The Economic and Fiscal Impact of Green Bay Recreational Fishing

Prepared for Walleyes For Tomorrow

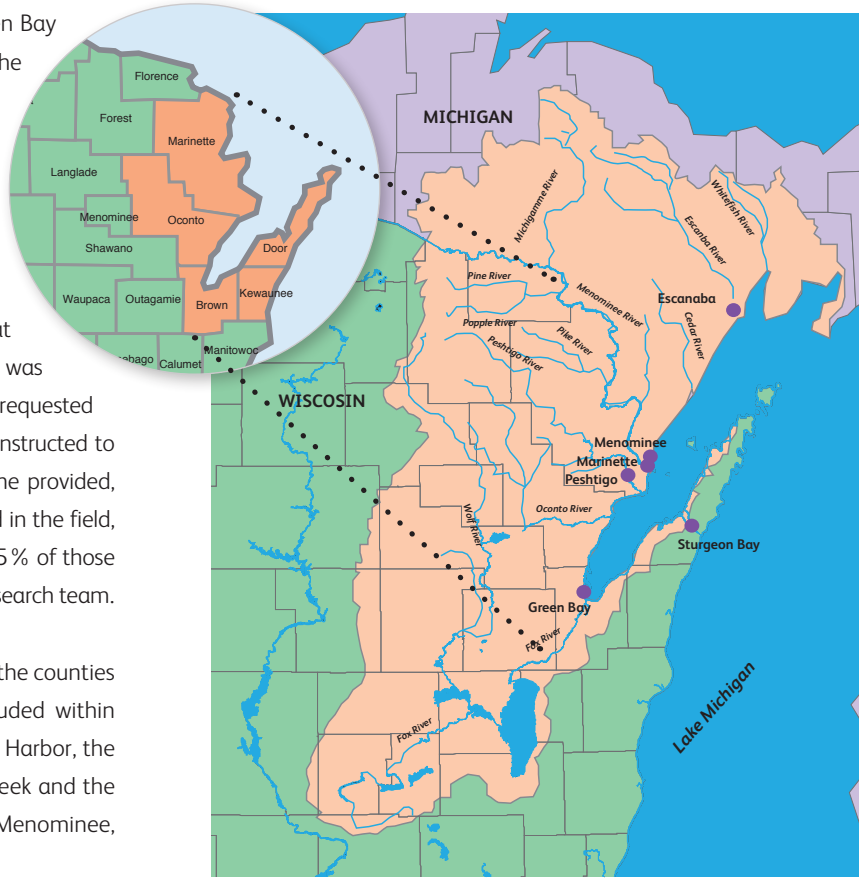
UNIVERSITY OF WISCONSIN WHITEWATER
Fiscal and Economic Research Center

TABLE OF CONTENTS

In Wisconsin, people love the Packers, Brewers, Bucks and outdoor activities – recreational fishing being one of the most popular outdoor sports among them. It is part of northern culture, making Wisconsinites unique and the state a special place. But it is not just fun, it is serious business. Wisconsin's recreational sport fisheries attract people from all over the country looking to experience and enjoy this incredible resource. The pleasure associated with fishing and everything it involves is the source of livelihood for many businesses and individuals across the state. A unique natural resource base (freshwater, forests, wetlands and a host of biological life forms), coupled with a longstanding cultural history creates an identity.

In an effort to better understand angling in the Bay of Green Bay watershed and how this identity impacts the state economy, the authors worked with Walleyes for Tomorrow and the Wisconsin Department of Natural Resources (WDNR). Since the WDNR continually examines the catch of anglers through a long-standing creel survey design that is used to estimate fishing pressure and success, the data collection effort for this study piggy-backed upon this creel survey design by distributing a survey packet to recreational anglers intercepted at boat launches and shore fishing areas. Voluntary participation was solicited from these anglers, whose contact information was requested and to whom a survey packet was given. The anglers were instructed to complete the survey at their convenience and return it in the provided, postage paid envelope. Overall, 1,350 anglers were contacted in the field, 79% agreed to participate in the survey, and 374 of these (35% of those that agreed) subsequently returned a survey packet to the re search team.

The study focused upon freshwater angling that occurred in the counties of Brown, Door, Kewaunee, Marinette, and Oconto. Included within this region are the Bay of Green Bay, Sturgeon Bay, Sawyer Harbor, the Sturgeon Bay Ship Canal and related tributaries of Duck Creek and the Suamico, East, Peshtigo, Little Suamico, Oconto, Pensaukee, Menominee, and Fox (up to the first dam) Rivers.



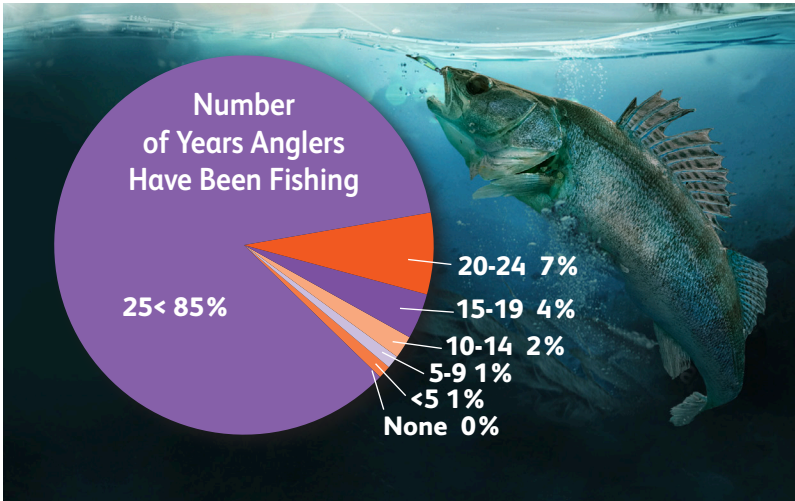
Recreational Anglers in the Bay

Evidencing the long term importance of fishing to the responding anglers, 86% have fished for 25 or more years and 97% have fished for 15 or more years. The fishing group type with whom they most often fish is "friends" (31%) but with "family" or "by myself" being almost equal (30% each). Notably, the survey choice of "group of family and friends" was rarely chosen (7%), indicating that the majority of anglers fished by themselves, with family, or with friends but not a combination – it either "was" or "was not" a family experience. When thinking about people with whom anglers associate, the proportion that fish is significant. A large number, 73%, reported that most of their friends fish, while 48% said most of their family members fish and 19% indicated most of their co-workers fish. Only around 1% and 6% reported that none of their friends or family members fish, respectively. Thus, it seems fishing is a significant bonding activity; this response seems intuitive since the respondents are anglers.

Fishing is part of the regional culture. This is reinforced by examining the residential choices of these anglers. Having been chosen from among those fishing in the creel survey intercept, 56% lived in the Green Bay regional study area (see pg.3 map); of these, 20% lived on the shores of freshwater lakes, rivers, or streams, and 45% reported the presence of fishing opportunities being a factor in their choice of residence location. Given residential mobility, it is even more significant to note that 48% of the responding anglers have not just fished for 25 or more years but have done so in the Green Bay study region. The presence of these angling opportunities keeps these anglers contributing to the stability of the region and its economy.

The responding anglers ranged from 16 to 81 years of age. The majority appear to be relatively established in their lifestyles as they have fished for quite some time and are on average 55 years of age. The average years of education was 14.6 and 42% have completed at least four years of education beyond high school. In terms of gender, these anglers were likely not representative of the fishing population, with 99.5% of the responding sample being male. As is typical of the region; however, these anglers were predominantly Caucasian (only 2.7% were nonwhite).

Anglers make fishing trips all year round. Over the one year study period these anglers estimated they made an average of 30 trips. Their avidity is demonstrated by noting roughly 3% of an angler's trips were to participate

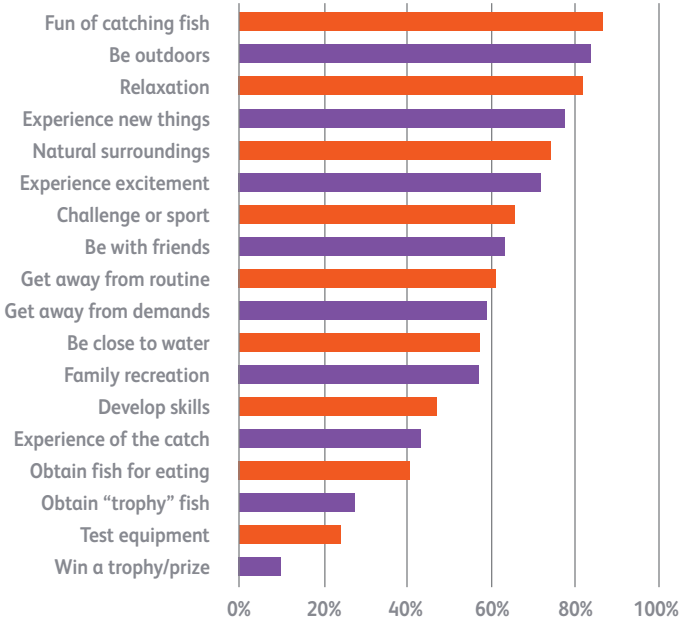


in tournaments and 8% to engage in ice fishing within the study region. They engage mostly in the warmer portions of the year; non-ice fishing trips comprised 92% of reported trips. Average trip length ranged from 2.5 days for tournament trips, less than 1 day for ice fishing, and around 1 day for other "typical" types of trips. Their interest in fishing is further reflected in their tendency to subscribe to fishing or other types of outdoors magazines (49.5%). Those who subscribed to magazines indicated a range from 1 to 10 subscriptions with an average of 2 subscriptions. These anglers' interest is also reflected in their joining outdoor related organizations. One-quarter (26.4%) were members of "fishing and boating clubs or organizations". Those indicating membership typically stated they belonged to one (72%) or two (24%) such fishing or boating clubs.

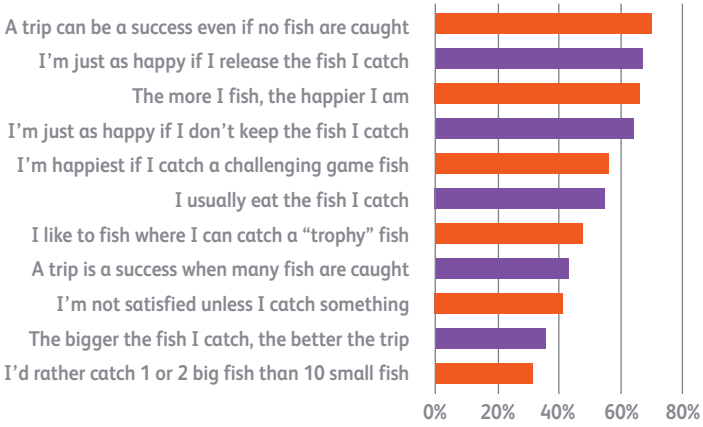
While tournaments are an important element of the fishing community, they are not the predominant activity of anglers in the Green Bay study region. Only one-third (33.2%) of the intercepted anglers indicated participation in local or national tournaments. The vast majority of those who did participate in tournaments did so locally (98%) and indicated that a typical year would see them in 3 local tournaments. Only a select few (17%) of those participating in tournaments did so at the national level, averaging 1.3 tournaments annually. It appears that, while tournament angling may generate significant expenditures by anglers coming to engage in something they enjoy with a passion, the majority of Bay of Green Bay area anglers are not tournament participants.

Given in the chart below is the percentage of respondents who agreed or strongly agreed that the stated reason is why they go fishing. The most important reason anglers engaged in fishing appear to be related to being in the natural environment, for an experience that involves relaxation and reduced stress from day-to-day activities. At the bottom of the important reasons are catching trophy fish, winning prizes or testing equipment. Anglers appear to engage in fishing because they desire a natural outdoor setting in scenic surroundings with friends or family.

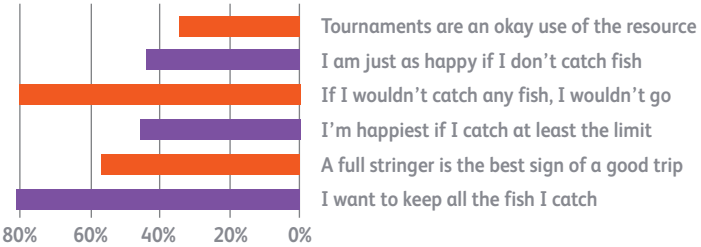
Reasons Anglers Fish



Anglers' Thoughts on Fishing Experience



Strongly Disagree ‹‹‹ Neutral ››› Strongly Agree



Effort was often directed at catching particular species with 80.1 % indicating that they "put most of" their "effort into fishing for one particular species of fish". They indicated that this species could be different by season, with the most common fish targeted (across all seasons) being Walleye, Bass, Perch, Salmon and Panfish, although Muskies and Trout weren't far behind. When asked what type of fish was their "most preferred" catch for a fishing trip in the study region, 42 % indicated it was walleye, while 20 % indicated smallmouth bass. They were also asked to indicate 2nd to 5th most preferred fish type. To get at an overall preference ordering, a weighted average of individual angler ranks was used. This data indicates anglers appear to have a catch preference for walleye, yellow perch, smallmouth bass, salmon, and northern pike in order of their top five fish types.

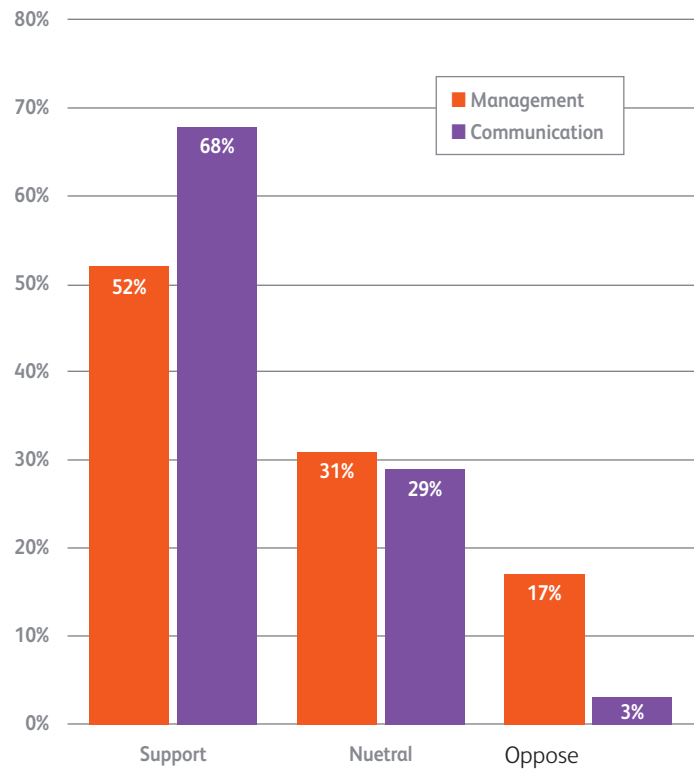
Fishing is clearly an experience, for which a variety of factors lead to it being judged one of high quality. Of seventeen statements rated on a scale of 1 to 5 (ranging from "strongly disagree" to "strongly agree") it seems that many things other than catch affect the happiness anglers derive from their fishing experiences (see the chart to the left). One would speculate that these anglers envision satisfying fishing experiences as ones where they interact with the natural world, other people in their fishing group, and derive pleasure from the joy of occasionally getting that nice catch. The latter needing to occur but, over the course of a season, satisfaction is defined by much more than hooking trophy fish or bringing home their limit. It is important to realize this and manage for satisfying fishing experiences while maintaining fish diversity and species population levels. Fish populations are a necessary condition for quality fishing experiences, of course, but quality of the experience is not just based upon catching fish.

Fishery Challenges & Management

Fishery management plays a large role in ensuring quality fishing experiences are created for anglers. This is especially important given that 61% of the respondents indicated that fishing was their most important outdoor activity, while another 21% indicated it as their second most important outdoor activity. As indicated in the conclusion of the previous section, anglers' utilization of the fishery and accompanying expenditures crucially depend upon good management. The health and vitality of the overall ecosystem and therefore the fishery resource is paramount to creating the type of experience and catch rates desired by anglers. It is the pursuit of the ideal fishing experience which generates the spending that drives economic growth in the region. Supporting the fishery by maintaining or improving upon the conditions which make it a world-class experience ultimately in-turn supports economic output and jobs in the region.

Given that fishing effort was often directed at catching particular species such as walleye, yellow perch, smallmouth bass, salmon, and northern pike, as well as panfish, muskies and trout to a lesser extent, management of these populations of fish is especially important. When asked whether "WDNR does a good job managing the Green Bay Region fishery", 52% support or strongly support WDNR management, while only 17% are opposed or strongly opposed. A larger share, 68%, support or strongly support that "WDNR communicates what [they] need to know about freshwater fishing". Overall, these views seem to reinforce that current management of the fishery is being done in a way that most anglers in the region view favorably and support.

Anglers' Views on WDNR



On the creel routes used in collecting survey information, WDNR staff interview fishermen at designated locations (in addition to passing out surveys). **Ramp** consists of anglers at various private and public boat ramps. **Pier** are anglers who obviously fish off public piers. **Shore** is anglers fishing from public shorelines. **Stream** is anglers fishing in the lower sections of Green Bay tributaries. **Charter** (salmon and trout only) refers to charter trips (which are relatively few), although there are many guides who take anglers fishing for non-salmon/trout and their numbers are included in these estimates. **Moored** is an estimate of anglers accessing Green Bay waters from private homes or marinas. WDNR actually have staff who motor along the entire Green Bay shoreline in the summer months and count the number of boats at private homes and marinas. Finally, **ice** is any angler accessing hard waters of Green Bay from various private and public locations. The number of angling hours counted for each of these angling methods for 2018 is listed in the table below.

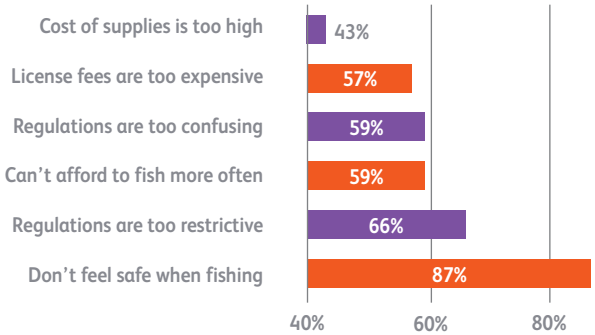
Fishery Type	*Angling Hours*	*Percentage*
Ramp	812,155	61.0%
Pier	37,048	2.8%
Shore	21,368	1.6%
Stream	121,548	9.1%
Charter	1,152	0.1%
Moored	31,730	2.4%
Ice	305,829	23.0%
Total	**1,330,830**	**100.0%**

Species	*Open Water Catch*	*Open Water Harvest*	*% Open Water Harvest*	*Ice Catch*	*Ice Harvest*	*% Ice Harvest*
Walleye	210,252	106,254	50.5%	23,010	4,505	19.6%
Y. Perch	138,705	73,403	52.9%	79,248	35,966	45.4%
Sm. Bass	111,961	2,425	2.2%	0	0	
N. Pike	2,1888	1,851	8.5%	3,039	1,421	46.8%
Muskie	3,725	0	0.0%	50	0	0.0%
Br. Trout	2,484	804	32.4%	0	0	
Ch.Salmon	2,372	2,338	98.6%	0	0	
Whitefish	1,308	147	11.2%	174,220	151,827	87.1%
R. Trout	437	407	93.1%	0	0	
Co.Salmon	47	0	0.0%	0	0	
Lake Trout	27	27	100.0%	0	0	
Total	**493,203**	**187,656**	**38.0%**	**279,567**	**193,719**	**69.3%**

WDNR staff also annually estimate the catch and harvest for the region; the 2018 numbers are provided above for the major fish species targeted. Harvest rates vary across fish species, season and based on regulations. 19% of respondents indicated that they release all of the legal fish they catch; 69% stated they release some of the legal fish they catch, but not all; only 11% indicated they keep all of their catch and rarely release fish. Anglers who harvest fish as regulated by the WDNR can promote a healthy fishery. Regulated harvest, which by construction aims for sustainability of the fishery, should not be viewed negatively. Sound management decisions and sensible regulations have an effect on harvest practices, and therefore on the overall health of the fishery itself.

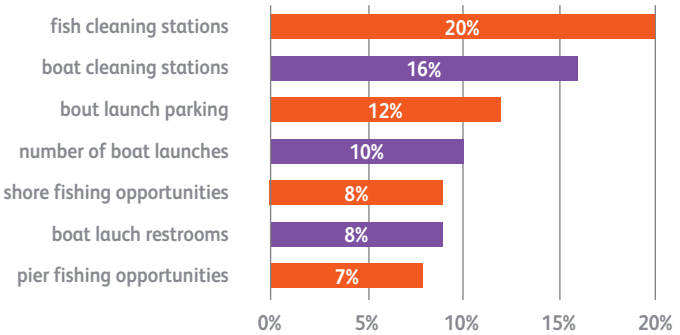
Even with the impressive number of hours and catch rates observed in the Green Bay region, 65% of anglers still indicated that factors exist which constrain them from fishing as often as they would like. The major constraint, with which 62% of anglers agree or strongly agree, is that they have "too many work/family commitments." The next most reported constraints that respondents agreed with were that "fishing facilities and areas are too crowded" and that "other leisure activities take up my time"; these were basically evenly split between disagree, neutral, or agree (with roughly 1/3 each). As seen in the graph below, a plurality of anglers (43%) don't believe the cost of equipment and supplies is too high and most (59%) can afford to fish more often. A majority of anglers disagree or strongly disagree that license fees are too expensive (57%), fishing regulations are too confusing (59%), fishing regulations are too restrictive (66%) or that they don't feel safe when fishing (87%).

Angler Constraints (% Disagree)



Anglers generally have some concerns and suggestions for improvements. Most complaints stem from boat launch amenities. This shouldn't be surprising given that 61% of Green Bay region angling is from ramps (i.e. boaters). 20%, 16%, and 12% of respondents felt fish cleaning stations, boat cleaning stations and parking were lacking or insufficient, respectively; 10% felt the number of boat launches was insufficient in the region and 8% felt boat launch restrooms were lacking. Another 8% and 7% felt shore and pier fishing opportunities were insufficient. These results are seen in the chart below. Improving on these perceived fishery deficiencies could lead to increases in the satisfaction of current anglers, who then increase either the number of trips they take in the region or the amount they spend per trip. It could also lead to new anglers coming to the region. In all of these cases, economic growth, health and vitality result.

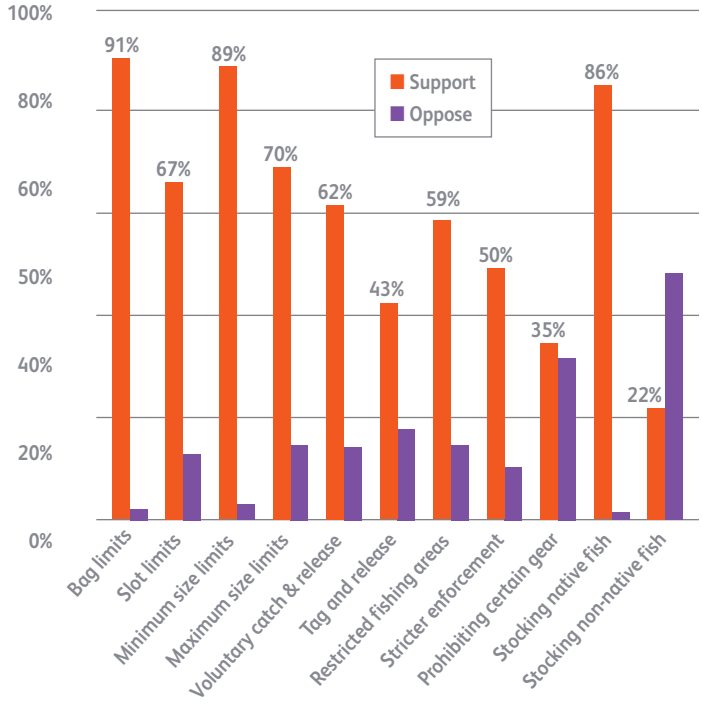
Angler Complaints (% Agree)



Overall, the responses from the previous pages seem to support the conclusion that the Green Bay area fishery is being managed in a way that anglers generally support. This is further reinforced when examining their responses on specific fishery management practices. As seen in the graph to the right, large majorities of anglers support fishery management practices which improve on the health of the fishery even when they limit or reduce anglers' catch and/or harvest. For example, 91% of anglers support being allowed to keep only a certain number of fish (bag limit); 67% of anglers support releasing fish within a certain size range (slot limit), while 89% and 79% support releasing fish below a certain length (minimum size limit) and releasing fish above a certain length (maximum size limit), respectively. There is also majority support for a voluntary catch and release program (62%), not being allowed to fish in certain restricted areas (59%) and stricter enforcement of current regulations (50%). Lower levels of support are present for a tag and release program (43%) and prohibiting the use of certain types of fishing gear (35%). Anglers strongly support (86%) stocking programs of native freshwater fish species, while 49% are opposed to stocking of non-native fish species in Wisconsin's waters (only 22% support non-native fish species, while the remainder are neutral on the matter).

Recreational anglers are often actively engaged in protecting and promoting fishery health, not just personally enjoying it. 13%, 10% and 14% have called, written or emailed legislators or elected officials on fisheries related matters, while a substantial 43% have attended public meetings. In all of these cases, we see that anglers actively get involved in fisheries issues and support management practices which lead to the long run promotion of fishery health.

Capital Expenditures

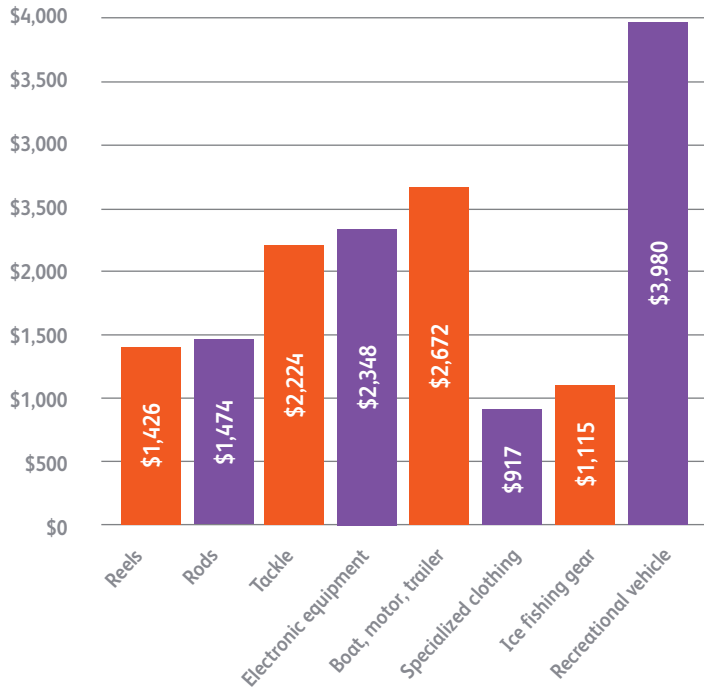


Sport Fishing & the Regional Economy

In addition to active involvement in the public sphere regarding fisheries management, anglers spend substantial money on this recreational activity and have a large impact on the state and region's economic health and vitality. They are heavily invested in angling across a range of capital categories. For example, 91% of anglers own power boats, kayaks, canoes, rowboats or sailboats. The average number of rod and reel combinations these anglers own is 21. Across all angling related equipment, including rods, reels, tackle, electronics, boat and trailer, specialized clothing, ice fishing gear, and recreational vehicles, the median replacement cost is $29,000. Not only is this a substantial up-front investment in sports angling equipment, but it also involves significant ongoing expenditures as sport anglers on average spend over $1,080 (median=$500) to maintain this equipment annually. Some of these capital expenditures (such as a boat) represent a large investment, that may have dual purposes which include fishing, but may also include swimming, skiing, etc. Average expenditures across the different major classes of capital investment can be seen in the chart to the right (Note: the boat, motor, trailer category is scaled down by a factor of 10 on the chart axis, the actual dollar value is indicated above corresponding bar).

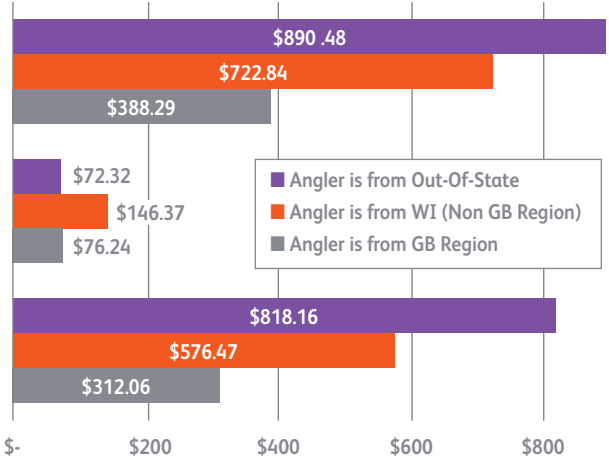
As mentioned previously, these capital investments support a lot of fishing as recreational anglers take, on average, 30 fishing trips per year and spend around ½ day per ice fishing trip, 1 day per "typical" open water fishing trip and 2.5 days per tournament trip in the local region. In turn, these recreational fishing trips support a tremendous amount of economic activity in both the local region and state of Wisconsin overall.

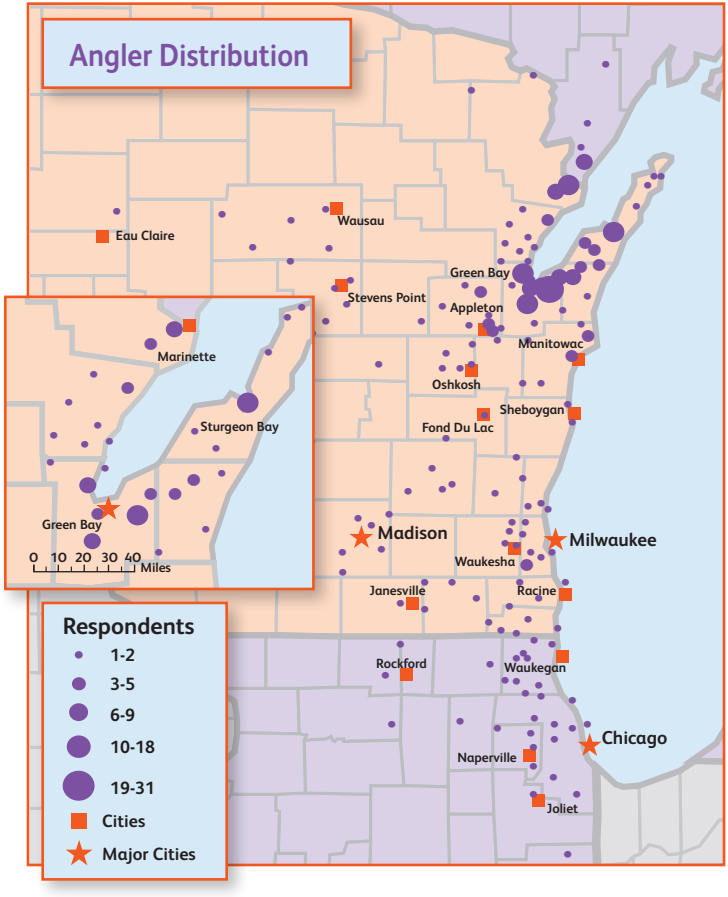
Capital Expenditures



A partial distribution of where anglers come from can be found in the map to the right. Roughly 53% of respondents were local anglers from the 5 counties contained in the Green Bay region, 30% were from Wisconsin but not the Green Bay region, while 17% were from out-of-state. In the chart below, annual expenditures across these different angler types is shown. Average expenditures within the Green Bay region, other parts of Wisconsin and Wisconsin-in-total are shown (total WI spending is the sum of the other two categories). Total trip costs are highest for out-of-state anglers who report spending on average (inside and outside WI) $1,025. Almost $900 of that trip cost is spent inside WI.

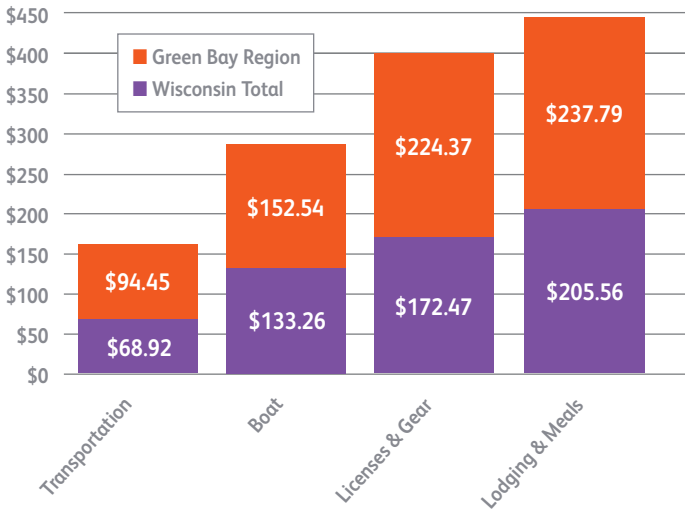
Annual Expenditures by Angler Type





On the "typical" fishing trip, anglers (across all types, local, in-state and out-of-state), spend on average a little over $580 in the Green Bay region and $129 in the rest of Wisconsin; this results, on average, in around $713 spent per trip in the state. The expenditures are made across a range of categories, including transportation, boat, licenses and other gear, as well as lodging and meals.

Annual Expenditures Per Fishing Trip



The economic impact of these recreational sport fishing trips on the Green Bay study region and state as a whole is estimated using the IMPLAN economic modeling system. This produces a quantitative measure of economic impact which recognizes all levels of an economy are functionally interconnected networks of interdependent activity. When one part of the economy changes, the rest of the economy is influenced by that change. When spending occurs in an economy, typically a greater total impact results than the original injection of spending because of the ripple effects through the interconnected networks the spending creates. A portion of that spending will "leak" out of the local economy through taxes or non-local expenditures though. The multiplier effect estimates the increase in economic activity which occurs from the original spending, while also compensating for these "leakages".

The IMPLAN model uses data gathered in the surveys and estimates to what extent different spending categories impact the local economy in terms of their direct and indirect effects. This method provides a means for capturing and measuring these effects. Direct effects refer to the spending by businesses related to sport fishing (e.g. employee wages). Indirect effects refer to inter-industry transactions of businesses; sport fishing businesses have an increased demand for locally produced materials (e.g. insurance) as a result of their sport fishing income. In addition, changes in household income (e.g. the spending of sport fishing business employees) is taken into account. Those individuals working at sport fishing businesses (and the suppliers of those businesses) spend money at restaurants, grocery stores and other local businesses which itself supports the local economy.

Total Annual Economic Impact of Angling:

$264.3 Million

$144,584,396	$119,804,558
Direct Economic Effect	Indirect Economic Effect

Total Annual Economic Impact of Angling:

$264.3 Million

Jobs (New & Retained): 2,711

1,833 *Direct Jobs*

828 *Indirect Jobs*

The total annual statewide economic impact of recreational sport fishing in the Green Bay study region is over $144.5 million in direct economic output, with an additional $119.8 million indirect economic output (see chart previous page). Thus, recreational sport fishing in the Green Bay region contributes over $264.3 million dollars to the health and stability of the regional economy. This economic activity in turn generates about $14.8 million in state and local tax revenues, as well as created (and retained) over 2,711 full-time equivalent jobs. Changes in the quality of the fishing experiences in the Green Bay study region have the potential to augment or threaten these numbers. For example, improvements in fishery management and increases in catch rates of desired fish species could lead to additional fishing trips taken in the region and subsequent growth in the economy. On-the-other-hand, changes in fishery management could just as easily cause reductions in the number of fishing trips taken, subsequently leading to declines in expenditures in the local and state economy.

The majority of respondents (97%) indicated that if fishing was not available in the Green Bay region, they would continue to fish but would do so elsewhere; 3% indicated they would quit fishing entirely. Even a modest 5% decline in fishing trips taken, due to for example, reductions in the quality of the fishery, could result in a loss of over $13 million in economic output, 135 Jobs and almost $1 million in tax revenues. A more substantial 20% reduction in trips would cost the state almost $53 million in output, over 540 jobs and nearly $3 million in tax revenues. These numbers strongly demonstrate the benefits of having a world-class fishery in the Green Bay area to both the region and state.

Conclusion

The study region of Brown, Door, Kewaunee, Marinette, and Oconto counties in Wisconsin contains a world-class fishery including the Bay of Green Bay, Sturgeon Bay, Sawyer Harbor, the Sturgeon Bay Ship Canal and related tributaries of Duck Creek and the Suamico, East, Peshtigo, Little Suamico, Oconto, Pensaukee, Menominee, and Fox (up to the first dam) Rivers. The economic output resulting from the recreational sport fishing in this region::

- Creates over $264.3 million in annual
- economic benefits
- Generates over $14.8 million in annual state and local taxes
- Supports over 2,711 full-time jobs

Wisconsin has an incredible resource in its fisheries. It has been a leader in fishery management, and should strive to maintain this leadership moving forward.

About the Fiscal and Economic Research Center

The University of Wisconsin-Whitewater Fiscal and Economic Research Center provides research services for area businesses, not-for-profits organizations and government entities, including:

- Economic analysis
- Land-use planning
- Geographic Information Systems (GIS) analysis
- Market research, marketing strategy and planning
- Statistical analysis
- Ecological and biological analysis
- Government and public policy analysis
- Entrepreneurship
- Economic forecasting and business development

This study was commissioned by Walleyes For Tomorrow

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For More Information: A full version of the Economic and Fiscal Impact of Bay of Green Bay recreational sport fishing, complete with methodology, documentation, footnotes and appendices, is available at www.uww.edu/ferc/completed.

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