charts 6 and 7 illustrate recent trends in employment and wages paid by firms located in the Belgrade Lakes Watershed respectively. One of the interesting features in both charts is the lack of a negative effect on total employment or wage growth due to the Great Recession of 2007 – 2009. In fact wages continued to increase steadily during those years and have not begun to plateau until recently. Average employment grew during this period and wages (adjusted for inflation) increased as well.

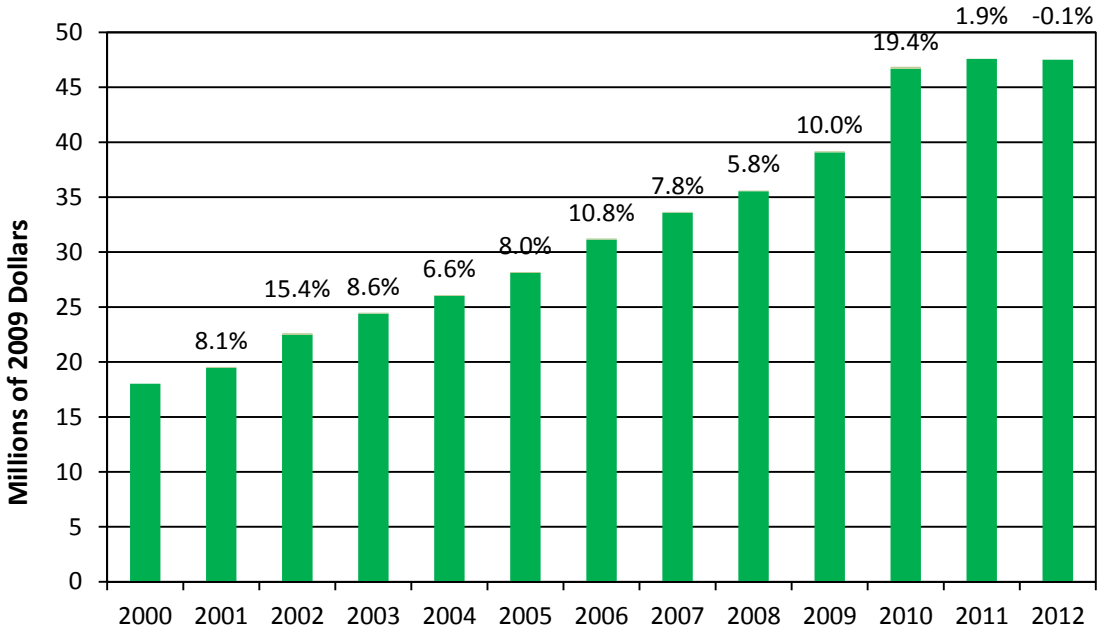
Map 3 illustrates the geographic dispersion of employers within the Belgrade Lakes Watershed by industry. Map 4 aggregates the level of employment across industries, providing an indication of geographic concentration of employment within the Belgrade Lakes Watershed.

Chart 6: Employment Trends in the Belgrade Lakes Watershed
(All Industries)



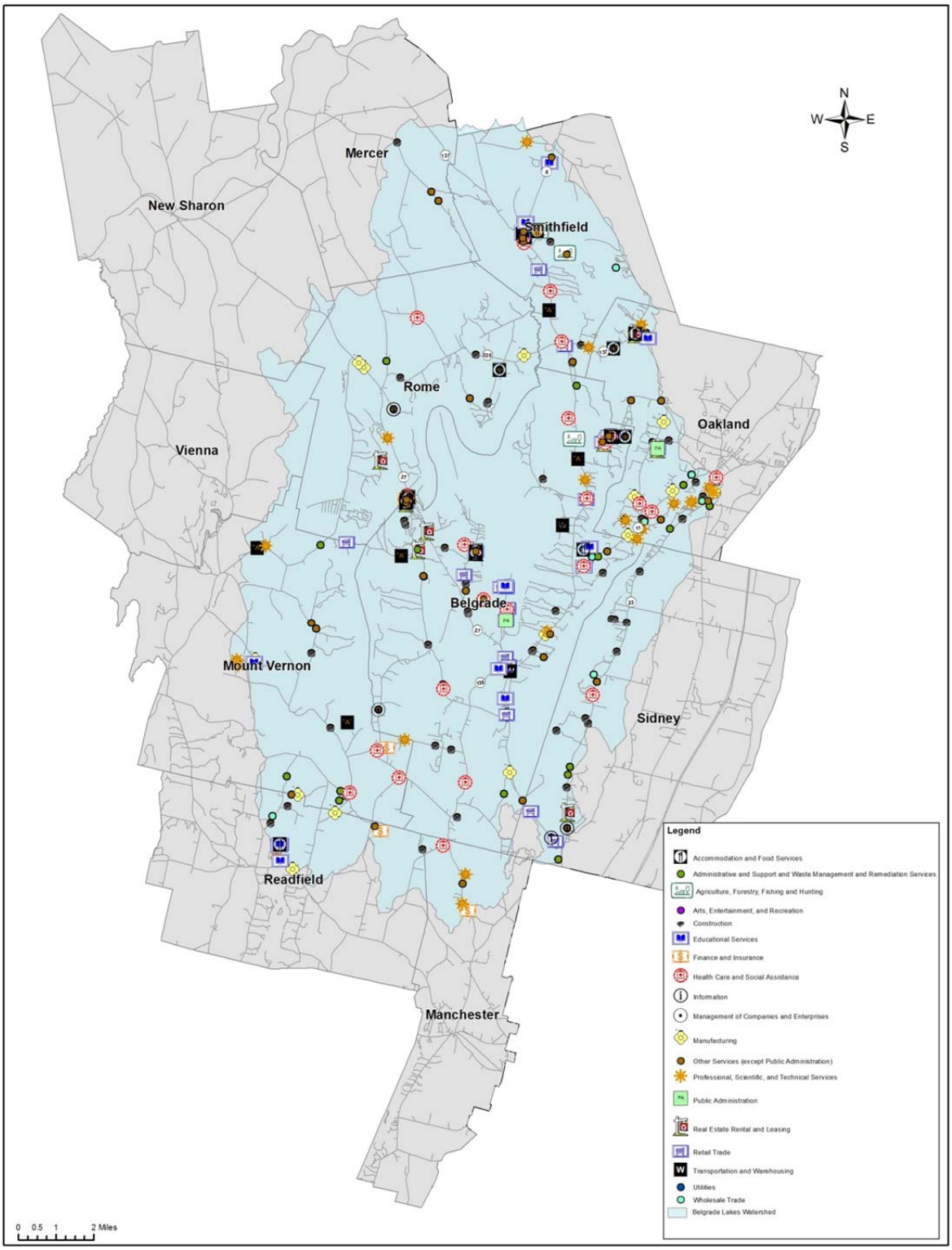
Source: Maine Department of Labor. Annual rates of growth are on top of each bar.

Chart 7: Wages Paid by Employers in the Belgrade Lakes Watershed
(All Industries, Inflation-Adjusted 2009 Dollars)

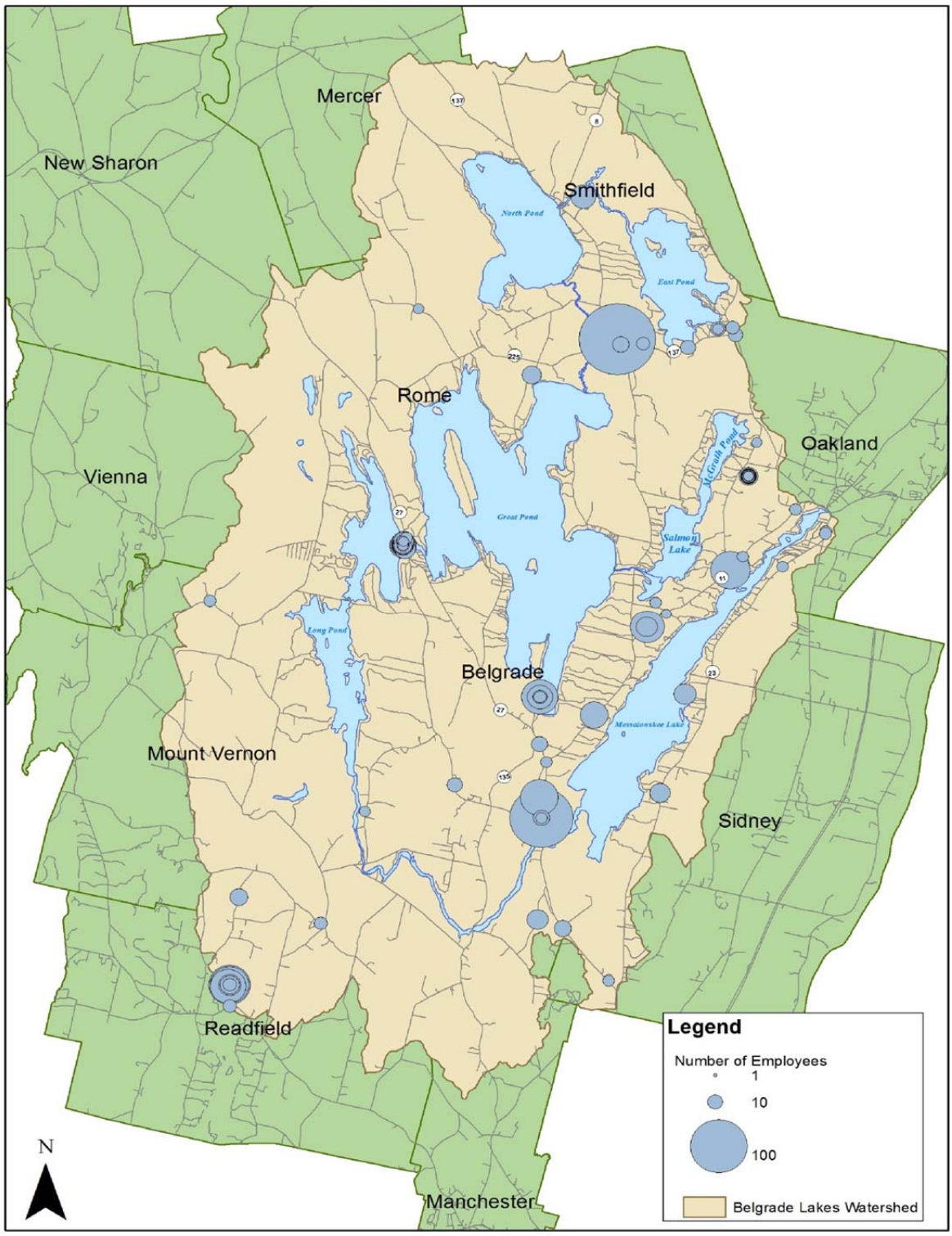


Source: Maine Department of Labor. Annual rates of growth are on top of each bar.

Map 3: Employers in the Belgrade Lakes Watershed in 2012



Map 4: Employment in the Belgrade Lakes Watershed in 2012



Labor Market Characteristics for the Belgrade Lakes Region

Labor market statistics for the seven of the towns touched by the Belgrade Lakes Watershed are presented in Table 6 both individually, and in aggregate form identified as the Belgrade Lakes Region.

Chart 5 at right illustrates trends in the unemployment rate for the Belgrade Lakes Region. Since 2000 the unemployment rate in the region has been below the average for the state of Maine.

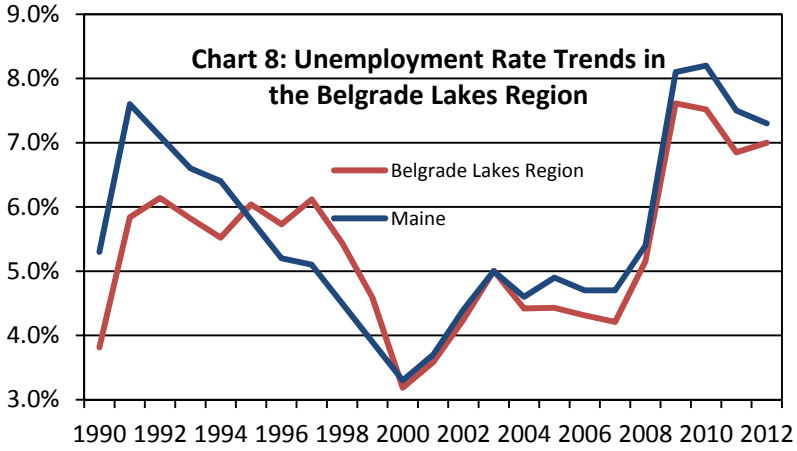


Table 8: Belgrade Lakes Region Labor Market

Variable	Mercer			Oakland			Sidney		
	2000	2010	2012	2000	2010	2012	2000	2010	2012
Civilian Labor Force	368	366	364	2973	3121	3156	2,051	2,442	2,449
Annualized Growth Rate		*-0.05%*	*-0.27%*		*0.49%*	*0.56%*		*1.76%*	*0.14%*
Employment	361	333	337	2871	2864	2922	1,997	2,283	2,305
Unemployment	7	33	27	102	257	234	54	159	144
Unemployment Rate %	*1.90%*	*9.00%*	*7.40%*	*3.40%*	*8.20%*	*7.40%*	*2.60%*	*6.50%*	*5.90%*

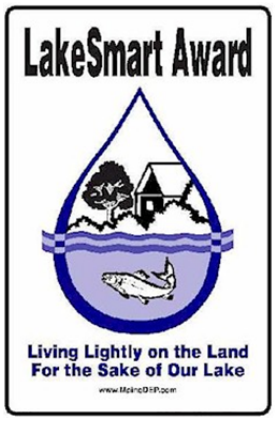
	Belgrade			Rome			Mount Vernon			Smithfield		
	2000	2010	2012	2000	2010	2012	2000	2010	2012	2000	2010	2012
Civilian Labor Force	1,632	1,733	1,737	499	520	521	861	918	932	485	518	521
Annualized Growth Rate		*0.60%*	*0.12%*		*0.41%*	*0.10%*		*0.64%*	*0.76%*		*0.66%*	*0.29%*
Employment	1,578	1,617	1,633	490	481	485	826	850	858	467	466	472
Unemployment	54	116	104	9	39	36	35	68	74	18	52	49
Unemployment Rate %	*3.30%*	*6.70%*	*6.00%*	*1.80%*	*7.50%*	*6.90%*	*4.10%*	*7.40%*	*7.90%*	*3.70%*	*10.00%*	*9.40%*

	Belgrade Lakes Region*			Kennebec			Somerset			Maine		
	2000	2010	2012	2000	2010	2012	2000	2010	2012	2000	2010	2012
Civilian Labor Force	8,869	9,618	9,680	60,826	63,493	63,859	25,038	24,785	24,831	672,440	700,567	706,097
Annualized Growth Rate		*0.81%*	*0.32%*		*0.43%*	*0.29%*		*-0.10%*	*0.09%*		*0.41%*	*0.39%*
Employment	8,590	8,894	9,012	58,741	58,642	59,381	23,869	22,002	22,407	650,385	643,244	654,501
Unemployment	279	724	668	2,085	4,852	4,478	1,169	2,782	2,424	22,055	57,324	51,596
Unemployment Rate	*3.15%*	*7.53%*	*6.90%*	*3.43%*	*7.63%*	*7.03%*	*4.67%*	*11.22%*	*9.76%*	*3.30%*	*8.20%*	*7.30%*

Source: Maine Department of Labor, http://www.maine.gov/labor/cwri/qcew1.html and http://www.maine.gov/labor/cwri/laus1.html.

The LakeSmart Awards Program[4]

In 2003, the Maine Department of Environmental Protection (Maine DEP) introduced an incentivized lake protection program called LakeSmart. Designed to halt persistent, widespread decline in lake water quality by offering the carrot of reward rather than the stick of enforcement, LakeSmart has become well known statewide. The program's trademark blue and white Award signs are broadly recognized as the hallmark of responsible lake stewardship. In essence, LakeSmart brings the expertise of lake managers to homeowners in an experiential, easy to understand fashion. The Award signs serve to recognize a homeowner's good stewardship, identify desirable landscape practices, and stimulate interest in the program to further its dissemination.



LakeSmart is a community-based initiative that requires a host organization for propagation. Usually, the host is a lake association or alliance whose mission exactly matches LakeSmart's intent. Members of the lake association community are invited to participate voluntarily, and interested homeowners are provided an individualized property assessment by visiting DEP-trained evaluators. Awards are given to those properties that earn high marks in four areas: 1) Driveway and Parking; 2) Structures and Septic Systems; 3) Lawn, Recreation, and Footpaths; and 4) Shorefront and Beach Areas. Since its inception, the program has been in high demand by lake groups anxious to implement it as a tool for water quality improvement, but state budget constraints have limited DEP's ability to include all groups that want to participate. At present, the program is active on thirty Maine lakes.

Recognizing LakeSmart's transformative potential, the Maine Congress of Lake Associations (COLA) initiated a partnership with Maine DEP in 2008 to test the use of trained volunteers to cut costs and speed distribution. Seven lakes in developing watersheds, including several from the Belgrade Lakes Watershed, were selected for a three-year pilot program that ran from 2009 through 2011. In these three years, participating Belgrade Lakes Watershed volunteers generated 74 LakeSmart Awards, a number that represents 16% of all LakeSmart Awards (463) distributed by Maine DEP throughout the state since LakeSmart began in 2003. Table 7 presents the current LakeSmart Award winners for the Belgrade Lakes Watershed.

In June, 2010, Colby College faculty and students engaged in the Sustainability Solutions Initiative (SSI) research project, *Modeling Resilience and Adaptation in the Belgrade Lakes Watershed*, were trained by Maine DEP and Maine COLA to perform property screenings in preparation for site evaluations by paid DEP evaluators. Eight students participated in property screenings that summer, significantly increasing the number of homeowners contacted. The pilot project's success points to new directions for LakeSmart. It demonstrated that volunteers increase the rate at which LakeSmart spreads, and they eliminate the costs and inefficiencies that occur when experts based outside the community travel distances to assess properties that may not qualify for an award. Ongoing social science research at Colby is finding that the site visit is, in itself, an important component of change agency. People are less likely to change behavior when presented by scientific fact than they are when they watch and imitate what their neighbors do. This element of social diffusion, the effect of person-to-person exchange within one's home network, is brought to LakeSmart by community-based volunteers who infuse the site visit's teaching moment with their own commitment to lake protection.

[4]The information in this section was originally reported in the 2012 edition of the Statistical Abstract.

Table 9: LakeSmart Awards in the Belgrade Lakes Watershed

Great Pond		Long Pond		East Pond	
Property Owner(s)	**Year**	**Property Owner(s)**	**Year**	**Property Owner(s)**	**Year**
Polly Beatie	2005	Blaine and Natalie Horrocks	2005	Betsy & Jerry Tipper	2009
Jane and Bret Eberle	2005	Frank and Pamela Lepera	2006	Mel & Kathy Croft	2009
Marge Humphreys	2005	Cindy MacColl	2006	Rob & Diane Jones	2009
Lea Ramirez	2005	Peter & Becky Alter	2006	Dave & Jo Comeau	2009
Maggie and Roger Shannon	2005	Maureen Maslak	2006	Max & Susan Hillson	2009
Jackie Tanner	2005	Peter & Betty Tilley	2007	Ted & Cindy Hesson	2009
Pat Donahue	2006	Jean Trueblood	2007	Gordon & Diane Woods	2009
Bill and Joan Witkin	2006	Dick & Susan Greenan	2007	Ron & Donna Dombrowski	2009
Chip and Laura Foye	2007	Larry & Debbie Onie	2007	Hal & Joan Jordan	2010
Dave & Kim Malley	2007	Doug & Tania Carnrick	2009	Peter & Jane Redmond	2010
Charlie & Anne McCandlish	2007	James & Aretta Muir	2009	Sally Harwood	2010
Francis Sterner	2007	Richard & Trudy Smith	2009	Dave Brown	2010
Mary & Matt Friedman	2007	Tracy Cove Assoc	2009	Al & Maureen Lantis	2010
Mark & Pam Heuberger	2007	Doris & Jim Williams	2009	Dave & Beth Jackson	2010
Sandy Cobb	2008	Ann & Tren Dolbear	2010	Joe & Cindy Reese	2011
Dr. Arthur Brown	2009	David & Ruth Harris	2010	George Pollock	2011
Jeanne Kreiger	2009	Stephen & Ann McNees	2010	Tom & Donna Mickewich	2011
Charles McCandlish	2009	David & Ruth Hollis	2010	Richard & Liz Knight	2011
Lynda & Rick Murray	2009	Scott & Lauren Bolduc	2010	Rob Levine & Val Schmitt	2011
Karen Norman	2009	Richard & Karen Roman	2010		
Barbara & Ben Ford	2009	John & Wendy Schlosser	2010		
Anonymous home owner	2009	Rose Talbor	2010		
David & Sue Gay	2010	Julia & David Baldwin	2011		
Deborah Boucher & Susan Pullen	2010	Bob & Naomi Behler	2011	**McGrath Pond**	
Elain Eadler & Tree Robbins	2010	Susan & Charlie Grover	2011	Joyce Bushey	2011
Bill & Nancy Gregory	2010	Nancy Whyte & Rudy Heintze	2011		
Dave & Izabela Hallett	2010	Tom & Nancy Kelly	2011		
Roberta & Larry LaFreniere	2010	Dan & Pam Pelletier	2011		
Michael & Beth Nowak	2010	Russ Sabia	2011		
Laurie & Christopher Raleigh	2010	Hilton & Catherine Salhanick	2011	**Salmon Lake**	
Steve & Patty Shaw	2010	George & Diana Tobey	2011	Ellen & Mal Dawson	2010
Ellen & Tom Sidar	2010	Jeff and Deb Baron	2011	Trudy Kaplan	2010
Michael & Bernadette Alford	2011	Lynn and Phyllis Matson	2011		
Joanne & Michael Bernstein	2011	Kathi and Alex Wall	2011		
Scott & Martha Finlay	2011				
Liz & Fred Fontaine	2011				
Michele & Michael Ginieczki	2011				
Cary & Lynne Johnson	2011				
Judy & Marty Lebson	2011				
Burgoyne	2011				
Tucker	2011				
Lauren Shaw & Paul Feinberg	2011				
Colby College Outing Club	2012				

Sources: Maine DEP http://www.maine.gov/dep/water/lakes/lakesmart/, the Belgrade Lake Association, and the East Pond Lake Association.

The Maine Lakes Resource Center Survey

The Maine Lakes Resource Center (MLRC) was built in 2011 in the town of Belgrade Lakes as a place to educate people about lake ecosystems and to bring together the conservation partners Belgrade Lakes Association (BLA), Belgrade Regional Conservation Alliance (BRCA), Maine Lakes Society, and Colby College. It has become a popular place for Belgrade residents and tourists to explore and learn about best management practices for conserving local natural resources. The Maine Lakes Resource Center is known as the "land buoy" that connects the public to their environment by providing them with information on lake conservation. It also provides a place for researcher lectures, the Chewonki Natural History Program, and musical performances that bring the community together.

The overall mission of the MLRC is to give landowners in the Belgrade Lakes watershed the knowledge and means to improve their properties and to be "lake-friendly" by decreasing soil runoff into the lakes and thereby prevent an overload of nutrients into the water. This is vital not only to the lakes' health, but also to the Belgrade area's economic stability. The lakes play a crucial role in the towns' economy by maintaining high property values and by attracting tourists during the summer season. Teaching landowners about preservation will help maintain the health of the lakes and allow them to continue stimulating the local economy.

Colby has established a close partnership with the Belgrade Lakes Watershed by conducting research involving several academic departments. The lakes provide a "lab" for student interns to learn research skills, professors to conduct their studies, and researchers to collect water quality information to be given back to the community. During the spring of 2013, Colby researchers launched "Goldie" on Great Pond, a buoy capable of sending oxygen levels, temperature, and water clarity information back to campus and the general public. This provided huge amounts of valuable data that will be thoroughly analyzed. The MLRC presents information on Goldie, findings from other student research projects, and current scientific data on the lakes to residents and visitors alike.

The goal of this study, initiated during the summer of 2013, was to find out what information people are learning when visiting the Maine Lakes Resource Center. This was accomplished by monitoring which educational materials were taken away from the center, providing a better idea of the topics visitors are most interested in learning about. Surveys were also conducted in order to find out what individuals learned and enjoyed most about their visit to the MLRC. Having a greater understanding of what people get out of their visit to the MLRC is extremely valuable in effectively educating the public on how to help conserve the Belgrade Lakes watershed.

When analyzing who comes to the MLRC, 54% were tourists to the area, 28% were seasonal residents, and 17% were full-time residents; 65% of everyone surveyed were first-time visitors to the center (sample size of 46 individuals). These findings imply that the MLRC greatly attracts new people. This is important because those who may not be familiar with the significance of the watershed are being informed of the importance of conserving the lakes.

People entered the MLRC for a variety of reasons: 26% came for a scheduled activity such as a lecture or the Belgrade Farmer's Market, 24% were curious, 17% were showing friends, and 13% came looking for specific information (Figure 1). The topics that had the most informational material taken were invasive species, LakeSmart, and the Belgrade Region (Figure 2). Of all the information regarding invasive species, the "zines" (miniature magazines) and "Quick Keys" were most popular. Since both materials assist in identifying invasive species, particularly milfoil, this illustrates that visitors are very concerned with being able to identify the plant. Of the seasonal and full-time residents surveyed, 76% learned about conservation land use practices, and 84% of non-residents learned about conservation land use practices. It is likely that there is little difference between these two groups of people because land conservation information can be applied anywhere, making it beneficial for both residents and non-residents.

The surveyed visitors' favorite aspects of the MLRC included the informational displays, photographs, building construction, artwork, and staff (Figure 3). The popularity of the displays is extremely encouraging, as this is how most of the visitors become educated.

Chart 9: The Maine Lakes Resource Center Survey Responses

Figure 1. Reasons visitors entered the MLRC building

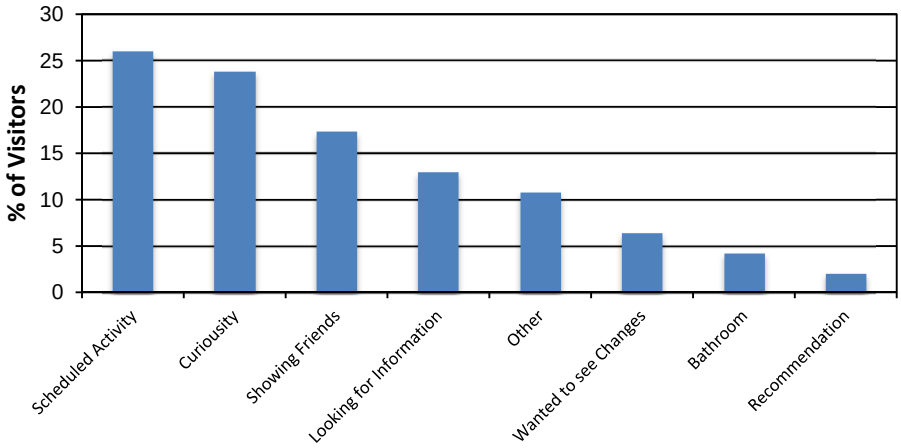


Figure 2. Information Materials of Interest

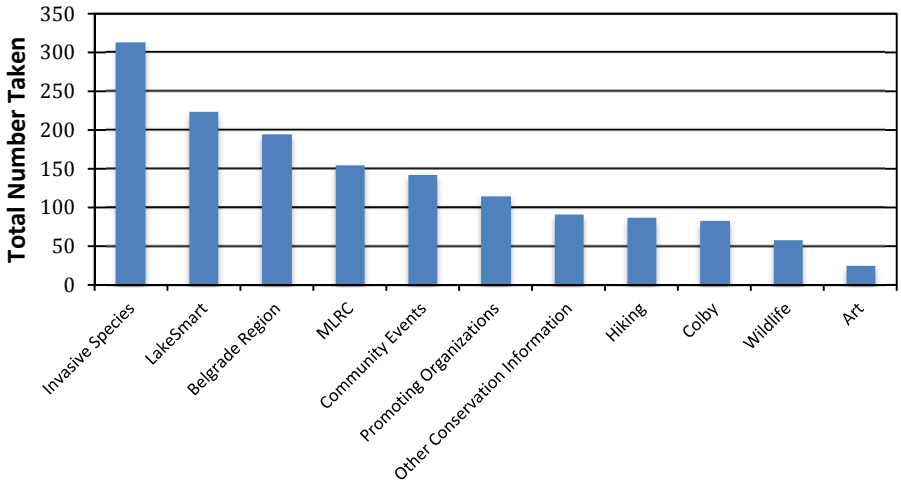


Figure 3. Favorite Features of the MLRC