

Evaluation of the Bass Fishing Tournament Pilot Program



Bureau of Fisheries Management

Administrative Report 61

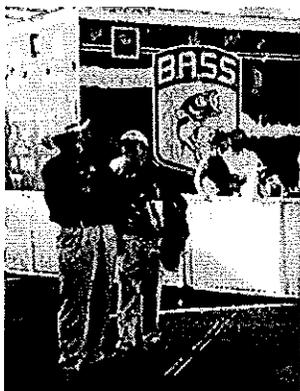
February 2007

Acknowledgements

The Wisconsin Department of Natural Resources would like to thank ESPN/BASS and FLW Outdoors for contributing funds to assist with this work. Additionally, the Department thanks the members of the Fishing Tournament Advisory Committee (FTAC) for volunteering their time and efforts in development of the bass fishing tournament pilot program.

Fishing Tournament Advisory Committee

John Aschenbrenner	Wisconsin Conservation Congress
Dan Brovarney	Wisconsin Bass Federation
Roger Dreher	Wisconsin Association of Lakes
Joel Everts	Wisconsin Association of Convention and Visitors Bureaus
Mike Hofmann	Wisconsin Bass Federation
Michelle Kilburn	Mercury Marine
Louie Kowieski	Wisconsin Council of Great Lakes Sport Fishermen
Ted Lind	Wisconsin Council of Sport Fishing Organizations
Steven Lindahl	Ranger Boats
Bob Miller	Wisconsin Wildlife Federation
Bob Munsen	Musky Clubs Alliance of Wisconsin
Steve Poll	World Walleye Association
Chuck Rolfsmeyer	The Bass Federation
Jim Schommer	Walleyes for Tomorrow
Bob Selk	Trout Unlimited
Mark Soletske	N.E.W. Team Tournament Trail
Brett Stapelmann	Wisconsin Bow Fishing Association
Larry Vanderhoef	Wisconsin Wildlife Federation
Steve Winters	Wisconsin Smallmouth Bass Alliance
Warren Zaren	C.A.S.T



This page was left blank intentionally

discussions with tournament anglers, and in-depth interviews with lakeshore property owners.

Final reports authored by the principal investigators for each evaluation component are summarized here. The reports themselves are attached as appendices.

SUMMARY OF THE EVALUATION OF MORTALITY IN WISCONSIN BASS TOURNAMENTS

The first component of the mortality research was to estimate tournament-associated mortality in Wisconsin bass tournaments, and factors that may impact mortality rates, such as the presence of disease (e.g. largemouth bass virus), water temperature, and weigh-in procedures. The second component was to estimate the mortality associated with the practice of culling bass.

Previous studies of bass tournament mortality show improvements in pre-weigh-in mortality but no improvements in post-tournament mortality of bass since the 1980s.

Previous studies have identified water temperature as a key factor in tournament mortality.

Tournament-Associated Mortality

Mortality of bass caught, transported, weighed, and released in Wisconsin bass tournaments was estimated at six of the seven pilot program tournaments. The only event where tournament-associated mortality was not measured was the first tournament, the ESPN/BASS Bassmaster Elite 50 Series, because the event was held prior to establishing the UWSP contract. No previous study of bass tournament mortality in Wisconsin has been conducted, although numerous similar studies have been conducted in other parts of the North America. Those studies have shown that tournament-associated mortality of bass brought to weigh-in has declined during the past several decades due to improved handling by anglers and currently averages less than 5%. Studies indicate that mortality of fish after being handled during weigh-in and released has not improved since the 1980s and averages about 25%. Other research indicates that higher water temperature leads to higher tournament-associated mortality.

Tournament-associated mortality rates estimated in this study included initial mortality of weighed fish (proportion of fish that died before or during the weigh-in process), delayed mortality of weighed fish (proportion of fish that died within 5 days after being released as a result of tournament handling), and total mortality of weighed fish (combination of initial and delayed mortality). These rates were compared to mortality of reference bass collected prior to the tournaments and held for the same period of time without having been subjected to the

tournament process. The purpose of reference fish was to provide an estimate of the mortality associated with holding bass in net pens. Delayed and total mortality rates can be adjusted to account for holding effects estimated by reference fish mortality. Initial mortality is the mortality that tournament anglers generally see as the fish are dead in their live well or bag. Delayed mortality generally makes up the bulk of tournament-associated mortality and occurs after tournament anglers and organizers are gone. Research points to delayed mortality being the result of the compounding effects from fish being handled multiple times.

Methods. - Standard accepted methods utilized in several other tournament mortality studies were employed in this study to estimate tournament-associated mortality of bass. The specifics of those methods can be found in the final report titled "Tournament-Associated Mortality and the Effects of Culling in Wisconsin Black Bass (*Micropterus* spp.) Tournaments" (Appendix 1).

Initial mortality rates in six Wisconsin bass tournaments were very low (0 - 3%).

Delayed mortality rates were higher and more variable (0 - 31.5% when adjusted for reference mortality).

Total mortality (adjusted for reference mortality) ranged from 0 - 33.9%.

SMB mortality rates were generally higher than LMB.

Results. - Mortality rates of both largemouth (LMB) and smallmouth (SMB) bass were similar to those observed in other similar studies conducted in North America and were higher when water temperatures were high. Initial mortality rates of largemouth (LMB) and smallmouth bass (SMB) were low in all six bass fishing tournament pilot program tournaments evaluated. Initial mortality ranged from 0 - 1.2% for LMB and from 0 - 3.3% for SMB. Delayed mortality rates were variable, ranging from 0 - 75.0% for LMB and 0 - 52.2% for SMB. Reference mortality ranged from 0 - 86.8% for LMB and 0 - 26.9% for SMB. Total mortality ranged from 0 - 76.2% for LMB and 0 - 55.5% for SMB. Adjusted delayed mortality could only be estimated with confidence at four of the six tournaments and ranged from 0 - 13.2% for LMB and 0 - 31.5% for SMB. Adjusted total mortality was estimated for the same four events and ranged from 0 - 15.6% for LMB and 0 - 33.9% for SMB (Table 2). Detailed results can be found in the final report (Appendix 1).

Table 2. Summary of bass fishing tournaments studied during 2005 and 2006. ¹Initial mortality rate not segregated by species and thus reported as combined LMB and SMB initial mortality. ²Adjusted mortality rates not reliable due to problems with reference fish. ³No fish captured and used.

Tournament	FLW LaCrosse 2005	WSBF Shawano 2005	Sturgeon Bay Open 2006	FLW LaCrosse 2006	BASS Winneconne 2006	WSBF Madison 2006
Avg. Water Temperature (°F)	81.0	61.7	58.3	81.1	82.0	62.1
LMBV	<i>Present</i>	Absent	Absent	<i>Present</i>	<i>Present</i>	<i>Present</i>
LMB Initial Mortality	1.2%	0%	0%	2.4% ¹	0.7%	0.9%
SMB Initial Mortality	2.6%	0%	0.1%	NA ³	3.3%	0%
LMB Delayed Mortality	75.0%	0.6%	0%	27.2%	68.2%	0%
SMB Delayed Mortality	39.7%	0%	0.3%	37.5%	52.2%	0%
LMB Reference Mortality	86.8%	0%	NA ³	14.0%	25.0%	0%
SMB Reference Mortality	26.9%	NA ³	0%	6.0%	NA ³	NA ³
LMB Adj Delayed Mortality	NA ²	0.6%	0%	13.2%	NA ²	0%
SMB Adj Delayed Mortality	NA ²	0%	0.3%	31.5%	NA ²	0%
LMB Adj Total Mortality	NA ²	0.6%	0%	15.6%	NA ²	0%
SMB Adjusted Total Mortality	NA ²	0%	0.4%	33.9%	NA ²	0%

Mortality in bass tournaments was related to water temperature.

Tournament-associated mortality of bass at low water temperatures was less than 1%.

Tournament-associated mortality of bass at high water temperatures was 15.6% for LMB and 33.9% for SMB.

Discussion. - In this study initial mortality rates were low and delayed mortality rates were quite variable. Mortality appeared to be related to water temperature. In three tournaments held when water temperatures were low, ranging from 58 - 62 °F, initial, delayed, and reference mortalities were very low resulting in estimated total mortality of less than 1%. In three tournaments held when water temperatures were high, all above 80 °F, initial, delayed, and reference mortalities were substantially higher. Due to high reference mortality in two of the three warm water tournaments (LaCrosse 2005 and Winneconne 2006), it was not possible to reliably estimate tournament-associated delayed mortality. LaCrosse 2006 provided the only reliable estimate of tournament-associated delayed mortality (13.2% for LMB; 31.5% for SMB), resulting in estimated adjusted total mortality of 15.6% for LMB and 33.9% for SMB.

Culling Mortality

Mortality associated with the culling of bass was estimated by simulating the conditions experienced by bass during a tournament day. This was accomplished using controlled angling and culling activities by volunteer anglers simulating culling that occurs during a real tournament. Actual tournaments were not used in this experiment so as to not interfere with the tournament proper. In addition we wanted

to ensure that live well holding time and number of fish in the live well were controlled. Three simulated tournaments were held during 2006 (Table 3).

Table 3. Summary statistics for three simulated tournaments bass tournaments in Wisconsin during 2006. ¹Data compromised due to escape of reference and treatment fish.

Simulated Tournament	Balsam Lake	Madison Chain	Minocqua Chain
Date	6/17/2006	8/25/2006	9/8/2006
LMBV Presence/Absence	Absent	Present	Absent
Mean Surface Water Temp (°F)	73.6	75.6	68.0
Delayed Mortality Rate	43%	NA ¹	0%
Reference Mortality Rate	30%	NA ¹	0%
Adjusted LMB Mortality Rate	16%	NA ¹	0%

Methods. - Detailed description of the methods can be found in the final report (Appendix 1).

Culling mortality data are limited, but mortality of culled bass also appears related to water temperature.

Results. - Balsam Lake had the highest mortality rates with delayed mortality of 43%, reference mortality of 30%, and adjusted mortality rate of 16%, while Minocqua had a 0% mortality of reference and treatment bass. LMBV was absent at Balsam and Minocqua. The data from Madison was compromised because muskrats chewed holes in the holding pens which resulted in escape of most of the fish. Balsam Lake was the only tournament at which we were able to evaluate mortality by hour. There was no distinct pattern of increased mortality with increased live well holding time at Balsam.

Discussion. - Mortality associated with culling has largely been ignored in the scientific literature, as most research has focused on the mortality associated with the entire tournament process. This study was an attempt to look specifically at culled bass, which do not experience the weigh-in portion of the tournament. Given the small sample size (i.e. number of simulated tournaments) it is difficult to make many solid conclusions regarding culling mortality. However, results from the two successful events, water temperature again appeared to be a factor. In the only simulation that resulted in mortality, we failed to detect increased mortality with increased live well holding time, an expected pattern if length of live well confinement caused bass mortality. This could be because live well confinement does not cause mortality or simply due to our single estimate.

When water temperatures are cool, mortality of bass in tournaments appears to be of little concern.

The presence of diseases like LMBV can have an impact on tournament-associated mortality.

LMBV appears to cause mortality only when temperatures are high, but there were no studies of warmwater tournaments where LMBV was not present.

Changes in tournament procedures for bass tournaments when water temperatures are high

Conclusions

A comprehensive review of 130 bass tournaments conducted across North America during three decades documented reduction in initial mortality from an average of nearly 20% in the 1970s to 6.5% in the 1990s. Results from this study indicate initial mortality rates are even lower in Wisconsin bass tournaments, the highest measured initial mortality rate being 3.3% for SMB at Winneconne in 2006. The same review documented that average delayed mortality during the same time period remained stable at 21-23%. Cool water tournaments in Wisconsin had delayed mortality rates much lower than this average. In fact of the three cool water tournaments only one had any mortality at all and it was less than 1%. Warm water tournaments had higher mortality. In two of the three warm water tournaments, delayed and reference mortality were high making estimates of tournament-associated delayed mortality unreliable. The delayed mortality rates estimated for SMB (31%) and LMB (13%) at the La Crosse FLW tournament in 2006 were consistent with national averages.

The presence of LMBV also contributes to the mortality of bass in tournaments when water temperatures are warm. LMBV is a recently discovered fish disease that can suppress largemouth bass immune systems and cause death under stressful conditions. The virus was present in all three warm water tournaments and one of the cool water tournaments. Mortality was low at the cool water tournament, indicating that temperature is more important than presence of the disease.

Based on these results and results from previous studies indicate that changes in bass fishing tournament procedures when surface water temperature is warm appears warranted. However, further studies may be needed to determine the specific threshold for water temperatures. Further investigation into the present and future distribution of LMBV in Wisconsin may also be warranted. Given the limited data, culling appeared to have a lesser impact on bass tournament mortality compared to the impacts of water temperature and LMBV.

SUMMARY OF THE EVALUATION OF LOCAL ECONOMIC IMPACTS OF WISCONSIN BASS TOURNAMENTS

The objectives of this research were first, to estimate the characteristics of tournament angling participant spending for seven bass fishing tournament pilot program events held during 2005-2006 (Table 1), and second, apply these expenditure characteristics to regional input-output models to estimate the local economic impact of these events.

Bassmaster Elite 50

The ESPN/BASS Bassmaster Elite 50 tournament was the most popular event to participate in the pilot program.

The largest event in terms of national stature to participate in the bass fishing tournament pilot program was the ESPN/BASS Bassmaster Elite 50 event held June 15-18, 2005 on Lake Wissota near Chippewa Falls. For this event, the Department of Tourism, the Chippewa Valley Convention and Visitors Bureau, DNR, and the University of Wisconsin's Department of Urban and Regional Planning partnered to gather marketing and economic impact information. Information on spectator demographics, trip characteristics, and expenditures was collected at the ESPN/BASS Bassmaster Elite 50 event. Expenditure data collected from non-local spectators, participants, ESPN/BASS crew, and vendors were used to estimate local (Chippewa and Eau Claire Counties) economic impact.

Methods. - Methods used to collect and analyze economic impact data are detailed in the final report titled "Profile of The Bassmaster Elite 50 Series; Fishing Tournament: Economic and Demographic Assessment of Those Involved in the June 15-18 Event" (Appendix 2).

Non-local spectators spent \$1.32 million and professionals spent \$135,000 for a total of \$1.45 million in direct economic impact.

This estimated spending resulted in a total economic impact of \$2.1 million.

Results. - A total of 181 completed spectator surveys were obtained, of which 57 were non-local spectators. An estimated 14,000 spectators attended the event, of which approximately 4,500 were non-local. Five angler expenditure surveys were returned from a total of 50 anglers. Eight vendor expenditure surveys were returned from a total of 68 vendors. Six crew expenditure surveys were returned from a total of 22 ESPN/BASS crew. Only non-local spending is considered when estimating economic impacts as it is assumed that spending by locals would have taken place in the community regardless of the tournament. Average expenditures by non-locals of over \$290 per trip, the majority of which was spent on lodging, food and travel, resulted in an estimated direct economic impact of nearly \$1.32 million. Average professional (anglers, vendors, and crew) spending in the Chippewa Valley

ranging from \$720 to \$1,057 per trip, the majority of which was spent on lodging food and travel, added an estimated additional \$135,000 in direct expenditures. This estimated \$1.45 million in spending as a result of the tournament generated an estimated total direct, indirect and induced output impact of just over \$2.1 million (\$2,116,000). Overall, this reflects an output multiplier of roughly 1.46.

Discussion. - Spectators generated the greatest economic impact associated with the 2005 Bassmaster Elite 50 tournament held on Lake Wissota due to the high attendance. However, the professionals spent far more per trip than spectators. Unmeasured in the evaluation were the local costs associated with conducting the event, such as law enforcement and emergency personnel costs, and complimentary goods and services. The local community also spent \$60,000 as a bid to bring the event to the area.

Other Bass Fishing Tournament Pilot Program Events

Six other events ranging from state level to regional bass tournaments were evaluated for their local economic impacts (Table 1).

Methods. - Methods used to collect and analyze economic impact data are detailed in the attached final report "Tournament angling in Wisconsin: estimating economic impacts for host communities" (Appendix 3).

Results. - General results of the economic impact assessment are provided in Table 4 below. These represent the local expenditures and local impacts of non-local visitors. Only non-local spending is considered when estimating economic impacts as it is assumed that spending by locals would have taken place in the community regardless of the tournament. At the FLW Everstart tournament held in La Crosse in 2005, a small number of spectator interviews were conducted. In addition the number of spectators was estimated by hand counting. Spectators interviewed fell into one of two categories. They were either with one of the anglers and thus included in the travel party expenses provided by anglers, or they were local. The spectator counts that included those people never exceeded 75 - 100. Therefore, spectators that attended these events were either captured in the angler travel party expenditures or not considered due to being locals

Discussion. - The economic impact of the other six pilot program tournaments was linked to the size of the

Non-local expenditures ranged from \$42,819 to \$328,244 at six pilot program tournaments.

These expenditures resulted in an estimated \$65,368 to \$459,143 in economic impact on the host communities.

tournament, with respect to the number of participants. The regional draw of anglers to the three larger events likely also contributed to the higher economic impact. The absence of the economic impact of spectators is very apparent, as all six other pilot program tournaments combined did not equal the impact of the Lake Wissota event.

Table 4. Average and total non-local expenditures in local area, total economic impact on the local area, and multiplier for six bass fishing tournament pilot program events held during 2005 - 2006.

Tournament	FLW LaCrosse 2005	WSBF Shawano 2005	Sturgeon Bay Open 2006	FLW LaCrosse 2006	BASS Winneconne 2006	WSBF Madison 2006
Average Boater Expenditures	\$965	\$490	\$983	\$967	\$576	\$425
Average Co-Angler Expenditures	\$612	\$310	\$824	\$627	\$285	\$338
Average Staff/Sponsor Expenditures	\$1,869	\$875	na	ns*	ns avg	ns
Total Expenditures	\$296,098	\$74,333	\$328,244	\$308,873	\$48,057	\$42,819
Total Economic Impact	\$452,465	\$105,555	\$440,718	\$459,143	\$66,672	\$65,368
Multiplier	1.49	1.39	1.35	1.49	1.53	1.55

na - not applicable, all staff were local

ns - not sampled

ns avg - no surveys but assumed to be average of staff/sponsor surveys

*average staff/sponsor spending in La Crosse in 2005 was utilized to estimate total expenditures in 2006.

Conclusions

Bass fishing tournaments provide positive local economic impacts when and where they are held. In this evaluation, the largest contributor to economic impacts was non-local spectators, as reflected by the results of the ESPN/BASS Bassmaster Elite 50 tournament. It was the only event that drew large numbers of spectators. Without drawing non-local spectators, the economic impact of bass tournaments was far less. A larger number of tournament participants from a larger geographical area can make up some of the potential gain not realized due to lack of spectator draw.

All of the pilot program events provided positive local economic impacts on the host communities.

Non-local spectators provided the greatest overall impact.

Three of the seven pilot program tournaments were "new" to Wisconsin.

One of the primary goals of the pilot program and of allowing culling for bass tournaments was to draw large tournaments from outside Wisconsin that would not come otherwise, bringing with them their positive economic impact. Three of the seven tournaments (Elite 50 and 2 FLW events) conducted as part of the bass fishing tournament pilot program were regional or national events that perhaps would not come to

The Sturgeon Bay Open, a bass tournament with a long history of operation in Wisconsin had as much an impact as the FLW events that only came to Wisconsin because the anglers could cull.

Angling in Wisconsin is a \$2.3 billion (2001 dollars) industry, resulting in \$1.2 billion in trip-related expenditures.

The new tournaments that came to Wisconsin only because of culling added one-tenth of one percent in fishing trip expenditures to the state of Wisconsin.

Wisconsin without participants being allowed to cull. The other four events were events that have either been traditionally held under current rules or would likely be held under current rules. The Sturgeon Bay Open has been conducted for 16 years in Wisconsin and 2006 was the first time culling was allowed. The expenditures and economic impact was very similar to the two FLW events held in La Crosse in 2005 and 2006.

Angling in Wisconsin is a \$2.3 billion industry that supports more than 26,000 jobs in Wisconsin and generates \$100 million in state tax revenue (2001 dollars). Overall there are over 22 million days of fishing in Wisconsin. Anglers spend approximately \$1.2 billion in trip-related expenditures in Wisconsin (USFWS 2001). The additional expenditures of non-locals during the three new tournaments that came to Wisconsin because participants were allowed to cull were approximately \$2.55 million over the two year pilot program. That equates to an annual increase of \$1.27 million in tournament trip expenditures from new tournaments coming to Wisconsin if allowed to cull. That results in approximately one-tenth of one percent of fishing trip related expenditures in Wisconsin.

SUMMARY OF THE EVALUATION OF ATTITUDES TOWARD FISHING TOURNAMENTS IN WISCONSIN

The goals of this study were to provide information on the public's awareness and acceptance of culling, their beliefs about tournament-related fish mortality, the impact tournaments have on the fishery resource as well as on water recreation, and the possible benefits (e.g. economic impacts) derived from fishing tournaments.

The results of this study generated from two quantitative and two qualitative surveys. The first quantitative study was a random sample of 1,000 Wisconsin anglers. Each angler received a 12-page questionnaire in the mail and after a maximum of three contacts, 63 percent returned usable questionnaires. The second quantitative study was a random sample of 1,000 Wisconsin registered boaters that received a 4-page questionnaire in the mail. After a maximum of three contacts, 67 percent returned usable questionnaires. The qualitative components included three focus groups with bass tournament participants and in-depth interviews with 14

waterfront property owners and/or members of a lake association.

17% of Wisconsin anglers participate in fishing tournaments.

Tournament participation in Wisconsin

A larger than expected percentage of Wisconsin anglers participates in fishing tournaments (17%). That equates to approximately 250,000 anglers. Roughly 150,000 anglers (10%) fish in ice fishing tournaments and 190,000 (13%) fish in open water tournaments. Walleye tournaments were most popular for open water tournaments and panfish were most popular for ice fishing tournaments.

Opposition to culling in bass tournaments was not overwhelming if live well standards were required for tournament participants to cull.

Public acceptance of culling

A majority of Wisconsin anglers are opposed to culling for bass tournament participants. However the opposition depends greatly on whether participants would have to be required to use boats with live wells that meet minimum standards. The opposition to culling is near unanimous if participants do not need to follow live well standards (85% opposed). Opposition to culling drops drastically (51%) if participants were required to have live wells that meet minimum standards. Seventeen percent of anglers were unsure whether culling in bass tournaments should be allowed if live well standards were required and 32% felt culling should be allowed. These results indicate that the opposition to culling is not necessarily as strong as initially thought based on previous concerns raised to DNR. This may be attributable to the polarization of the issue among two relatively small groups, and the majority of anglers having relatively neutral opinions on the issue.

Bass tournament anglers feel strongly that culling should be allowed for their sport.

Results from focus groups with tournament participants support this assertion. Tournament anglers believe culling is a necessity for tournament expansion. Further, they believe that culling results in less harm to the fishery resource than does catch-and-keep fishing practiced by some other anglers.

Lake shore property owners were not opposed to culling if it did not harm the fishery.

In-depth interviews with lake shore property owners revealed that their attitudes regarding culling were driven by potential harm to the fishery. If culling did not harm the fishery and was done by an angler with knowledge and experience in fish handling (e.g. a tournament angler) then it was acceptable.

Biological impacts appear most important to angler attitudes.

Tournament impacts on fishery resources

Biological impacts on fishery resources appear most important to anglers and attitudes about tournament issues are tied to beliefs about the impact of tournaments on fisheries. Most

Few anglers believe that tournaments are harmful to fisheries.

anglers felt that tournaments did little or no harm to fisheries. Only about one angler in five (22%) believes that tournaments do "moderate" to "a great deal of harm" to the future fishery of a waterbody. Fifty-three percent believe that tournaments do "no" to "little" harm to the fishery.

Despite the relatively small proportion of people that felt tournaments were harmful to fisheries, analyses reveal that beliefs about the potential harm to fishery resources due to tournament fishing is a likely influence on their beliefs about culling and other tournament aspects. Those who believe that tournaments "moderately" or "greatly" harm the fishery resource are more likely to oppose culling even with live-well standards than those who believe the resource has had "no" or a "little" harm. Further, they are less likely to speculate that a high percentage (75% to 100%) of tournament caught and released fish will survive than those who believe the resource will experience "no" or a "little" harm.

The importance of biological impacts on attitudes toward tournaments was evident during in-depth interviews with lake shore property owners as well. The primary concern was for the health of the fishery. Interviews revealed that catch and release tournament fishing was preferred to catch and harvest angling.

Tournament impacts on water recreation

Fishing tournaments do not go unnoticed by other anglers. Approximately one-half of all anglers said that being on the water as a non-participant during a tournament affected the quality of their fishing experience (52%); a nearly equal proportion said the tournament made it difficult to obtain access to the water (48%). In addition, just over one-half of water recreation users reported that tournament boats and trailers caused overcrowding in the parking lots (56%) and that tournament boats congested the boat ramps (54%); about one-third of the respondents (34%) said they felt crowded on the water because of the tournament.

Tournaments generally do not interfere with water recreation.

Looking at the bigger picture of water recreation indicates that a majority of all water recreation users said the tournament did not interfere with their recreational pursuits and more than one-half reported that the tournament did not cause them to leave the water - one respondent in five (20%), however, was displaced from the water because of the tournament, that is, the tournament caused them to leave the water.

Tournament fishing boats were no more of a problem for water users than other fishing boats. Tournament boats were not at all a problem for about eight respondents in ten (79%), results nearly equal to those for pontoons and houseboats (83% no problem). Just under one respondent in ten (8%) reported that tournament boats as well as other fishing boats were a "moderate" or "serious" problem. Less than 10 percent (9%) said these boats were the biggest problem on Wisconsin waters.

Personal watercraft, speed boating, and water skiing were more of a problem for boaters.

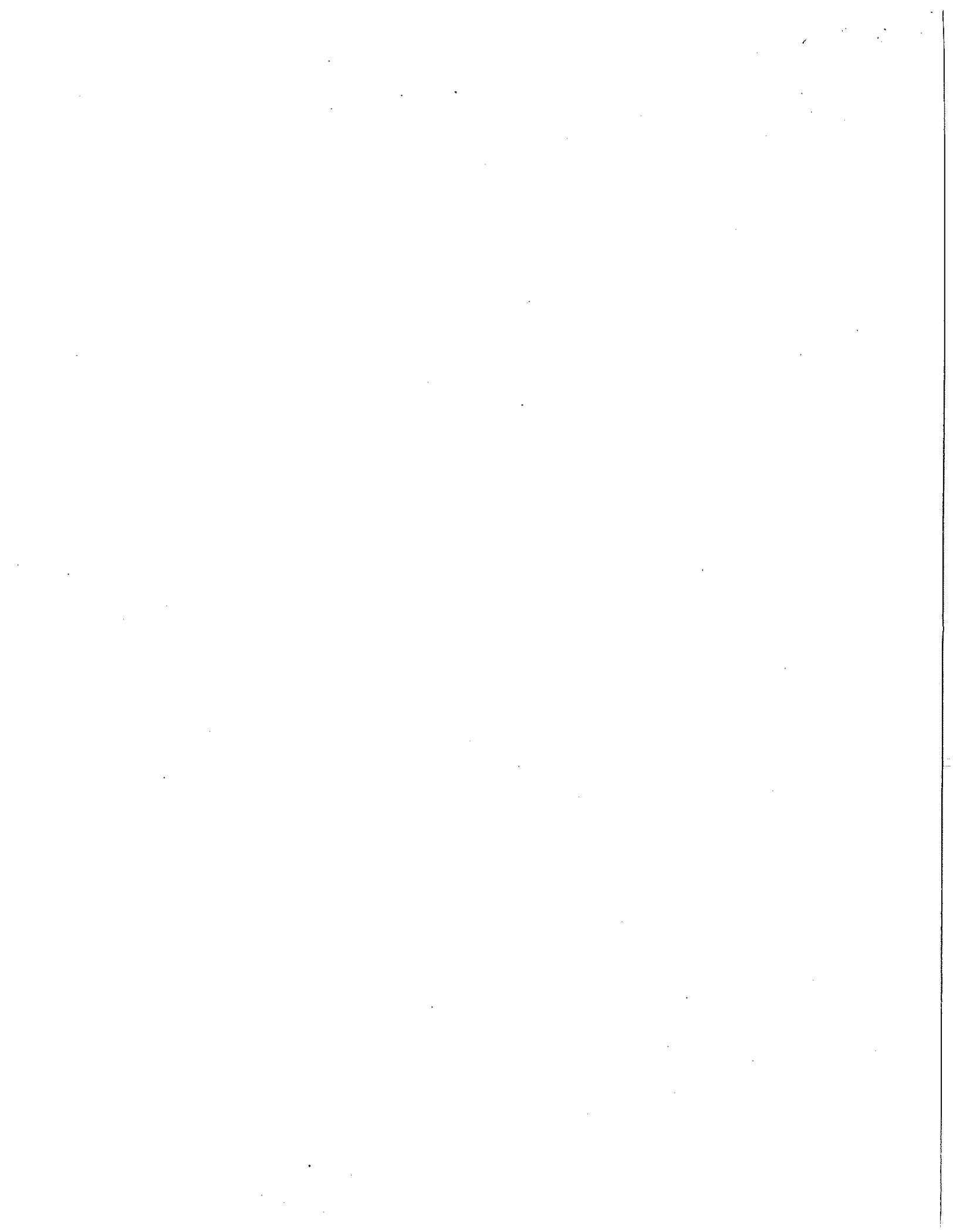
A majority of water users reported that personal watercrafts (76%), speed boating (72%) and water skiing (72%) should be restricted by time and/or location. This is substantially more than the minority (although almost one-half) of water users that believe tournament fishing should be restricted by time and/or location (48%).

Benefits of tournament fishing

Neither economic gain nor drawing attention to Wisconsin as a fishing destination were seen as benefits derived from fishing tournaments. Only about one-third of anglers agree that tournaments are good for the state because of their economic contributions. About an equal proportion of anglers felt that tournaments are good because they draw attention to Wisconsin as a fishing destination.

CONCLUSIONS

- Tournament - associated mortality is of minimal concern at low water temperatures.
- When water temperatures are high, tournament-associated mortality can be a concern.
- Bass tournaments can provide positive local economic impacts to host communities.
- The additional economic impact to the state as a whole due to allowing culling was small.
- Opposition to culling in bass tournaments by Wisconsin anglers was not overwhelming but was driven by perceived biological impacts of culling.



APPENDIX 1

Tournament-Associated Mortality and the Effects of Culling in Wisconsin Black Bass
(*Micropterus* spp.) Tournaments

Craig W. Williamson
Michael A. Bozek

Wisconsin Cooperative Fishery Research Unit
University of Wisconsin-Stevens Point, Wisconsin 54481

Final Report
December 31, 2006

Funding provided by
Wisconsin Department of Natural Resources

Executive Summary

The Wisconsin Cooperative Fishery Research Unit was contracted by the Wisconsin Department of Natural Resources (WDNR) to evaluate the mortality associated with culling in bass tournaments. The objective of this study was to quantify mortality rates of largemouth bass (*Micropterus salmoides*) (LMB) and smallmouth bass (*M. dolomieu*) (SMB) occurring as a result of tournament-induced stress, and in particular culling. Two parallel studies were conducted. The first study quantified general characteristics of tournament angling where culling is allowed, including the degree of culling, water temperature, pathogens, weigh-in procedures, and subsequent mortality in selected bass tournaments in Wisconsin. This provided background information on the extent to which tournaments that allow culling affect black bass mortality in general. The second study directly targeted the effects of culling on mortality rates. This aspect of the project was evaluated using controlled angling and culling activities by volunteer anglers simulating culling that occurs during a real tournament. The culled treatment fish were evaluated for five days to assess mortality. At the six professional bass tournaments studied, total mortality rates ranged from 0% to 77.4% for LMB and 0% to 54.6% for SMB. When adjusted for reference fish mortalities, total mortality rates of LMB ranged from 0% to 43.9%, and SMB from 0% to 55.5%. Initial mortality rates which occur at the time of weigh-in and reflect what anglers and the public actually see drastically under represents the true effects of angling on bass mortality during tournaments. The adjusted delayed mortality rates ranged from 0% to 43.2% for LMB and 0% to 52.2% for SMB whereas the initial mortality rates for LMB and SMB ranged from just 0% to 2.4%. Across these tournaments, mortality rates were higher when water temperatures were high and when largemouth bass virus (LMBV) (Iridoviridae) was present. Our data also reflect results seen in other bass tournament angling studies that

considered the effects of water temperature and LMBV on bass mortality, and when combined with those study results, the impacts of water temperature and the presence of LMBV on tournament-associated mortality of bass are amplified. At the two simulated tournaments, mortality rates were 0% and 16.0%. Largemouth bass virus was absent at both tournaments and warm water temperatures were present at the tournament with higher mortality. Culling in the simulated tournament did not appear to increase mortality rates relative to what was seen at the professional bass tournaments. These data suggest culling does not significantly increase mortality at tournaments, but the sample size was small. However, there was no mortality in one simulated tournament and no clear trend in increasing mortality with increasing time held in live wells among culled fish in the tournament that had higher mortality. Our results support other studies that indicate tournament-associated mortality dramatically increases when water temperatures exceed 25°C where LMB are the primary target species and 20°C where SMB are the primary target species, and that strict regulation of bass tournaments under such conditions may be warranted (Neal and Lopez-Clayton 2001, Schramm et al. 1987, Edwards et al. 2004, Weathers and Newman 1997, Meals and Miranda 1994, Schramm et al. 2004). We would recommend conducting further studies to determine the precise threshold for water temperature effects on tournament-associated mortality of bass. Further, we recommend the WDNR conduct an ongoing investigation into the current and projected future distribution of LMBV throughout Wisconsin and its effects on tournament angling and catch-and-release fishing in general.

Introduction

Continuing to fish after reaching a daily creel limit is common practice in bass fishing tournaments in other states where anglers are allowed to replace previously caught smaller fish in their livewell with newly caught larger fish (Staggs 2005). This process is known as culling. Current Wisconsin fishing regulations state “any fish taken into an angler’s possession and not immediately returned must be considered part of that angler’s daily creel limit”, thus culling is prohibited (Staggs 2005). No known previous study has researched the mortality rates of culled bass in tournaments, in particular. Moreover, few studies have evaluated tournament-associated mortality rates in the northern United States (see Perry 2002, Kwak and Henry 1995, Edwards et al. 2004, and Hartley and Moring 1995 (Appendix A)) and no tournament-associated mortality study has been conducted on black bass in Wisconsin. An understanding of the mortality rates sustained by tournament-caught and tournament-culled bass is prerequisite to considering and implementing changes in Wisconsin fishing regulations.

In 2004, the Wisconsin legislature passed Act 249 which required the Wisconsin Department of Natural Resources (WDNR) to establish a bass fishing tournament pilot program and evaluate its impacts. This evaluation includes assessment of economic, social, and biological impacts (Staggs 2005). The Wisconsin Cooperative Fishery Research Unit was charged with evaluating the biological impacts. Biological impacts of culling, specifically, and bass tournament angling in general, may include physiological stress responses of individuals ultimately terminating with mortality, and population-level effects that consider the relative effect mortality has in a given water body. Other potential biological impacts, including the effect of displacement of tournament caught bass, were beyond the scope of this study.

Objectives

The objectives of this study were to (1) quantify initial, delayed, and total mortality rates of largemouth bass (*M. salmoides*) and smallmouth bass (*M. dolomieu*) weighed in at professional black bass tournaments in Wisconsin and (2) quantify the mortality rates (5-day delayed) of largemouth bass and smallmouth bass which have been culled at simulated tournaments in Wisconsin.

Methods

Two sets of information are necessary to obtain a realistic and complete evaluation of the effects of tournament angling and culling on bass in Wisconsin. An assessment of the effects of tournament angling proper is prerequisite to providing context for understanding effects of culling. Thus, the first set of information collected quantifies mortality of tournament-caught bass at professional black bass tournaments. The second set of information aimed to quantify the mortality rates of culled bass. This was done in simulated tournaments, where culling effects could be sufficiently isolated to assess the magnitude of the effects. We used methods for evaluating black bass tournaments that are relatively standardized in studies of this type.

For the first portion of the study, which evaluated professional black bass tournaments, mortality rates included initial mortality of weighed fish (proportion of fish that die before or during weigh-in), delayed mortality of weighed fish (proportion of fish that die sometime after being released as a result of tournament handling, up to 5 days post-catch), and total mortality of weighed fish (combination of initial and delayed mortality). For the second portion of the study, which evaluated simulated tournaments, the mortality rate was 5-day delayed mortality of culled fish in two hour increments (proportion of fish that die sometime after being culled as a result of being captured and handled).

The first portion of the project was achieved by monitoring six professional bass tournaments that allowed culling during 2005 and 2006, whereas the second portion of the study was achieved by monitoring three simulated tournaments during 2006.

Professional bass tournaments were evaluated on rivers, lakes and reservoirs throughout Wisconsin (Table 1). Tournaments were evaluated from late spring to early fall and covered a range of water temperatures. The simulated tournaments were conducted on lakes from late spring to late summer and also covered a range of water temperatures (Table 1).

Methods for Professional Bass Tournaments

During evaluations of professional bass tournaments, a subset of tournament-caught largemouth and smallmouth bass were placed in holding pens to serve as the “treatment” in mortality experiments. Holding pen fish densities have varied greatly among previous studies, ranging from 0.6 fish/m³ to 50.0 fish/m³ (Table 2). To assess pen size on mortality prior to the actual evaluations we conducted a preliminary study by holding bass in a holding pen for 5 days where no fish died, suggesting mortality was not caused by the holding pens. Moreover, pre-tournament holding of bass in 3 lakes in central and southern Maine by Hartley and Moring (1995) also showed no mortality caused by the holding pens. Depending on the expected catch of the tournament, we placed up to 50 bass in each half of the holding pens (3.1 fish/m³). The exact number of fish in each side of the holding pens varied among tournaments since catch rates varied among tournaments. “Control” fish (see Wilde et al. 2003 for discussion on lack of true controls and its consequences), herein referred to as reference fish, were obtained by boat electrofishing with pulsed direct current, or by fyke netting 1-2 days prior to each tournament to compare with the mortality rates of treatment fish (i.e., tournament-caught fish).

Table 1. Professional black bass tournaments and simulated tournaments evaluated during this study.

Waterbody	County	Dates	Abbreviation
Professional Bass Tournaments			
Mississippi River	LaCrosse	August 3-6, 2005	LC05
Shawano Lake	Shawano	September 24-25, 2005	SH05
Green Bay	Door County	May 20-21, 2006	SB06
Mississippi River	LaCrosse	July 12-15, 2006	LC06
Wolf River Chain	Winnebago	July 30, 2006	WC06
Madison Lake Chain	Dane	September 23-24, 2006	MA06
Simulated Tournaments			
Balsam Lake	Polk	June 23, 2006	BA06
Madison Lake Chain	Dane	August 26, 2006	MAS06
Minocqua Lake Chain	Oneida	September 9, 2006	MI06

Table 2. Examples of holding pens volumes in previous tournament-associated mortality studies.

Holding Pen Volume	Max. Pen Density	Citation
31.1 m ³	0.6 fish/m ³	Schramm et al.(1987)
28.2 m ³	1.2 fish/m ³	Weathers and Newman (1997)
32.7 m³	3.1 fish/m³	This study
4.6 m ³	9.8 fish/m ³	Neal and Lopez-Clayton (2001)
1.7 m ³	17.6 fish/m ³	Kwak and Henry (1995)
1 m ³	50.0 fish/m ³	Hartley and Moring (1995)

The reference fish remained separate from treatment fish and the treatment fish were separated by day of capture to evaluate daily mortality rates.

Monitoring Bass at Professional Tournaments and Simulated Tournaments

All fish assessed for delayed mortality were held for 5 days in rectangular, floating, holding pens and evaluated for mortality each day. The holding pens were located as close as

possible to the weigh-in location on the same body of water in which the tournament was held. The holding pens measured 3.66 m in length by 3.66 m in width by 2.44 m in depth for a total volume of 32.7 m³ with 2.54 cm square knotted nylon mesh. The pens were placed in water with a minimum depth of 2.5 m to accommodate the maximum depth of pens. The holding pens had a vertical net divider in the middle of the frame; consequently dividing the holding pens into two 16.35 m³ areas. The frame was constructed of polyvinyl chloride pipe. The cross-sectional diameter of the top floating portion of the frame was 7.62 cm in diameter while the bottom sinking portion of the frame was 5.08 cm in diameter. Expanding spray foam was placed in the top floating pipes to aid in buoyancy, while re-bar was placed in the bottom pipes to eliminate buoyancy. The frame was free floating and had no pipes connecting the top frame to the bottom frame; only the net extended between them. The netting was attached to the top and bottom frame with zip ties. The holding pen was covered in netting on all six sides. The portion of the netting that covered the top of the holding pen was sewn to the pen on one side. Once fish were placed in the holding pen, the top cover was tied with string to the frame on the remaining three sides to seal it shut and prevent escape.

Dead bass (no opercular movement) were removed, recorded, measured (TL), and discarded daily at a standardized time (1000) during each tournament. On the morning of the fifth day of confinement, the reference and treatment fish were removed from the holding pens, counted, measured (TL), identified by species, and released. Subsets of treatment fish (≈ 30) from each tournament were sent to a United States Fish and Wildlife Service (USFWS) pathologist in LaCrosse, Wisconsin to be necropsied and tested for largemouth bass virus (Iridoviridae).

Because “reference” fish were subjected to the physiological stress of electrofishing and hence were not true “controls”, they were used as another treatment from which to compare delayed mortality from angling (i.e., a reference). Incidentally, both reference fish and treatment fish were affected to some degree by capture, thus adjusted mortality rates of treatment fish are conservative, as more reference fish may have survived if not subjected to electrofishing or fyke netting. Because environmental conditions among days of a tournament can vary, total mortality and total delayed mortality was also evaluated among days, (by keeping fish caught each day in separate pens), to elucidate a day effect.

Water temperature (°C) and dissolved oxygen (mg/l) were recorded every 15 min at the water surface and 2.5 m deep with two Aqua 2002™ dissolved oxygen and temperature data loggers from BioDevices in Aimes, IA, USA near the holding pens. Water temperature and dissolved oxygen profiles were also recorded twice a day with a YSI 95® temperature and dissolved oxygen meter from YSI Incorporated in Yellow Springs, OH, USA adjacent to pens as a backup system. Water temperatures were recorded every 0.5 m from the surface to 2.5 m deep once each morning and evening. The profiles were taken next to the holding pen nearest shore and at the holding pen farthest from shore.

Simulated Tournaments

The second objective of the study was designed to assess the effects of culling. This aspect of the project was evaluated using simulated (i.e., controlled) angling and culling activities using volunteer anglers executing actual angling and culling that would occur during a tournament. Actual tournaments were not used in this experiment so as to not interfere with the tournament proper. In addition we wanted to ensure that live well holding time and number of fish in the live well could be controlled.

Methods for Simulated Tournaments

Fish used in this portion of the study were obtained by electrofishing and held for a minimum of one day in holding pens to assess pre-tournament mortality and to determine physiological suitability for the simulation. At the start of the experiment, five individual bass were removed from the holding pens, and then hooked with a single hook through the upper mandible. Next, the fish were placed in the water so a volunteer angler, who were in his/her boat approximately 10 m from the holding pen, could "angle" or reel the fish in, unhook the fish, and place the angled fish into a livewell until five angled fish had been placed into an angler's livewell. The anglers were assigned a standardized return time in 2-hour intervals at which time he/she returned and "culled" an individual treatment bass at each of the four pre-selected time intervals. One fish per time period, per boat was "culled". Each designated "culled" fish (treatment fish) was placed in an individually marked holding pen based on the length of time (e.g., 2 hour intervals) they were assigned to be held for evaluation. As each culled fish was removed from a livewell, a "new" marked fish was angled and added to the livewell to ensure five fish remained in the livewell (Figure 1). New fish were marked with X-Tools™ culling clips, which are numbered clips placed on the lower mandible of bass for quick identification, to distinguish them from fish already in the livewell. The numbered clips also allowed us to know how long each fish had been in the livewell. Anglers returned to fish in the lakes as they would in a real tournament with a full livewell. They never placed additional fish caught during the simulated tournament in the livewells. Electrofished bass not held in livewells were used as reference fish. Once anglers had placed the last treatment bass (8-hour treatment bass) into the 8-hour holding pen, they still had four marked fish (new fish added during culling) remaining in their livewell.

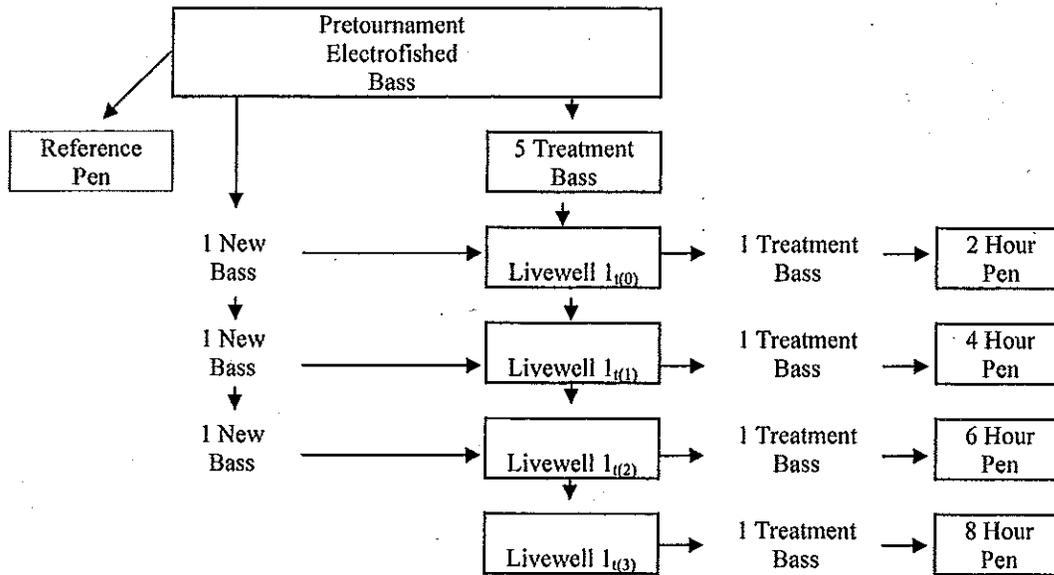


Figure 1. Diagram of how simulated tournaments were handled. Culled bass were held in holding pens based on how long they were held in livewells. As a bass was removed from a livewell to be placed in a holding pen, a new bass (marked with a culling clip) was placed in the livewell. Bass not held in livewells served as reference bass.

These marked fish were then placed in holding pens based on the length of time they had been in the angler's livewell. At all times, five fish (maximum creel limit) were in livewells during the simulated tournaments. So each angler had placed two treatment fish into each of the four 2-hour interval holding pens. The remaining reference fish were removed from the reference pen and placed in a 0-hour holding pen to serve as the reference. At the end of the simulated tournament, five holding pens contained fish culled at each of the time intervals, 0-hours, 2-hours, 4-hours, 6-hours, and 8-hours.

Data Analysis for Professional Bass Tournaments

Procedures used to evaluate mortality closely follow those of previous researchers; especially Wilde et al. (2003), which have become standardized nationwide (see Kwak and Henry 1995, Schramm et al. 1987, Wilde et al. 2003). At professional bass tournaments, fish were judged dead or alive by tournament officials at weigh-in. The ratio of fish brought to weigh-in dead $n_{I,i}$, versus the total number of fish weighed in $N_{I,i}$ for any given day i were our initial mortality rate $M_{I,i}$ (Wilde et al. 2003). The initial mortality rate used the function:

$$M_{I,i} = \frac{n_{I,i}}{N_{I,i}}$$

Where:

$M_{I,i}$ = initial mortality rate on day i

$n_{I,i}$ = total number of that die before or during weigh-in on day i

$N_{I,i}$ = total number of fish weighed in on day i

To quantify delayed mortality a subset of tournament-caught fish that are weighed in alive were held in holding pens for five days. The ratio of held tournament-caught fish that die after weigh-in $n_{T,i}$ versus the total number of tournament-caught fish held $N_{T,i}$ for any given day i was the delayed mortality rate $M_{T,i}$. The delayed mortality rate used the function:

$$M_{T,i} = \frac{n_{T,i}}{N_{T,i}}$$

Where:

$M_{T,i}$ = delayed mortality rate on day i

$n_{T,i}$ = total number of tournament-caught fish that die after weigh-in (5 days) on day i

$N_{T,i}$ = total number of tournament-caught fish held for evaluation (5 days) on day i

The reference mortality rate was $M_{R,i}$ where $n_{R,i}$ is the number of reference fish that died on any given day i , and $N_{R,i}$ is the number of reference fish held. The reference mortality rate used the function:

$$M_{R,i} = \frac{n_{R,i}}{N_{R,i}}$$

Where:

$M_{R,i}$ = reference mortality rate on day i

$n_{R,i}$ = total number of reference fish that die on day i

$N_{R,i}$ = total number of reference fish held for evaluation (5 days) on day i

To adjust the delayed mortality rate for pen mortalities we subtracted the reference mortality rate from the delayed mortality rate to obtain an adjusted delayed mortality rate $M_{D,i}$. The adjusted delayed mortality rate used the function:

$$M_{D,i} = M_{T,i} - M_{R,i}$$

Where:

$M_{D,i}$ = adjusted delayed mortality rate on day i

$M_{T,i}$ = delayed mortality rate on day i

$M_{R,i}$ = reference mortality rate on day i

Total mortality M_i for any given day i used the function:

$$M_i = M_{I,i} + \left\{ \left(\frac{n_{L,i}}{N_{L,i}} \right) * M_{D,i} \right\}$$

Where:

M_i = total mortality rate on day i

$M_{I,i}$ = initial mortality rate on day i

$n_{L,i}$ = total number of that die before or during weigh-in on day i

$N_{L,i}$ = total number of fish weighed in on day i

$M_{D,i}$ = adjusted delayed mortality rate on day i

where $M_{I,i}$ is initial mortality on the i th day, $M_{D,i}$ is delayed mortality of fish captured on the i th day, $n_{L,i}$ is the number of fish brought to weigh-in alive, and $N_{L,i}$ is the total number of fish live or dead that are captured and brought to weigh-in.

Data Analysis for Simulated Tournaments

To quantify the mortality rate, "culled" fish were held in holding pens for 5 days. The ratio of held "culled" dead fish $n_{T,i}$ versus the total number of "culled" fish held $N_{T,i}$ for any given day i is the mortality rate $M_{T,i}$. The mortality rate for "culled" fish used the function:

$$M_{T,i} = \frac{n_{T,i}}{N_{T,i}}$$

Where:

$M_{T,i}$ = mortality rate of "culled" fish on day i

$n_{T,i}$ = total number of "culled" fish that die on day i

$N_{T,i}$ = total number of "culled" fish held for evaluation (5 days) on day i

The reference mortality rate is $M_{R,i}$, where $n_{R,i}$ is the number of reference fish that died on any given day i , and $N_{R,i}$ is the number of reference fish held. The reference mortality rate used the function:

$$M_{R,i} = \frac{n_{R,i}}{N_{R,i}}$$

Where:

$M_{R,i}$ = reference mortality rate on day i

$n_{R,i}$ = total number of reference fish that die on day i

$N_{R,i}$ = total number of reference fish held for evaluation (5 days) on day i

To adjust the mortality rate for pen mortalities we subtracted the reference mortalities from the mortalities of “culled” fish to obtain an adjusted mortality rate M_i . The adjusted mortality rate used the function:

$$M_i = M_{T,i} - M_{R,i}$$

Where:

M_i = adjusted mortality rate of “culled fish” on day i

$M_{T,i}$ = delayed mortality rate of “culled” fish on day i

$M_{R,i}$ = reference mortality rate on day i

Results

Professional Bass Tournaments

Mortality rates varied greatly among the professional black bass tournaments selected as part of the bass fishing tournament pilot program in 2005 and 2006. Unadjusted total mortality rates ranged from 0% to 77.4% for LMB and 0% to 54.6% for SMB. Total mortality rates of

LMB ranged from 0% to 43.9%, and SMB from 0% to 55.5% when adjusted for reference fish mortalities. Combined LMB and SMB delayed mortality rates ranged from 0 to 66.0%. Adjusted delayed mortality rates ranged from 0% to 43.2% for LMB and 0% to 52.2% for SMB (Figures 3 & 4). LMB had higher delayed mortality rates than SMB in four out of five tournaments. Combined initial mortality rates for LMB and SMB ranged 0% to 2.4% (Figure 5). SMB suffered greater initial mortality rates than LMB, with SMB initial mortality rates ranging from 0% to 3.3%, while LMB initial mortality rates ranged from 0% to 1.2%. (See table 3). The highest mortality rates occurred at WC06 where the data was compromised. Chi square analysis showed a significant difference ($p < 0.05$) in mortality between treatment and reference fish and LC05, LC06, and WC06. (See table 3). LMBV was present in four of the six tournament fisheries (LC05, LC06, WC06, and MA06, see table 3). Tournaments taking place in fisheries where LMBV was present had greater mortality rates for LMB than tournaments taking place in fisheries where LMBV was absent especially when the water temperature was above 25°C (Table 3). Mean surface water temperatures ranged from 15.2°C to 27.9°C at all six tournaments. The three tournaments that had high mortality rates all took place in fisheries where the mean surface water temperature was > 25°C and LMBV was present. Mortality at MA06 was very low despite the presence of LMBV, because the mean surface water temperature was 16.7°C. Dissolved oxygen was only an issue at WC06 where dissolved oxygen levels occasionally dropped to very low levels (≈ 3.5 mg/l) which could have added to the mortality rates. There were sufficient dissolved oxygen levels (> 5 mg/l) at the holding pens during rest of the tournaments. (See table 3).

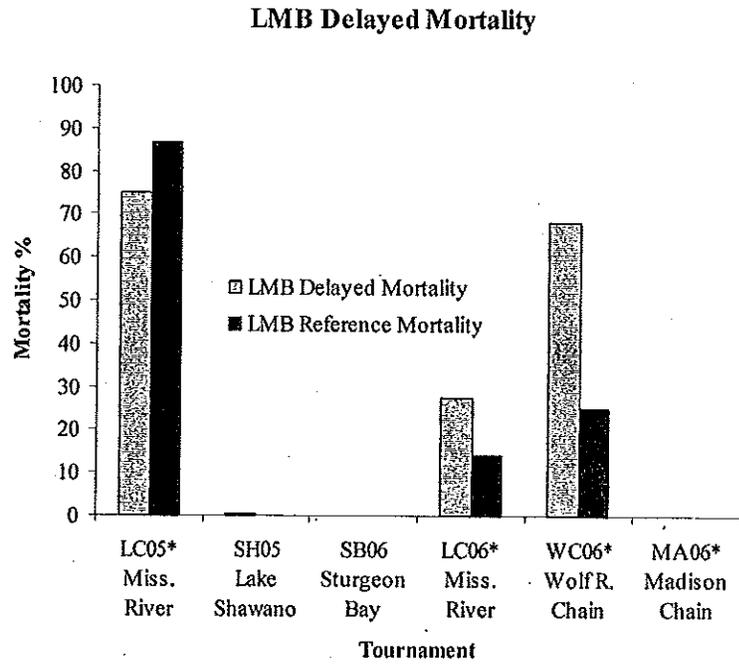


Figure 3. Delayed mortality rates of treatment and reference largemouth bass (LMB) at professional bass tournaments (* largemouth bass virus present).

SMB Delayed Mortality

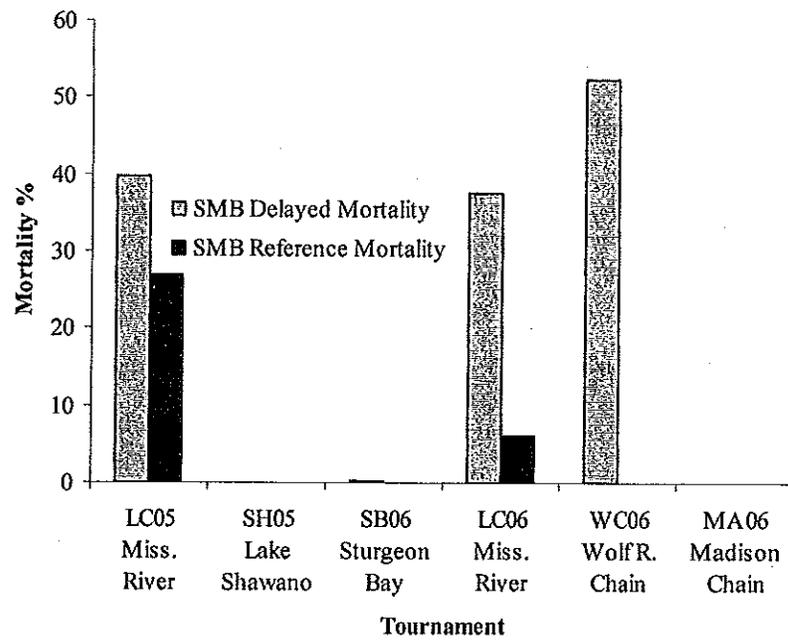


Figure 4. Delayed mortality rates of treatment and reference smallmouth bass (SMB) at professional bass tournaments.

Initial Mortality Rates

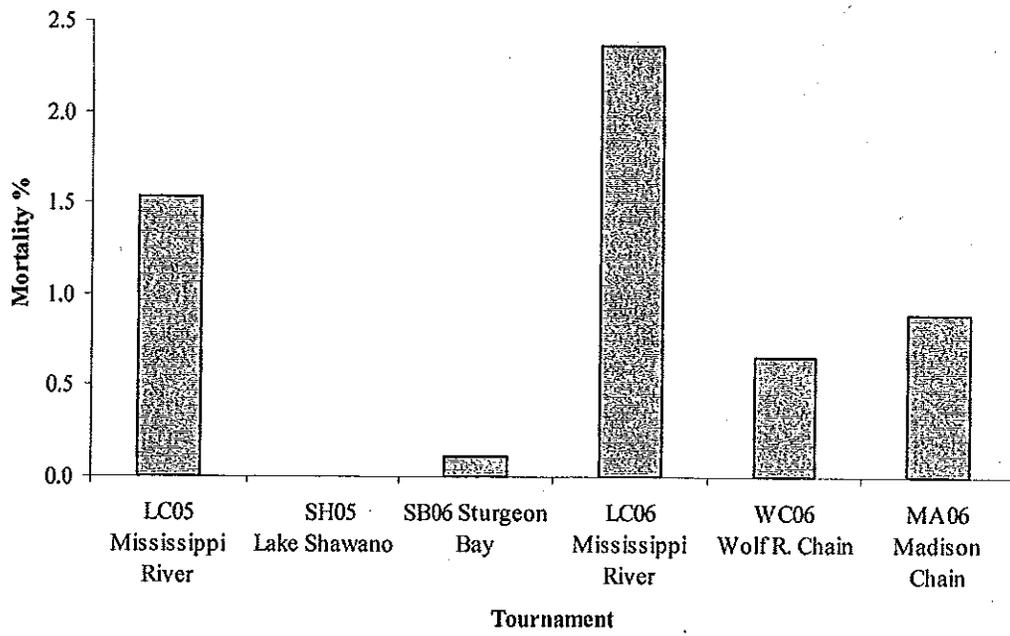


Figure 5. Initial mortality rates at professional bass tournaments.

Table 3. Summary of professional bass tournaments studied during 2005 and 2006. ¹ Combined largemouth and smallmouth bass initial mortality. ² Adjusted mortalities compromised due to problems with reference fish. ³ No fish used in study.

	Tournament					
	LC05	SH05	SB06	LC06	WC06	MA06
Date	Miss. River	Lake Shawano	Sturgeon Bay	Miss. River	Wolf R. Chain	Madison Chain
Mean Surface Water Temp (°C)	8/3-8/6/2005	9/24-9/25/2005	5/20-5/21/2006	7/12-7/15/2006	7/30/2006	9/23-9/24/2006
Surface Water Temp Range (°C)	27.2 ± 0.01458	16.5 ± 0.29991	14.6 ± 0.05239	27.3 ± 0.05289	27.8 ± 0.03912	16.7 ± 0.03427
LMBV Presence/Absence	26.4 - 28.2	12.7 - 18.6	11.9 - 17.5	24.8 - 30.9	24.5 - 29.2	12.9 - 17.8
Mean Surface D.O. (mg/l) at Pens	Present	Absent	Absent	Present	Present	Present
Mean Surface D.O. (mg/l) Range	9.6 ± 0.43604	12.5 ± 0.29759	11.9 ± 0.03908	10.5 ± 0.08313	7.3 ± 0.06077	10.6 ± 0.03351
Mean Bottom D.O. (mg/l) at Pens	6.1 - 13.3	8.9 - 14.4	8.5 - 13.7	7.1 - 17.0	3.8 - 9.5	8.8 - 12.6
Mean Bottom D.O. (mg/l) Range	8.3 ± 0.22434	12.3 ± 0.28670	12.3 ± 0.10348	7.3 ± 0.02898	7.0 ± 0.06651	9.9 ± 0.03191
Mean Bottom D.O. (mg/l) Range	5.91 - 9.77	8.9 - 14.0	7.7 - 18.9	4.8 - 9.6	3.4 - 9.7	8.1 - 11.9
LMB Total Mortality Rate (%)	-10.7	0.6	0	15.6	43.9	0
SMB Total Mortality Rate (%)	15.3	0	0.4	33.9	55.5	0
LMB Delayed Mortality Rate (%)	75.0	0.6	0	27.2	68.2	0
SMB Delayed Mortality Rate (%)	39.7	0	0.3	37.5	52.2	0
LMB Reference Mortality Rate (%)	86.8	0	NA ³	14.0	25.0	0
SMB Reference Mortality Rate (%)	26.9	NA ³	0	6.0	NA ³	NA ³
Adjusted LMB Delayed Mortality (%)	-11.8 ²	0.6	0	13.2	43.2 ²	0
Adjusted SMB Delayed Mortality (%)	12.8 ²	0	0.3	31.5	52.2 ²	0
LMB Initial Mortality Rate (%)	1.2	0	0	2.4 ¹	0.7	0.9
SMB Initial Mortality Rate (%)	2.6	0	0.1	NA ³	3.3	0
Total # LMB Weighed In	1551	275	16	2498	271	220
Total # SMB Weighed In	540	42	1741	634	30	6
Total # Treatment SMB	242	28	398	32	23	4
Total # Treatment LMB	711	172	2	180	173	183
Total # Ref LMB	106	91	0	50	8	100
Total # Ref SMB	26	0	101	50	0	0
Chi X ²	4.2519	0.4566	0.253	13.6242	5.7481	NA
p - value	0.0392	0.4992	0.6150	0.0002	0.0165	NA
Total # LMB Culled	286	1	6	924	43	6
Total # SMB Culled	149	0	1113	247	5	0
Reference Fish Compromised?	Yes	No	No	No	Yes	No

Simulated Tournaments

Three simulated tournaments were conducted resulting in varying mortality rates ranging from 0% to 43%. BA06 showed the highest adjusted mortality rate of 16%, while MI06 had a 0% mortality rate and much cooler water temperatures (Table 4). LMBV was absent at BA06 and MI06 (Table 4). The data from MAS06 was compromised because muskrats chewed many holes in the holding pens which consequently let most reference and treatment fish escape. BA06 was the only tournament we were able to evaluate mortality by hour at since MAS06 was compromised and no fish died at MI06 (Figure 6, Table 5). Dissolved oxygen levels were not an issue at any of the three simulated tournaments since the levels remained above 7.6 mg/l throughout the experiments. (See table 4).

Table 4. Summary statistics simulated tournaments bass tournaments in Wisconsin.

¹ Data compromised due to escape of reference and treatment fish.

	<u>Tournament</u>		
	BA06 Balsam Lake	MAS06 Madison Chain	MI06 Minocqua Chain
Date	6/17/2006	8/25/2006	9/8/2006
LMBV Presence/Absence	Absent	Present	Absent
Mean Surface Water Temp (°C)	23.1 ± 0.01734	24.2 ± 0.02139	20.0 ± 0.33473
Surface Water Temp Range (°C)	22.2 - 24.3	21.9 - 26.0	18.5 - 21.9
Mean Surface D.O. (mg/l) at Pens	8.5 ± 0.01693	9.6 ± 0.03045	9.9 ± 0.03271
Mean Surface D.O. (mg/l) Range	7.7 - 9.3	8.2 - 12.3	7.6 - 12.1
Mean Bottom D.O. (mg/l) at Pens	8.6 ± 0.01898	8.0 ± 0.02736	8.3 ± 0.01023
Mean Bottom D.O. (mg/l) Range	7.6 - 9.5	6.6 - 10.3	7.8 - 9.0
Mortality Rate (%)	43%	NA ¹	0%
Adjusted LMB Mortality Rate	16%	NA ¹	0%
Total # Treatment LMB	111	44	71
Total # Treatment SMB	0	0	0
Total # Ref LMB	59	8	41
Total # Ref SMB	0	0	0
Chi X ²	7.47	NA	NA
p - value	0.0583	NA	NA
Reference Fish Compromised?	No	Yes	No

Mortality by Hour at Balsam Lake Simulated Tournament

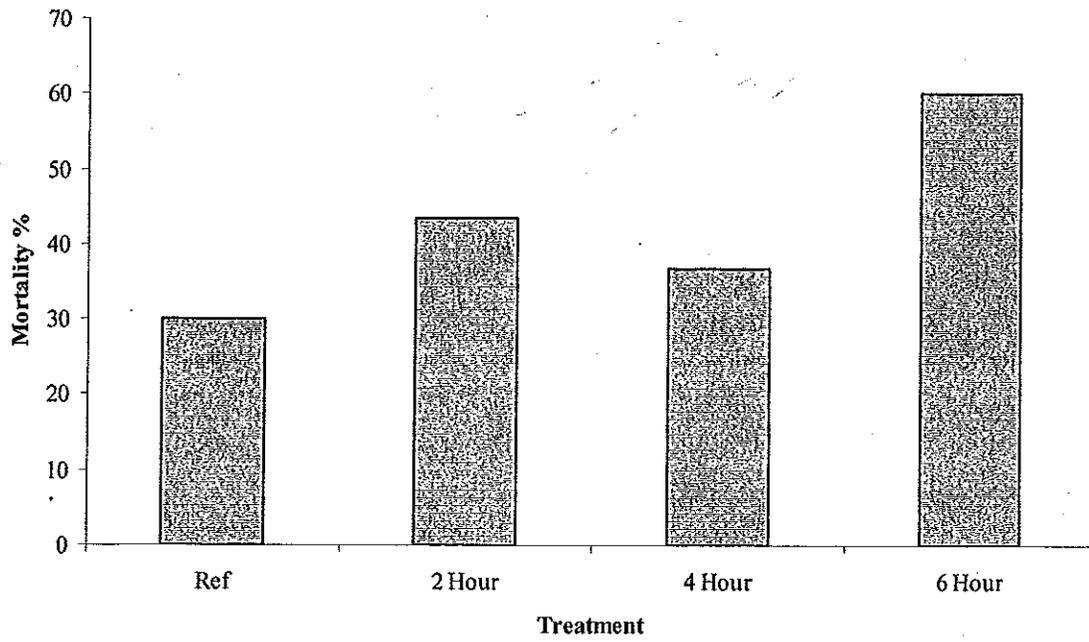


Figure 6. Mortality by treatment at BA06.

Table 5. Mortality by length of time fish were held until culled at Balsam Lake simulated tournament. Note, no fish died at Minocqua simulated tournament and the Madison simulated tournament could not be evaluated due to loss of fish from pens.

	<u>Ref</u>	<u>2 Hour</u>	<u>4 Hour</u>	<u>6 Hour</u>
	Balsam Lake			
Mortality %	30.0	43.3	33.7	60.0
Adjusted Mortality %	NA	13.3	6.7	30.0
	Minocqua Chain			
Mortality %	0	0	0	0
Adjusted Mortality %	NA	0	0	0

Discussion

Professional Tournaments

In general our findings concurred with the findings of previous studies (Neal and Lopez-Clayton 2001, Hartley and Moring 1995, Kwak and Henry 1995, Schramm et al. 1987, Edwards et al. 2004, Weathers and Newman 1997, Meals and Miranda 1994, Schramm et al. 2004). We found that high water temperatures combined with the presence of LMBV leads to high mortality rates, Similar to previous research that indicates high mortality rates for LMB when water temperatures exceed 25°C, especially when LMBV is present, and SMB when temperatures exceed 20°C (Figure 6) (see Edwards et al. 2004). In addition, a study conducted in the southeastern United States on fisheries that had largemouth bass virus found an average delayed mortality rate of approximately 76% for largemouth bass (Schramm et al. 2004). The study was conducted during the summer while average surface water temperatures ranged from 27.8-32.8°C (Table 6). The combination of largemouth bass virus and warm water temperatures played a significant role in the high mortality rates sustained by the largemouth bass. Smallmouth bass mortality rates were generally unaffected by largemouth bass virus presence or absence, because smallmouth bass are capable of carrying largemouth bass virus, but do not suffer any harmful effects from the virus. Initial mortality rates were lower than delayed mortality rates, especially when largemouth bass virus was present since largemouth bass mortalities are delayed 1-5 days while the fish succumb to the virus.

It is important to point out the technical problems we had at two of the six tournaments. At the Mississippi River tournament in 2005 our reference fish were held in a modified hoop net overnight prior to placement in the holding pens. This added stress to the fish by confining them in a smaller enclosure than the holding pen. The reference fish were crowded and did not have

Mean Total Mortality Rates at LMB Tournaments

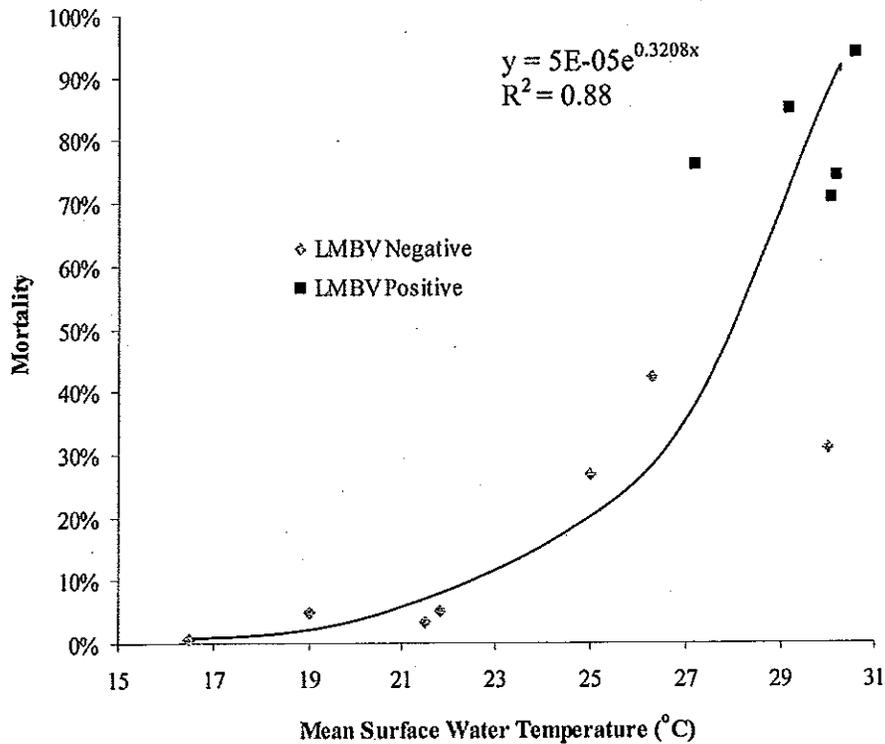


Figure 6. Mean total mortality rates for multiple LMB tournaments (including this study) throughout the United States. Each data point represents multiple studies (Neal and Lopez-Clayton 2001, Hartley and Moring 1995, Kwak and Henry 1995, Schramm et al. 1987, Edwards et al. 2004, Weathers and Newman 1997, Meals and Miranda 1994, Schramm et al. 2004). (need to add citation for the other data used in this figure).

Table 6. Selected tournament-associated mortality study results (Neal and Lopez-Clayton 2001, Hartley and Moring 1995, Kwak and Henry 1995, Schramm et al. 1987; Edwards et al. 2004, Weathers and Newman 1997, Meals and Miranda 1994; Schramm et al. 2004).

Tournament Location	Number of Tournaments Evaluated	Dates	Mean Surface Water Temperature (°C)	LMBV Presence/Absence	Mean Total Mortality Rate
No Largemouth Bass Virus					
Wisconsin	1	Sep. 2005	16.5	Absent	0.5%
Connecticut	54	Apr. 2001- Oct. 2002	21.5	Untested	3.2%
Minnesota	2	May 1992- Sep. 1992	19.0	Untested	4.8%
Maine	9	Jun. 1989- Oct. 1989	21.8	Pre-LMBV	5.0%
Florida	11	Jul. 1984- Jun. 1985	25.0	Pre-LMBV	26.7%
Alabama	14	May 1991- Sep. 1992	30.0	Untested	30.8%
Puerto Rico	15	Apr. 1999- Mar. 2000	26.3	Untested	42.0%
Largemouth Bass Virus Present					
Alabama	3	Jul. 2002-Aug. 2003	30.1	Present	70.7%
Mississippi	7	Jul. 2002-Sep.2003	30.2	Present	74.2%
Wisconsin	1	Aug. 2005	27.2	Present	75.0%
Missouri	1	Aug. 2002	29.2	Present	85.0%
Arkansas	1	Jul. 2002	30.6	Present	93.9%

adequate ventilation. The fish were subjected to additional stress when we removed them from the hoop net and placed into the holding pen. Consequently 75% of the reference fish died, which was 9% higher than the combined delayed mortality rate of the treatment fish.

We also had problems at the Winneconne tournament in 2006. The night after we collected reference fish, a severe thunderstorm came through, and the high winds and waves flipped the holding pen that the reference fish were in. Many of the reference fish were pinned to the surface of the pen since the net collapsed on itself. Approximately one quarter of the fish were dead when we arrived to check them the next morning. So we released the remaining reference fish and decided to try and collect more reference fish the day after the tournament. The air temperature was over 38°C the day after the tournament while we were electrofishing and subsequently we only captured eight reference bass. We are unable to get a realistic comparison of mortality with only eight reference fish. In addition to the mortality of the reference fish at Winneconne, on five separate occasions the dissolved oxygen content dipped below 5 mg/l in the holding pens during the five day observation period. We believe this contributed to the high mortality rate observed at this tournament, as dissolved oxygen contents below 5 mg/l are considered stressful to largemouth bass (Gilliland et al. 2002).

Simulated Tournaments

The results of our simulated tournaments are similar to the results of our professional bass tournaments. The Balsam Lake tournament was held under warm water conditions and had a higher mortality rate than the Minocqua Chain tournament which had cooler water temperatures. We expected increased mortality with increased retention time in livewells. However, more fish in the 2 hour treatment died than in the 4 hour treatment, but this may be a

result of small sample size. It is also possible we did not see this pattern because the time the fish was held in the livewell did not cause mortality, rather mortality may have been caused by the numerous other stressors the fish endured throughout the experiment.

Conclusion

Strict regulation of bass fishing tournaments when surface water temperature exceeds 25°C if LMB are the primary target species, and 20°C if SMB are the primary target species appears warranted. We recommend conducting further studies to determine the threshold for water temperatures in which no bass tournaments should be allowed. We also recommend the WDNR conduct an ongoing investigation into the present and future distribution of LMBV throughout Wisconsin's fisheries and its affect on tournament angling and catch-and-release fishing. Given our limited data, culling appeared to have a lesser impact on bass tournament mortality compared to the impacts of water temperature and LMBV.

Literature Cited

- Edwards, G. P., Jr., R. M. Nuemann, R. P. Jacobs, and E. B. O'Donnell. 2004. Factors related to mortality of black bass caught during small club tournaments in Connecticut. *North American Journal of Fisheries Management* 24: 801-810.
- Gilliland, E. R., H. L., Schramm Jr. 2002. Keeping bass alive: a guide book for anglers and tournament organizers. Bass Angler Sportsman Society, Montgomery Alabama. 44 p.
- Hartley, R. A., and J. R. Moring. 1995. Differences in mortality between largemouth and smallmouth bass caught in tournaments. *North American Journal of Fisheries Management* 15: 666-670.
- Kwak, T. J., and M. G. Henry. 1995. Largemouth bass mortality and related causal factors during live-release fishing tournaments on a large Minnesota lake. *North American Journal of Fisheries Management* 15: 621-630.
- Meals, K. O., and L. E. Miranda. 1994. Size-related mortality of tournament-caught largemouth bass. *North American Journal of Fisheries Management* 14: 460-463.
- Neal, J. W., and D. Lopez-Clayton. 2001. Mortality of largemouth bass during catch-and-release tournaments in a Puerto Rico reservoir. *North American Journal of Fisheries Management* 21: 834-842.
- Perry, S. G. 2002. Initial mortality in New Hampshire black bass fishing tournaments, 1997-2001. New Hampshire Fish and Game Department, internal agency report Concord, New Hampshire. 12 p.

- Schramm, H. L., Jr., P. J. Haydt, and K. M. Porter. 1987. Evaluation of prerelease, postrelease, and total mortality of largemouth bass caught during tournaments in two Florida lakes. *North American Journal of Fisheries Management* 7: 394–402.
- Schramm, H. L., Jr., J. Grizzle, L. Hanson, G. Gilliland. 2004. Improving survival of tournament-caught bass and the effects of tournament handling on largemouth bass virus disease. Internal Agency Completion Report. Mississippi Cooperative Fish and Wildlife Research Unit, Mississippi State University, Mississippi State, Mississippi. 120 p.
- Staggs, M. 2005. Bass fishing tournament pilot program evaluation plan. Internal Agency Report. Wisconsin Department of Natural Resources. 5 p.
- Weathers, K. C., and M. J. Newman. 1997. Effects of organizational procedures on mortality of largemouth bass during summer tournaments. *North American Journal of Fisheries Management* 17: 131–135.
- Wilde, G. R., K. L. Pope, and R. E. Strauss. 2003. Estimation of tournament mortality and its sampling variance. *North American Journal of Fisheries Management* 23: 779–786.

Appendix

Literature Review

Background and Origin of Black Bass Tournaments

Wisconsin has two black bass species, largemouth bass and smallmouth bass both of which play an integral role in Wisconsin fisheries (Simonson 2001). Adult largemouth and smallmouth bass are among the top predators in Wisconsin fisheries while young smallmouth and largemouth bass serve as prey for older centrarchids, esocids, and percids, as well as crayfish, birds, frogs, and snakes (Becker 1983).

Largemouth bass and smallmouth bass are two of the most popular sport fish in North America (Hartley et al. 1995). According to the Bass Angler Sportsman Society (B.A.S.S.) over 30 million people fished for bass in 2002 (Suski et al. 2004). In 1985, black bass overtook panfish as America's most popular sportfish (Suski et al. 2004). Black bass (*Micropterus* spp.) tournaments are a popular and increasingly important use of Wisconsin's fisheries resources. Under the current format of the vast majority of bass fishing tournaments (e.g. total-weight tournaments), fish are held in boat live wells until the end of the fishing day (Staggs 2005). They are then brought to a common location where each angler's daily creel is weighed (Staggs 2005). Anglers are penalized for weighing in dead fish as an incentive to keep fish alive; live fish are then released after being weighed (Staggs 2005). The angler with the highest weight of captured fish wins one or a combination of prizes, trophies, and/or money.

Tournament angling has increased concurrently with the increase in bass angling. Bass tournaments originated in the southern states; in 1955, the first organized bass tournament was held on Lake Whitney, Texas with seventy-three anglers participating in the tournament (Suski et al. 2004). By the 1970's, tournaments were being held across the Midwest and parts of the western United States (Ostrand et al. 1999). In the north-central United States, the number of

waters on which black bass tournaments occurred doubled from 161 in 1978 to 330 in 1983 (Kwak et al. 1995). At least 30,000 competitive fishing tournaments now occur annually across North America (Suski et al. 2004).

Organized bass associations became established as black bass tournaments became more popular. Ray Scott founded B.A.S.S. in 1968 in Alabama to organize American bass anglers, promote bass tournaments, support fisheries management, and elevate the sport (Suski et al. 2004). Since the organization was founded, membership has increased from 100 anglers to over 600,000 anglers in 2003 (Suski et al. 2004).

During early days of competitive black bass tournaments (1950's - 1970's), mortality rates were high due to generous size and catch limits and high retention rates (i.e., keeping fish) (Ostrand et al. 1999). Therefore, in 1972, Ray Scott started the "Don't Kill Your Catch" program in an effort to reduce tournament-associated mortality (Suski et al. 2004).

Improvements were made in aerating live-wells and developing catch-and-release techniques that dramatically improved largemouth bass survival rates (Figure 1) (Ostrand et al. 1999). These improvements were made by the late 1970's and early 1980's and subsequently reduced mortality rates (Ostrand et al. 1999).

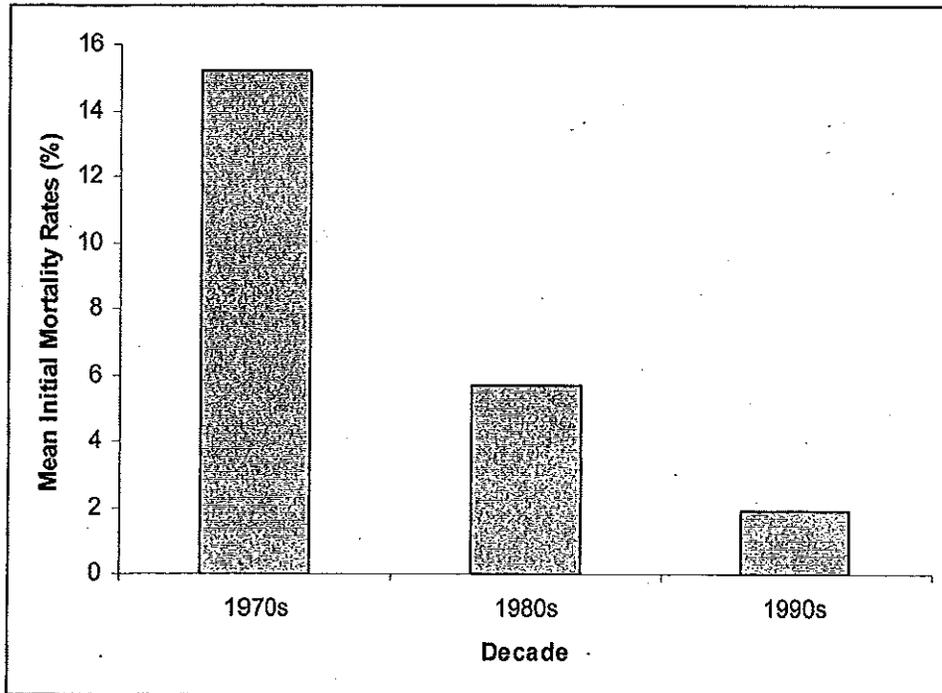


Figure 1. Mean initial mortality rates of black bass tournaments from 1970-2000 (Ostrand et al. 1999).

Problematic Issues Concerning Black Bass Tournaments

Many anglers are concerned about the potential biological and social impacts of competitive fishing (Schramm et al. 1991). The main issue of concern is the belief by many non-tournament anglers that the majority of tournament-caught fish do not survive angling, handling, confinement, weigh-in, and release (Ostrand et al. 1999). For instance, a survey conducted in Texas found 51% of black bass anglers believe tournaments harm their fishing experience by reducing their catch rates and a number of other reasons (Wilde 1998) which will be discussed later. In 1984, 32% of Indiana anglers thought tournaments hurt fishing; that number increased to 45% by 1994 due to social problems between non-tournament and tournament anglers (Pearson 2003).

Tournament and Non-Tournament Angler Attitudes

Fishery managers have become increasingly aware of the importance of managing anglers and have attempted to understand the attitudes and goals of anglers to appropriately manage fishery resources (Schramm 1991). Grouping anglers according to their type of participation in fishing provides insight to fishery managers on the diversity of motivations and fishing experiences preferred by black bass anglers that is not obtainable when anglers are lumped into one group (Wilde et al. 1998). So to further understand the issues concerning bass tournaments a mail survey of Texas black bass anglers was conducted in 1992 (Wilde et al. 1998). The survey sought to identify the motives, attitudes and demographic characteristics of tournament and non-tournament anglers (Wilde et al. 1998). The study used specific contexts of a fishing experience to help illustrate the importance in explaining a number of differences among angler groups which can help fishery managers manage for the specific fishing experiences desired by different anglers and angler groups.

The survey found differences in tournament and non-tournament demographic characteristics and fishing participation (Wilde et al. 1998). Specifically, the survey found 17.8% of Texas black bass anglers participated in tournaments (Wilde et al. 1998). The survey also found tournament anglers to be younger, fished more frequently, often male, often belong to fishing clubs, and viewed themselves as more skilled (Wilde et al. 1998). The study also found tournament anglers and non-tournament anglers have different motives for fishing (Wilde et al. 1998). For example, tournament anglers were more prone to fish for “experience, adventure, and excitement” and to “experience new and different things”, while non-tournament anglers were more interested in obtaining fish for consumption (Wilde et al. 1998) (tournament anglers were found to be less interested in keeping their fish). Tournament anglers placed greater importance on developing their skills, obtaining trophy fish, winning a prize, and challenge or sport as reasons for fishing than non-tournament anglers (Wilde et al. 1998).

When compared to non-tournament anglers the tournament anglers were more heterogeneous in their attitudes toward fishing (Wilde et al. 1998). For example, tournament anglers were more concerned with catching larger trophy bass and catching specific species than non-tournament anglers (Wilde et al. 1998). Tournament anglers and non-tournament anglers also had different views about the impacts of tournament fishing on fishing quality (Wilde et al. 1998). Only 27% of tournament anglers believed tournaments harmed their fishing while 51% of non-tournament anglers believed tournaments harmed their fishing (Wilde et al. 1998). Tournament anglers were (88.3%) more likely to believe most bass survived tournament weigh-in and release than non-tournament anglers (55.8%) (Wilde et al. 1998).

The results of this study were consistent with those from previous studies comparing tournament and non-tournament anglers (Wilde et al. 1998). The study concluded tournament

and non-tournament anglers do have certain fishing behaviors, motives, and attitudes in common, but also have some important differences. The study also concluded tournament anglers are more specialized than non-tournament anglers and in general have different motives for fishing (Wilde et al. 1998).

As a major and growing use of fishery resources, it is important for fishery managers to effectively integrate competitive fishing with other fishery and aquatic resource uses (Schramm et al. 1991). Fishery managers can manage fisheries more effectively when they are aware of the specific needs of the different angler groups which then allow the fisheries managers to manage for those needs. By providing a variety of different fishing experiences for different user groups, fishery managers can potentially help eliminate future conflicts among different user groups. Allocation and rulemaking by fishery managers therefore need to be especially sensitive to user group differences.

Tournament-Associated Mortality

Again, the main issue of concern and primary focus of this study is tournament-associated mortality. Subsequently, tournament-associated mortality of black bass has been studied since the early 1970s to help quantify impacts on fisheries, and results show highly varying rates of bass mortality, ranging from 0 to 98% (Wilde 1998, Neal and Lopez-Clayton 2001). In such studies, mortality is classified as either initial or delayed mortality: initial mortalities are fish which die before or during weigh-in and delayed mortalities are fish which die after being weighed-in and released (usually determined in holding pens). The data on tournament-associated mortality show that initial mortality of black bass was greatest in the 1970s ($\bar{x} = 15.2\%$), decreased in the 1980s ($\bar{x} = 5.7\%$), and decreased further in the 1990s ($\bar{x} = 1.9\%$) (Ostrand et al. 1999). As a portion of total mortality, delayed mortality rates have shown

high variation among studies ranging from less than 5% to greater than 90% (Table 1) (Kwak and Henry 1995, Schramm et al. 1987, Edwards et al. 2004, and Schramm et al. 2004).

Widespread adoption of live-release practices and improved procedures for handling captured bass likely reduced tournament-associated mortality.

Even though tournament-associated mortality rates have varied from 0-98%, in general, tournaments have not been considered a major factor in reducing the size of fish populations since catch-and-release procedures were established (see Table 1) (Schramm et al. 1991). This is partially because not all tournaments have high mortality rates. However, the black bass tournaments with high mortality rates can potentially have negative biological impacts on fish populations such as reducing the number of black bass over the legal length limit (Suski et al. 2004). Fishery managers are also concerned that some tournaments may harm fisheries by simply increasing and concentrating fishing effort and increasing black bass mortality (Meals and Miranda 1994). Again, the primary focus of this study will be on mortality rates sustained by tournament-caught black bass.

Table 1. Selected tournament-associated mortality study results.

Tournament Location	Number of Tournaments Evaluated	Dates	Mean Surface Water Temperature (°C)	LMBV Presence/Absence	Mean Total Mortality Rate
No Largemouth Bass Virus					
Wisconsin	1	Sep. 2005	16.5	Absent	0.5%
Connecticut	54	Apr. 2001- Oct. 2002	21.5	Untested	3.2%
Minnesota	2	May 1992- Sep. 1992	19.0	Untested	4.8%
Maine	9	Jun. 1989- Oct. 1989	21.8	Pre-LMBV	5.0%
Florida	11	Jul. 1984- Jun. 1985	25.0	Pre-LMBV	26.7%
Alabama	14	May 1991- Sep. 1992	30.0	Untested	30.8%
Puerto Rico	15	Apr. 1999- Mar. 2000	26.3	Untested	42.0%
Largemouth Bass Virus Present					
Alabama	3	Jul. 2002-Aug. 2003	30.1	Present	70.7%
Mississippi	7	Jul. 2002-Sep.2003	30.2	Present	74.2%
Wisconsin	1	Aug. 2005	27.2	Present	76.0%
Missouri	1	Aug. 2002	29.2	Present	85.0%
Arkansas	1	Jul. 2002	30.6	Present	93.9%

Stressors

Variables Associated with Tournament Mortality

Many studies have assessed sources of tournament-associated mortality, physiological responses, and sublethal effects and have recommended ways of eliminating or reducing mortality (Weathers et al. 1997). These physiological stressing factors or variables have been studied to help isolate the causes of tournament-associated mortality. These factors include osmo-regulatory dysfunction (Carmichael et al. 1984), fatigue (Parker 1959), stress induced from hooking and landing (Gustaveson et al. 1978), hooking location (Pelzman 1978), live-well conditions (Plumb et al. 1988), live-well densities (Schramm et al. 1985), fish size (Meals and Miranda 1994), use of chemical water conditioners in live-wells (Carmichael et al. 1984), water temperature (Carmichael et al. 1984), time of year and geographical location of tournaments (Ostrand et al. 1999), water quality (Carmichael et al. 1984), length of confinement of fish in boat live-wells (Seidensticker 1975), length of tournament (Bennet 1989), tournament size (Schramm et al. 1985), weigh-in procedures (Hartley et al. 1995), handling procedures (Welborn et al. 1974), environmental conditions of tournament waters (Kwak et al. 1995), and bacterial and fungal infections (Welborn et al. 1973). The following pages will examine these variables to give an overview of the findings of previous studies.

Stress as an Underlying Effect

Physiological stress, from angling, confinement, handling, and weigh-in procedures, are the root causes of mortality during bass tournaments. Plasma glucose and corticosteroid levels in the blood of angled bass have been evaluated because they are good indicators of acute stressors, whereas chloride and osmolality have been studied because they are useful as good indicators of long-term stress and patterns of recovery after stressors are removed (Table 2) (Carmichael et al.

1984). Research showed short-term exposure to poor water quality alters plasma corticosteroids and glucose but has little effect on plasma chloride or osmolality (Carmichael et al. 1984).

Placing a bass in water that is abruptly different in temperature causes elevations in plasma corticosteroid and glucose concentrations and reduced plasma chloride and osmolality (Carmichael et al.1984). Confinement causes elevated glucose and corticosteroid levels and reduced osmolality and chloride values (Carmichael et al. 1984). Bass require 14 days to recover normal plasma characters after being confined for 2 days (Carmichael et al. 1984). This study highlights the importance of maintaining proper live well temperatures and holding bass for as short a time as possible. These topics will be discussed in greater detail in the following pages.

Table 2. Blood-plasma characteristics of largemouth bass exposed to high and low concentrations of oxygen, high carbon dioxide concentrations, and elevated ammonia concentrations (Carmichael et al. 1984). Groups of fish were treated alone (unconfined) and with a 30-minute net stress (confined). Values represent mean \pm SE; N = 6 for each treatment and 30 for control fish; meq = milliequivalents; mOsm = milliosmoles; ND = nondetectable. Asterisks denote significant differences (analysis of variance; $P \leq 0.05$) from control value (*) or from both control and recovery values (**).

Test Phase	Concentration (mg/liter)		Corticosteroids (μ g/100 ml)		Glucose (mg/dl)	
	Unconfined	Confined	Unconfined	Confined	Unconfined	Confined
Control ^a	0.7 \pm 0.1	8.5 \pm 0.7	61 \pm 3	124 \pm 8		
			<i>Dissolved Oxygen</i>			
After brief exposure	<1	4.6 \pm 0.8 ^b	132 \pm 16**	137 \pm 11		
After 24 hours' recovery	5-6	11.9 \pm 1.2 ^b	42 \pm 7	116 \pm 13		
After 24 hours' exposure	11	9.5 \pm 2.4	60 \pm 6	116 \pm 11		
After 24 hours' recovery	5-6	11.2 \pm 1.3	39 \pm 11	121 \pm 15		
			<i>Carbon Dioxide</i>			
After 24 hours' exposure	135	13.1 \pm 2.8	289 \pm 10**	194 \pm 29**		
After 24 hours' recovery	35	12.3 \pm 3.0	62 \pm 6	130 \pm 10		
			<i>Un-ionized Ammonia</i>			
After 24 hours' exposure	0.04	6.6 \pm 1.2	80 \pm 11	200 \pm 13*		
After 24 hours' recovery	ND	8.8 \pm 1.4	114 \pm 13*	210 \pm 16*		
After 24 hours' exposure	0.2	7.0 \pm 1.0	173 \pm 8**	279 \pm 52**		
After 24 hours' recovery	ND	6.7 \pm 1.2	71 \pm 6	135 \pm 13		

^a Ambient concentrations of oxygen (5-6 mg/liter), carbon dioxide (35 mg/liter), and ammonia (ND) were present in control situations.

^b Significant difference between values, but none from control.

Table 2. extended.

	Chloride (meq/liter)		Osmolality mOsm/liter	
	Unconfined	Confined	Unconfined	Confined
	111 ± 1	109 ± 2	314 ± 4	329 ± 5
	110 ± 3	115 ± 2	294 ± 8	337 ± 10
	113 ± 3	115 ± 2	296 ± 3	305 ± 5
	118 ± 2	116 ± 1	305 ± 4	320 ± 6
	115 ± 3	119 ± 2	292 ± 7	310 ± 8
	108 ± 3	105 ± 2	331 ± 4	332 ± 4
	102 ± 3*	97 ± 6	317 ± 7	326 ± 8
	111 ± 2	117 ± 4	304 ± 3	325 ± 3
	118 ± 4	117 ± 2	310 ± 2	323 ± 7
	109 ± 2	109 ± 2	301 ± 3	308 ± 4
	98 ± 5*	110 ± 1	294 ± 4	309 ± 2

Hooking and Handling

Hooking and handling bass had long been believed to be associated with tournament-associated mortality (Gustaveson et al. 1991). Hooking and playing bass causes blood chemistry alterations due to a physiological stress response (Gustaveson et al. 1991). This fatigue is indicated by elevated blood lactate levels and is directly proportional to hooking time and water temperature (Gustaveson et al. 1991). Data collected on Lake Powell, Utah in March, May, and July of 1990 at different water temperatures, (11°C - 30°C), found fish hooked and played for less than one minute were well within stress tolerance limits, even when played for five minutes (Gustaveson et al. 1991). This study also showed fish played to exhaustion take longer to recover, or return to baseline blood chemistry levels, (which were determined at hatcheries with resting wild largemouth bass), than fish that are landed quickly. But in both cases elevated glucose and lactate levels are greatly reduced after 24 hours of recovery (Gustaveson et al. 1991). Researchers concluded hooking stress alone is not directly responsible for acute or delayed mortality, because the treatment fish were able to fully recover and they saw no mortalities in their experiments, especially among fish caught at water temperatures of 11-13°C (Gustaveson et al. 1991). Gustaveson et al. (1991) suggested encouraging anglers to play and land fish within 2-3 minutes; hold tournaments during seasons when water temperatures are cool and the fish are in shallower water; and require the use of aerated live wells for holding released fish in an effort to reduce stress and ultimately reduce mortality.

Hooking location has been studied to evaluate hooking mortality. An experimental study using hatchery reared fish, involved hooking by hand largemouth bass in different locations of the mouth (Pelzman 1978). The mouths of the bass' were divided into six major

areas, and approximately 50 fish per area were hooked. The study only found significant mortality ($P < 0.05$) of treatment fish hooked in the esophageal area due to hemorrhaging in the pericardial cavity (Pelzman 1978). The author suggested anglers avoid using small lures and baits, as they are more prone to hooking bass in the esophageal area.

Live Well Conditions

Bass are vulnerable to stress from a number of water quality conditions which are present while they are held in live wells. These stressors will be discussed in the following sections, but first I will give you a brief overview of live wells. Live wells are portable fish tanks used to hold fish captured by anglers. Most modern bass boats have at least one live well built into the floor of the boat. Water is typically sprayed into the live wells by a pump which helps aerate the water entering the live well. Overflow valves are placed near the top of the live well which allows excess water to drain. Live wells are designed this way to allow fish to receive fresh, aerated water and to remove accumulated waste products (Suski et al. 2005).

Live Well Densities

Live well fish densities are believed by fisheries researchers to be related to tournament-associated mortality (Wilde et al. 2002; Schramm et al. 1985). So numerous studies evaluated correlations between live-well densities and tournament-associated mortality and found significant relationships (Wilde et al. 2002; Schramm et al. 1985). Increased creel limit, mean weight, and fish per angler increase live well fish densities. Initial mortality in B.A.S.S. tournaments held from 1983-1998, showed significant correlations with creel limit ($P = 0.0044$), mean weight ($P = 0.0005$), and fish per angler ($P < 0.0001$) (Wilde et al 2002). Logistic regression showed creel limit to affect initial mortality

the most (Wilde et al 2002). However, another study conducted in Florida did not find a significant relationship between mean catch per team and initial, delayed, and total mortality rates (Schramm et al. 1985). To help keep mortality rates to a minimum, Gilliland et al. 2002 recommends no more than 0.45 kilograms (1 pound) of fish per 3.79 liters (1 gallon) of water should be placed in a live-well.

Fish Size

An evaluation of size related mortality on tournament-caught largemouth bass by Meals and Miranda (1994) found prerelease mortality of large fish (total length > 457.2 mm) was significantly greater ($P < 0.05$) than the average mortality of small fish. Prerelease mortality of was recorded at bass tournaments on Sardis Reservoir, Mississippi, from 1989-1991. Large fish mortality averaged 29% while small fish mortality averaged 9%. Not surprisingly, mortality increased significantly with water temperature and mean number of fish per boat in large ($P < 0.10$) and small ($P < 0.05$) fish (Meals and Miranda 1994). The authors expected this result, because increased weight of largemouth bass in a live well exerts a greater demand for available oxygen.

Water Conditioners

When bass tournaments began, live wells occasionally lacked devices to circulate or aerate water. Because harmful metabolites build up in live wells during bass tournaments, techniques for improving water quality have been sought. Initial solutions included aerating and recirculating live well water. Later, techniques for thermal regulation of live wells were developed (e.g., ice, electric coolers). As part of these potential solutions, chemical water conditioners were also evaluated in an effort in increase live well water quality. A study conducted in 1988 found the addition of water conditioners to live wells enhanced survival of

largemouth bass ($P < 0.05$) (Plumb et al. 1988). In this study, the water conditioner was a mixture of sodium chloride, potassium chloride, sodium thiosulfate, pyrogenic silica, dimethylketone, alpha-methylquinoline, methylene blue, nitromersol, EDTA, triethyleneglycol, and acriflavine (Plumb et al. 1988). Bass held in live wells, with the water conditioner for 3 to 9 hours, had a 96.5% survival rate, while bass held in ponds with no water conditioner had a survival rate of 90.8% (Plumb et al. 1988). A simpler additive, non-iodized salt at a 0.5% solution is also widely accepted as a useful tool in reducing stress in live wells (Gilliland and Schramm 2002). The salt aids the bass in osmoregulation, while water conditioners aid bass in a number of ways including osmoregulation and protection against secondary infections which should help reduce stress and mortality (Gilliland and Schramm 2002).

Water Temperatures

Of all the variables related to black bass tournament-associated mortality, water temperature is consistently the most significant variable related to initial and delayed mortality (Gilliland et al. 2002); both waterbody temperatures and live well water temperatures can affect mortality. Removing fish from their aquatic habitat and placing them into a live well can potentially be lethal if there is too large of a difference in the water temperatures and/or water chemistry (Gilliland et al. 2002). Largemouth bass can survive in water from 35.6°C to 0°C (Becker 1983). Depending on weather, water temperatures can potentially change rapidly in live wells. The exact range of thermal shock that bass can survive is unknown, however, a rapid increase of 2.78°C or decrease of 5.56°C in water was shown by Gilliland et al. (2002) to immobilize, kill, or cause loss of equilibrium to some fish species (Gilliland et al. 2002). Because bass slowly acclimate to water temperature and

water chemistry, live well water should come from the same habitat the angler is fishing to reduce any impacts of thermal shock or shock from changes in water chemistry (Gilliland et al. 2002). Also, bass angled from deeper cooler water are often placed into live wells containing warmer epilimnetic water from the surface. To prevent this, live well temperatures need to match the temperatures the bass are coming from or be slightly cooler to reduce stress.

Time of year and geographical location in which fishing tournaments are held are two important factors related to tournament-associated mortality, primarily due to their relation with water temperature. A compilation of eight studies by Wilde (1998) found a strong positive relation between water temperature and both initial ($r = 0.51$) and delayed mortality ($r = 0.36$). A study conducted by Schramm et al. (1987) on eleven tournaments in Florida found prerelease and total mortality rates to be significantly ($p \leq 0.05$) related to water temperature. Initial and delayed mortality rates were also found to be significantly ($p < 0.0001$) related to water temperature in Connecticut tournaments as well (Edwards et al. 2004).

Generally, northern states have lower mortality rates at tournaments than southern states. This is partially a function of cooler average water temperatures, which is why most North American tournaments today follow a south to north circuit from spring to fall (Kwak et al. 1995). Consequently, fishery managers suggest limiting tournament activity during the hottest summer months (Edwards et al. 2004). Nonetheless, the majority of bass tournaments throughout North America are held on weekends from around daybreak to early afternoon from May through October (Ostrand et al. 1999). Therefore, a study was conducted to quantify mortality rates during different seasons and after evaluating 2,072 Texas black bass

tournaments, initial mortality rates in winter were found to be less than 2%, increasing in the spring and climaxing in the summer at 8% (Ostrand et al. 1999). During summer the probability of initial mortality increases exponentially at temperatures above 25 °C for largemouth bass and above 20°C for smallmouth bass (Figure 2) (Edwards et al. 2004). Neal et al. (2001) concerned with these findings, conducted a study using 15 bass tournaments on a Puerto Rican reservoir and found when mean surface water temperature was above 25 °C, total mortality rates (54.0%) were more than threefold higher than tournaments with lower mean surface temperatures (16.8%) (Neal et al. 2001).

Seasonal differences in tournament-associated mortality can sometimes be attributed to physiological condition rather than water temperature. A study conducted in Minnesota during September of 1991 and May of 1992 found all estimates of mortality to be significantly higher in the May tournament even though the surface water temperatures were on average 5°C cooler in May (Kwak et al. 1995). The higher mortality rates in May were attributed to post-spawn stresses (Kwak et al. 1995).

Dissolved Oxygen

Reduced dissolved oxygen, particularly at higher water temperatures, is believed to contribute to mortality of bass in live wells (Gilliland and Schramm 2002). Catching and handling increases the oxygen demand of bass due to increased aerobic activity, which is why it is imperative to hold bass in live wells that are properly oxygenated and thermally regulated (Gilliland et al. 2002). A dissolved oxygen level of 5 mg/l is considered stressful to black bass, whereas a dissolved oxygen level of 3 mg/l is considered lethal (Gilliland et al. 2002). In general, water temperature is inversely correlated to the dissolved oxygen content in water: the saturation point of water is 11.3 mg/l at approximately 10°C whereas the

saturation point of water at 35.6°C is 6.6 mg/l (Gilliland et al. 2002). If bass are held in live wells with no aeration, the dissolved oxygen content would quickly be depleted to lethal levels.

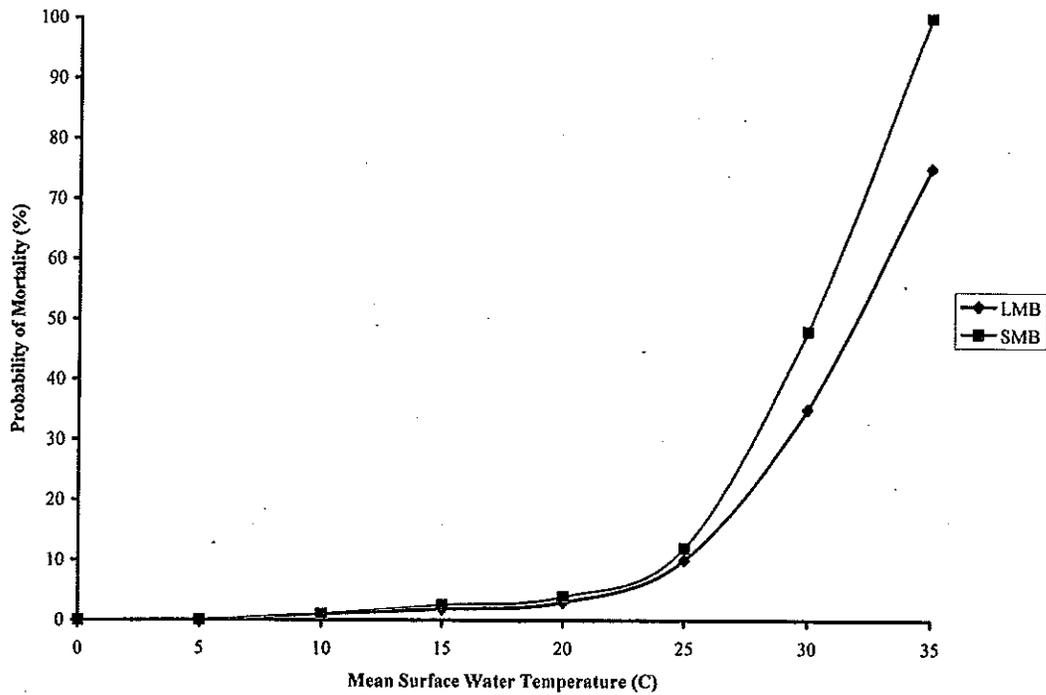


Figure 2. Initial mortality of tournament-caught largemouth bass and smallmouth bass in relation to surface water temperature (Edwards et al. 2004).

Metabolic Waste

Reduced dissolved oxygen and thermal shock are not the only problems associated with water temperature. As water temperature increases, metabolic rates of bass increase thus increasing metabolic wastes such as carbon dioxide and ammonia (Kwak and Henry 1995). A study conducted on 11 tournaments in Minnesota found the percentage of dead fish in live wells was significantly ($p < 0.05$) and inversely correlated with pH, which is a byproduct of metabolic waste (Kwak and Henry 1995). Acidity increases with high levels of dissolved carbon dioxide, and high levels of acidity, carbon dioxide, or both in live wells can cause bass mortalities (Kwak and Henry 1995). During the Minnesota tournaments, pH was found to be significantly and inversely correlated with dead bass in a live well. Another byproduct of metabolic waste, ammonia, is also toxic to bass and becomes more of a problem as water temperature increases (Gilliland et al. 2002). Problems associated with carbon dioxide or ammonia buildup can be avoided if the live-well is properly aerated (Gilliland et al. 2002).

Confinement and Handling Time

Stress caused by confinement time contributes to increased mortality rates (Carmichael et al. 1984). Confinement time can be defined as the time between catching a particular bass and weighing in that particular bass. In a compilation of data conducted on 15

bass tournaments held in Puerto Rico, confinement time showed a positive correlation with initial mortality ($r = 0.520$; $P = 0.043$) but not a significant relationship to total mortality (Neal et al. 2001). A compilation of data from 99 bass tournaments held in Connecticut used logistic regression to show positive correlations between initial mortality and total handling time (Wald $\chi^2 = 14.09$; $P = 0.0002$) and fishing day length (Wald $\chi^2 = 4.95$; $P = 0.0261$) (Edwards et al. 2004). Shorter tournament fishing days seem to improve survival of harvested bass, by reducing the amount of time in which bass are subjected to stressors (Seidensticker 1975). The Texas B.A.S.S. Federation held a bass tournament on March 30 and 31, 1974 where anglers were allowed to fish for 10 hours on the 30th and 7 hours on the 31st. Initial mortality was 31% on the 30th and 11% on the 31st; indicating shorter fishing days reduce mortality rates (Seidensticker 1975).

Environmental Conditions other than Water Quality of Tournaments

Environmental conditions such as air temperature and cumulative radiation during tournaments have been studied by fisheries researchers to assess other effects of tournament angling on mortality (Neal and Lopez-Clayton 2001, Schramm et al. 1985). Researchers presumed increased air temperature and increased cumulative radiation could increase mortality rates by increasing water temperatures and stressing bass. However, a compilation of data from multiple studies failed to find correlations between air temperature or cumulative radiation to tournament-associated mortality (Schramm et al. 1987, Neal and Lopez-Clayton 2001, Schramm et al. 1985). The attempts of many anglers to cool or maintain live well water temperatures are presumed responsible for the insignificance of air temperature and cumulative radiation on mortality (Schramm et al. 1985).

Bacterial and Fungal Infections

Studies have been conducted to see if mortality rates increase as a result of secondary bacterial and fungal infections caused by angling and weigh-in activities (Archer et al. 1975). Increased stress reduces black bass' immunosuppressant capabilities which increase the likelihood of bass suffering complications from bacterial and fungal infections. However, past failures to achieve significant improvements in post-release survival of angler-caught fish with antibiotic injections leads researchers to believe neither internal nor external bacterial disease significantly affects post-release survival of angler-caught largemouth bass (Schramm et al. 1987). For instance, in multiple experiments fish were given drugs after capture and held in holding ponds and raceways for observation with fish that had not been administered drugs and found no significant difference in mortality rates. These studies conducted in 1973 and 1974 suggested administration of Terramycin is of questionable value in the promotion of post-tournament survival of largemouth bass after failing to significantly reduce mortality when compared to untreated fish (Archer et al. 1975, Seidensticker 1975). Potassium permanganate is another oxidizing agent which has been found to have no significant impact of survival of largemouth bass (Schramm et al. 2004). Another study conducted in Mississippi suggested the administration of oxytetracycline to captured largemouth bass was not beneficial in reducing mortality of the released bass (Plumb et al. 1975). With multiple studies failing to reduce mortality rates with the use of antibiotics, bacterial and fungal infections are not considered a significant factor impacting tournament-caught bass mortality rates. Furthermore, the authors agreed that the adoption of routine antibiotic injection into released bass does not appear to be feasible either in efficacy or from a practical standpoint (Plumb et al. 1975).

Weigh-in

Weigh-in is an important factor contributing to the physiological disturbance in tournament fish (Suski et al. 2004). Two distinct components of tournaments cause severe bouts of anaerobic activity which decrease survival capabilities of tournament-caught bass: angling and weigh-in (Suski et al. 2004). A simulated study conducted at the Queen's University Biological Station on Lake Opinicon, Ontario evaluated the effects of weigh-in on largemouth bass. The results showed a 700% increase in lactate, a 75% decrease in white muscle phosphocreatine, a 46% decrease in ATP, and a 62% decrease in glycogen relative to control largemouth bass using the enzymatic assay methods of Lowry and Passonneau (1972) (Suski et al. 2004). These physiological changes result from a combination of physical activity, air exposure, and hypoxia from the use of non-aerated weigh-in bags (Suski et al. 2004). The magnitude of physiological changes caused during simulated weigh-ins were similar to those caused by simulated angling activities suggesting weigh-in is as physiologically detrimental as angling was, consequently affecting mortality (Suski et al. 2004). A study conducted in Connecticut suggested tournament-associated mortality may be reduced by increasing the efficiency of weigh-in procedures at tournaments, which reduces physiological stress (Edwards et al. 2004).

Tournament Size

Tournament size has been studied as a factor resulting in tournament-associated mortality. The size of tournaments is believed to correspond (positively) to the efficiency in which fish are weighed in and the care of the fish (Wilde 1998). In a compilation of data from 130 bass tournaments across the U.S.A., tournament size has been negatively correlated with initial mortality of tournament caught bass ($r = -0.54$), and positively correlated with delayed mortality ($r = 0.30$), suggesting large tournaments have reduced mortality rates

(Wilde 1998). Similarly, for 2,072 Texas bass tournaments, the mean initial mortality rate of 1.8% was recorded for the large tournaments, (tournaments with 50 or more boats) whereas the small tournaments had a higher rate of 4.1% (Ostrand et al. 1999). Both authors suggest larger tournaments are typically better organized and have stricter rules and procedures than smaller tournaments which reduced handling time, thus reducing mortality (Wilde 1998, Ostrand et al. 1999).

Review of Stressors

While many correlations have been found between all the variables studied and mortality, many of these factors are often inconsistent and/or statistically insignificant among tournaments. However, many of these factors are closely related to each other and thus make it difficult to identify singular causal factors of mortality. No single study can provide a definitive estimate of the magnitude of mortality or the relationship between mortality and different explanatory factors, but trends have started to emerge (see Wilde 1998). The studied variables found to be correlated with mortality include:

- Water temperature
- Dissolved oxygen
- Metabolic waste
- Handling time
- Tournament size

To briefly summarize, most tournament-associated mortality is believed to be the result of a combination of sublethal stressors in any given tournament (Wilde 1998).

Fishing Tournament Formats

Fishing tournaments are conducted using a variety of rules and formats which result in varying mean mortality rates (Ostrand et al. 1999). Researchers wished to study mortality rates at different tournaments to decide which formats had lower mean mortality rates than others. Therefore, data were collected from October 9, 1993 through June 13, 1997 by a voluntary tournament reporting program enlisted by the Texas Parks and Wildlife Department on mortality rates of 2,072 black bass tournaments (Ostrand et al. 1999). Most tournaments were "total-weight tournaments" in which prizes are awarded to the anglers who capture the greatest total weight of fish (Ostrand et al. 1999). In "total-weight tournaments" fish are kept in live-wells until the tournament is over, then they are weighed and released (Ostrand et al. 1999). This format had a mean initial mortality rate of 4.0% (Ostrand et al. 1999). Many other formats exist which include "paper tournaments" in which fish are captured, measured, recorded, and immediately released (Ostrand et al. 1999). "Paper tournaments" showed the lowest mean initial mortality rate of (1.1%), due to decreased handling time (Ostrand et al. 1999). Another common format is "big-fish tournaments", in which prizes are awarded for the heaviest individual fish weighed-in each hour (Ostrand et al. 1999). Capture and confinement are especially stressful on larger bass, but "big-fish tournaments" reduce the number of fish held in live-wells (Ostrand et al. 1999). "Big-fish tournaments" showed the highest mean mortality rates of 4.7% (Ostrand et al. 1999). However, this rate can be misleading. The number of fish per angler is one, because all smaller fish are culled out of the live well, and only the largest fish remains. The proportion of bass that die is higher in comparison with a total-weight tournament but there are fewer bass involved in the tournament (Ostrand et al. 1999). The last common format is "road-runner tournaments", in which anglers fish a number of different waters, transport their fish

overland to a central weigh-in site to weigh and then release the fish (Ostrand et al. 1999). The mean mortality rate for roadrunner tournaments was 4.3% (Ostrand et al. 1999). The mortality rates in road runner tournaments are higher because fish are exposed to additional stress from being transported and confined longer (Ostrand et al. 1999).

Paper tournaments showed the lowest mean mortality rate, but are not the most common format. Total weight tournaments remain the most common format, likely due to the excitement of weigh-ins which allows spectators to watch, and sponsors to promote their products.

Species Differences

This study will also evaluate mortality by species. The following is an overview of previous research looking at species differences.

In black bass tournaments, studies have found higher mortality rates for smallmouth bass compared to largemouth bass which are much more tolerant of tournament stressors (Edwards et al. 2004). Largemouth bass and smallmouth bass are closely related, but utilize different habitat and have different physiological tolerances (Furimsky et al. 2003). Largemouth bass are typically viewed as "lie and wait" predators inhabiting shallower, warmer, weedy areas, while smallmouth bass are more "active" predators that prefer deeper and cooler open water (Furimsky et al. 2003). The preferred temperature for smallmouth bass is 20.3-21.3°C versus 27.2-30°C for largemouth bass, which is one reason smallmouth bass often inhabit deeper, cooler water than largemouth bass (Becker 1983). Because tournament anglers place both species in live wells filled with surface water (which is typically warmer than deeper water), smallmouth bass suffer greater stress and consequently higher mortality rates since the surface water temperature is warmer than the water the

smallmouth bass inhabited (Edwards et al. 2004). This is especially true during the summer months when lakes are thermally stratified and the surface water being placed into the live well is warmer (Edwards et al. 2004).

Laboratory experiments conducted at Queen's University in Kingston, Ontario, tested largemouth bass and smallmouth bass arterial blood respiratory conditions, ventilation rate, and cardiac output to compare their physiological responses to graded levels of hypoxia (Furimsky et al. 2003). The study found progressive reductions in water dissolved oxygen levels had a much greater effect on blood oxygen transport properties, acid-base status, ventilation rates, and cardiac variables in smallmouth bass than largemouth bass, concluding smallmouth bass are more sensitive to hypoxia than largemouth bass (Furimsky et al. 2003). This helps explain why smallmouth bass often appear to be less tolerant of tournament procedures than largemouth bass (Furimsky et al. 2003). Unless certain precautions are made, hypoxia can easily occur in several different stages of bass tournaments, including live well holding, bag confinement, weigh-in air exposure, and the holding tanks of the release boats (Furimsky et al. 2003).

Non-lethal Tournament Effects

Tournament-associated mortality is not the only effect of tournaments concerning fishery managers and anglers. Another concern is the dispersal of tournament-caught black bass after release. In particular, fishery managers and anglers are concerned about the relocation (translocation) and concentration of fish at fishing tournament release sites (Wilde et al. 2003). Fishery researchers have studied the proportion of fish returning to their site of capture, the rate and distance dispersed by tournament-caught black bass, whether dispersal is greater among largemouth or smallmouth bass, whether dispersal differs between fish

captured and released in rivers and in lakes and reservoirs, and what proportion of dispersing fish do anglers recapture (Wilde et al. 2003, Lantz and Carver 1975). A compilation of data, published and unpublished, estimations of dispersal distances by black basses captured and released alive in fishing tournaments were evaluated by Wilde et al. (2003). Data from 12 studies (36 days to 3 years in duration) in Arizona, California, Indiana, Texas, New York, Oklahoma, Utah, and Ontario (1976-1997) showed that on average, only 14% of tournament-caught largemouth bass and 32% of smallmouth bass returned to their site of capture (Wilde et al. 2003). Fifty-one percent of largemouth bass and 26% of smallmouth bass dispersed less than 1.6 km from their release sites, and on average, smallmouth bass dispersed a greater distance (7.3 km) from their release sites than largemouth bass (3.5 km) (Wilde et al. 2003). The review also showed no difference in dispersal distances for fish captured and released in rivers versus those released in lakes and reservoirs (Wilde et al. 2003). Twenty-two percent of largemouth bass and 15% of smallmouth bass caught and released in fishing tournaments were subsequently recaptured by anglers (Wilde et al. 2003).

Release boats have been recommended to help redistribute fish after weigh-in, so fish are not concentrated at weigh-in sites (Wilde 2003). This recommendation has been slow to catch on due to lack of regulatory or other incentives (Wilde 2003).

Literature Cited

- Allan, R. C. 1978. A biological assessment of largemouth bass tournaments in southern Nevada. *California-Nevada Wildlife; Transactions* 24: 122-126.
- Archer, D. L., and H. A. Layacono, Jr. 1975. Initial and delayed mortalities of largemouth bass captured in the 1973 national Keowee B.A.S.S. tournament. *Proceedings of the Annual Conference Southeastern Association of Game and Fish Commissioners* 28: 90-96.
- Becker, G. C. 1983. *Fishes of Wisconsin*. The University of Wisconsin Press, Madison, Wisconsin, U.S.A. 1952 p.
- Bennett, D. H., L. K. Dunsmoor, R. L. Rohrer, and B. E. Rieman. 1989. Mortality of tournament-caught largemouth and smallmouth bass in Idaho lakes and reservoirs. *California Fish and Game* 75: 20-26.
- Carmichael, G. J., J. R. Tomasso, B. A. Simco, and K. B. Davis. 1984. Confinement and water quality-induced stress in largemouth bass. *Transactions of the American Fisheries Society* 113: 767-777.
- Edwards, G. P., Jr., R. M. Nuemann, R. P. Jacobs, and E. B. O'Donnell. 2004. Factors related to mortality of black bass caught during small club tournaments in Connecticut. *North American Journal of Fisheries Management* 24: 801-810.
- Furimsky M., S. J. Cooke, C. D. Suski, Y. Wang., and B. L. Tufts. 2003. Respiratory and circulatory responses to hypoxia in largemouth bass and smallmouth bass: implications for "live-release" angling tournaments. *Transactions of the American Fisheries Society* 132: 1065-1075.

- Gilliland, E. R., H. L., Schramm Jr. 2002. Keeping bass alive: a guide book for anglers and tournament organizers. Bass Angler Sportsman Society, Montgomery Alabama. 44 p.
- Gustaveson, W. A., R. S. Wydoski, and G. A. Wedemeyer. 1991. Physiological response of largemouth bass to angling stress. *Transactions of the American Fisheries Society* 120: 629-636.
- Grant, E. C., D. P. Philipp, K. R. Inendino, T. L. Goldberg. 2003. Effects of temperature on the susceptibility of largemouth bass to largemouth bass virus. *Journal of Aquatic Animal Health* 15: 215-220.
- Hartley, R. A., and J. R. Moring. 1993. Observations of black bass (Centrarchidae) confined during angling tournaments: a cautionary note concerning dissolved oxygen. *Aquaculture and Fisheries Management* 24: 575-579.
- Hartley, R. A., and J. R. Moring. 1995. Differences in mortality between largemouth and smallmouth bass caught in tournaments. *North American Journal of Fisheries Management* 15: 666-670.
- Hayes, D. B., W. W. Taylor, and H. L. Schramm, Jr. 1995. Predicting the biological impact of competitive fishing. *North American Journal of Fisheries Management* 15: 457-472.
- Jackson, J. J., and D. W. Willis. 1991. Short-term mortality of smallmouth bass caught during a live-release tournament at Lake Oahe, South Dakota. *Prairie Naturalist* 23: 201-204.

- Kerr, S. J., and K. K. Kamke. 2003. Competitive fishing in freshwaters of North America: a survey of Canadian and U.S. jurisdictions. *Fisheries* 28: 26–31.
- Kwak, T. J., and M. G. Henry. 1995. Largemouth bass mortality and related causal factors during live-release fishing tournaments on a large Minnesota lake. *North American Journal of Fisheries Management* 15: 621–630.
- Lantz, K. E., and D. C. Carver. 1975. Dispersal of tournament caught bass from a central release point. *Proceedings of the Annual Conference Southeastern Association of Game and Fish Commissioners* 29: 115-125.
- Meals, K. O., and L. E. Miranda. 1994. Size-related mortality of tournament-caught largemouth bass. *North American Journal of Fisheries Management* 14: 460– 463.
- Neal, J. W., and D. Lopez-Clayton. 2001. Mortality of largemouth bass during catch-and-release tournaments in a Puerto Rico reservoir. *North American Journal of Fisheries Management* 21: 834–842.
- Nielson, L. A. 1985. Public attitudes toward competitive fishing. Abstracts; American Fisheries Society 115th annual meeting, Sun Valley, Idaho. pp 62-63.
- Ostrand, K. G., G. R. Wilde, D. W. Strickland, and M. I. Muoneke. 1999. Initial mortality in Texas black bass fishing tournaments. *North American Journal of Fisheries Management* 19: 1124–1128.
- Parker, R. R., E. C. Black, and P. A. Larkin. 1959. Fatigue and mortality in troll-caught chinook salmon (*Onchorhynchus tshawytscha*). *Journal of the Fisheries Research Board of Canada* 16: 429-448.

- Pearson, J. 2003. Largemouth bass tournament monitoring at Indiana natural Lakes. Indiana Division of Fish and Wildlife. Indianapolis, Indiana.
- Pelzman, R. J. 1978. Hooking mortality of juvenile largemouth bass, *Micropterus salmoides*. California Fish and Game 64: 185-188.
- Perry, S. G. 2002. Initial mortality in New Hampshire black bass fishing tournaments, 1997-2001. New Hampshire Fish and Game Department, internal agency report Concord, New Hampshire. 12 p.
- Plumb, J. A., J. L. Gaines, and M. Gennings. 1975. Experimental use of antibiotics in preventing delayed mortality in a bass tournament on Lake Seminole, Georgia. Proceedings of the Annual Conference of the Southeastern Association of Game and Fish Commissioners 28: 87-90.
- Plumb, J. A., J. M. Grizzle, and W. A. Rogers. 1988. Survival of caught and released largemouth bass after confinement in live wells. North American Journal of Fisheries Management 8: 324-328.
- Rumsey, S. 1991. The biological and social impacts of bass tournaments. Montana Department of Fish, Wildlife and Parks. Internal agency report. 6 p.
- Schramm, H. L., Jr., P. J. Haydt, and N. A. Bruno. 1985. Survival of tournament-caught largemouth bass in two Florida lakes. North American Journal of Fisheries Management 5: 606-611.
- Schramm, H. L., Jr., P. J. Haydt, and K. M. Porter. 1987. Evaluation of prerelease, postrelease, and total mortality of largemouth bass caught during tournaments in two Florida lakes. North American Journal of Fisheries Management 7: 394-402.

- Schramm, H. L., Jr., M. L. Armstrong, A. J. Fedler, N. A. Funicelli, D. M. Green, J. L. Hahn, D. P. Lee, R. E. Manns Jr., S. P. Quinn, and S. J. Waters. 1991. Sociological, economic, and biological aspects of competitive fishing. *Fisheries* 16: 13-21.
- Schramm, H. L., Jr., J. Grizzle, L. Hanson, G. Gilliland. 2004. Improving survival of tournament-caught bass and the effects of tournament handling on largemouth bass virus disease. Internal Agency Completion Report. Mississippi Cooperative Fish and Wildlife Research Unit, Mississippi State University, Mississippi State, Mississippi. 120 p.
- Seidensticker, E. P. 1975. Mortality of largemouth bass for two tournaments utilizing a "don't kill your catch" program. *Proceedings of the Annual Conference Southeastern Association of Game and Fish Commissioners* 28: 83-86.
- Simonson, T. 2001. Wisconsin's black bass management plan. Administrative Report Number 54. Bureau of Fisheries Management and Habitat Protection, Wisconsin Department of Natural Resources P.O. Box 7921 Madison, Wisconsin 53707.
- Staggs, M. 2005. Bass fishing tournament pilot program evaluation plan. Internal Agency Report. Wisconsin Department of Natural Resources. 5 p.
- Suski, C. D., S. S. Killen, S. J. Cooke, J. D. Kieffer, D. P. Phillip, and B. L. Tufts. 2004. Physiological significance of the weigh-in during live-release angling tournaments for largemouth bass. *Transactions of the American Fisheries Society* 133: 1291-1303.

- Suski, C. D., S. J. Cooke, S. S. Killen, D. H. Wahl, D. P. Phillip, and B. L. Tufts. 2005. Behaviour of walleye, *Sander vitreus*, and largemouth bass, *Micropterus salmoides*, exposed to different wave intensities and boat operating conditions during live well confinement. *Fisheries Management and Ecology* 12: 19-26.
- Weathers, K. C., and M. J. Newman. 1997. Effects of organizational procedures on mortality of largemouth bass during summer tournaments. *North American Journal of Fisheries Management* 17: 131-135.
- Welborn, T. L., Jr., and J. H. Barkley. 1974. Study on the survival of tournament released bass on Ross, R. Barnett Reservoir, April 1973. *Proceedings of the Annual Conference of the Southeastern Association of Game and Fish Commissioners* 27: 512-519.
- Wilde, G. R. 1998. Tournament-associated mortality in black bass. *Fisheries* 23: 12-22.
- Wilde, G. R., C. E. Shavlik, and K. L. Pope. 2002. Initial mortality of black bass in B.A.S.S. fishing tournaments. *North American Journal of Fisheries Management* 22: 950-954.
- Wilde, G. R., K. L. Pope, and R. E. Strauss. 2003. Estimation of tournament mortality and its sampling variance. *North American Journal of Fisheries Management* 23: 779-786.
- Wilde, G. R. 2003. Dispersal of tournament-caught black bass. *Fisheries* 28: 10-17.
- Wilde, G. R. 2003. Differences in attitudes, fishing motives, and demographic characteristics between tournament and non-tournament black bass anglers in Texas. *North American Journal of Fisheries Management* 18: 422-431.

APPENDIX 2



Wisconsin Department of Tourism

Co-op Research Program

Profile of The Bassmaster Elite 50 Series Fishing Tournament: Economic and Demographic Assessment of Those Involved in the June 15-18 Event

In conjunction with

**Department of Urban & Regional Planning
University of Wisconsin - Madison**



Department of Natural Resources

Chippewa Valley Convention & Visitors Bureau

December 2005

Visitor Profile of Chippewa Falls Bassmaster Elite 50 Fishing Tournament

Introduction

Wisconsin was highlighted during the month of July on ESPN, thanks to the efforts of the Chippewa Valley Sports Commission. Fifty of the world's best BASS pros visited the Chippewa Valley to participate in the Bassmaster Elite 50 Series. Practice days began on June 12 through the 14th with competition days held June 15-18 on Lake Wissota in Chippewa Falls. Daily boat launches began at 10:00 am from an area restaurant, The View, with weigh-ins held either at 7:00 or 7:30 pm. Elimination rounds were held on Wednesday and Thursday, reducing the anglers to twelve by Friday. By the final day of competition, Saturday, six pro anglers remained. In addition to the fishing tournament, there was an outdoor expo featuring numerous fishing vendors and displays. Two days of the event featured Bassmaster CastingKids Program that was created to teach children how to flip, pitch and cast in addition to bringing the out-of-doors experience to kids. Over the course of four days, the Chippewa Valley Convention and Visitors Bureau estimates there was an attendance of 14,000 spectators.

In an attempt to gather more information about sporting events held in Wisconsin, the Department of Tourism, the Chippewa Valley CVB, the Department of Natural Resources¹, and the University of Wisconsin's Department of Urban and Regional Planning² partnered to gather marketing and economic impact information. The objectives of this research were to 1) define the demographics of a spectator at this event (age, income, residence); 2) to define characteristics of their trip to the event (overnight lodging, party size, length-of stay in area); 3) to identify the user's reasons for being in the area and other activities they will participate in while on this trip; and 4) to measure user expenditures in the area; and 5) to determine the economic impact of nonresident visitors in the area.

As part of 2003 Wisconsin Act 249, the Wisconsin Legislature required the Department of Natural Resources to establish a bass fishing tournament pilot program under which the department shall issue 4 permits per year to bass fishing tournaments that authorize participants to exceed the daily bag limit by culling. In addition, Act 249 requires the department to conduct research and collect data for the purpose of evaluating the pilot program. Much of the impetus behind the addition of the bass fishing tournament pilot program to Act 249 was the potential economic benefit from attracting large bass tournaments, which previously avoided our state due to our bag limit regulations. Hence evaluation of the local economic impact of events like the Bassmaster Elite 50 will be an important component of the overall evaluation of the pilot program.

Research Methods

The results of this report are based on a stratified random sample of spectators during the final four days of competitive fishing. Using interviewers provided by the Chippewa Valley Convention and Visitors

¹ Patrick Schmalz, Treaty Fisheries Coordinator, Bureau of Fisheries Management and Habitat Protection Wisconsin Department of Natural Resources.

² Professor Dave Marcouiller of the University of Wisconsin-Madison conducted the economic impact analysis by analyzing survey-based expenditure estimates and applying them to a regional economic impact model using Micro-IMPLAN, a standard input-output modeling software and database package.

Bureau, spectators were randomly intercepted at nightly weigh-ins, as they toured the Outdoor Expo or waited in line for transportation shuttles using a survey instrument (Appendix A) jointly developed by the participating agencies. A drawing for free tickets to Eau Claire's Country Jam USA was used to entice visitors to fill out a survey.

A total of 238 visitor parties were intercepted; there were 39 refusals and 18 parties had previously been surveyed. A total of 181 completed surveys were obtained.

Once compiled and cleaned, this survey response dataset was analyzed for descriptive frequencies and various cross-tabulations.

The economic impact assessment was conducted with the use of a regional economic model of that part of the Chippewa Valley represented by the greater Eau Claire/Chippewa Falls region. For this project, the Chippewa Valley was defined as Eau Claire and Chippewa Counties. The model, developed for this project using Micro-IMPLAN software and county-level data for the base year 2002, is a standard input-output model of the two counties. At the heart of the impact model is a transaction table for the region. This table tracks the flow of all goods and services produced by industries in the region. By identifying receipts to industry groupings from non-local visitors, impacts of the Bassmaster Elite 50 tournament on the regional economy can be assessed.

The analysis captures direct impacts, as identified in the expenditure section, plus indirect and induced impacts. Some refer to direct and induced impacts as "multiplier" impacts. Local firms that benefit from visitor spending, use some of that revenue to purchase additional goods and services, of which some is purchased locally, thus creating a partial retention and recycling of the initial traveler dollar. These are often referred to as intermediate purchased inputs. Examples of these may include the purchase of furniture by a local motel, food purchases of a local restaurant, artwork and screening for articles of clothing, or wholesale purchases of t-shirts by a local merchant for resale. These purchases are important in transmitting dollars to other local firms and feed into what is termed the indirect economic impact.

Expenditures also filter into the economy through increased consumption by residents in the Chippewa Valley as a result of increases in household incomes. These increases occur due to the jobs created, both directly and indirectly, by the Bassmaster Elite 50 tournament. This is referred to as the induced economic impact.

Following construction of the Chippewa Valley input-output model, impact assessments were made. Several economic characteristics are relevant when assessing economic impacts. These often focus on income and employment effects. For our purposes, we present results for the event's impact on total gross regional product (output), income as measured in total value added (including employee compensation, proprietor's income, other property-type income, and indirect business taxes), and employment (measured in number of jobs).

Specifically, total non-local expenditures were associated with specific economic sectors. For instance, expenditures on restaurants and bars were associated with eating and drinking establishments. All expenditures were constrained by the level, or supply, of existing business activity in the Chippewa Valley. The results identified direct impacts from expenditures, as well as the multiplier effect caused by the linkages that exist between the industries and households in the Chippewa Valley.

Limitations

Like all research, this study has a number of limitations, which requires the reader to be cautious in interpreting the findings.

The interviewing process was hindered by the fact that spectators arrived just prior to the nightly weigh-ins and left immediately afterwards. In addition, they were hesitant to participate as they watched the weigh-ins. The only exception was on the weekend where spectators visited the outdoor expo and milled around The View longer.

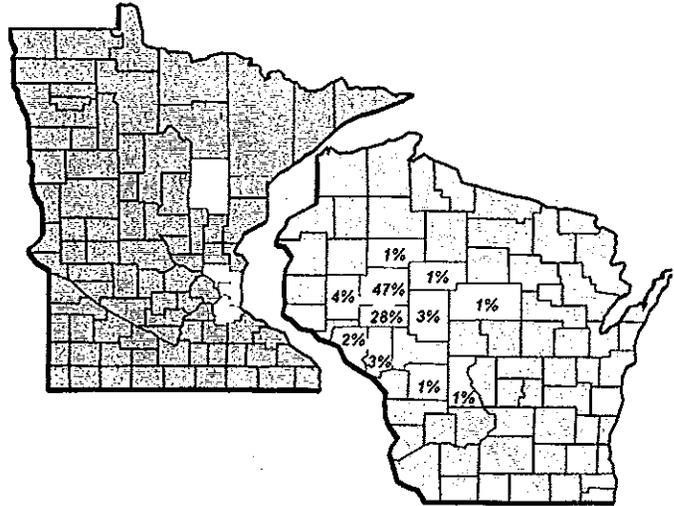
The economic impact assessment was limited to the standard assumptions of input-output analysis and the quality of data found in the 2002 Micro-IMPLAN dataset.

Although this report details the positive impacts the Bassmaster Elite 50 tournament will have on the local economy, it does not address whether these positive impacts justify the expense of hosting the event. Other factors, such as Bassmaster Elite 50 revenue, local promotional activities, and increased public service costs may also contribute to decisions that rest on a full accounting of benefits and costs of the event. Additionally, the positive media exposure that Chippewa Valley as well as Wisconsin receives is an additional economic benefit not measured by this study.

This report focused on the economic impact of the Bassmaster Elite 50 tournament attendees from outside of the Chippewa Valley. The effects of the Bassmaster Elite 50 tournament on local quality-of-life issues associated with hosting an international event was not measured in this report. These effects are often significant and reflect local perceptions of day-to-day life that include issues of local notoriety, resident perceptions of local vibrancy, and community pride.

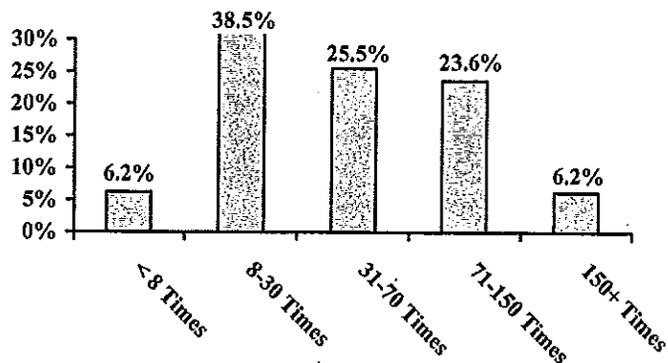
Demographic Profile of Spectators at Bassmaster Elite 50

- The majority of spectators at ESPN's Bassmaster Elite 50 fishing tournament came from the midwestern states of Wisconsin (88%), Minnesota (3%), Michigan (1%) and Illinois (1%). As can be seen in the maps, the Wisconsin counties that were the biggest contributor of spectators at the Elite 50 were Chippewa (47%) and Eau Claire (28%). Four percent of the spectators came from Dunn County; Clark and Trempealeau counties each garnering 3% of the sample; 2% came from Buffalo, and 1% from Juneau, Taylor, Rusk, Marathon and Monroe counties. The Minnesota counties that produced visitors to the Bassmaster Elite included Hennepin, Ramsey, Washington, Aitkin and Dakota.



- The La Crosse-Eau Claire designated market area³ (DMA), which included both Chippewa and Eau Claire counties produced the highest percentage of spectators with 78% of the sample. Other market areas included the Twin Cities (8%), Wausau-Rhineland (3%), and Green Bay (2%). To see a breakout of the DMAs represented in this study, please see the Appendix.

- When spectators were queried as to what type of fish they generally fished for, 51% said they generally went after all types of fish. One-fourth indicated they were bass fishermen, 10% were family anglers, 7% were walleye fishermen, and 1% fished for Musky.

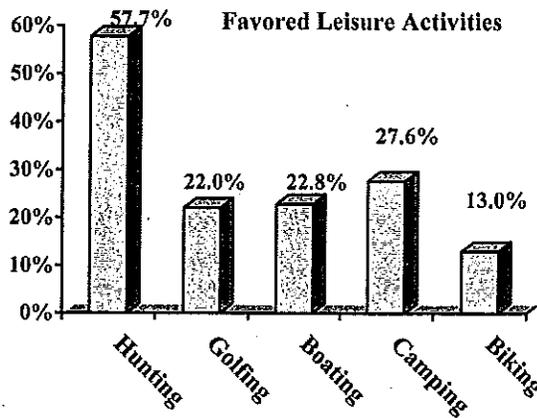


- These spectators were avid fishermen, who fished an average of 63 days a year, or about 5 days a month. The graph at the right categorizes the number of days fished during a typical year.

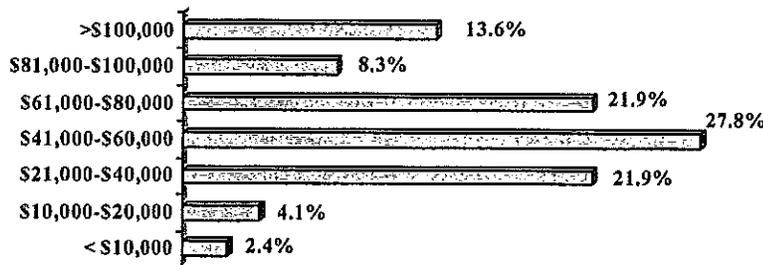
Fishing Days in Year

³ The Lifestyle Market Analyst, a publication produced by Standard Rate and Data Service are areas defined by Nielson Media Research and are commonly referred to as television or broadcast markets.

- ◆ Good fishing spots are generally a guarded secret and not usually shared with everyone except perhaps with your closest fishing friend. But when asked what types of information they would like to know prior to fishing a particular body of water, "hot" fishing spots (64%) was cited most often followed by a map of the lake (63%). Other responses included area boat ramps, nearest bait shops, water temperature, area restaurants/entertainment, and lodging accommodations.
- ◆ Almost a third (31.5%) of the respondents indicated they would rely on a Department of Natural Resources magazine or a DNR report (17.7%) to receive the above fishing information. In addition, people who fish are no strangers to the Internet; 34.8% indicated they would turn to Internet chat rooms. Twenty-one percent indicated they would go to an on-line fishing chat room and 13.8% would turn to a fishing magazine chat room. Also on the radar screen would be a daily radio broadcast (24%).
- ◆ People who fish are truly outdoors enthusiasts. When asked to list their three favorite leisure activities, in addition to fishing, the graph at the right displays their top five responses.
- ◆ Almost three-fourths of the respondents were male (74%).
- ◆ Their average age was 42. Visitors 22 or younger accounted for 7%; 35% were between the ages of 23 and 38, 46% were baby boomers (39-57 years old), and 12% were 58 or older.
- ◆ Annual household incomes were generally in the middle-income brackets.



Annual Household Income



Trip Characteristics

- ◆ Eighty-seven percent indicated the primary purpose for their trip was to attend this fishing event.
- ◆ With more than three-fourths of the respondents coming from the local area, it's not surprising that a small percentage (14%) required overnight lodging.
- ◆ Hotels or motels (42%) were the dominant choice for paid overnight lodging; RV and tent camping each garnered 13% of the sample and 4% indicated they stayed in a B&B.
- ◆ On average, these overnight visitors stayed 3 nights.
- ◆ Visitor parties generally averaged about three people.
- ◆ Since so many spectators were local residents, they have the luxury of being close in proximity to the event and consequently, invested little time in their trip planning. Thirty percent of the spectators made their decision to attend the same day they went. Seven percent decided to attend the day before and 22% planned it within a week. Twenty-seven percent planned it more than a month in advance.
- ◆ Because of the ratio of local to non-local, it's not surprising that one-third used the radio as their source of information for planning purposes. Newspaper (29%), word-of-mouth recommendations (26%), the Internet (12%) and brochures (12%) followed.

Economic Impact of the Bassmaster Elite 50

Located in West-Central Wisconsin, the Chippewa Valley (comprised of Chippewa and Eau Claire counties) has many of the economic characteristics reflective of a rapidly changing micropolitan economy. The total personal income of its 62,800 households (population of roughly 150,000) was roughly \$4 billion in 2002 (\$4,009,838,000). This translates into an average total household income of about \$63,800. Thus, the economic stimulus of new dollars spent by visitors to the Bassmaster Elite 50 was quite modest relative to the overall economic structure of the county.

Spectator Spending

In an effort to understand the travel-related spending habits of people at the Bassmaster Elite 50, survey respondents were asked to report the total amount of money they had personally spent on their trip in nine expenditure categories. These categories included lodging, food/drink at area restaurants, area entertainment, shopping (non-fishing related), gas/parking/repairs, convenience stores (non-fishing related), gaming/sweepstakes, fishing-related expenses (bait, etc.) and other expenses. The table below provides the average of amount of spending per spectator per trip by category. (For the full table, please refer to Table 1 in the Appendix.)

Lodging	\$24.81
Food/drink	30.89
Entertainment	3.30
Shopping	12.48
Gas/auto	20.32
Convenience stores	3.25
Transportation	10.60
Gaming	0.28
Fishing-related	9.94
Other	<u>17.85</u>
Total	\$133.72

Spending by Spectator Groups

Spectators were classified into two categories: local and non-local. Local spectators include those who live within the counties of Eau Claire and Chippewa and accounted for 67.6% of the sample. Non-locals live outside these county jurisdictions and accounted for 32.4% of the respondents. Below are the averages per person per trip expenditures for local and non-local spectators.

	Local	Non-Local
Lodging	\$1.26	\$73.96
Food/drink	19.17	55.35
Entertainment	3.36	3.16
Shopping	3.74	30.74
Gas/auto	7.73	46.61
Convenience	2.94	3.89
Transportation	2.31	27.89
Gaming	0.42	0.00
Fishing-related	5.80	18.60
Other	<u>8.38</u>	<u>30.36</u>
Total	\$55.11	\$290.56

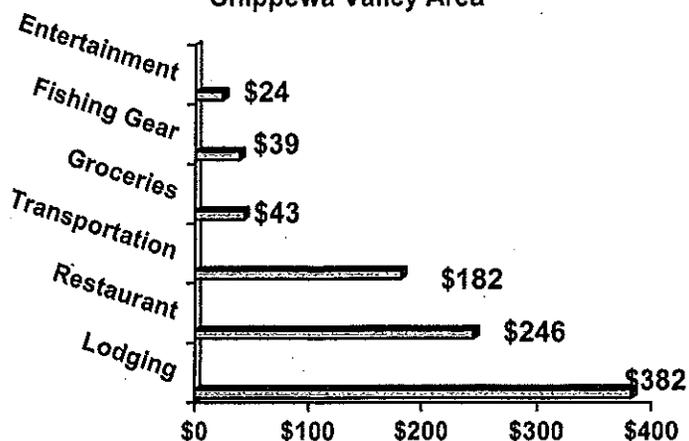
Spectator spending was further expanded to total visitation levels of 14,000 spectators (both local and non-local) on the next page.

	Local Spectators	Non-Local Spectators
Lodging	\$11,927	\$335,341
Food/drink	181,461	250,962
Entertainment	31,805	14,328
Shopping	35,403	139,378
Gas/auto	73,171	211,334
Convenience	27,830	17,638
Transportation	21,866	126,456
Gaming	3,976	0
Fishing-related	54,902	84,334
Other	79,324	137,655
Total	\$521,666	\$1,317,425

Spending by Anglers, Crew and Vendors

Expenditure information was collected during pre-tournament angler registration and from vendors at the outdoor expo. Information from the crew was gathered after the tournament. In addition to some basic demographic information, information was gathered on seven expenditure categories in relation to their whole trip as well as expenditures made specifically in the Chippewa Valley area. (See Table 2 in Appendix.) For the purposes of this study, we are reporting only that spending that occurs in the Chippewa Valley. The graph shows the total amount of dollars spent in the Chippewa Valley area by all three categories combined.

Angler, Crew and Vendor Spending in Chippewa Valley Area



Looking more specifically at the individual expenses per category, anglers had the biggest impact in the area, followed by vendors and then crew. The table below highlights the Chippewa Valley area expenditures by category by visitor type.

	Angler	Vendor	Crew
Lodging	\$522	\$309	\$363
Groceries	125	21	3
Restaurants	171	329	197
Transportation	164	234	128
Fishing gear	75	36	13
Entertainment	0	44	17
Total	\$1,057	\$972	\$720

An average expenditure pattern for professionals was expanded to account for the number of people in each category. For example, a total of 50 anglers participated in this study. Each angler spent \$522 in the Chippewa Valley area. Multiplying the lodging expenditure by the number of anglers would show visitor spending of \$26,100 for lodging. The table below shows the total spending for each type of professional. (See Table 3 in Appendix.)

	Angler	Vendor	Crew
Lodging	\$26,100	\$20,995	\$7,993
Groceries	6,250	1,403	74
Restaurants	8,550	22,398	4,338
Entertainment	0	2,975	367
Transportation	8,200	15,895	2,805
Fishing gear	3,750	2,465	275
Total	\$52,850	\$66,131	\$15,581

As a result of tournament travel, the combined expenditures for all professionals amounted to \$134,832 in the Chippewa Valley.

Translating Visitor Spending into Economic Impact

One of the objectives of this research was to determine the spending habits of visitors at this fishing tournament and then analyze these figures with a regional model for estimating economic impacts. Total visitor spending and economic impact are two separate issues. A tournament of this nature will bring people into a particular region where they spend money that would not be in the region without their visitor. The ESPN Bassmaster Elite 50 tournament brought in fifty professional anglers as well as ESPN crew and vendors who participated in the outdoor expo and of course, spectators.

For the purposes of this report, the primary focus in economic impact analysis is identifying how income is generated from "new dollars" flowing into a region from visitors who live outside that region. Only non-local visitor spending was used to assess economic impact. All professionals including ESPN crew as well as vendors were assumed non-local visitors, thus, we used a combined total spending level for professionals combined with non-local spectator spending as a driver of the economic impacts reported.

When we apply the new dollars from these non-local visitors to the input-output model of the Chippewa Valley, the multiplier effect of inter-industry purchases generates indirect impacts and the increased income of households drives induced impacts. These impacts are summarized for total output change in Table 4, employment in Table 5, and income in Table 6.

A quick note on the difference between output and value added. Output is the total result of all economic activity and is analogous to gross regional product, gross state product, and gross national product. In other words, it is the total accounting for all regional production. Value added is defined as the value of the region's business output minus the value of all inputs purchased from other firms. It is therefore a measure of the "profit" or income generated locally. Value added includes a combination of employee compensation, proprietor's income ("business profit"), other property type income, and indirect business taxes paid to governments.

It is interesting to note from Table 4 that the amount of NEW money brought into the Chippewa Valley by people from the outside had broader impacts on the economic structure of the Chippewa Valley. This new money had the effect of generated business activity. Results of the spending shock to the input-output model for the Chippewa Valley suggests that the direct spending of non-local visitors (\$1,452,000) generated a total direct, indirect and induced output impact of just over \$2 million (\$2,116,000). Overall, this reflects an output multiplier of roughly 1.46, which is reasonable given the relatively modest size of the Chippewa Valley economy. From the perspective of employment, Table 5 summarizes the number of jobs supported by visitor spending as a result of the Bassmaster Elite 50 tournament. This amount of new spending directly supported roughly 35 total jobs with an added indirect and induced effect of roughly 8 jobs (employment multiplier of 1.23). Further, there was an income impact that is summarized in Table 6. Spending by visitors to the Bassmaster 50 tournament resulted in roughly \$1 million (\$1,059,000) in direct income effect and almost \$1.5 million (\$1,481,000) in total income (value added multiplier of roughly 1.40).

APPENDIX

Table 1. Individual per-trip expenditure patterns of spectators at the Bassmaster Elite 50 at Lake Wissota, Wisconsin – June 2005 (in 2005 dollars)

Spending Category:	Locals ¹	Non-locals ²	Total	In-Region ³ Spending:	
				Locals ¹	Non-locals ²
Lodging	\$1.26	\$73.96	\$24.81	\$11,927	\$335,341
Food/Drink	\$19.17	\$55.35	\$30.89	\$181,461	\$250,962
Entertainment	\$3.36	\$3.16	\$3.30	\$31,805	\$14,328
Shopping	\$3.74	\$30.74	\$12.48	\$35,403	\$139,378
Gas/Auto	\$7.73	\$46.61	\$20.32	\$73,171	\$211,334
Convenience	\$2.94	\$3.89	\$3.25	\$27,830	\$17,638
Transportation	\$2.31	\$27.89	\$10.60	\$21,866	\$126,456
Gaming	\$0.42	\$0.00	\$0.28	\$3,976	\$0
Fishing-related	\$5.80	\$18.60	\$9.94	\$54,902	\$84,334
Other	\$8.38	\$30.36	\$17.85	\$79,324	\$137,655
Total	\$55.11	\$290.56	\$133.72	\$521,666	\$1,317,425
n (sample)	119	57	176		
% total	67.6%	32.4%			
N (Population)	9466	4534	14000		

1. Locals are defined as residents of Eau Claire and Chippewa Counties
2. Non-locals defined as residents of elsewhere and visitors to Eau Claire and Chippewa Counties
3. In-region defined as within Eau Claire and/or Chippewa Counties

Table 4. Total output change of the Chippewa Valley economy as a result of the Bassmaster Elite 50 Tournament at Lake Wissota – June 2005 (in 2005 dollars as modeled using MicroIMPLAN)

Industrial sector:	2-digit NAICS Code ¹	Types of IMPACT:			Total
		Direct	Indirect	Induced	
Ag, Forestry, Fish & Hunting	11	\$598	\$5,400	\$3,176	\$9,174
Utilities	22	\$0	\$17,722	\$8,330	\$26,052
Construction	23	\$0	\$17,751	\$2,805	\$20,556
Manufacturing	31-33	\$0	\$31,918	\$18,353	\$50,272
Wholesale Trade	42	\$0	\$15,323	\$14,510	\$29,834
Transportation & Warehousing	48-49	\$92,055	\$21,429	\$11,745	\$125,228
Retail trade	44-45	\$383,926	\$8,463	\$57,608	\$449,997
Information	51	\$4	\$23,169	\$10,838	\$34,011
Finance & insurance	52	\$0	\$13,162	\$32,253	\$45,415
Real estate & rental	53	\$1,163	\$25,869	\$15,823	\$42,855
Professional- tech services	54	\$54	\$23,500	\$9,037	\$32,592
Management of companies	55	\$0	\$15,416	\$3,620	\$19,036
Administrative & waste services	56	\$0	\$18,099	\$7,370	\$25,470
Educational services	61	\$0	\$84	\$2,860	\$2,944
Health & social services	62	\$0	\$11	\$72,910	\$72,921
Arts- entertainment & recreation	71	\$14,696	\$1,653	\$5,557	\$21,906
Accommodation & food services	72	\$671,688	\$5,779	\$27,161	\$704,628
Other services	81	\$0	\$7,780	\$22,281	\$30,060
Government & non NAICS Institutions	92	\$274,501	\$18,910	\$65,760	\$359,171
		\$13,614	\$0	\$0	\$13,614
Total		\$1,452,300	\$271,440	\$391,996	\$2,115,736

1. As defined by the North American Industrial Classification System (NAICS)

Table 5. Employment effects in the Chippewa Valley resulting from the Bassmaster Elite 50 Tournament on Lake Wissota, WI -- June 2005 (in total number of jobs created as modeling using MicroIMPLAN).

Industrial sector:	2-digit NAICS Code ¹	Types of IMPACT:			Total*
		Direct*	Indirect*	Induced*	
Ag, Forestry, Fish & Hunting	11	0.0	0.1	0.1	0.2
Utilities	22	0.0	0.1	0.0	0.1
Construction	23	0.0	0.2	0.0	0.2
Manufacturing	31-33	0.0	0.2	0.1	0.3
Wholesale Trade	42	0.0	0.2	0.1	0.3
Transportation & Warehousing	48-49	0.6	0.3	0.1	1.0
Retail trade	44-45	11.9	0.2	1.2	13.2
Information	51	0.0	0.2	0.1	0.3
Finance & insurance	52	0.0	0.1	0.2	0.3
Real estate & rental	53	0.0	0.3	0.2	0.5
Professional- tech services	54	0.0	0.4	0.1	0.5
Management of companies	55	0.0	0.1	0.0	0.1
Administrative & waste services	56	0.0	0.4	0.2	0.6
Educational services	61	0.0	0.0	0.1	0.1
Health & social services	62	0.0	0.0	1.1	1.1
Arts- entertainment & recreation	71	0.3	0.1	0.2	0.5
Accommodation & food services	72	20.5	0.2	0.8	21.5
Other services	81	0.0	0.1	0.4	0.5
Government & non NAICs	92	1.3	0.1	0.0	1.4
Total		34.5	2.9	5.1	42.5

1. As defined by the North American Industrial Classification System (NAICS)

Table 6. Total income (or value added) impact on the Chippewa Valley resulting from the Bassmaster Elite 50 tournament on Lake Wissota – June 2005 (in 2005 dollars as modeled using MicroIMPLAN).

Industrial sector:	2-digit NAICS Code ¹	Types of IMPACT:			Total*
		Direct*	Indirect*	Induced*	
Ag, Forestry, Fish & Hunting	11	\$125	\$1,093	\$933	\$2,151
Utilities	22	\$0	\$13,408	\$6,303	\$19,711
Construction	23	\$0	\$9,619	\$1,420	\$11,039
Manufacturing	31-33	\$0	\$10,473	\$6,053	\$16,526
Wholesale Trade	42	\$0	\$11,894	\$11,263	\$23,157
Transportation & Warehousing	48-49	\$60,966	\$13,328	\$6,828	\$81,122
Retail trade	44-45	\$315,911	\$6,946	\$47,266	\$370,123
Information	51	\$1	\$9,761	\$5,689	\$15,451
Finance & insurance	52	\$0	\$8,177	\$17,687	\$25,864
Real estate & rental	53	\$880	\$19,830	\$11,423	\$32,133
Professional- tech services	54	\$44	\$18,519	\$6,972	\$25,536
Management of companies	55	\$0	\$12,483	\$2,931	\$15,414
Administrative & waste services	56	\$0	\$10,381	\$4,523	\$14,904
Educational services	61	\$0	\$48	\$1,695	\$1,743
Health & social services	62	\$0	\$6	\$48,668	\$48,674
Arts- entertainment & recreation	71	\$7,348	\$473	\$2,583	\$10,404
Accommodation & food services	72	\$470,276	\$2,847	\$11,831	\$484,953
Other services	81	\$0	\$3,674	\$11,444	\$15,119
Government & non NAICS	92	\$203,094	\$14,307	\$49,662	\$267,063
Total		\$1,058,644	\$167,267	\$255,174	\$1,481,085

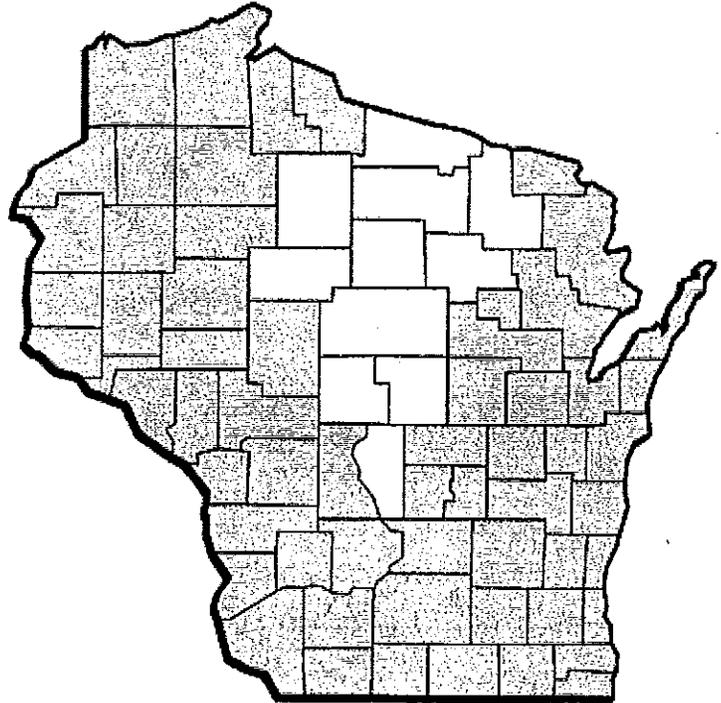
1. As defined by the North American Industrial Classification System (NAICS)

Wausau-Rhineland Designated Market Area

(Adams, Forest, Langlade, Lincoln, Marathon, Oneida,
Portage, Price, Taylor, Vilas & Wood Counties)

DMA Statistics

➤ Total Adult Population	322,896
➤ Total Households	168,615
➤ Median Age	50
➤ Median Income	\$41,705
➤ Education	
College (1-4 Years)	35%
High School	41%
➤ Married	62%
➤ No children at home	68%
➤ Occupations	
Professional/technical	20%
Blue collar	20%
Retired	20%
➤ Income Earners	
Single	38%
Married, one income	24%
Married, two incomes	38%
➤ Dual Income Households with Kids	
No kids	19%
Kids under 13 years	9%
Kids between 13-18 years	10%

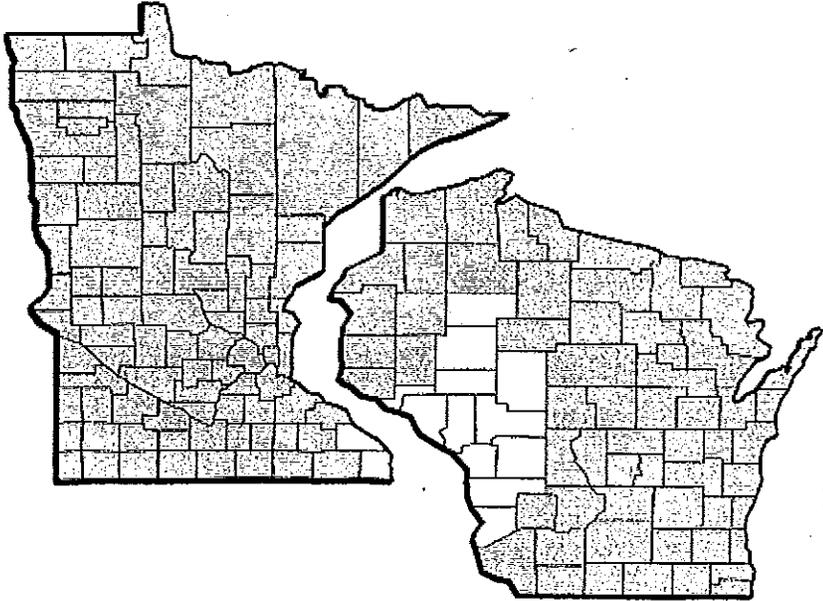


Percentage of Households Who:

Shop by catalog/mail	61	Avid book readers	39
Subscribe to cable TV	56	Physical fitness/exercise	38
Own a cellular phone	46	Camp/hike	38
Fish frequently	51	Vegetable gardening	35
Use a personal computer	49	Crafts	33
Flower garden	48	Travel for pleasure/vacation	32
Travel in USA	44	Are health conscious	32
Walk for health	43	Bicycle frequently	29
Subscribe to online service	43	Golf	26
Watch sports on TV	43	Casino gambling	21
Hunting/shooting	42		

La Crosse-Eau Claire Designated Market Area

(Counties of Buffalo, Chippewa, Clark, Crawford, Eau Claire, Jackson, La Crosse, Monroe, Pepin, Rusk, Trempealeau & Vernon, WI & Houston & Winona, MN)



DMA Statistics

➤ Total Adult Population	387,461
➤ Total Households	198,211
➤ Median Age	49
➤ Median Income	\$38,845
➤ Education	
College (1-4 Years)	38%
High School	39%
➤ Married	58%
➤ No children at home	67%
➤ Occupations	
Professional/technical	23%
Blue collar	19%
Retired	18%
➤ Income Earners	
Single	42%
Married, one income	21%
Married, two incomes	37%
➤ Dual Income Households with Kids	
No kids	18%
Kids under 13 years	9%
Kids between 13-18 years	10%

Percentage of Households Who:

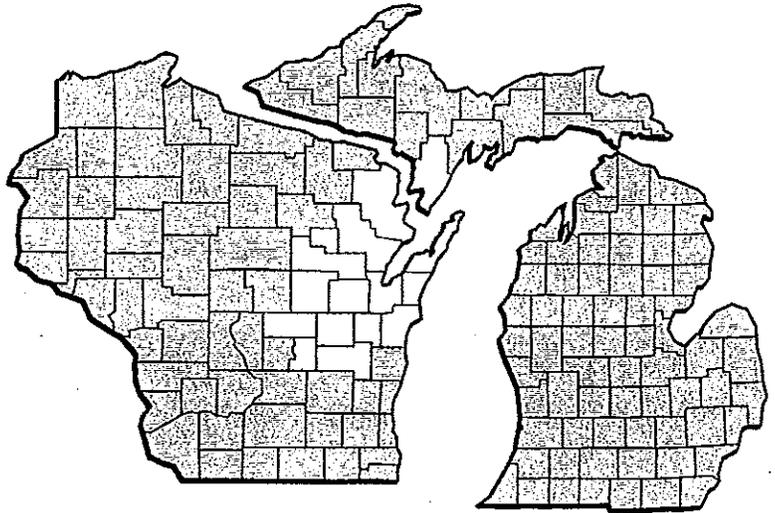
Subscribe to cable TV	62	Physical fitness/exercise	39
Shop by catalog/mail	57	Camp/hike	37
Use a personal computer	49	Hunting/shooting	36
Flower garden	46	Vegetable gardening	35
Fish frequently	45	Travel for pleasure/vacation	34
Own a cellular phone	44	Are health conscious	34
Walk for health	43	Crafts	32
Watch sports on TV	41	Bicycle frequently	28
Travel in USA	41	Golf	25
Avid book readers	39	Casino gambling	21

Green Bay-Appleton Designated Market Area

(Counties of Brown, Calumet, Door, Fond du Lac, Green Lake, Kewaunee, Manitowoc, Marinette, Menominee, Oconto, Outagamie, Shawano, Waupaca, Waushara, Winnebago, WI & Menominee, MI)

DMA Statistics

➤ Total Adult Population	782,687
➤ Total Households	411,732
➤ Median Age	48
➤ Median Income	\$45,872
➤ Education	
College (1-4 Years)	36%
High School	42%
➤ Married	61%
➤ No children at home	67%
➤ Occupations	
Professional/technical	22%
Blue collar	20%
Retired	17%
➤ Income Earners	
Single	39%
Married, one income	22%
Married, two incomes	39%
➤ Dual Income Households with Kids	
No kids	19%
Kids under 13 years	10%
Kids between 13-18 years	9%



Percentage of Households Who:

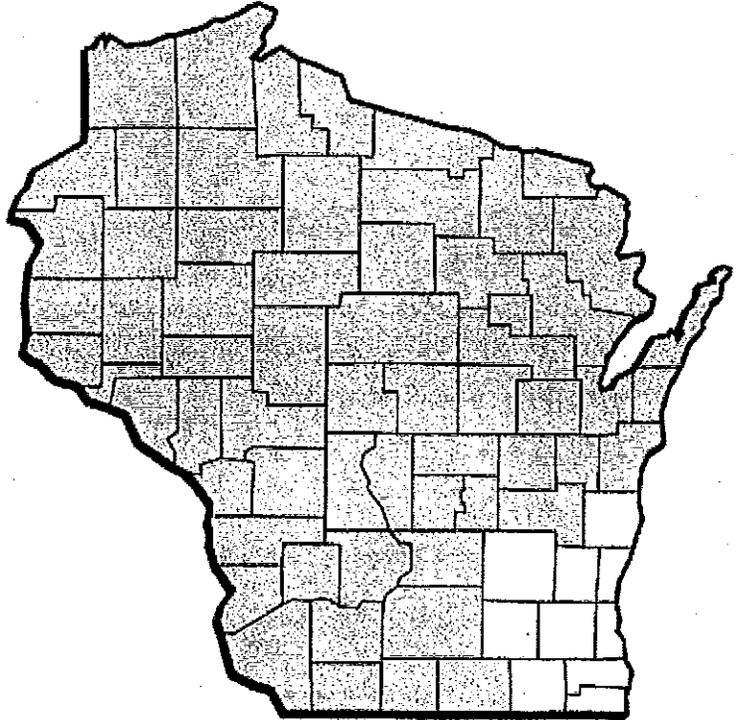
Subscribe to cable TV	64	Physical fitness/exercise	40
Shop by catalog/mail	58	Avid book readers	39
Own a cellular phone	57	Travel for pleasure/vacation	34
Use a personal computer	50	Camp/hike	34
Subscribe to online service	46	Hunting/shooting	33
Watch sports on TV	45	Vegetable gardening	33
Flower garden	45	Are health conscious	33
Travel in USA	44	Crafts	32
Fish frequently	42	Golf	30
Walk for health	42	Bicycle frequently	29
		Casino gambling	20

Milwaukee Designated Market Area

(Dodge, Jefferson, Kenosha, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington & Waukesha Counties)

DMA Statistics

➤ Total Adult Population	1,641,993
➤ Total Households	837,817
➤ Median Age	48
➤ Median Income	\$52,296
➤ Education	
College (1-4 Years)	45%
High School	34%
➤ Married	56%
➤ No children at home	69%
➤ Occupations	
Professional/technical	27%
Blue collar	15%
Retired	16%
➤ Income Earners	
Single	44%
Married, one income	20%
Married, two incomes	36%
➤ Dual Income Households with Kids	
No kids	19%
Kids under 13 years	9%
Kids between 13-18 years	8%



Percentage of Households Who:

Subscribe to cable TV	66	Walk for health	39
Own a cellular phone	58	Are health conscious	35
Shop by catalog/mail	57	Travel for pleasure/vacation	35
Subscribe to online service	50	Fish frequently	33
Use a personal computer	52	Crafts	29
Travel in USA	46	Camp/hike	28
Watch sports on TV	43	Golf	28
Physical fitness/exercise	43	Bicycle frequently	27
Flower garden	41	Vegetable gardening	27
Avid book readers	39	Casino gambling	23
		Hunting/shooting	21

1. What was the PRIMARY purpose for your trip today?
Please check one box only.

- ¹ Attending the Bassmaster Elite 50 Series tournament
- ² Working/volunteering at this event
- ³ Vacating in the area, stopped in
- ⁴ Visiting family & friends in area
- ⁵ Business or meeting in area
- ⁶ Passing through area, stopped in
- ⁷ Other _____

2. What information did you use to find out about this event? Please check all that apply.

- Live in area
- Newspaper
- Radio
- Brochures
- Family/friends
- Chamber/CVB
- Internet
- Other _____

3. How far in advance did you plan your trip to this tournament?

- ¹ The day of the trip
- ² Day before the trip
- ³ Within a week
- ⁴ Within a month
- ⁵ 1-3 months before
- ⁶ 4-5 months before
- ⁷ 6 months or more

4. Will you need overnight lodging or will you be returning home tonight?

- No lodging needed
- Yes -- What type of lodging are you using:
 - ² Hotel/Motel
 - ³ Camp (RV)
 - ⁴ Camp (Tent)
 - ⁵ Rent private home
 - ⁶ 2nd home/vacation
 - ⁷ Friend/relative
 - ⁸ Rent cabin
 - ⁹ B&B
 - ¹⁰ Resorts
 - ¹¹ Other _____

Name & City of Paid Lodging: _____

5. How many nights will you be staying at the above accommodations? # _____

6. Counting yourself, how many people are in your immediate travel group? # _____

7. Please indicate what type of angler you consider yourself:

- ¹ Bass
- ² Walleye
- ³ Musky
- ⁴ Trout stream
- ⁵ Great Lakes Trout
- ⁶ Family angler
- ⁷ Any or all of the above
- ⁸ Don't fish

8. In a typical year, how many days do you fish?

_____ days ⁹⁹ Don't fish

9. If you could choose the type of information you would like to know before fishing a particular body of water, please check the type of information from the categories below?

- "Hot" fishing spots
- Water temperature
- Area boat ramps
- Nearest bait shop
- Fishing guides
- Other-Please explain _____
- Area restaurants/entertainment
- Lake map
- Boat rental/docking/gas
- Where to get fishing license
- Area accommodations

10. Thinking of your selections in Question #8, how would you like to receive this information?

- DNR Magazine
- On-line fishing chat room
- Fishing magazine chat room
- Daily radio broadcast featuring fishing
- DNR Report
- Other-Please explain _____

11. Could you estimate the dollars that you yourself have spent or plan on spending on this trip?

- \$ _____ Lodging accommodations
- \$ _____ Food/drink at area restaurants/bars
- \$ _____ Area entertainment, admissions, etc.
- \$ _____ Shopping (non-fishing related)
- \$ _____ Gas, parking, repairs
- \$ _____ Convenience stores (non-fishing related)
- \$ _____ Transportation to area
- \$ _____ Gaming/sweepstakes
- \$ _____ Fishing-related expenses (bait, etc.)
- \$ _____ Other _____

12. In addition to fishing, please list three other favored leisure activities?

1. _____
2. _____
3. _____

13. What is your age: _____ Gender: Male Female

14. Which of these categories best describes your annual household income?

- ¹ Less than \$10,000
- ² \$10,000-\$20,000
- ³ \$21,000-\$40,000
- ⁴ \$41,000-\$60,000
- ⁵ \$61,000-\$80,000
- ⁶ \$81,000-\$100,000
- ⁷ \$100,000 or more
- ⁸ Prefer not to answer

15. Please list what county and state you live in along with your zip code.

County _____ State _____ Zip _____



Profile of Visitors at Sporting Events - 2005
Bassmaster Elite 50 Series

APPENDIX 3

Tournament angling in Wisconsin:
Estimating economic impacts for
host communities

Dave Marcouiller, Patrick Schmalz, and Will Sierzchula

Extension Report 07-01
Department of Urban and Regional Planning
University of Wisconsin - Madison/Extension

February 2007

Executive Summary

Tournament angling has been an increasingly important part of recreational freshwater fisheries in the Great Lake States for the past 50 years. During the past 15 or so years in Wisconsin, the number of permitted tournaments has grown from just over 300 to about 450 today. Most of these tournaments are locally organized events sponsored by fishing clubs, local business interests, and/or non-profit organizations. While most are fairly modest local events, a few larger regional and national events gain notoriety every year.

In 2004, a new Wisconsin Act supported the Wisconsin Department of Natural Resources' (WDNR) rule-making authority to regulate fishing tournaments and established a bass fishing tournament pilot program. Under the pilot program the department would issue up to 4 permits tournaments per year authorizing participants to exceed their daily bag limit by culling bass. This Act also called for research that evaluated the pilot program.

An important component that motivated the pilot program revolved around the potential economic benefit from attracting large tournaments, which previously avoided Wisconsin due to bag limit regulations. An economic evaluation of host community impacts resulting from tournaments is an important component of the overall evaluation of the pilot program and provides the focus for the work reported in this document.

In this paper, we report on a 2005/2006 effort to better understand the characteristics of six separate tournaments and their participants (boating anglers, co-anglers, and staff/sponsors) in Wisconsin. We surveyed tournament participants for several characteristics including expenditure patterns. We developed estimates of aggregate spending and applied these estimates as export-based final demand shocks to an array of retail and service business groupings. Host community economic impacts were analyzed using county-level input-output models. These impacts were placed in perspective using analogous data from previous studies on overall recreational angling and alternative tournaments.

Results suggest that local infusions of non-local participant spending drive modest host community economic impacts. Estimates of non-local participant spending in host communities range from roughly \$40,000 for the WSBF Madison Chain-of-Lakes Tournament in Dane County to over \$300,000 for the Sturgeon Bay Open (Door County) and the FLW Stren (La Crosse County) tournaments. While expenditure patterns varied somewhat, the amount of aggregate spending was largely determined by the size of the tournament. Results of the regional input-output models suggest that the multiplier effects of this infusion of new money range from about 1.3 to 1.5, depending on the economic structure of the host communities.

One of the elements that motivated this research had to do with the decision to allow tournament anglers to cull their catches. Our specific niche in helping to understand this situation was to develop estimates of the potential for positive host community business impacts in Wisconsin if rules were changed to allow participants to cull. The pilot program looked at a total of seven tournaments; all with various histories of culling and/or not culling. Results of this research suggests that culling, indeed, may not be essential for bass tournaments to provide substantive local economic benefits in Wisconsin.

The economic benefits derived by host communities from tournament angling must be viewed within the context of direct event hosting costs and indirect costs created by recreational displacement and fisheries management. The applied implications of these results suggest that host community economic elements, in addition to biologic and sociologic criteria, are a necessary evaluative mechanism for progressive public fisheries policies that address tournament angling events, their specific rule structures, and the overall sustainability of local fisheries resources.

Acknowledgements

This work was funded by the Wisconsin Department of Natural Resources using special funds appropriated for the Tournament Angling Pilot Program. The authors wish to thank the tournament organizers and participants for their willingness to participate in the survey effort reported in this document. In particular, we extend our appreciation to the Wisconsin Bass Federation; Wisconsin BASS Federation Nation; ESPN/BASS; FLW Outdoors; the Sturgeon Bay Open Bass Tournament, their sponsors and staff. Our apologies and thanks to anyone we may have inadvertently missed and to others that will contribute to this effort in the future.

Author Affiliations

Marcouiller is a Professor of Urban and Regional Planning, University of Wisconsin - Madison and State Extension Resource Economist with the University of Wisconsin - Extension. Schmalz is a Staff Specialist with the Division of Water at the Wisconsin Department of Natural Resources. Sierzchula is a Graduate Student in the Department of Urban and Regional Planning, University of Wisconsin - Madison.

Tournament angling in Wisconsin: Estimating economic impacts for host communities

Table of Contents

Section:	Page:
Executive Summary	ii
Acknowledgements	iii
Author Affiliations	iii
Table of Contents	iv
1. Introduction	1
2. Methods used in evaluating tournament angling impacts	3
3. Results	8
3.1 Expenditures patterns of individuals	8
3.2 Expansion to total local expenditures	11
3.3 Local economic impacts	14
3.4 Comparisons with other water-based recreation studies	18
4. Summary and Conclusions	21
Literature Cited	23
Appendix A. Sample angler expense survey	26
Appendix B Local economic impacts for each tournament (Tables B1 through B6)	27

List of Tables

Table 1 Tournaments studied, number of individual non-local participants, local participants, and survey response sample size.	5
Table 2. Respective industrial sectors for expenditure patterns used to estimate regional economic impacts	7
Table 3. Individual Expenditure Patterns of Tournament Participants.	9
Table 4. Total Local Expenditures of Non-local Tournament Participants.	12
Table 5 Local economic impacts of non-local tournament participant spending estimated using Micro-IMPLAN	16
Table 6 Impact per non-local participant in local output and income for each tournament	18
Table 7 Individual per-trip spending habits of non-local IFWT spectators and participants by place of expenditure (in 2003 dollars)	18
Table 8 Total expenditures of non-local In-Fisherman Tournament attendees in Pierce County	20
Table 9 Average daily expenditure patterns for trail users of different types	21

Table of Contents (con't)

Section:	Page:
Appendix B Tables:	27
Table B1 Local economic impacts in La Crosse County of non-local tournament participant spending at the '05 FLW Everstart	27
Table B2 Local economic impacts in Shawano County of non-local tournament participant spending for the '05 WSBF 4 Man Classic in Shawano	28
Table B3 Local economic impacts in Door County of non-local tournament participant spending for the Sturgeon Bay Open	29
Table B4 Local economic impacts in La Crosse County of non-local tournament participant spending for the '06 WSBF FLW Outdoor Stren in La Crosse	30
Table B5 Local economic impacts in Winnebago County of non-local tournament participant spending for the Bassmaster Weekend in Winneconne	31
Table B6 Local economic impacts in Dane County of non-local tournament participant spending for the '06 WSBF 4 Man Classic in Madison	32

Tournament angling in Wisconsin:

Estimating economic impacts for host communities

Dave Marcouiller, Patrick Schmalz, and Will Sierzchula

1. Introduction

Managers of fisheries rely on a wide variety of information and data to make decisions about how best to plan for sustainable fishery resources.

Increasingly, there is a need to interpret and more fully understand the social and economic consequences of activities that affect local communities within which these resources reside. Extending our understanding into the human dimensions of resource management has been an area of rapidly expanding knowledge (Krueger and Decker 1999; Pollock et al. 1994).

During the past quarter century, there has been significant academic progress that more fully integrates economic and social attributes with the more traditional natural science aspects that dominate resource management (Barron, Perlack and Boland 1998; VanKooten 1993). With specific relevance to fisheries management, the economic impacts of sport fishing have taken on increased importance given intensified human demands for water-based recreational resources and general tendencies for increased community dependence on tourism as a source of income (Brown et al. 1991; Ridler 1997; Bohnsack et al 2002; Hammel et al. 2002; Chen et al. 2003; Haas et al. 2004; Gunderson and Kreag 2004;). One specific aspect of sport fishing, that of tournament angling, is of particular interest in this report. Tournament angling has been the focus of a limited literature (Schramm et al. 1991; Rhodes and Iverson 1998).

In Wisconsin, there has been a continual effort to address issues associated with natural resource related economic impacts at the community level in-general (Haines et al. 1998). A limited number of studies have focused

specifically on the economic impacts of fishery resources (USDI/USDC 1993; 1998; 2003, Marcouiller et al. 1995; Anderson et al. 2001; Stoll et al., forthcoming). Given the need to promulgate rules, a current area of information need surrounds the local economic impacts associated with tournament angling. In addition to the work reported here, specific literature on tournament angling impacts in Wisconsin are limited to a 2003 effort to assess the In-Fisherman Walleye Tournament on Lake Pepin (Hass et al. 2004), the ESPN Bass Tournament on Lake Wissota (Hamilton et al. 2005) and a currently ongoing effort to isolate tournament anglers from a study of all anglers on the Lake Winnebago system by a team led by John Stoll at the University of Wisconsin - Green Bay (Stoll et al, forthcoming).

Tournament angling in Wisconsin grew in popularity during the mid to late 1980s. Although fishing tournaments were held in Wisconsin during the 1970s, they did not draw much attention from the Wisconsin Department of Natural Resources (WDNR) until 1987. The WDNR did not keep records on the number of fishing tournaments in the state until 1994, when a permitting system was created. The number of permitted tournaments in Wisconsin has grown from just over 300 in the mid-1990s to approximately 450 today. Most Wisconsin fishing tournaments are locally organized tournaments sponsored by fishing clubs, private businesses (resorts, bait shops), and local government organizations (chambers of commerce, tourism bureaus). There are a few regional and national events held in Wisconsin annually.

In April 2004, the Wisconsin Legislature passed and the Governor signed into law 2003 Wisconsin Act 249. In addition to providing the Wisconsin Department of Natural Resources (WDNR) rule-making authority to regulate fishing tournaments, it required the WDNR to establish a bass fishing tournament pilot program. Under the pilot program the department would issue up to 4 permits per year to bass fishing tournaments authorizing participants to exceed their daily bag limit by culling bass. Act 249 also required the WDNR to

conduct research and collect data for the purpose of evaluating the pilot program. Much of the impetus behind the addition of the bass fishing tournament pilot program to Act 249 was the potential economic benefit from attracting large bass tournaments, which previously avoided Wisconsin due to bag limit regulations (i.e. participants not being allowed to cull fish). Hence evaluation of the local economic impact of the pilot program tournaments will be an important component of the overall evaluation of the pilot program.

The basic question that underlies the research effort reported here is straightforward. To what extent are local communities that host tournament angling events impacted by the spending activities of tournament participants? A related contextual question then asks the following. How do the local economic impacts of tournament angling compare with other uses of local water resources? To answer these questions, we have three specific research objectives. First, we will estimate the characteristics of tournament angling participant spending for a select number of events included in the tournament pilot program (6 total events) held during 2005-2006. Second, we will apply these expenditure characteristics to regional input-output models to estimate the local economic impact of these events. Third, we will compare the impacts of these tournaments to other tournament characteristics and other types of recreational activities using existing literature that reports on comparable studies.

2. Methods Used in Evaluating Tournament Angling Impacts

During 2005-2006, seven communities hosted bass fishing tournament pilot program events. The largest event in terms of national stature was the ESPN/BASS Bassmaster Elite 50 event held June 15-18, 2005 on Lake Wissota near Chippewa Falls. As part of the pilot program evaluation, and to gather more information about sporting events held in Wisconsin, the Department of Tourism, the Chippewa Valley Convention and Visitors Bureau, the Department

of Natural Resources, and the University of Wisconsin - Madison's Department of Urban and Regional Planning partnered to gather marketing and economic impact information. Information on spectator demographics, trip characteristics, and expenditures was collected at the ESPN/BASS Bassmaster Elite 50 event. Expenditure data collected from non-local spectators, participants, ESPN/BASS crew, and vendors were used to estimate local economic impact. A summary containing descriptive results and local economic impacts of the Bassmaster Elite 50 event was compiled and disseminated in an earlier report (Hamilton et al. 2005).¹

Based upon the experience gained in the Lake Wissota work, six additional events were evaluated using an analogous research design. These included the following events:

- 1) '05 FLW Outdoors Everstart Series Fishing Tournament on the Mississippi River. Aug. 3 - 6, 2005 (La Crosse County),
- 2) '05 Wisconsin Bass Federation (WSBF) 4-Man Classic on Shawano Lake. Sept. 24 - 25, 2005 (Shawano County),
- 3) Sturgeon Bay Open Bass Tournament on Sturgeon Bay, WI. May 20 - 21, 2006 (Door County),
- 4) '06 FLW Outdoors Stren Series Fishing Tournament on the Mississippi River. July 12 - 15, 2006 (La Crosse County),
- 5) Bassmaster Weekend Series Bass Tournament on the Wolf River Chain. July 30, 2006 (Winnebago County),
- 6) '06 Wisconsin Bass Federation (WSBF) 4-Man Classic on Madison Lake Chain. Sept. 23 - 24, 2006 (Dane County).

For these six events, expenditure surveys were distributed to tournament anglers, sponsors and staff present at the six angling tournaments, targeting smallmouth and largemouth bass, which took place sometime between August

¹ The summary of participant demographics and local economic impacts of the Lake Wissota - ESPN Bassmaster Elite 50 is included in a companion report (Hamilton et al. 2005). With the exception of comparisons found later in the report, we will limit our discussion here to the research surrounding the six tournaments that followed the Lake Wissota work.

2005 and September 2006. The total number of participants (staff, anglers and sponsors) and the sample of usable responses from each tournament are summarized in Table 1.²

Table 1. Tournaments studied, numbers of individual non-local participants, local participants, and respective survey response sample sizes (n).

Tournament name & location	Dates	Type of #	Boaters	Co-Anglers	Staff/Spnsr	Locals
'05 FLW Everstart Tournament	Aug-05	Total	166	174	16	26
- La Crosse		n	63	66	6	10
'05 WSBF 4-Man Classic	Sep-05	Total	84	71	13	19
- Shawano Lake		n	13	11	2	3
Sturgeon Bay Open	May-06	Total	211	147	0	42
- Sturgeon Bay Area		n	10	7	0	2
'06 FLW Outdoors Stren Series	Jul-06	Total	170	207	14	37
- La Crosse		n	73	89	0	16
Bassmaster Weekend	Jul-06	Total	60	34	3	30
- Winneconne		n	30	17	0	15
'06 WSBF 4-Man Classic	Sep-06	Total	59	56	7	15
- Madison Chain of Lakes		n	16	15	0	4

To develop estimates of trip expenditures for tournament travel, each participant was provided a survey instrument crafted from the instrument used for the earlier Bassmaster 50 Elite tournament work (see Appendix A). Each survey gathered demographic and economic data about participants in the angling tournament. The estimated spending covers the entire time that the participant stayed in the tournament area. The survey instrument centered on a set of questions intended to estimate local spending within the regional economy of the area hosting the tournament.

² As can be seen in Table 1, survey response rates varied among the tournaments from a high of over 50 percent for the Winneconne Bassmaster Weekend to a low of less than 5 percent for the Sturgeon Bay Open. This variability in response rates reflected differences in both how the surveys were distributed and different characteristics of the participants, themselves. Overall, the sample represents 1,634 participants and includes usable responses from 469 for an aggregate response rate of roughly 30 percent. Although the potential for non-response bias exists, anecdotal impressions lead us to be confident that reasons for either responding or failing to return surveys were, in general, non-strategic and unbiased.

Input-output models were constructed for the six tournament regions using the most recent 2004 county-level MicroIMPLAN datasets for Dane, Door, LaCrosse (2 tournaments), Shawano, and Winnebago Counties (MIG 2006). In calculating the demand shock, tournament years (2005/2006) were taken into account in the use of a sector-specific deflator to convert to 2004 dollars. All reports reflect results inflated back to a common 2006 reporting year using sector-specific inflation rates. A total multiplier approach was used in running the impact models. The full description of input-output modeling as a standard method used to develop estimates of regional economic impacts is beyond the scope of this report but readily available in standard textbooks on the topic (Shaffer et al. 2004; Chapter 15).

For the assessment of economic impacts resulting from the six tournaments assessed in this study, non-local participant expenditures were allocated to seven specific industrial sectors. Each sector into which expenditures were allocated is represented by unique 3 to 6 digit NAICS codes and is specific to the sector structure of MicroIMPLAN.³ Expenditure categories, IMPLAN sectors, and respective NAICS codes are summarized in Table 2.

Estimated total expenditures for each tournament and the amount spent locally were summarized. Only the local portion of expenditures that occurred within the tournament's regional economy (as defined by the county in which the tournament took place) were used as the demand shock for input-output modeling. This reflects a characteristic unique to export-base impacts and a necessary condition for theoretical consistency in economic impact modeling using input-output analysis.

³ While we recognize that this method of expenditure allocation could miss some sectoral groupings and/or overly simplifies the manner in which spending relates to local business receipts, we are confident that these potential problems are minor. The approach represents a valid technique used to estimate the local demands shocks of visitor impacts found in other tourism impact studies.

Table 2. Respective industrial sectors for expenditure patterns used to estimate regional economic impacts (IMPLAN sectors and respective 3-5 digit NAICS codes in which expenditures were allocated).

Expenditure Category:	IMPLAN Sector	NAICS Code
Hotels, motels, bed & breakfasts, camping	479	72111/72112
Grocery stores	405	445
Restaurants	481	722
Transportation related (gas, repairs)	407	447
Fishing equipment and gifts	409	451
Entertainment (gambling, theatres, bowling)	478	713
Other expenses	411	453

Standard categories of economic impacts included *output* (or the aggregate impact on regional economic activity), *income* (that portion of total output that accrues locally), and *employment* (total numbers of jobs created) locally.⁴ The county-level input-output models used to calculate total impacts estimated multiplier effects measured as direct, indirect, and induced impacts. These are uniquely calculated and reported for output, income, and employment. Direct effects include respective portions of the amount initially injected into the regional economy (non-local spending in the region). Indirect effects relate to inter-industry transactions resulting from the initial demand shock (direct effects). Induced effects include the increase in local income resulting from the direct and indirect effects and their subsequent effects on local consumption.

The extent of these round-by-round "multiplier" effects will depend on fundamental characteristics of the regional economy. In general, larger and more diverse regional economies will exhibit higher levels of economic multiplier effects. Conversely, smaller and less diverse regional economies will exhibit

⁴ Output includes all economic activity related to visitor spending including intermediate purchased inputs, income or value added, and imported inputs. Income most clearly reflects the impacts felt by local residents and includes four components: (1) employee compensation, (2)

relatively lower multiplier effects. These economic multiplier generalizations reflect alternative levels of regional economic "leakage" and "capture". They relate to regional export/import balances. For this study, the regional economies hosting the tournaments varied widely from relatively small, less-diverse economies such as Shawano County (non-metropolitan) to fairly robust and diverse economies such as La Crosse and Dane County (metropolitan).

3. Results

For purposes of reporting results, discussion will focus on descriptive analyses of the survey responses and their expansion to total numbers of participants. Tournament-specific average values by non-local participant type were used for expansion to regional estimates. For all six tournaments, the "region" is specified as the county in which the tournament took place. This inflow of new dollars into each regional host economy then serves as the stimulus for assessment of local economic impacts estimated through the use of county-level input-output models.

3.1 Expenditure patterns of individuals

Descriptive analysis of the survey instruments developed average expenditure patterns for tournament participants for the six events which are summarized in Table 3. For purposes of focusing on the inflow of new dollars into host communities, cross-tabulations of host county zip codes were used to isolate and exclude local participants. Note from the Table that, in general, expenditure patterns differed by the type of participant. For all six tournaments studied, boating angler spending patterns were higher when compared to their accompanying co-angler. This appears to result from the fact that boating

proprietor's income, (3) other property income, and (4) indirect business taxes. Employment measures total jobs created and includes full-time, part-time and seasonal jobs.

Table 3. Individual Expenditure Patterns of Non-local Tournament Participants.

Spending Category:	Boating Angler:		Co-angler:		Staff/Sponsors:	
	Total	Local	Total	Local	Total	Local
05 FLW Everstart (La Crosse):						
Hotels, Motels, B&Bs	\$328.41	\$293.79	\$251.82	\$192.64	\$517.33	\$517.33
Groceries & Liquor Stores	\$78.33	\$66.03	\$75.68	\$47.04	\$176.67	\$176.67
Restaurants & Taverns	\$155.63	\$142.50	\$142.38	\$105.08	\$513.34	\$513.34
Automobile related	\$393.97	\$323.53	\$201.44	\$127.14	\$387.42	\$387.42
Fishing Equipment & Gifts	\$121.43	\$108.41	\$127.39	\$91.43	\$191.33	\$191.33
Entertainment (gambling, theatres, etc.)	\$17.54	\$17.54	\$57.88	\$32.66	\$8.33	\$8.33
Other	\$15.71	\$12.94	\$17.17	\$16.11	\$74.92	\$74.92
Total	\$1,111.02	\$964.74	\$873.76	\$612.10	\$1,869.34	\$1,869.34
05 WSBF 4-Man Classic (Shawano):						
Hotels, Motels, B&Bs	\$120.38	\$116.54	\$107.45	\$107.45	\$100.00	\$100.00
Groceries & Liquor Stores	\$36.15	\$36.15	\$25.45	\$25.45	\$65.00	\$65.00
Restaurants & Taverns	\$77.62	\$77.62	\$63.55	\$59.86	\$250.00	\$250.00
Automobile related	\$160.77	\$123.35	\$78.18	\$63.68	\$325.00	\$310.00
Fishing Equipment & Gifts	\$23.54	\$23.54	\$36.45	\$19.82	\$100.00	\$100.00
Entertainment (gambling, theatres, etc.)	\$110.77	\$110.77	\$30.45	\$30.45	\$50.00	\$50.00
Other	\$1.54	\$1.54	\$3.64	\$3.64	\$0.00	\$0.00
Total	\$530.77	\$489.51	\$345.18	\$310.36	\$890.00	\$875.00
Sturgeon Bay Open (Sturgeon Bay):						
Hotels, Motels, B&Bs	\$ 400.00	\$400.00	\$353.57	\$353.57	na	na
Groceries & Liquor Stores	\$ 99.50	\$85.50	\$58.57	\$53.57	na	na
Restaurants & Taverns	\$ 190.50	\$169.00	\$167.86	\$165.00	na	na
Automobile related	\$307.50	\$230.66	\$187.86	\$135.00	na	na
Fishing Equipment & Gifts	\$144.50	\$70.00	\$48.57	\$40.00	na	na
Entertainment (gambling, theatres, etc.)	\$22.50	\$22.50	\$53.57	\$53.57	na	na
Other	\$5.00	\$5.00	\$22.86	\$22.86	na	na
Total	\$1,169.50	\$982.66	\$892.86	\$823.57	na	na
06 FLW Outdoor Stren (La Crosse):						
Hotels, Motels, B&Bs	\$351.05	\$298.45	\$290.72	\$250.04	ns	ns
Groceries & Liquor Stores	\$85.07	\$69.93	\$57.53	\$49.33	ns	ns
Restaurants & Taverns	\$136.37	\$121.37	\$120.22	\$105.45	ns	ns
Automobile related	\$491.51	\$346.21	\$178.09	\$125.37	ns	ns
Fishing Equipment & Gifts	\$130.14	\$102.54	\$92.19	\$73.09	ns	ns
Entertainment (gambling, theatres, etc.)	\$16.58	\$13.84	\$10.39	\$6.46	ns	ns
Other	\$14.59	\$14.45	\$17.45	\$17.17	ns	ns
Total	\$1,225.31	\$966.79	\$766.59	\$626.91	ns	ns

ns = not surveyed but most likely similar to same tournament, previous year
na = not surveyed and not applicable since all staff were local

Table 3 (con't). Individual Expenditure Patterns of Non-local Tournament Participants.

Spending Category:	Boating Angler:		Co-angler:		Staff/Sponsors:	
	Total	Local	Total	Local	Total	Local
Bassmaster Weekend (Winneconne):						
Hotels, Motels, B&Bs	\$203.80	\$171.13	\$107.12	\$98.71	ns avg	ns avg
Groceries & Liquor Stores	\$54.33	\$29.33	\$27.53	\$20.47	ns avg	ns avg
Restaurants & Taverns	\$92.20	\$85.20	\$59.82	\$47.59	ns avg	ns avg
Automobile related	\$300.70	\$217.34	\$119.00	\$71.06	ns avg	ns avg
Fishing Equipment & Gifts	\$63.53	\$31.10	\$38.47	\$15.53	ns avg	ns avg
Entertainment (gambling, theatres, etc.)	\$19.67	\$10.33	\$12.94	\$12.94	ns avg	ns avg
Other	\$32.10	\$32.10	\$19.18	\$19.18	ns avg	ns avg
Total	\$766.33	\$576.53	\$384.06	\$285.48	ns avg	ns avg
06 WSBF Four Man Classic (Madison):						
Hotels, Motels, B&Bs	\$166.81	\$148.06	\$120.27	\$113.60	ns	ns
Groceries & Liquor Stores	\$36.56	\$27.81	\$28.67	\$28.67	ns	ns
Restaurants & Taverns	\$103.75	\$97.50	\$68.67	\$66.00	ns	ns
Automobile related	\$140.25	\$99.63	\$104.87	\$82.07	ns	ns
Fishing Equipment & Gifts	\$36.25	\$12.50	\$25.00	\$20.33	ns	ns
Entertainment (gambling, theatres, etc.)	\$17.81	\$17.81	\$17.33	\$17.33	ns	ns
Other	\$21.88	\$21.88	\$9.67	\$9.67	ns	ns
Total	\$523.31	\$425.19	\$374.48	\$337.67	ns	ns

na = not surveyed and not applicable since all staff were local

ns avg = not surveyed but assumed to be the average of staff/sponsor surveys

ns = not surveyed but most likely similar to same tournament, previous year

anglers have additional expenses related to their boat (e.g. gas) that are not shared by co-anglers. This said, the data suggests that, with minor exception, expenditures by boaters in other categories were also generally higher than co-anglers.

Among tournaments, participants of the '05 and '06 FLW events held on the Mississippi Pools near La Crosse exhibited the highest levels of individual spending. This could result from several characteristic differences among the tournaments. Important among these characteristics are participant demographics and local business offerings. The '05 and '06 FLW events generally drew anglers from a wider geographic area than Shawano, Sturgeon Bay, Winneconne, or Madison. Additionally, La Crosse offers a relatively robust

variety of hotel, entertainment, and restaurant options for participants when compared to Shawano, Winneconne, or Sturgeon Bay.

Non-local staff and sponsors are also an important type of event participant. While they were few in number, expenditure patterns for non-local staff and sponsors were consistently higher in the four events where they were present (FLW Everstart & Outdoor Stren, WSBF 4-Man Classic in both Shawano & Madison, and the Winneconne Bassmaster Weekend)

3.2 Expansion to total local expenditures

These individual expenditure patterns were then used with final non-local participant numbers to arrive at expanded values that estimate total local spending by non-local participants. This then serves as an infusion of new dollars into the local economies that host the events. These infusions can be thought of as export-based shocks to the local economic structure that would not have happened were it not for the hosting of the tournament event. These expanded values that serve as infusions of spending by non-local participants are summarized in Table 4.

Note from this Table that expansion to total local expenditures is sensitive to the numbers of participants. In general, the larger the number of participants - the higher the level of local spending. For these six events, there were a total of 1,639 participants with individual event participation from a low of 97 non-local participants at the Bassmaster Weekend in Winneconne to a high of 391 non-local participants at the 2006 FLW Outdoor Stren event in La Crosse.

In total, these six events created an infusion of about \$1.1 million in local spending. Among the six tournaments, there was fairly wide variation in local spending levels. The Sturgeon Bay event experienced the highest levels of local spending at roughly \$328,000. The FLW events of 2005 and 2006 in La Crosse also experienced high levels of local spending with totals of \$296,000 and \$309,000 respectively. The lowest amount of local spending among

Table 4. Total Local Expenditures of Non-local Tournament Participants.

Spending Category:	Boating Angler:	Co-angler:	Staff/Sponsors:	TOTAL
'05 FLW Everstart (La Crosse):				
Hotels, Motels, B&Bs	\$48,761.04	\$33,495.45	\$8,177.38	\$90,434
Groceries & Liquor Stores	\$10,959.16	\$8,179.12	\$2,792.60	\$21,931
Restaurants & Taverns	\$23,651.07	\$18,270.88	\$8,114.31	\$50,036
Automobile related	\$53,697.06	\$22,106.58	\$6,123.91	\$81,928
Fishing Equipment & Gifts	\$17,993.07	\$15,897.47	\$3,024.33	\$36,915
Entertainment (gambling, theatres, etc.)	\$2,911.16	\$5,678.79	\$131.67	\$8,722
Other	\$2,147.68	\$2,801.14	\$1,184.25	\$6,133
Total	\$160,120.23	\$106,429.42	\$29,548.46	\$296,098
'05 WSBF 4-Man Classic (Shawano):				
Hotels, Motels, B&Bs	\$9,769.27	\$7,621.86	\$1,289.66	\$18,681
Groceries & Liquor Stores	\$3,030.37	\$1,805.52	\$838.28	\$5,674
Restaurants & Taverns	\$6,506.70	\$4,245.93	\$3,224.14	\$13,977
Automobile related	\$10,340.13	\$4,517.02	\$3,997.93	\$18,855
Fishing Equipment & Gifts	\$1,973.30	\$1,405.72	\$1,289.66	\$4,669
Entertainment (gambling, theatres, etc.)	\$9,285.58	\$2,160.17	\$644.83	\$12,091
Other	\$129.09	\$257.93	\$0.00	\$387
Total	\$41,034.44	\$22,014.16	\$11,284.48	\$74,333
Sturgeon Bay Open (Sturgeon Bay):				
Hotels, Motels, B&Bs	\$84,210.53	\$52,105.05	na	\$136,316
Groceries & Liquor Stores	\$18,000.00	\$7,894.53	na	\$25,895
Restaurants & Taverns	\$35,578.95	\$24,315.79	na	\$59,895
Automobile related	\$48,560.00	\$19,894.74	na	\$68,455
Fishing Equipment & Gifts	\$14,736.84	\$5,894.74	na	\$20,632
Entertainment (gambling, theatres, etc.)	\$4,736.84	\$7,894.53	na	\$12,631
Other	\$1,052.63	\$3,368.84	na	\$4,421
Total	\$206,875.79	\$121,368.21	na	\$328,244
'06 FLW Outdoor Stren (La Crosse):				
Hotels, Motels, B&Bs	\$50,672.79	\$51,758.28	\$4,138.64	\$106,570
Groceries & Liquor Stores	\$11,873.17	\$10,211.31	\$1,413.36	\$23,498
Restaurants & Taverns	\$20,606.99	\$21,828.15	\$4,106.72	\$46,542
Automobile related	\$58,781.79	\$25,951.59	\$3,099.36	\$87,833
Fishing Equipment & Gifts	\$17,409.91	\$15,129.63	\$1,530.64	\$34,070
Entertainment (gambling, theatres, etc.)	\$2,349.85	\$1,337.22	\$66.64	\$3,754
Other	\$2,453.42	\$3,554.19	\$599.36	\$6,607
Total	\$164,147.91	\$129,770.37	\$14,954.72	\$308,873

Table 4 (con't). Total Local Expenditures of Non-local Tournament Participants.

Spending Category:	Boating Angler:	Co-angler:	Staff/Sponsors:	TOTAL
Bassmaster Weekend (Winneconne):				
Hotels, Motels, B&Bs	\$10,185.00	\$3,329.07	\$926.00	\$14,440
Groceries & Liquor Stores	\$1,745.61	\$690.37	\$362.51	\$2,798
Restaurants & Taverns	\$5,070.77	\$1,605.01	\$1,145.01	\$7,821
Automobile related	\$12,935.24	\$2,396.56	\$1,046.13	\$16,378
Fishing Equipment & Gifts	\$1,850.95	\$523.76	\$437.00	\$2,812
Entertainment (gambling, theatres, etc.)	\$614.80	\$436.41	\$87.50	\$1,139
Other	\$1,910.47	\$646.86	\$112.38	\$2,670
Total	\$34,312.83	\$9,628.04	\$4,116.51	\$48,057
'06 WSBF Four Man Classic (Madison):				
Hotels, Motels, B&Bs	\$8,811.96	\$3,831.25	\$700.00	\$13,343
Groceries & Liquor Stores	\$1,655.14	\$966.92	\$455.00	\$3,077
Restaurants & Taverns	\$5,802.82	\$2,225.90	\$1,750.00	\$9,779
Automobile related	\$5,929.59	\$2,767.88	\$2,170.00	\$10,867
Fishing Equipment & Gifts	\$743.95	\$685.65	\$700.00	\$2,130
Entertainment (gambling, theatres, etc.)	\$1,059.98	\$584.47	\$350.00	\$1,994
Other	\$1,302.21	\$326.13	\$0.00	\$1,628
Total	\$25,305.66	\$11,388.19	\$6,125.00	\$42,819

these six events was the WSBF 4-Man Classic held on the Madison Chain of Lakes at roughly \$43,000.

It is important to note that these six events differed from the ESPN Bassmaster Elite 50 (the first tournament studied) in that there were virtually no or negligible numbers of spectators in attendance. For those familiar with the ESPN event, estimates placed the number of spectators at roughly 14,000 which represents a large aggregate amount of spending. Previous research results (Hamilton et al. 2005) suggest that while individual spectator spending is relatively low compared to participants, the simple fact that the audience size at this event was large drove significant local spending levels. Spectators are relatively rare at most tournament angling events. Again, the subsequent six tournaments focused on in this report had few spectators present. Those

spectators in attendance were either local or were accompanying one of the anglers participating.

3.3 Local economic impacts

The communities that host tournaments in Wisconsin vary widely in economic structure. The economic structure of a region is a key determinant in the extent to which multiplier impacts are felt locally. Rural communities such as Shawano and Sturgeon Bay will tend to have relatively smaller numbers of local retail and service businesses in which tournament anglers can spend their money. Further, these communities will have fewer local linkages for intermediate purchased inputs, or those items needed to produce the items that are sold locally. Micropolitan and metropolitan regions such as the Fox Cities (Appleton and Oshkosh), La Crosse, and Madison tend to be relatively more robust and diverse economies with a much broader array of local retail and service businesses and a commensurately higher amount of locally available intermediate purchased inputs. In general, smaller and less diverse regional economies are relatively more dependent on the outside for the items sold by local retail and service businesses. Conversely, larger, more diverse regional economies tend to be more self-contained. Hence, multiplier impacts tend to be larger as the economic structure of a regional economy grows.

The economic stimulus of new dollars spent by visiting tournament participants tends to be quite modest relative to the overall economic structure of these counties; even those that are small. For instance, in 2004, Door County had a resident population of just over 28,000 people, with an average household income of almost \$69,000, 18,000 total jobs, and a total amount of personal income of about \$925 million. The Sturgeon Bay Open tournament, for comparison, generated just over \$328,000 in local business receipts.⁵

⁵ Using the other rural example, Shawano County had a resident population of roughly 41,000 people in 2004, with an average income per household of just over \$61,000. Further, in 2004 there

To reiterate, the estimation of economic impacts resulting from tournament angling focuses on the infusion of new dollars into the communities surrounding the water bodies on which tournaments are held. Total local expenditures made by non-local participants are identified by local business sectors sensitive to travel expenditures in Table 4. When we apply these new dollars to the input-output model of each respective host county, the multiplier effect of inter-industry purchases generates indirect impacts and the increased income of households drives induced impacts. These impacts are summarized for various economic characteristics in Tables 5.

A quick note on the difference between output and income (in aggregate, also known as value added). Output is the total result of all economic activity and is analogous to gross regional product, gross state product, and gross national product. In other words, it is the total accounting for all regional production. Income, or value added, is defined as the value of the region's business output minus the value of all inputs purchased from other firms. It is therefore analogous to the "profit" or income generated locally. Value added includes a combination of employee compensation, proprietor's income ("business profit"), other property type income, and indirect business taxes paid to governments.

It is interesting to note from Table 5 that the amount of NEW money brought into host communities by people from the outside had broader impacts on the economic structure of these counties. This new money had the effect of generated business activity within the regions. Results of the spending shock to the input-output models suggests that the direct spending of non-local tournament angling participants generated a total direct, indirect and induced impacts that varied based on the amount of local spending. The two

were roughly 19,000 jobs and a total personal income in Shawano County was slightly over \$1 billion (MIG 2006). For comparison, the '05 WSBF 4-man Classic generated just over \$74,000.

tournaments held in La Crosse County and the one tournament in Door County were the largest tournaments surveyed, with twice as many anglers as the other

Table 5. Local economic impacts of non-local tournament participant spending estimated using Micro-IMPLAN (Base Year 2004 reported in 2006 US dollars and total numbers of jobs created).

Tournament, County, & Number Non-local Participants	Type of Economic Effect	Economic Impact		
		Output (2006 \$)	Income (2006 \$)	Employment (total # jobs)
'05 FLW Everstart (La Crosse): 356 Non-local Participants	Direct Effect	\$304,246.00	\$182,160.00	5.9
	Indirect Effect	\$72,902.00	\$39,859.00	0.7
	Induced Effect	\$75,318.00	\$44,666.00	0.9
	Total Effect	\$452,465.00	\$266,685.00	7.4
'05 WSBF 4-Man Classic (Shawano): 168 Non-local Participants	Direct Effect	\$76,476.00	\$43,293.00	1.9
	Indirect Effect	\$15,475.00	\$7,159.00	0.2
	Induced Effect	\$13,604.00	\$7,953.00	0.2
	Total Effect	\$105,555.00	\$58,406.00	2.3
Sturgeon Bay Open (Door): 358 Non-local Participants	Direct Effect	\$328,217.00	\$197,871.00	6.3
	Indirect Effect	\$50,903.00	\$26,423.00	0.6
	Induced Effect	\$61,598.00	\$37,574.00	0.7
	Total Effect	\$440,718.00	\$261,868.00	7.6
'06 FLW Outdoor Stren (La Crosse): 385 Non-local Participants	Direct Effect	\$308,928.00	\$186,696.00	5.9
	Indirect Effect	\$73,564.00	\$40,383.00	0.7
	Induced Effect	\$76,651.00	\$45,456.00	0.9
	Total Effect	\$459,143.00	\$272,535.00	7.5
Bassmaster Weekend (Winnebago): 97 Non-local Participants	Direct Effect	\$48,008.00	\$29,040.00	1.0
	Indirect Effect	\$9,051.00	\$5,018.00	0.1
	Induced Effect	\$9,612.00	\$5,646.00	0.1
	Total Effect	\$66,672.00	\$39,704.00	1.2
'06 WSBF 4 Man Classic (Dane): 122 Non-local Participants	Direct Effect	\$42,717.00	\$25,412.00	0.8
	Indirect Effect	\$11,522.00	\$6,484.00	0.1
	Induced Effect	\$11,128.00	\$6,671.00	0.1
	Total Effect	\$65,368.00	\$38,567.00	1.0

tournaments. The tournaments with more participants had a larger economic impact on output, income and employment in the regional economy.

Further, other sectors of these economies were impacted as shown in Appendix B (Tables B-1 through B-6). The multiplier impacts extend throughout the economy; well beyond the directly impacted sectors of the retail and service sectors.

Overall, output multipliers representative of the results reported in Table 5 ranged from almost 1.55 in Dane County, 1.53 in Winnebago County, 1.49 in La Crosse County, to 1.39 in Shawano County and 1.35 in Door County. To reiterate, the extent of multiplier impacts result from the relative diversity of each regions' economic structure. These results are reasonable given the relative sizes of each region's economy.

Another approach to presenting the impact results can be found by dividing the total impacts by the number of non-local participants. This summary is found in Table 6. Again, these metrics reflect both the amount of non-local spending for each tournament and the regional economic structure of host communities. Note from this table that the La Crosse and Door county tournaments had an impact per non-local participant in output and income that was almost twice as high as the other three tournaments. The output impact per non-local participant for the three larger tournaments was more than \$500 higher than the three smaller tournaments. The impact on output per non-local participant varies from \$536 to \$1,271 resulting in local income per non-local participant from about \$316 to \$749. On average, and based on the tournaments assessed in this report, communities hosting angling tournaments could expect an impact of roughly \$925 per non-local participant in total output resulting in roughly \$545 per non-local participant in local income.

Table 6. Impact per non-local participant in local output and income for each tournament

Tournament (Host County)	Impact per Non-local Participant	
	Local Output	Local Income
'05 FLW Everstart (La Crosse)	\$1,271	\$749
'05 WSBF 4-Man Classic (Shawano)	\$628	\$348
Sturgeon Bay Open (Door)	\$1,231	\$731
'06 FLW Outdoor Stren (La Crosse)	\$1,193	\$708
Bassmaster Weekend (Winnebago)	\$687	\$409
'06 WSBF 4 Man Classic (Dane)	\$536	\$316
Average	\$924	\$544

3.4 Comparison with other water-based recreation studies

In interpreting the local economic impact of tournament angling, it is important to remember that this is represent a very small slice of both the competitive and recreational aspects of water resource use. Our results suggest that even the largest tournament in Wisconsin generates less than ½ million dollars in local output. For comparison, estimates of the importance of recreational angling in Wisconsin suggest that fishing as a leisure pursuit represented 2001 trip-related expenditures of about over one billion dollars (\$1.2 billion; USDI/USDC 2003). Other estimates provided multiplier estimates of this spending at roughly \$2.3 billion dollar in aggregate output that supports roughly 26,000 jobs in the state and generates 100 million dollars in state tax revenue.⁶

⁶ Problems exist with this and other comparisons and relates primarily to how we define local aspects of economic impact. Our point, though, is that tournament angling represents a small niche of overall angling in the state. While generating positive impacts, tournament angling must be weighed with respect to direct costs of hosting the events, unaccounted dislocation of recreational anglers, and other social and biological costs associated with allowing tournaments to proliferate on Wisconsin waters.

Results from the six tournaments assessed in this report appear to be reasonable estimates of local spending and impact. They are consistent with other studies of tournament angling. For comparison, Table 7 outlines results of individual per-trip spending patterns from a walleye tournament in 2004 on Lake Pepin (for the full report, see Hass, et al. 2003).

Table 7. Individual per-trip spending habits of non-local IFWT spectators and participants by place of expenditure (in 2003 dollars).

Spending category	Professional anglers (n = 29)		Amateur anglers (n = 27)		Spectators (n = 169)	
	regional	local	regional	local	regional	local
Hotels, motels, bed/breakfast, camping	467.00	167.86	205.26	48.22	60.79	13.77
Groceries and liquor stores	153.10	41.11	45.56	21.30	20.88	10.42
Restaurants and taverns	189.14	83.78	74.26	40.37	47.45	22.68
Automobile related (gas, repairs, rental)	240.69	81.30	49.37	16.41	20.63	11.49
Fishing equipment and gifts	150.21	41.64	33.81	20.07	23.95	8.95
Entertainment (gambling, theatres, etc.)	21.21	3.45	20.00	5.56	23.72	3.06
Other	13.79	6.90	3.70	3.70	2.25	0.71
TOTAL	\$1,235.14	426.04	431.96	155.62	199.67	71.08

Note from this table that individual patterns of local spending fall within the ranges estimated in these six bass tournaments. Several unique aspects of the In-Fisherman Walleye Tournament IFWT are noteworthy and provide some difficulty when making comparison. The IFWT was held on Lake Pepin and the interests of impact focused on Pierce County (quite rural). Further, the IFWT included a specific type of participant that included amateurs. Also, the IFWT involved professionals that were generally traveling large distances to participate (hence their relatively high levels of total spending). Finally, the IFWT had a modest amount of spectator activity that also, like the ESPN Elite 50 tournament, drove a significant amount of local spending.

When these individual spending patterns are expanded to tournament numbers in an analogous fashion to the method used in this report, Table 8 summarizes total regional expenditures in a comparable array of local retail and service sector business groupings.

Table 8. Total expenditures of non-local In-Fisherman Tournament attendees in Pierce County.

Type of spending	Professional anglers (N = 130)	Amateur anglers (N = 130)	Spectators (N = 1134)	Total
Hotels, motels, bed/breakfast, camping	\$21,821.80	\$6,268.60	\$15,615.18	\$43,705.58
Groceries and liquor stores	\$5,344.30	\$2,769.00	\$11,816.28	\$19,929.58
Restaurants and taverns	\$10,891.40	\$5,248.10	\$25,719.12	\$41,858.62
Automobile related (gas, repairs, rental)	\$10,569.00	\$2,132.00	\$13,029.66	\$25,730.66
Fishing equipment and gifts	\$5,413.20	\$2,609.10	\$10,149.30	\$18,171.60
Entertainment (theatres, bowling, etc.)	\$448.50	\$722.80	\$3,470.04	\$4,641.34
Other	\$897.00	\$481.00	\$805.14	\$2,183.14
TOTAL	\$55,385.20	\$20,230.60	\$80,604.72	\$156,220.52

Again, these results suggest general consistency with our estimates given the unique characteristics of the six events focused on in this report.

For comparison to general outdoor recreation, tournament angling tends to attract participants that spend a significantly higher amount of money. Results of a broad collection of individual expenditure patterns on a daily basis is summarized in Table 9. Note from this table that tournament angling participants have, across the board, higher levels of spending only partially explained by their length of stay.

Table 9. Average daily expenditure patterns for different types of non-local recreational users (Carleyolsen et al. 2006 from a variety of sources)*

<i>Spending Category:</i>	<i>User Category:</i>						
	Bicycling	Wildlife Watching	Fishing	Camping	Hiking	XC Skiing	Horseback Riding
Dining and Drink	\$6.12	\$21.90	\$16.58	\$3.00	\$3.76	\$3.86	\$6.28
Grocery/Convenience Stores	\$4.08	\$14.60	\$11.05	\$2.00	\$2.50	\$2.57	\$6.27
Retail Shopping	\$1.87	\$5.87	\$6.61	\$2.46	\$1.30	\$1.72	\$2.49
Entertainment	\$1.25	\$3.91	\$4.41	\$1.64	\$0.87	\$1.14	\$2.48
Transportation (Gas & Auto)	\$6.24	\$28.55	\$20.89	\$4.14	\$3.27	\$4.28	\$13.62
Accommodation	\$4.53	\$18.25	\$13.82	\$5.75	\$1.90	\$0.48	\$1.42
Miscellaneous Retail	\$4.25	\$0.00	\$12.38	\$4.60	\$3.60	\$5.29	\$5.76
Total	\$28.34	\$93.08	\$85.74	\$23.59	\$17.20	\$19.34	\$38.33

* Sources used in this compilation included a variety of studies from Canada and The United States. Certainly, a compilation of this sort requires comparability that is confused when combining studies that use different approaches and definitions. All estimates were, to the best of our abilities, placed on a comparable basis (accounting for inflation, exchange rate, and user demographics).

Once again, our results for tournament angling suggest that non-local participants do indeed spend significant amounts of money in the local area hosting the events when compared to overall non-local recreationists. This said, their relatively small numbers limit the local economic impacts associated with hosting tournaments.

4. Summary and conclusions

The research conducted for and documented within this report provides an estimate of the infusion of non-local spending resulting from six tournament angling events in Wisconsin and their resulting local economic impacts on host communities. This was accomplished using surveys of tournament participants, analysis of non-local expenditure patterns, and input-output models of the host counties in which tournaments were held. The disaggregation of local economic impacts by business sector and type of impact allows for an understanding of

how this infusion of new dollars within a community is distributed among both households and local businesses.

Tournaments that bring non-local anglers into host communities (including all those studied in the research reported here) will, in general, generate positive economic impacts. These positive benefits must be weighed against the direct costs associated with hosting events, the inevitable displacement of recreational anglers and other water resource users that result from tournaments, and the costs associated with resource management necessary to provide high quality water bodies that support the fish and conditions sought in tournament angling. In sum, tournaments should be weighed within the context of alternative uses of the water resources upon which they impact.

Much of the impetus behind establishment of the bass fishing tournament pilot program was based on the potential for positive host community business impacts in Wisconsin if rules were changed to allow participants to cull. The research results reported in this document provide estimates of these impacts. The ESPN/Bassmaster Elite 50 and the two FLW events were examples based on the ability of participants to cull. The Sturgeon Bay Open has been conducted in Wisconsin for the past 16 years, 15 of which were conducted without culling. The WSBF 4-man Classic tournaments held in '05 (Shawano) and '06 (Dane County) and the Bassmaster Series tournament in Winneconne are state-level tournaments that have traditionally been held in Wisconsin and would likely to have occurred despite bag limit rules prohibiting culling. Our results suggest that the newer tournaments studied, in general, had higher levels of economic impact to host communities. The Sturgeon Bay Open (and, to a lesser extent, the FLW events) experienced similar expenditure estimates. This suggests that culling, indeed, may not be essential for bass tournaments to provide substantive local economic benefits in Wisconsin.

Literature Cited

- Anderson, A., L. Hewitt, and D. Marcouiller. 2001. Outdoor recreation, community development, and change through time: A replicated study of canoeing and trout angling in Southwestern Wisconsin. Staff Paper 00-2, Center for Community Economic Development, UW - Madison/Extension, Madison, WI. 85 pages.
- Barron, W., R. Perlack, and J. Boland. 1998. *Fundamentals of Economics for Environmental Managers*. Westport, CT: Quorum Press.
- Bohnsack, B.L., R.B. Ditton, J.R. Stoll, R.J.Chen, R. Novak, and L.S. Smutko. 2002. The economic impacts of the recreational bluefin tuna fishery in Hatteras, North Carolina. *North American Journal of Fisheries Management* 22:165-176
- Brown, T.L., B.A. Knuth, and F.C. Menz. 1991. Lake Ontario sport fisheries: Socioeconomic research progress and needs. *Canadian Journal of Fisheries and Aquatic Sciences* 48(8):1595-1601.
- Chen, R. J., K. M. Hunt, and R. B. Ditton. 2003. Estimating the economic impacts of a trophy largemouth bass fishery: issues and applications. *North American Journal of Fisheries Management* 23:835-844.
- Gunderson, J. and G. Kreag. 2004. Estimated economic impact of recreational fishing on Minnesota waters of Lake Superior. Minnesota Sea Grant Research. Staff Paper <http://www.seagrant.umn.edu/tourism/impact.html>
- Haines, Anna, D.W. Marcouiller, N.R. Sumathi, and Al Anderson. 1997. Regional economic impact assessments: An annotated bibliography of selected Wisconsin studies. Staff Paper Number 97.3; Center for Community Economic Analysis, UW-Extension, Madison, WI.
- Hamel C, M. Herrmann, and S.T. Lee, K.R. Criddle, and H.T. Geier. 2002. Linking sportfishing trip attributes, participation decisions, and regional economic impacts in Lower and Central Cook Inlet, Alaska. *Annals of Regional Science* 36(2):247-264.
- Hamilton, S., D.W. Marcouiller, and P. Schmaltz. 2005. Economic and demographic characteristics of the Bassmaster 50 Elite tournament on Lake Wisconsin. Wisconsin Department of Tourism Staff Paper. Madison, WI.

- Hass, E., P. Herreid and D. Marcouiller. 2003. The In-Fishermen Walleye Tournament: A study of economic impacts in Pierce County and the surrounding Lake Pepin region. Extension Report 03-3, Department of Urban and Regional Planning, University of Wisconsin - Madison/Extension. 20 pages.
- Krueger, C. C. and D. J. Decker. 1999. The process of fisheries management. Pages 31-57 in C. C. Kohler and W. A. Hubert, editors. Inland fisheries management in North America, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Marcouiller, D.W., A. Anderson and W.C. Norman. 1995. Trout angling and implications for regional development: A case study of Southwestern Wisconsin. Staff Paper 95.3, Center for Community Economic Development, University of Wisconsin - Extension, Madison, WI. 68 pages.
- Pollock, K. H., C. M. Jones, and T. L. Brown. 2004. Angler survey methods and their applications in fisheries management. American Fisheries Society Special Publication 25.
- Rhodes, R.J., and K.G. Iverson. 1998. Economic impacts of a saltwater fishing tournament series in South Carolina. Pages 184-199 in 1998 National IMPLAN user's conference proceedings. Minnesota IMPLAN Group, Stillwater.
- Ridler N.B. 1997. Rural development in the context of conflictual resource usage. *Journal of Rural Studies* 13(1):65-73.
- Shaffer, R., S.C. Deller, and D.W. Marcouiller. 2004. Community Economics: Linking Theory and Practice. Ames, IA: Blackwell Press.
- Schramm Jr., H. L., M. L. Armstrong, A. J. Fedler, N. A. Funicelli, D. M. Green, J. L. Hahn, D. P. Lee, R. E. Manns Jr., S. P. Quinn, and S. J. Waters. 1991. Sociological, economic, and biological aspects of competitive fishing. *Fisheries* 16:13-21.
- Stoll, John, et al. (forthcoming). The Economic Impacts of Fishing on the Lake Winnebago System. Unpublished technical report; Wisconsin DNR and UW-Green Bay.
- U.S. Department of Interior & U.S. Department of Commerce. 2003. 2001 *National Survey of Hunting, Fishing, and Wildlife-associated Recreation - Wisconsin*. FHW/01-WI Rev.

U.S. Department of Interior & U.S. Department of Commerce. 1998. 1996
National Survey of Hunting, Fishing, and Wildlife-associated Recreation -
Wisconsin. FHW/96-WI Rev.

U.S. Department of Interior & U.S. Department of Commerce. 1993. 1991
National Survey of Hunting, Fishing, and Wildlife-associated Recreation -
Wisconsin. FHW/91-WI Rev.

vanKooten, C. 1993. *Land Resource Economics and Sustainable Development:*
Economic Policies for the Common Good. Vancouver, BC: University of British
Columbia Press.

Appendix A. Sample Angler Expense Survey

1. When did you arrive in the _____ area? Date: _____
2. How long will you be staying in this area: _____ days _____ nights
3. Counting you, how many people are in your travel party? _____ # people
4. To estimate economic impact, we need to ask about your spending habits on this trip according to the following guidelines:

- Estimate spending while you are in the _____ area.
- Your actual "out of pocket" expenses.
- Also include what you actually spent for the other people, not the total of everyone's expenses.
- Include previous and anticipated spending for the entire trip in the Madison area.
- Estimate what portion was spent in the Madison area.

	Total Trip Spending	How much was spent in Madison area?
a. Hotels, motels, Bed/Breakfast, camping	\$ _____	\$ _____
b. Grocery stores	\$ _____	\$ _____
c. Restaurants	\$ _____	\$ _____
d. Transportation related (gas, repairs)	\$ _____	\$ _____
e. Fishing equipment and gifts	\$ _____	\$ _____
f. Entertainment (gambling, theaters, bowling)	\$ _____	\$ _____
g. Other (list type: _____)	\$ _____	\$ _____

5. Please list the city, state and zip code of your permanent residence.

City	State	Zip

6. Please indicate below whether you were a BOATER or a CO-ANGLER

BOATER

CO-ANGLER

Table B-1. Local economic impacts in La Crosse County of non-local tournament participant spending at the '05 FLW Everstart (MicroIMPLAN results based on 2004 models in 2006 dollars and total numbers of jobs).

Industry (2 digit NAICS groupings)	Output (2006 dollars)			Value Added or Income (in 2006 dollars)			Employment (total number of jobs)		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Ag. Forestry, Fish & Hunting	\$68	\$617	\$685	\$19	\$131	\$150	0	0	0
Utilities	\$0	\$3,952	\$3,952	\$0	\$2,679	\$2,679	0	0	0
Construction	\$0	\$2,223	\$2,223	\$0	\$1,136	\$1,136	0	0	0
Manufacturing	\$0	\$9,389	\$9,389	\$0	\$3,096	\$3,096	0	0	0
Wholesale Trade	\$0	\$3,627	\$3,627	\$0	\$2,479	\$2,479	0	0	0
Transportation & Warehousing	\$0	\$5,310	\$5,310	\$0	\$3,325	\$3,325	0	0	0
Retail trade	\$151,086	\$3,679	\$154,765	\$95,972	\$2,279	\$98,251	2.6	0.1	2.7
Information	\$0	\$5,267	\$5,267	\$0	\$1,999	\$1,999	0	0	0
Finance & insurance	\$0	\$3,603	\$3,603	\$0	\$2,345	\$2,345	0	0	0
Real estate & rental	\$0	\$9,507	\$9,507	\$0	\$6,565	\$6,565	0	0	0
Professional- scientific & tech svcs	\$0	\$5,358	\$5,358	\$0	\$2,895	\$2,895	0	0	0
Management of companies	\$0	\$7,801	\$7,801	\$0	\$4,507	\$4,507	0	0	0
Administrative & waste services	\$0	\$6,519	\$6,519	\$0	\$3,360	\$3,360	0	0	0
Educational svcs	\$0	\$161	\$161	\$0	\$84	\$84	0	0	0
Health & social services	\$0	\$3	\$3	\$0	\$1	\$1	0	0	0
Arts- entertainment & recreation	\$8,293	\$388	\$8,681	\$5,342	\$150	\$5,492	0.1	0	0.1
Accommodation & food services	\$143,138	\$2,098	\$145,236	\$80,789	\$938	\$81,727	3.2	0	3.2
Other services	\$0	\$2,660	\$2,660	\$0	\$1,557	\$1,557	0	0	0
Government & non NAICS	\$51	\$742	\$793	\$39	\$333	\$372	0	0	0
Institutions	\$1,610	\$0	\$1,610	\$0	\$0	\$0	0	0	0
Total	\$304,246	\$72,902	\$377,148	\$182,160	\$39,859	\$222,019	5.9	0.7	6.6

Table B-2. Local economic impacts in Shawano County of non-local tournament participant spending for the '05 WSBF 4 Man Classic in Shawano (MicroIMPLAN results based on 2004 models in 2006 dollars and total numbers of jobs).

Industry (2 digit NAICS groupings)	Output (2006 dollars)			Value Added (Income in 2006 dollars)			Employment (total number of jobs)		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Ag. Forestry, Fish & Hunting	\$1,092	\$757	\$2,026	\$230	\$221	\$507	0	0	0
Utilities	\$0	\$74	\$100	\$0	\$50	\$68	0	0	0
Construction	\$0	\$578	\$671	\$0	\$269	\$309	0	0	0
Manufacturing	\$0	\$1,918	\$2,624	\$0	\$386	\$543	0	0	0
Wholesale Trade	\$0	\$898	\$1,726	\$0	\$614	\$1,180	0	0	0
Transportation & Warehousing	\$0	\$857	\$1,243	\$0	\$457	\$651	0	0	0
Retail trade	\$30,566	\$748	\$33,402	\$18,967	\$460	\$20,702	0.7	0	0.8
Information	\$0	\$2,277	\$2,673	\$0	\$624	\$746	0	0	0
Finance & insurance	\$0	\$709	\$1,378	\$0	\$491	\$947	0	0	0
Real estate & rental	\$0	\$2,092	\$2,854	\$0	\$1,464	\$1,988	0	0	0
Professional- scientific & tech svcs	\$0	\$689	\$887	\$0	\$357	\$466	0	0	0
Management of companies	\$0	\$1,749	\$1,899	\$0	\$891	\$968	0	0	0
Administrative & waste services	\$0	\$934	\$1,078	\$0	\$368	\$426	0	0	0
Educational svcs	\$0	\$5	\$99	\$0	\$4	\$67	0	0	0
Health & social services	\$0	\$0	\$2,004	\$0	\$0	\$1,127	0	0	0
Arts- entertainment & recreation	\$10,341	\$149	\$10,711	\$6,528	\$35	\$6,692	0.3	0	0.3
Accommodation & food services	\$33,045	\$430	\$34,668	\$17,557	\$180	\$18,218	1	0	1
Other services	\$0	\$412	\$1,220	\$0	\$209	\$582	0	0	0
Government & non NAICS	\$15	\$200	\$2,873	\$10	\$80	\$2,220	0	0	0
Institutions	\$1,417	\$0	\$1,417	\$0	\$0	\$0	0	0	0
Total	\$76,476	\$15,475	\$105,555	\$43,293	\$7,159	\$58,406	1.9	0.2	2.3

Table B-3. Local economic impacts in Door County of non-local tournament participant spending for the Sturgeon Bay Open (MicroIMPLAN results based on 2004 models in 2006 dollars and total numbers of jobs).

Industry (2 digit NAICS groupings)	Output (2006 dollars)			Value Added (Income in 2006 dollars)			Employment (total number of jobs)		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Agriculture, Forestry, Fish & Hunting	\$242	\$705	\$1,420	\$98	\$293	\$660	0	0	0
Utilities	\$0	\$123	\$168	\$0	\$83	\$114	0	0	0
Construction	\$0	\$2,556	\$3,024	\$0	\$1,244	\$1,459	0	0	0
Manufacturing	\$0	\$4,116	\$5,818	\$0	\$1,275	\$1,722	0	0	0
Wholesale Trade	\$0	\$1,156	\$2,432	\$0	\$790	\$872	0	0	0
Transportation & Warehousing	\$0	\$1,965	\$2,882	\$0	\$1,209	\$1,662	0	0	0
Retail trade	\$119,400	\$3,728	\$133,850	\$74,574	\$2,321	\$83,522	2.1	0.1	2.3
Information	\$0	\$7,094	\$8,655	\$0	\$2,083	\$2,592	0	0	0
Finance & insurance	\$0	\$2,661	\$5,489	\$0	\$1,897	\$3,831	0	0	0
Real estate & rental	\$0	\$11,700	\$16,243	\$0	\$8,264	\$11,389	0	0	0
Professional- scientific & tech svcs	\$0	\$3,118	\$4,226	\$0	\$1,588	\$2,196	0	0	0
Management of companies	\$0	\$169	\$185	\$0	\$82	\$89	0	0	0
Administrative & waste services	\$0	\$4,339	\$5,113	\$0	\$1,685	\$2,043	0	0	0
Educational svcs	\$0	\$23	\$439	\$0	\$14	\$276	0	0	0
Health & social services	\$0	\$2	\$11,319	\$0	\$1	\$6,837	0	0	0
Arts- entertainment & recreation	\$12,169	\$698	\$14,256	\$7,853	\$325	\$9,024	0.2	0	0.2
Accommodation & food services	\$195,584	\$2,320	\$204,086	\$115,346	\$1,135	\$119,385	4.1	0	4.3
Other services	\$0	\$2,851	\$6,633	\$0	\$1,592	\$3,411	0	0.1	0.1
Government & non NAICs	\$0	\$1,529	\$13,580	\$0	\$515	\$9,947	0	0	0
Institutions	\$821	\$0	\$821	\$0	\$0	\$0	0	0	0
Total	\$328,217	\$50,903	\$440,718	\$197,871	\$26,423	\$261,868	6.3	0.6	7.6

Table B-4. Local economic impacts in La Crosse County of non-local tournament participant spending for the '06 WSBF FLW Outdoor Stren in La Crosse (MicroIMPLAN results based on 2004 models in 2006 dollars and total numbers of jobs).

Industry (2 digit NAICS groupings)	Output (2006 dollars)				Value Added (Income in 2006 dollars)				Employment (total number of jobs)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Ag, Forestry, Fish & Hunting	\$29	\$557	\$316	\$902	\$8	\$118	\$76	\$202	0	0	0	0
Utilities	\$0	\$4,050	\$1,577	\$5,627	\$0	\$2,745	\$1,069	\$3,814	0	0	0	0
Construction	\$0	\$2,299	\$486	\$2,785	\$0	\$1,174	\$234	\$1,408	0	0	0	0
Manufacturing	\$0	\$9,011	\$3,410	\$12,421	\$0	\$3,046	\$915	\$3,961	0	0.1	0	0.1
Wholesale Trade	\$0	\$3,475	\$4,112	\$7,586	\$0	\$2,375	\$2,810	\$5,186	0	0	0	0
Transportation & Warehousing	\$0	\$5,365	\$2,220	\$7,585	\$0	\$3,365	\$1,225	\$4,590	0	0.1	0	0.1
Retail trade	\$151,972	\$3,734	\$10,395	\$166,101	\$96,662	\$2,313	\$6,406	\$105,381	2.6	0.1	0.2	2.8
Information	\$0	\$5,330	\$1,485	\$6,815	\$0	\$2,029	\$607	\$2,636	0	0	0	0
Finance & insurance	\$0	\$3,676	\$6,563	\$10,239	\$0	\$2,400	\$3,525	\$5,925	0	0	0	0
Real estate & rental	\$0	\$9,542	\$3,879	\$13,421	\$0	\$6,594	\$2,571	\$9,166	0	0.1	0	0.1
Professional- scientific & tech svcs	\$0	\$5,466	\$1,835	\$7,302	\$0	\$2,953	\$1,035	\$3,988	0	0.1	0	0.1
Management of companies	\$0	\$7,984	\$783	\$8,767	\$0	\$4,612	\$453	\$5,065	0	0.1	0	0.1
Administrative & waste services	\$0	\$6,945	\$1,369	\$8,314	\$0	\$3,541	\$763	\$4,304	0	0.1	0	0.2
Educational svcs	\$0	\$162	\$1,203	\$1,366	\$0	\$84	\$640	\$724	0	0	0	0
Health & social services	\$0	\$3	\$14,967	\$14,970	\$0	\$1	\$8,922	\$8,924	0	0	0	0
Arts- entertainment & recreation	\$3,567	\$351	\$1,225	\$5,143	\$2,297	\$137	\$723	\$3,157	0.1	0	0	0.1
Accommodation & food services	\$152,082	\$2,114	\$5,707	\$159,903	\$87,691	\$946	\$2,443	\$91,080	3.3	0.1	0.1	3.5
Other services	\$0	\$2,723	\$3,850	\$6,572	\$0	\$1,601	\$1,977	\$3,578	0	0	0	0
Government & non NAICs	\$49	\$776	\$11,269	\$12,094	\$37	\$347	\$9,062	\$9,446	0	0	0	0
Institutions	\$1,229	\$0	\$0	\$1,229	\$0	\$0	\$0	\$0	0	0	0	0
Total	\$308,928	\$73,564	\$76,651	\$459,143	\$186,696	\$40,383	\$45,456	\$272,535	5.9	0.7	0.9	7.5

Table B-5. Local economic impacts in Winnebago County of non-local tournament participant spending for the Bassmaster Weekend in Winneconne (MicroIMPLAN results based on 2004 models in 2006 dollars and total numbers of jobs).

Industry (2 digit NAICS groupings)	Output (2006 dollars)			Value Added or Income (in 2006 dollars)			Employment (total number of jobs)			
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	
Ag. Forestry, Fish & Hunting	\$17	\$106	\$170	\$5	\$23	\$13	\$41	0	0	0
Utilities	\$0	\$4	\$7	\$0	\$3	\$2	\$6	0	0	0
Construction	\$0	\$327	\$387	\$0	\$174	\$30	\$203	0	0	0
Manufacturing	\$0	\$1,140	\$1,778	\$0	\$403	\$169	\$572	0	0	0
Wholesale Trade	\$0	\$322	\$673	\$0	\$220	\$240	\$460	0	0	0
Transportation & Warehousing	\$0	\$796	\$1,068	\$0	\$522	\$158	\$680	0	0	0
Retail trade	\$24,700	\$507	\$26,440	\$16,020	\$315	\$755	\$17,089	0.4	0	0.5
Information	\$0	\$672	\$806	\$0	\$324	\$60	\$384	0	0	0
Finance & insurance	\$0	\$481	\$1,380	\$0	\$310	\$472	\$782	0	0	0
Real estate & rental	\$0	\$860	\$1,173	\$0	\$597	\$210	\$807	0	0	0
Professional- scientific & tech svcs	\$0	\$757	\$955	\$0	\$388	\$113	\$501	0	0	0
Management of companies	\$0	\$1,210	\$1,306	\$0	\$773	\$62	\$835	0	0	0
Administrative & waste services	\$0	\$1,080	\$1,270	\$0	\$578	\$110	\$688	0	0	0
Educational svcs	\$0	\$3	\$73	\$0	\$2	\$38	\$40	0	0	0
Health & social services	\$0	\$1	\$2,016	\$0	\$0	\$1,209	\$1,209	0	0	0
Arts- entertainment & recreation	\$970	\$37	\$1,136	\$620	\$15	\$75	\$710	0	0	0
Accommodation & food services	\$21,973	\$270	\$22,984	\$12,396	\$117	\$311	\$12,823	0.5	0	0.5
Other services	\$0	\$289	\$330	\$0	\$165	\$278	\$443	0	0	0
Government & non-NAICs	\$0	\$188	\$1,869	\$0	\$89	\$1,342	\$1,432	0	0	0
Institutions	\$349	\$0	\$349	\$0	\$0	\$0	\$0	0	0	0
Total	\$48,008	\$9,051	\$66,672	\$29,040	\$5,018	\$5,646	\$39,704	1	0.1	1.2

Table B-6. Local economic impacts in Dane County of non-local tournament participant spending for the '06 WSBF 4 Man Classic in Madison (MicroIMPLAN results based on 2004 models in 2006 dollars and total numbers of jobs).

Industry (2 digit NAICS groupings)	Output (2006 dollars)				Value Added or Income (in 2006 dollars)				Employment (total number of jobs)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
	Ag, Forestry, Fish & Hunting	\$25	\$129	\$46	\$200	\$7	\$26	\$11	\$45	0	0	0
Utilities	\$0	\$545	\$216	\$761	\$0	\$362	\$141	\$503	0	0	0	0
Construction	\$0	\$313	\$68	\$382	\$0	\$170	\$35	\$205	0	0	0	0
Manufacturing	\$0	\$1,406	\$724	\$2,130	\$0	\$456	\$189	\$646	0	0	0	0
Wholesale Trade	\$0	\$558	\$558	\$1,116	\$0	\$381	\$381	\$763	0	0	0	0
Transportation & Warehousing	\$0	\$694	\$268	\$962	\$0	\$436	\$154	\$590	0	0	0	0
Retail trade	\$17,595	\$542	\$1,472	\$19,609	\$11,392	\$344	\$926	\$12,662	0.3	0	0	0.3
Information	\$0	\$849	\$288	\$1,138	\$0	\$367	\$133	\$500	0	0	0	0
Finance & insurance	\$0	\$800	\$1,013	\$1,813	\$0	\$514	\$539	\$1,053	0	0	0	0
Real estate & rental	\$0	\$1,715	\$672	\$2,387	\$0	\$1,192	\$452	\$1,643	0	0	0	0
Professional- scientific & tech svcs	\$0	\$1,204	\$407	\$1,611	\$0	\$664	\$240	\$904	0	0	0	0
Management of companies	\$0	\$949	\$117	\$1,066	\$0	\$589	\$73	\$661	0	0	0	0
Administrative & waste services	\$0	\$952	\$203	\$1,155	\$0	\$530	\$121	\$650	0	0	0	0
Educational svcs	\$0	\$13	\$124	\$137	\$0	\$6	\$65	\$72	0	0	0	0
Health & social services	\$0	\$1	\$1,764	\$1,765	\$0	\$0	\$1,090	\$1,090	0	0	0	0
Arts- entertainment & recreation	\$1,687	\$101	\$165	\$1,953	\$1,084	\$37	\$91	\$1,212	0	0	0	0
Accommodation & food services	\$22,730	\$287	\$781	\$23,798	\$12,921	\$137	\$362	\$13,420	0.5	0	0	0.5
Other services	\$0	\$355	\$634	\$988	\$0	\$217	\$367	\$583	0	0	0	0
Government & non NAICS	\$11	\$92	\$1,602	\$1,704	\$9	\$47	\$1,296	\$1,351	0	0	0	0
Institutions	\$669	\$0	\$0	\$669	\$0	\$0	\$0	\$0	0	0	0	0
Total	\$42,717	\$11,522	\$11,128	\$65,368	\$25,412	\$6,484	\$6,671	\$38,567	0.8	0.1	0.1	1

APPENDIX 4

Fishing Tournaments in Wisconsin: Public Awareness, Participation and Opinions

**Submitted to:
Bureau of Fisheries Management**

**Prepared by:
Bureau of Science Services**

December 2006

For additional information please contact:

Jordan Petchenik
Department of Natural Resources
Bureau of Science Services
101 South Webster Street
Madison, WI 53707

608/266-8523

jordan.petchenik@wisconsin.gov

Table of Contents

4	Introduction and Research Highlights
7	Methods: Sampling, Data Collection and Analysis
9	Analysis Definitions of Anglers
10	Results and Discussion
10	Statewide Angler Survey
10	Participation in Tournament Fishing
10	Awareness of and Participation in Tournament Fishing in Wisconsin
12	Attitudes Towards Tournament Fishing
12	The Attraction of Tournament Fishing
14	Tournament Impact on Fishing Quality and Water Access
15	Tournament Numbers and Holiday Permits
17	Will There be Bass Tournaments in July and August?
19	To Cull or not to Cull?
24	Riparians' Thoughts on Culling
26	Perceived Survival Rate of Caught and Released Fish
27	Tournaments and Impacts on the Future Fishery
29	Tournaments and Invasive Species
30	Benefits from Fishing Tournaments
32	Public Impressions of Tournament Anglers
34	Participation in Fishing and the 2005 Season
34	Fishing Participation and Fish Pursued
36	Fishing Practices
39	Fishing Frequency and Out-state Fishing
40	Sources of Information
41	Problems Encountered While Fishing
42	Satisfaction with the 2005 Season and Overall Assessment of the DNR's Fish Management Program

44	Commitment to Fishing
45	Importance of Fishing to Their Lives
45	Participation Over the Last Five Years
46	Change in Fishing Frequency Over Time
47	Primary Reason for Declining Fishing Days
47	Affiliation with Fishing Clubs
47	Respondent Background
50	Statewide Boater Survey
50	Awareness of and Participation in Tournament Fishing
53	Observations of Tournament Fishing
61	Participation in Water Recreations
61	Participation in Water Recreations
63	Restricting Water Recreations by Time and/or Location
64	Respondent Background

Introduction and Research Highlights

This report was written to inform policy makers on the public's opinions on various aspects surrounding tournament fishing in Wisconsin. Specifically, the report examines the public's awareness and acceptance of tournament fishing, their beliefs about tournament-related fish mortality, the impact tournaments have on the fishery resource as well as on water recreation, the public's acceptance of or opposition to culling in tournaments, and the possible benefits derived from fishing tournaments.

The results of this study were based on input from two quantitative and two qualitative endeavors. The first quantitative study was a random sample of 1,000 Wisconsin anglers. Each angler received a 12-page questionnaire in the mail and after a maximum of three contacts, 63 percent returned usable questionnaires. The second quantitative study was a random sample of 1,000 Wisconsin registered boaters that received a 4-page questionnaire in the mail. After a maximum of three contacts, 67 percent returned usable questionnaires. The qualitative components included three focus groups with bass tournament participants and in-depth interviews with 14 waterfront property owners and/or members of a lake association.

To anticipate the detailed findings of the Results and Discussion section, three major findings followed by eight secondary findings are presented here.

Major Finding #1.

Anglers, in general, do not support culling in tournaments.

Approximately one-half (51%) of all anglers do not support culling in tournaments even with live-well restrictions. Anglers with tournament experience are just as opposed to culling as are anglers without tournament experience.

Results from focus groups with tournament participants do not concur with survey results – the participants believe culling is a necessity for tournament expansion. Further, they believe that culling results in less harm to the fishery resource than does catch-and-keep fishing practiced by so many non-tournament anglers.

It's possible these opposing results can be explained by a specialization continuum found in many outdoor pursuits. It's likely that very few, if any, respondents to the questionnaires were as highly specialized in their fishing development as were the participants in the tournament focus groups. Questionnaire respondents, even those who reported they had experience with tournament fishing, more likely represent the general angling public. Participants in the tournament focus groups, however, participate in a highly specialized form of fishing. Being allowed to cull would allow tournament anglers to further advance in their angling specialization.

Another plausible explanation for the opposing results is probably linked to opportunities to cull. If a slight majority of all anglers believe that culling does "no" or "little" harm to the fishery resource then why are they opposed to culling? The hypothesis would be that general anglers believe they will never have the required equipment (i.e., live-wells) to legally cull. If they cannot cull, why should other anglers with better, more advanced equipment, be allowed to cull?

Major Finding #2.

Results of the biological assessment of culling must be communicated to the public.

If the biological assessment of culling and tournament fishing is positive, meaning harm to the fishery resource was not found, those results must be widely communicated with the angling public and with waterfront property owners.

Analyses reveal that respondents' beliefs about the potential harm to fishery resources due to tournament fishing is a likely influence on their beliefs about culling and other tournament aspects. Those who believe that tournaments "moderately" or "greatly" harm the fishery resource are more likely to oppose culling even with live-well standards than those who believe the resource has had "no" or a "little" harm. Further, they are less likely to speculate that a high percentage (75% to 100%) of tournament caught and released fish will survive than those who believe the resource will experience "no" or a "little" harm.

Major Finding #3.

Tournament anglers and general anglers agree on several key issues pertaining to tournaments and culling.

Tournament anglers and general anglers did not differ in their opinions of when tournaments should be prohibited (holiday weekends), of whether or not culling should be allowed (51% oppose), the survival rate of fish caught and released during a culling tournament (29% believe that 75% or more of the fish caught and released will survive at least one day although 63% believe an acceptable survival rate would be at least 75%), the potential harm to the fishery resource due to tournaments (about one-quarter of all anglers believe tournaments cause a "moderate" or "great deal" of harm), and their opinions of potential economic and tourism benefits resulting from tournaments. These similarities mean that policy makers are primarily dealing with a single population of anglers, rather than an angling public with diverse and opposing opinions.

Secondary Findings

1. Tournament fishing is not widely practiced. Fewer than one angler in five (17%) said he or she participated in some kind of fishing tournament.
2. Fishing tournaments do not go unnoticed by other anglers. Approximately one-half of all anglers said that being on the water as a non-participant during a tournament affected the quality of their fishing experience (52%); a nearly equal proportion said the tournament made it difficult to obtain access to the water (48%). In addition, just over one-half of water recreation users reported that tournament boats and trailers caused overcrowding in the parking lots (56%) and that tournament boats congested the boat ramps (54%); about one-third of the respondents (34%) said they felt crowded on the water because of the tournament.

Looking at the bigger picture of water recreation indicates that a majority of all water recreation users said the tournament did not interfere with their recreational pursuits and more than one-half reported that the tournament did not cause them to leave the water – one

respondent in five (20%), however, was displaced from the water because of the tournament, that is, the tournament caused them to leave the water.

3. Overall, tournament fishing boats were no more of a problem for water users than were other fishing boats. Tournament boats were not at all a problem for about eight respondents in ten (79%), results nearly equal to those for pontoons and houseboats (83% no problem). Just under one respondent in ten (8%) reported that tournament boats as well as other fishing boats were a "moderate" or "serious" problem. Less than 10 percent (9%) said these boats were the biggest problem on Wisconsin waters.
 4. The conduct of tournaments needs to be monitored. Even anglers with tournament experience believe that tournaments should be prohibited during the opening weekend of the fishing season (71%) and during holiday weekends (72%).
 5. A majority of water users reported that personal watercrafts (76%), speed boating (72%) and water skiing (72%) should be restricted by time and/or location. This is substantially more than the minority (although almost one-half) of water users that believe tournament fishing should be restricted by time and/or location (48%).
 6. Respondents believe that more of the fish they catch and release survive at least one day than do fish caught and released during a bass tournament that allows culling. Three-fifths (60%) of the respondents speculate that 75 percent or more of the fish they release survive at least one day; only 29 percent of the respondents speculate that 75 percent or more of bass caught and released during a culling tournament survive at least one day.
 7. Despite concerns about survival rates of fish caught and released during a tournament, only about one angler in five (22%) believes that tournaments do "moderate" to "a great deal of harm" to the future fishery of a waterbody. Just over one-half (53%) believe that tournaments do "no" to "little" harm to the fishery.
 8. Neither economic gain nor drawing attention to Wisconsin as a fishing destination were seen as benefits derived from fishing tournaments. Only about one-third of the anglers agree that tournaments are good for the state because of their economic contributions. These findings are hardly a ringing endorsement for tournaments and if the economic assessment proves otherwise, may mean that some promotional or educational and communication work is needed to inform the various publics of tournament benefits.
-

Methods: Sampling, Data Collection and Analysis

The data presented in this report were drawn from two primary and two secondary study populations. The first primary population consisted of **Wisconsin anglers**. A random selection of 1,000 resident anglers, 18 years and older, was proportionally drawn from all 2005 licenses that allow a person to fish in Wisconsin. Data were obtained through the use of a mailed questionnaire developed in consultation with the Bureaus of Science Services and Fisheries Management as well as the Fishing Tournament Advisory Committee (FTAC). The questionnaire was pre-tested on 12 anglers varying in fishing experience; revisions were subsequently made resulting in a 12-page questionnaire.

Standard mailed questionnaire techniques were used to conduct this survey. Each angler was contacted a maximum of three times. These contacts included an initial questionnaire with a cover letter signed by Mike Staggs, Bureau Director of Fisheries Management, and a first-class hand-stamped addressed return envelope (known as the full mailing); a follow-up letter which served as a "thank you" for returning the questionnaire or as a reminder to please complete and return it; and a second full mailing sent to all non-respondents. Mailings were conducted in May 2006.

The response rate is based on a formula that divides the number of returned questionnaires by the total number mailed, minus the number of cases determined to be "non-sample." For this study a non-sample is defined as selected respondents who are deceased; mailings undelivered with no forwarding address given; or people who said they did not purchase a license (although they were in the Department database). From the sample of 1,000 anglers, 41 were eliminated as non-sample. Useable questionnaires were returned by 602 anglers for a response rate of 63 percent.

The University of Wisconsin Survey Center (UWSC) conducted all clerical tasks associated with this survey. They assembled the mailings, tracked the response rate, and performed the necessary data entry. All mailings originated from and were returned to the UWSC.

The Wisconsin DNR Bureau of Science Services conducted all analyses using SPSS-PC version 13.0. The margin of error for the study is +/- 3 percent.

The second primary population consisted of **registered boaters** of Wisconsin. A random selection of 1,000 resident boaters, 18 years and older, was drawn from the 2006 boater registration records. This database consists of any watercraft which has been registered, including motorboats, pontoons, canoes, kayaks, and personal watercrafts. Similar to the angler survey, data were obtained through the use of a mailed questionnaire developed in consultation with the Bureaus of Science Services and Fisheries Management as well as the FTAC. The questionnaire was pre-tested on ten boaters as well as the Technical Committee; revisions were subsequently made resulting in a 4-page questionnaire.

Standard mailed questionnaire techniques, identical to those used for the angler survey, were used to conduct this survey. Mailings were conducted in October 2006. From the sample of

1,000 boaters, 53 were eliminated as non-sample. Useable questionnaires were returned by 630 boaters for a response rate of 67 percent.

The DNR Bureau of Science Services assembled the mailings and tracked the response rate. The UWSC performed the data entry. All mailings originated from and were returned to the DNR. Analyses were performed by the Bureau of Science Services using SPSS-PC version 13.0. The margin of error for the study is +/- 3 percent.

The secondary study populations included bass tournament participants and riparian landowners on lakes that have experienced tournaments. Focus group discussions were conducted at three bass tournaments with **tournament participants**. The discussions were conducted in Little Sturgeon Bay (Green Bay water), McFarland (Lake Waubesa) and Marinette (Upper Scott Flowage). Recruitment was conducted on-location with the discussions lasting 60 to 75 minutes and occurring after the awards ceremonies. A total of 21 tournament anglers participated in the focus groups (between five and eight participants per group).

Focus groups consist of a small group of people (typically five to ten) usually sitting around a table discussing a topic under the direction of a trained moderator. The discussions typically last between one and two hours. They are relaxed, informal, and generally enjoyable for the participants. The format allows participants to relate their experiences and express their opinions and feelings. During the discussion they have the opportunity to listen to others, to compare their experiences and ideas, and to interact with one another.

Surveys, which isolate respondents, and which also limit their answers to closed-ended questions, do not provide respondents with this flexibility. On the other hand, as a method for collecting information, focus groups have their limitations. They generate narrative rather than numerical data; insights rather than statistical generalizations. These are standard cautions that must accompany any focus group report. Note, however, that certain themes recurred in ways suggesting that they may be widespread.

The other secondary study population was **riparian landowners** (riparians) on lakes that have experienced tournaments. In-depth personal interviews were conducted in Dane County with the Lake Waubesa Conservation Association and the Friends of Lake Kegonsa Society. In addition, two telephone interviews were conducted with riparians in Vilas County. A total of 14 riparians participated.

Direct quotations from the focus groups and the in-depth interviews are found integrated throughout this report. The quotations appear in *italics* and have been inserted to add context to some of the thinking that underlies the survey findings and to shed additional light on topics not covered in the two surveys.

Analysis Definitions of Anglers

There are numerous ways in which the data could be analyzed. Respondent age, commitment to fishing, and frequency of fishing no doubt explain many of the opinions and attitudes held by the respondents. This inquiry, however, was one component of the bass fishing *tournament* pilot program. Therefore, where applicable, respondent participation in fishing tournaments was chosen as the independent variable for further analyses.

Throughout this report two angler types are referenced: "general anglers" and "tournament anglers." This dichotomy was developed based on responses to the following question: "Have you ever participated in a permitted fishing tournament in Wisconsin?" Those responding "no" were labeled as "general anglers;" those responding "yes" were labeled as "tournament anglers." Additional discussion on this dichotomy is presented in the first section of the report.

Results and Discussion

Statewide Angler Survey

Participation in Tournament Fishing

This section addresses the objective of assessing the prevalence of tournament fishing in Wisconsin. Specifically, the section reports on angler awareness of tournament fishing in Wisconsin, angler participation in tournament fishing, and the specific types of tournaments participated in by anglers.

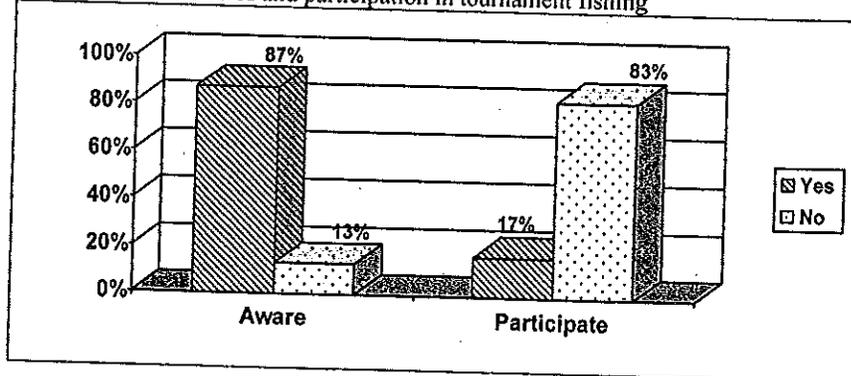
Awareness of and Participation in Tournament Fishing in Wisconsin

The questionnaire included an information textbox explaining that a permit for a tournament is required when competition is the primary intent, when prizes exceed \$500 and there are more than 20 boats or 40 participants. Respondents were also informed that over the last five years the number of permitted tournaments in Wisconsin has remained relatively stable at approximately 350 to 400 annually.

Respondents were asked if prior to receiving the questionnaire they were aware that permitted fishing tournaments occur in Wisconsin. Results found in Figure 1 show that nearly all respondents (87%) are aware that fishing tournaments take place in Wisconsin.

Respondents were subsequently asked if they had ever participated in a permitted fishing tournament in Wisconsin. Figure 1 illustrates that tournament fishing is not widely practiced. A substantial minority of less than one-fifth (17%) has participated in some kind of permitted fishing tournament.

Figure 1. Awareness of and participation in tournament fishing



Respondents who participated in fishing tournaments were asked to identify what kind of tournaments. Among open water tournaments, participation was most frequent for walleye (22%), bass (20%) and trout/salmon (20%) (Table 1). General tournaments that are not fish specific were also popular (19%). Among ice fishing tournaments, panfish tournaments were the

clear favorite with 31 percent indicating participation. Other popular ice fishing tournaments included those for northern pike (25%), walleye (23%), and any fish (22%).

Table 1: Participation in various tournament types

Fish type	Open water (% of all respondents)	Open water (% of tournament anglers)	Ice fishing (% of all respondents)	Ice fishing (% of tournament anglers)
Walleye	4	22	4	23
Trout/Salmon	4	20	0	1
Bass	3	20	2	13
Musky	3	13	0	1
Panfish	2	9	6	31
Northern pike	1	5	4	25
Rough fish	1	5	1	3
General	3	19	4	22

Results also show that anglers who have participated in tournaments tend to participate in more than one kind. Of those who participated in open water and/or ice fishing tournaments, more than one-half (58%) have participated in two or more different tournament types; more than one-third (36%) have participated in three or more tournament types (Table 2). However, within the open water and ice fishing tournament dichotomy, most anglers participated in just one tournament: of those who participated in an open water tournament, 71 percent participated in only one type of tournament; and of those who participated in an ice fishing tournament, 53 percent participated in only one type of tournament.

Table 2: Number of tournaments participated in by open water and ice fishing anglers

Tournament number	Open water	Ice fishing	Total
1	71%	53%	43%
2	16	9	22
3	7	19	18
4	3	14	8
5	1	7	6
6	3	0	3
9	0	0	1

NOTE 1: Tournament number indicates different types of tournaments as defined by fish species (one walleye, one bass, one musky tournament would equal three tournaments), not multiple tournament experiences with the same fish species (three bass tournaments would equal one tournament type).

NOTE 2: Analyses of the open water and ice fishing dichotomy tell us that anglers participated in both open water and ice fishing tournaments. This is supported by the finding that 13 percent of all anglers have participated in an open water tournament and ten percent have participated in an ice fishing tournament, yet overall, 17 percent have participated in any kind of tournament. Further, data confirm that every angler who participated in an ice fishing tournament also participated in at least one open water tournament. We can, therefore, use the results from the question of ever participating in a permitted fishing tournament (response options of "yes" or "no") as defining a tournament angler or a general angler.

Attitudes Towards Tournament Fishing

This section addresses the objective of anglers' perspective on how tournaments should be conducted. Specifically, the section addresses the effect tournaments may or may not have on time spent on the water, when, if ever, tournaments should be prohibited, whether or not culling should be permitted, the perceived survival rate of caught and released fish, and the impact tournaments may have on a water's future fishery.

The Attraction of Tournament Fishing

Results of the focus groups make it clear that tournament participants are passionate about their sport. Their participation defines who they are and how they enjoy spending their time. Put another way, participants are highly committed to their tournaments.

This is what we do. Not like a job or a career but it's why I work so I can do these tournaments.

It's what we do. It's the only type of fish we fish for in the summer. I don't know many of these guys that go out walleye or trout fishing. Once you get into the tournament circuit, you become completely committed to it. It's who you are. It's what we do. It's a lifestyle.

We spend a lot of time fishing but we also spend more time working – so that we can afford to go fishing.

It's my favorite way to spend time. Not just the fishing but everything about them. You make great friends, long friends at these tournaments. I think I knew just about everybody here today. My wife has started coming with me so we make them into short trips like little vacations.

Some guys play golf or whatever. Me, I do tournaments. That's my thing. I know everybody here and I wouldn't miss this for the world.

I come here for the enjoyment and camaraderie and seeing the others. I've met a lot of guys from all over the state and this is our way of getting together. I've met people that I'll never forget.

No one that participated in the focus groups was a career tournament angler. While they acknowledge that it might be possible to make a career of tournament fishing, it is not a motivation for their participation.

You can [be a professional] but it's hard. We work full time and do tournaments as a side thing. Some people use it as a small business...you can make money but you really have to put the time and effort into it. Most guys I know are doing it as a serious hobby, something we love, not to make money.

Top prize I think is \$1,500 and split between four guys is not even \$400. I come here not to make money.

It's a hobby. There's nobody here that's doing it for a living. It's all about bragging rights...The money you make is nice but it's all about bragging.

You factor in your boat and all the other costs and your time and you're lucky to break even...It's a really expensive version of a softball league.

So what is it about tournament fishing that attracts the participants? Competition, rather than prize money, is the primary motivation.

I'm competitive by nature you know. I like to fish, so when I'm competitive by nature, hence, the bass tournament.

I'd say competition is probably about 75 percent the reason because it's not about the money. If it was about the money, we wouldn't be here.

And the competition. It's something I can compete in and do it against anybody. You gotta be in surprisingly okay shape, well you know, fit, to stand all day and throw and cast. We're not tossing a bobber and sitting. You're making a cast every 30 seconds to every minute.

Tournament anglers describe three levels of competition: competition with themselves to do better than their previous outing, competition with their buddy or tournament partner, and competition with the other participants.

Well there's competition with myself to do better than last year or the last tournament and there's with your partner in the boat and of course with the other boats. Best is to beat a buddy, a buddy you got in the tournament. If you got a buddy in the tournament it's most satisfying to beat them. I got a buddy that I fish with quite often in a partner's tournament and we fish for \$2 between us for the most weight and it's more satisfying to win that \$2 than it is to win the \$300.

I could see it as three types of competition. Competition for yourself - I did it better this time than before. Competition perhaps with your partner. And then competition between all the guys.

Competition with yourself is probably first but creaming the guy you're in the boat with is also up there.

It's good to know just fishing against yourself how you do from tournament to tournament. How you can do better in the next tournament.

And in the words of a riparian who enjoys fishing:

Fishing is competitive. We love to fish. Every time I fish with somebody in the same boat we usually have buck for the first fish or a buck for the most. Nothing high but it's a little of that going on. It makes it more fun.

Tournament Impact on Fishing Quality and Water Access

Although less than 20 percent of all anglers reported that they participated in a permitted fishing tournament, a majority of 61 percent said they have been on a body of water while a tournament was in progress as a non-participant. Being on the water during a tournament as a non-participant was significantly more common for tournament anglers (83%) than for general anglers (56%) (chi square=23.37, 1 df, $p < 0.000$).

Respondents who said they had been on the water during a tournament as non-participants were asked if they thought the tournament affected the quality of their fishing that day. Responses were measured on a 5-point scale where 1 represents "definitely yes," 2 represents "probably yes," 3 represents "probably no," 4 represents "definitely no," and 5 represents "unsure." A slight majority of **52 percent indicted that the tournament somehow affected the quality of their fishing day.** Respondents were also asked if they thought the tournament interfered with access to the water, that is, their ability to get on the water. Responses were measured on a 5-point scale where 1 represents "very difficult," 2 represents "somewhat difficult," 3 represents "not too difficult," 4 represents "not at all difficult," and 5 represents "unsure." Just under **one-half of all anglers (48%) reported that the tournament made it more difficult for them to get on the water.**

Table 3 indicates that fishing tournaments have affected anglers that are not participating in the tournament. The impact on fishing quality was significantly greater for general anglers (57%) than for tournament anglers (36%) (chi square=11.66, 3 df, $p < 0.009$). Further, access to the water was more difficult for a greater proportion of general anglers (51%) than for tournament anglers (42%), although this difference is not significant.

Table 3: Impact of tournament on fishing quality and access to water

	General angler	Tournament angler	Total
Affect fishing quality?			
Yes	57%	36%	52%
No	43	64	48
Interfere with water access?			
Difficult	51%	42%	48%
Not difficult	49	58	52

NOTE 1: The questionnaire did not specify how quality was affected. Thus, a tournament could result in a beneficial or detrimental experience. Post-survey interviews with anglers indicate that the tournament negatively affected their fishing day. It is, however, possible that some respondents experienced a positive affect from the tournament (such as seeing large fish or knowing where to fish).

NOTE 2: No one responded "unsure" to the two questions about fishing quality and water access.

Tournament Numbers and Holiday Permits

Another question addressed the number of tournaments in Wisconsin. The introduction to the question explained that the number of permitted fishing tournaments has remained relatively stable at approximately 350 to 400 annually. Respondents were asked whether they thought the number of permitted tournaments in Wisconsin should increase or decrease. Respondents were offered six response options with 1 representing "definitely decrease," 2 representing "probably decrease," 3 representing "remain at current level," 4 representing "probably increase," 5 representing "definitely increase," and 6 representing "unsure." A substantial proportion of respondents (27%) were not sure how to respond. The mean score for all anglers, based on a 5-point scale ("unsure" omitted), was 2.5, indicating that tournament numbers should remain as they are or possibly decrease.

Table 4: Should tournaments in Wisconsin increase, decrease or remain at current level?

	General angler	Tournament angler	Total
Decrease	31%	22%	29%
Current level	37	49	39
Increase	4	5	4
Unsure	28	24	27

The greatest proportion of anglers feels that the number of tournaments should remain at the current level (Table 4). More than one-third (37%) of the general anglers and almost one-half (49%) of the tournament anglers think permitted tournament numbers should not change. Note that those who favor a decrease in the number of tournaments greatly outweigh those who favor an increase.

NOTE: Although substantive differences between angler types are observed, the differences are not statistically significant.

Interviews with waterfront property owners reveal their concern with the potential for tournaments to increase in frequency and grow in size. Their concern is that as tournaments grow, the incidents of rude behavior will correspondingly grow.

I don't think most people object to tournaments per se, but when they start to become every weekend that becomes another issue...I think frequency could be an important issue.

I'm wondering what the number of tournaments would be and how many participants you're talking about. Because if they grew in size and number, that could be a problem.

I have the feeling that as the prize money and everything else increase, the size and number, the problems associated with tournaments also will increase. If somebody plunks down a \$5,000 entrance fee and has a \$40,000 boat, he's gonna zip around and do whatever it takes to get those fish and recoup his initial costs of the tournament with the expectation of winning the prize money.

...the thing is that if an awful lot of money was at stake from the tournament, then the tournament competitors become much more competitive and they're probably going to be less courteous to other lake users.

Keeping the tournament small in all terms of their scale is much more appealing. It's a sport, a competitive sport, people are doing it for one upmanship or whatever, 'I beat you' so I think that small would be more reasonable.

The questionnaire considered when permitted tournaments should be allowed on Wisconsin waters. Specifically, should tournaments be conducted during the opening weekend of the fishing season or on holiday weekends such as July 4th and Labor Day? Responses were based on a 5-point scale where 1 represents "definitely no," 2 represents "probably no," 3 represents "unsure," 4 represents "probably yes," and 5 represents "definitely yes." The mean responses were 1.7 for allowing tournaments during opening weekend of the fishing season and 1.9 for tournaments during holiday weekends – both scores indicative of solid opposition.

Table 5: Should tournaments be allowed on opening and holiday weekends?

	General angler	Tournament Angler	Total
Allowed on opening weekend?			
No	71%	71%	71%
Unsure	20	13	20
Yes	9	16	10
Allowed on holiday weekends?			
No	66%	72%	67%
Unsure	23	11	22
Yes	11	17	11

Table 5 indicates that a majority of all anglers on both questions said "no." Seven anglers in ten (71%) were opposed to tournaments during the opening weekend of the fishing season. A nearly equal percentage of anglers (67%) were opposed to the conduct of tournaments during holiday weekends.

NOTE: Significant differences were not found between general anglers and tournament anglers. Essentially, even anglers that have tournament experience seem to be saying that there is a time and place for tournaments but not during fishing's opening weekend or heavy recreation weekends over the summer holidays.

When riparians were asked if there was any particular time of the year they thought tournaments should not be allowed, those with an opinion agreed they should not be held during holiday weekends when the lakes are most crowded.

Probably the only time I would say not to have them is on the holiday weekends. That's when we do get the highest population of users on the lake.

The July four weekend would be a bad time because the lake is so crowded not just with us property owners but with all the people visiting the residents and just with the tourists that come up here. That would not be the time for a tournament.

Any of the holidays. Like he said, the Fourth of July, but also Memorial weekend and Labor Day. Boy, at the end of the summer, that's like our best week of weather and we have a lot of people on the water so having tournament boats zipping around wouldn't be a good idea... And really, I don't think they [tournament participants] would like it either because of all of the other boats and skiers and people.

Will There be Bass Tournaments in July and August?

Tournament participants are seriously concerned that the State of Wisconsin will prohibit bass tournaments during July and August. Their understanding is that high water temperatures can induce stress and increase mortality for caught-and-released bass.

What about the new proposed rule of a ban from July and August, no catch-and-release tournaments because the water is too warm? That takes away from my entertainment, my sport, from the short amount of time that Wisconsin has.

Look at how many fish they lose in these tournaments. Not many. One or two. What did they weigh in, 1,500 bass at the Sturgeon Bay open? I think they lost one fish out of the pen.

They did the survey on Shawano Lake last year at the fall classic and found that they never lost a fish. They boom shocked and put a net full of fish here and took all the tournament fish and put them in another net and kept for like three to five days and none of them died in either net. So the mortality rate was fine. The tournament fish had the same mortality results as the boom shocked fish.

They don't stop tournaments in July and August in the south and the water temperature's 15 degrees warmer.

This participant noted that today's live-wells are designed to reduce mortality by providing cool, aerated water.

Fish held in confinement in warm water without proper aeration they're more susceptible to dying, but that's ridiculous with our live-wells now a-days.

Participants were particularly vocal about the DNR's role in bass mortality attributed to tournaments.

You know who's killing the fish, don't you? The DNR. All the fish they put them in a small tank. They put 500 fish in a itty bitty tank, did not feed them for a week and just left them in there. And they wondered why they were dying. Well, what do you think?

If they're basing it on 1,000 fish put in a pen on a tributary of the Mississippi that had low current when it was 100 degrees outside, that may not be anything more than a fish getting stressed trying to get itself back to a spot where it's comfortable.

They actually also have problems with that virus and who knows, maybe by penning them up it spread and more died.

You want to have the DNR curtail or kill tournaments in Wisconsin, a July through August ban will do it.

Tournament participants believe the push for a July/August ban on tournaments is coming from lake associations.

In my opinion the push is coming from the Wisconsin Association of Lakes. The statement to the DNR is ridiculous. From lakefront owners. They're blaming all this water pressure on us. Anybody who's been to these bigger lakes for a tournament, well, we're probably only 30 percent of the boats on the water. And we have a trolling motor in the water 95 percent of the time. We're not running across the lakes all day. People just don't want us on their lakes.

They buy a million dollar home on the lake and take out all the trees and put in a dock, well now they don't want anybody fishing around their dock. They're mad about these weeds, blaming us saying we're bringing them back and forth and I'm not a biologist but if you fertilize your lawn and dump all these nutrients into the water through the runoff then something's gonna grow.

What gives them the right to cut the weeds they see because they never come back. Just because they're property owners? Big deal. And it's waterfowl habitat, fish habitat. That water is the property of everybody in the state, not just the people with property around it.

Participants also believe they are being needlessly persecuted. If bass tournaments in July and August are prohibited, they believe bass fishing for the general angler should also be prohibited.

They way I feel is that it's our resource too, unless you're going to go after bass fishing in general – no bass fishing in the summer. Otherwise leave us alone. It's our resource as much as anyone's. I don't believe you have any right to do that.

We all buy the same license as everybody else. I just don't see what the problem is... We're paying the same license as the other guys so why can't we use the resource? That's a 100 percent kill right there that they do. If we lose a fish here or there then we're still batting 80 percent. That's pretty good, better than the other guys.

Are they proposing to shut down bass fishing for the general public? No, just in tournaments. So guys can go out and catch five and kill 'em and go home and those five are gone forever. There's no other way of putting it - it's okay for a guy to catch five and eat them but it's not okay for us to catch five and release them back into the system?

To Cull or not to Cull?

The questionnaire included an information textbox defining culling as:

“...keeping a fish alive in a live-well in the angler's boat and releasing the fish back into the water from which it was caught and replacing it with a different, usually larger fish. Typically, anglers do not cull until they reach the bag limit. So a tournament angler would fish for legal sized fish and keep them alive in his/her live-well until the bag limit is reached. At that point, the angler continues to fish and if a fish is caught larger than one in the live-well, the larger one is kept and the smallest one from the live-well is released. After the fish are weighed at the tournament's registration station all live fish are released back into the water. **Culling in Wisconsin is illegal.**”

“In 2004 the state legislature enacted a bass fishing tournament pilot program. The purpose of the pilot program is to evaluate the impacts of culling through selected bass tournaments.”

Respondents were asked if prior to receiving the questionnaire they were aware of culling being practiced during tournaments in other states. A little more than one-half of all anglers (53%) were aware of culling being practiced in other states. Tournament anglers were significantly more aware of the practice than were general anglers (64% compared to 51%, respectively; chi square=4.95, 1 df, $p<0.017$).

An additional textbox explained that for “a pilot program bass tournament in Wisconsin to allow culling, the tournament must meet specific live-well standards. These standards state that the live-well in each participant's boat be an original manufactured part of the boat that provides oxygen to the well and circulates fresh water.” Respondents were then asked two questions: 1) should culling be allowed in Wisconsin bass tournaments if participants are not required to meet live-well standards? and 2) should culling be allowed in Wisconsin bass tournaments if participants are required to meet live-well standards or should participants be required to follow the general fishing regulations that prohibit culling?

Responses to both questions were on a 5-point scale where 1 represents “definitely be allowed,” 2 represents “probably be allowed,” 3 represents “unsure,” 4 represents “probably be prohibited,” and 5 represents “definitely be prohibited.” The mean response for culling without live-well

regulations was 4.5, indicating strong opposition; the mean response for culling with live-well regulations was 3.4, indicating a degree of uncertainty among anglers.

Table 6: Should culling in tournaments be allowed with and/or without live-well regulations?

	General angler	Tournament angler	Total
Allow culling without live-well regulations?			
Allow	6%	1%	5%
Unsure	11	5	10
Prohibit	83	94	85
Allow culling with live-well regulations?			
Allow	30%	38%	32%
Unsure	19	10	17
Prohibit	51	52	51

Nearly all anglers, including those with tournament experience, are opposed to culling in tournaments that do not require the above-defined live-well standards (Table 6). Although a significant difference was not found between angler types, substantively, a higher proportion of tournament anglers (94%) than general anglers (83%) opposed this idea.

When live-well standards are introduced to the question, opposition drops for all anglers but the greatest proportion of anglers still feel that culling during tournaments should not be allowed (Table 6). Approximately one-half (51%) of all anglers are opposed to culling even with the live-well standards. Slightly more tournament anglers (38%) than general anglers (30%) are supportive of culling with live-well standards for bass tournaments (although the difference is not statistically significant).

During the focus groups tournament participants had the most to say about culling. In their view, culling is essential for tournament advancement in Wisconsin. They believe that culling would generate more money for the state by attracting larger tournaments. They also point to numerous other states that have successful culling tournaments without doing harm to the fishery.

Participants believe that culling should be permitted – it only makes sense.

Say you got five fish in your boat [the limit]. You catch another one, the fish of a lifetime. You want to mount it and put it on the wall. You can't, you gotta let it go. Anybody, tournament or regular angler, you gotta let it go because you can't cull. So I say why not?

It's stupid now. You allow some guy to catch five and kill them but you won't allow me to catch five and release that same day in the same lake? Go figure.

If someone could show me actual biological research telling us that we were hurting the fishery then maybe they'd have something. But I don't see any. Fishing is as good, probably better than it's ever been.

The best thing that could happen for tournaments is culling, that's the number one issue, the best thing for tournaments in Wisconsin.

Culling would attract larger tournaments and, therefore, generate greater revenue for the state.

I think you're going to prevent a lot of your big tournaments from coming in without it. It will bring in a lot more money. You bring in FLW to a local lake, they're bringing in \$50,000 or \$60,000, plus, all the motels and restaurants... Culling is something we need to look at. And if these guys can only catch five fish and then quit, that won't work.

Culling will attract the bigger, better tournaments which will generate more money for the locals and the whole state.

BASS would come here if we could have a culling tournament. But they said not until you lift the no culling.

Participants pointed out that other states offer culling tournaments.

This culling in tournaments is not new so why doesn't Wisconsin check with Florida and some of the other states that have tournaments nine and ten months out of the year?

If you look at all the big tournaments that take place all the big money is down south. Everybody knows that. Well they've been culling in the southern states for years and years and you never hear anything bad about it. Even in the bass magazines you don't hear anything bad. The only thing you ever hear about is fishing during the spawn. That's when a lot of people have the problem with it.

Participants also explained that culling would be healthier for the fishery. By spending a short amount of time in their "recovery" live-wells, fish would be returned to the water in healthier conditions than if they were not returned until after the weigh-in process.

I think culling in tournaments should be allowed. To be honest I think it would be better for the resource because the fish would be spending less time in the live-well. You'd be taking them out after spending only a little time in there maybe.

I don't believe culling hurts anything at all. When I let a fish go that's been in my live-well it's way healthier than if a person's got it hanging off a stringer. Them fish are going back into an environment and 90 percent of the time when you catch them you're catching them in deeper water, and if you let them go at the shoreline, well that's not good, so they're going to have a much better chance from the live-well.

Sitting in our live-wells is no stress at all on the fish. None at all. With your aerated live-wells and timers and catch-and-release, you're actually putting more into that fish than when it was caught. You put it on a stringer and it's gonna die. But you put it in these live-wells that we got now with the aeration systems we got, it's more healthy for them. Like you're reviving them.

They proved beyond a reasonable doubt that letting the big females go after catching definitely does not hurt the fish. With today's technology and the new boats with the live-well systems with water coming in and out, it's just like the fish is in its own environment. I don't see any negative aspect to culling at all.

To be fair, when the participants were asked if they would have fished the pilot tournament if they could not cull, nearly all responded, "Yes, definitely. Oh, yea."

The discussion on allowing culling in tournaments led into a question of equity – should culling be limited to tournaments or should it be open to the general angling public? The consensus was that the required equipment (i.e., live-wells) should dictate who can cull.

It almost can't be for everyone because you would have to qualify to do that kind of fishing. The person who is fishing on the bank with a bucket or a stinger, no you can't have that.

So culling is allowed as long as the following are met... You would have to meet certain requirements with live-wells and stuff.

The reason we should be allowed to cull now is because of the live-wells we have in our boats. The aerator system and fresh water, that's what's needed. If a guy doesn't have that, he's using an old holding tank or definitely not a stringer, than I say no way should that person be allowed to cull. But if he's got the right equipment, well then, okay.

Relative to culling, tournament participants were asked if they should be allowed to fish under a set of different regulations than general anglers. The unanimous response was to establish a "tournament" or a "culling" stamp, allowing them to cull, and with the proceeds from the stamp being dedicated to the state's tournament program.

Most tournament participants support a stamp, costing \$10 to \$15, allowing them to cull.

I think it should be allowed. I brought up that I'd be willing to spend \$10 or \$15 a year for a separate license like a duck stamp that would give me that right. If that's what it takes to do that, to validate that, then I'd do it. There should be a culling stamp.

I can see having a tournament stamp that allows live releases. It would require that your boat have the right equipment, the live-well, to handle it.

I'd like to see us get a tournament stamp that would allow us to cull. You know a \$10 stamp would bring in a lot of revenue. We have what, 1,000 members, 700 in our federation, well, that's \$70,000 coming back to the state.

It would be the same as a turkey stamp. Say \$10 or \$15 for an annual tournament stamp, I think that would be a fair price and that would cover every tournament you enter for the whole state... Fifty dollars would be outrageous for a working man and 90 percent of us are. But \$10 or \$15 seems fair.

You pay for a duck stamp, a turkey stamp, so hey, make a tournament stamp for us, or a bass stamp.

This is all about money as far as I'm concerned. And if it's about money, the only way I'll pay extra is if you allow me to cull. And I'll pay money to cull, maybe \$10 to \$15 a year but just to cull.

The stamp "program" would operate similar to the trout or turkey stamp programs where generated revenues would be earmarked for the tournament program.

I think a tournament stamp is a good thing as long as that money is used to be put back into the bass tournament program. It should be helping our resources, especially at the local level. The money should go back to the lake resource.

You have a culling stamp or a tournament stamp. To do mortality studies or whatever is needed for the tournaments. I would hope that it's put back into the resource... That would be one of the requirements like duck stamps are put back into the duck program.

I think it should be for the tournaments. We spend thousands of dollars every year so \$15 isn't anything... We put way more back into the resource as does the guy who catches and eats them. We catch and release them into the same system so why should we have to pay an extra \$15 if it's not for the tournaments?

Participants disagreed on how the stamp should be packaged. Some suggested a culling stamp should be available to all anglers that met the equipment requirements; others believed a tournament stamp should be developed specific for culling in tournaments.

There's a difference between labeling it a tournament stamp and a culling stamp. A culling stamp would be for anybody as long as they meet certain requirements.

Calling it a culling stamp would stir up the general public. If you call it a tournament stamp it would be for tournaments...

No way. Anybody who met the requirements could cull. You can't go against the public.

What about the guy who has the same boat and equipment as us but doesn't do the tournaments? Can he cull?

[In reply] He should be able to buy the stamp, yes, but you can only cull during a tournament. I think that's the only way to do it.

I don't agree. You're putting the tournament angler up on a pedestal. You can't do that. If the guy has the equipment he should have the same rights to the resource as we do. Otherwise it will never fly.

Related to additional fees, some participants volunteered their thoughts on the benefits of a tournament permit. Their belief is that a required permit would legitimize their recreation and prevent poorly managed tournaments from being conducted.

A tournament permit would be a good idea. It would keep the ma and pa tavern on the lake from having their own because they wouldn't want to pay the fee. And if you got the game warden out there and they find out that they're running a tournament that falls under the criteria without a permit, then they get a big fine.

It would scare a lot of the crap tournaments out of the system. Make them all legit and it would help us as well.

Riparians' Thoughts on Culling

In general, riparians did not object to culling. Most saw culling as being preferable to keeping and killing fish. Some reserved their opinion until more definitive information is available on the survival rate of fish that have been kept in a live-well. Others, regardless of the survival rate, objected to culling.

Some riparians preferred culling to catch-and-keep fishing and noted that culling may not be possible, or should not be allowed, for all anglers.

It's better than keeping everything you catch. I mean they talk about the enjoyment they get from fishing, being outdoors and with friends and family and all, so why do you have to keep everything you catch? No, I'd rather see them take a picture and put the fish back in the water. Or if they have to keep it for a while like for a tournament who catches the biggest fish, then make sure the fish are in these live-wells he's talking about and they get released soon so as to keep them healthy and help them survive.

Personal experience from fishing in South Dakota for walleyes is that it was just fine. I don't know the biological impact of culling on the lake we were on and we were very careful about handling and releasing the fish so I don't have any problem with it.

You told us that these tournaments aren't new so what I see is that the fish populations aren't shrinking up here so what's the problem? They're putting the fish back which should be a good thing, right? Better than keeping them all like some of these tourist vacations do. Keep everything they catch. But these guys are putting them back in the water so what's the problem?

Culling may not be suitable for all anglers.

You certainly don't want the guy who puts his fish on a stringer in 70 degree water for hours and then catches a bigger fish to be allowed to release a smaller fish from the stringer.

Another thing about culling is that the general angler might not be as skilled at getting the fish off the hook as the professional so there might be more injury if culling was allowed for everyone...and with fishing with live bait for the general angler there will probably be more fish that swallow it deep than you get in a tournament.

Support for or opposition to culling will depend on results from culling mortality research.

For me it all depends on how many survive. I mean I'd rather see them put the fish back then keep them for some big feed-bag dinner but if the survival rate is down there then it seems to me all you're doing is torturing the fish. Like prolonging its eventual slow death. So prove to me that culling doesn't kill fish first. If it does, than I say no way. But if they survive, than I say okay, go ahead with your culling.

Can you answer if culling eventually kills the fish? Sure you're putting it back in the water but look what it goes through. How long is it in the live-well and how long is it out of the water being weighed and taking pictures and all? That's not the same as the catch-and-release trout fishing like we did when we would go out west.

And I wonder about this disease that bass get. If you put them altogether would that be a problem with tournaments, too?

I didn't realize that the fish are returned to the water so I may have had a presupposition that the fish population would suffer from too many tournaments. If it turns out that a biological survey tells us that there's very little impact from a tournament to the fish population of the lake, I think that would be great news and refreshing news to a lot of people on the lake that might not know that.

Another riparian objected to culling because tournament participants should follow the same regulations as other anglers.

I say a fair tournament is who's the best by looking at the five fish they catch or whatever the limit is that I could catch without culling. So when you catch fish you have to decide do I throw it back in the water or do I put it in my well for measuring? There's none of this switching for a bigger fish once you catch your limit...The fish still have to be returned to the water afterwards but none of this switching should be allowed.

During the discussion with riparians it became clear that support for culling and tournaments in general were not without serious caveats. Most notable, riparians made it clear that regardless of culling, tournaments should be prohibited if they alter the "culture of the lake" in any way.

If it was shown that these tournaments were having an affect on the fish population or a certain age class of fish then I would say you would have to at least limit the frequency of the tournaments if not eliminate them completely...

Anything that affects the ecosystem or changes the demographics of the fish population.

Anything that would destroy the lake, the culture of the lake, I'm going to say no to...If the culling actually brought disease to the lake or made more fish die than you can't do it.

The biological implications. If it's not gonna have any impact on the fish population then I'd be much more in favor of them. [Not to imply current opposition.]

Perceived Survival Rate of Caught and Released Fish

Respondents were asked three questions pertaining to the survival rate of caught and released fish. The first two questions asked them to 1) speculate what percentage of fish they catch and release survive at least one day; and 2) speculate what percentage of bass caught and released during a culling tournament survive at least one day. The third question asked respondents what they considered to be an acceptable one-day survival rate for bass caught and released during a culling tournament. Responses were measured on a 7-point scale where 1 represents "less than 10%," 2 represents "10% - 24%," 3 represents "25% - 49%," 4 represents "50% - 74%," 5 represents "75% - 89%," 6 represents "90% or higher," and 7 represents "unsure." These were difficult questions as noted by the large proportion of "unsure" responses -- 17 percent to nearly one-third (31%) were unable to offer an opinion. When the "unsure" responses are omitted, resulting in a 6-point scale, a clear difference is found in the mean scores for survival rates of released fish (Table 7). Respondents speculate that fish they catch and release have significantly higher survival rates than do bass caught during a tournament that allows culling. The mean score for one-day survival rates for fish caught and released by the respondents was 5.0, equating to a 75% - 89% survival rate; the mean score for one-day survival rates for bass caught and released during a culling tournament was 4.1, equating to a 50% - 74% survival rate ($p < 0.000$). The mean score for an acceptable one-day survival rate for bass caught and released during a culling tournament was 5.3, very similar to the respondents' mean score and significantly higher than the speculated tournament mean score ($p < 0.000$).

Table 7: Perceived 1-day survival rate of caught and released fish

Survival rate	Respondent caught and released fish	Tournament culling	Tournament acceptable survival
< 10%	2%	3%	2%
10% - 24%	3	5	2
25% - 49%	4	12	1
50% - 74%	12	20	7
75% - 89%	20	17	20
90% - 100%	40	12	43
Unsure	17	31	25
Mean (6-pt)	5.0	4.1	5.3

Table 7 indicates that respondents believe more fish they catch and release survive at least one day than do fish caught and released during a bass tournament that allows culling. Three-fifths (60%) of the respondents speculate that 75 percent or more of the fish they release survive at least one day; only 29 percent of the respondents speculate that 75 percent or more of bass caught and released during a culling tournament survive at least one day. Further, acceptable survival rates for bass tournaments are more in-line with non-tournament than with tournament speculation. Nearly two-thirds (63%) of the respondents believe an acceptable survival rate for bass caught and released during a culling tournament is 75 percent or higher.

NOTE: Statistical differences were not found between general anglers and tournament anglers for speculated survival rates and acceptable survival rates.

Tournaments and Impacts on the Future Fishery

The lower speculated survival rates of fish caught and released during a bass culling tournament leads one to question if anglers believe tournaments are harmful to the water's fishery. The questionnaire asked if on a body of water where a tournament has occurred, how much harm, if any, the respondents think the tournament does to the future fishery resource in that water. Responses were on a 5-point scale where 1 represents "no harm at all," 2 represents "a little harm," 3 represents "unsure," 4 represents "moderate (more than a little) harm," and 5 represents "a great deal of harm." The mean score for all anglers was 2.5, indicating a level of uncertainty but leaning towards a little harm.

Table 8: Do tournaments harm future fishery resource?

Harm	General angler	Tournament angler	Total
No/Little harm	51%	63%	53%
Unsure	22	15	22
Moderate/Great deal of harm	27	23	26

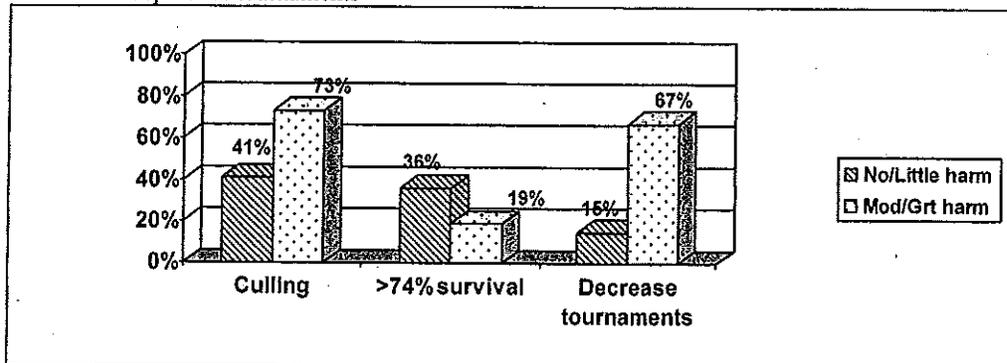
As with the previous question, respondents had difficulty offering an opinion on the potential harm due to tournament fishing. Approximately one-fifth of the general anglers (22%) and 15 percent of the tournament anglers were not sure how much harm to think is done (Table 8). In

light of that uncertainty, the highest proportion of anglers thought that tournaments do “no” to “little” harm to the future fishery on a tournament waterbody. This was noted by one-half (51%) of the general anglers and more than three-fifths (63%) of the tournament anglers. A sizeable minority of about one-fourth (27%) of the general anglers and the tournament anglers (23%) believe that tournaments do “moderate” to “a great deal of harm” to the future fishery of a waterbody.

NOTE: Although substantive differences exist between general anglers and tournament anglers, their beliefs about potential harm to the fishery resource due to tournaments were not statistically different.

Further analyses reveal that respondents’ beliefs about the potential harm to fishery resources due to tournament fishing is a likely influence on their beliefs about culling and other tournament aspects. Figure 2 indicates significant affects stemming from the respondents’ beliefs about the level of harm done to a fishery after a tournament has occurred:

Figure 2. Respondents’ beliefs about harm to future fishery due to tournament fishing and various aspects of tournaments



Those who believe that tournaments “moderately” or “greatly” harm the fishery resource are:

more likely to oppose culling with live-well standards than those who believe the resource has had “no” or a “little” harm (73% compared to 41%, respectively) (chi square=88.56, 8 df, $p<0.000$);

less likely to speculate that a high percentage (75% to 100%) of tournament caught and released fish will survive than those who believe the resource has had “no” or a “little” harm (19% compared to 36%, respectively) (chi square=88.56, 8 df, $p<0.000$);

much more likely to believe that the number of permitted tournaments in Wisconsin should decrease than those who believe the resource has had “no” or a “little” harm (67% compared to 15%, respectively) (chi square=197.24, 6 df, $p<0.000$).

Tournaments and Invasive Species

Participants in the riparian focus groups saw an additional potential impact from tournaments -- the risk of introductions of exotic and invasive species.

I'd be concerned about them cleaning their boats and trailers so as not to spread unwanted species from one lake to another. That would be a major worry about increasing tournament numbers would be that we get some exotic brought into the lake. That could really change the culture of our lake.

Introduction of exotics would be a concern. If tournaments grow in popularity it only makes sense that the chances of them bringing in something from one lake to another is gonna increase.

I mean I would expect this from anybody who uses a boat on different waters that they thoroughly clean the boat and the trailer. You have to today because what they have down south, or like the zebra mussels in Lake Michigan, well I don't want them here.

While riparians expressed concern over the potential introduction of exotic and invasive species due to increasing tournament numbers and tournament boats, participants in the tournament focus groups offered a very different take on exotics. From their perspective, some exotics have been beneficial to their fishing and to the water.

Gobies are a growing food source and where they are found, sport fish flourish.

The gobies are food, they are I believe. When I was on the Bay there's tons of gobies and the smallmouth are right there. I think that's a good thing.

That's right. The gobies are a great food source for the sport fish.

Zebra mussels clean the water and that has contributed to an improved bass fishery.

The zebra mussel. Well shipping-wise they're quite a nuisance but as far as fishing I don't see what the problem is.

The zebra mussel helped to clear the water and that's helped the bass.

Now another example with the zebra mussels is back in the '80s all we used to fish up here was slime. Green Bay was slime and then the zebra mussels came and cleaned everything off. You can see even in early July, you used to be able to see 18 feet after the zebra mussels came. And now they're dieing off and the slime is coming back, so that cycle is kind of running itself...

The populations are there. We were in 45 ft. of water and as fast as we could drop it down, we were catching four and five inch bass... We thought it was just balls of bait fish, and they were little bass. That's new since the mussel came in.

Tournament anglers acknowledged that they feel they are blamed by other anglers and by riparians for a change in the fishery and the culture of the lake.

And like up in Door County where years ago you used to catch 30, 50 fish in eight or ten feet of water but with the zebra mussel and the goby, clearing the water, making it cleaner, the fish moved into deeper water and people aren't adjusting to that. So they think the fishery has gone backwards because they can't go to the same spot and fish the way they did ten years ago. Well that's not our fault and we catch flack for that. The fishery has changed but they haven't changed how they fish.

I think a lot of it is right here with the zebra mussel. When that water got cleared up, fish moved to different, deeper locations than what these locals or other people don't know. Well they gotta move to where the fish are.

You put a weed cutter out on the lake well that's just chopping them up and dropping them and re-germinating the weeds all over the lakes and the bad weeds are growing ten times faster than the good weeds and it's choking the lakes... And some of those cutters are transferred from one lake to another, spreading the bad weeds. But they have a problem with us moving aquatic vegetation from lake to lake? We all have nice boats and we try to take care of them – better than the average boat.

Other participants acknowledged that zebra mussels can be detrimental and that as a practice, they clean their boats and trailers before entering new water.

No, they are a nuisance for fishing. They'll cut your line big time. They are a nuisance. They clutter everything up, and cling to everything, any kind of rock.

We clean our boat as soon as we're out of the water and wash it down before the next tournament. It's common practice.

Benefits from Fishing Tournaments

Respondents were asked their opinions regarding three statements about bass fishing tournaments that allow culling. The statements were: "Thinking about bass fishing tournaments that allow culling would you say they are good for the state because ...

- ...they generate economic benefits to local economies.
 - ...they draw attention to Wisconsin as a fishing destination.
 - ...the possible economic benefits justify the impact tournaments may have on the fishery resource.
-

Responses were on a 5-point scale where 1 represents “strongly disagree,” 3 represents “neutral,” and 5 represents “strongly agree.” The mean score for benefits to local economies and drawing attention to the state were both 3.0, indicating that respondents are divided on the issues. The mean score for possible economic benefits justifying possible resource impacts was 2.6, indicating a leaning towards disagreement.

Table 9. Respondents' agreement or disagreement with three statements about tournament fishing

Level of agreement	Generate benefits to local economies	Draw attention to state as fishing destination	Economic benefits justify possible resource impacts
Disagree	26%	30%	42%
Neutral	42	34	39
Agree	33	36	18

Respondents were fairly evenly divided on two of the statements (Table 9). About one-fourth (26%) of the respondents do not believe that bass fishing tournaments that allow culling benefit local economies; one-third (33%) believe that such tournaments are good for local economies. Three respondents in ten (30%) do not believe that bass fishing tournaments that allow culling would draw attention to the state as a fishing destination; slightly more respondents (36%) believe that such tournaments would generate attention.

The statement with the greatest variance was whether or not bass fishing tournaments that allow culling are good for the state because the possible economic benefits justify the impact tournaments may have on the fishery resource. More than twice as many respondents disagreed (42%) with the statement as agreed (18%). Even with this disparity, it is difficult to project a meaningful direction because of the high “neutral” response – two-fifths (39%) of the respondents were indifferent.

NOTE: Statistical differences between general anglers and tournament anglers were not found for each of the three statements.

Focus group participants were asked what, if any, benefits are derived from the tournaments. They cited benefits to the economy and the fishery resource.

Tournaments contribute to the state and to local economies.

I'd say to talk to the towns that have big tournaments. How much money does that bring into their community? How much attention to the lake?

Think of the money that we spend, think how much we're contributing through taxes on our equipment, gear, the gas tax...I spend at least \$10,000 a year on tournaments. All that money is taxed so I'm contributing through my tax dollars and that runs right back into the resource pot.

There's a lot of dollars that Wisconsin won't have if they eliminate tournaments.

Look at Wisota. What did that bring in, like \$2 million dollars? I mean Chippewa Falls put up some money but they got that money back into the community four fold. They made money for sure.

Tournaments also benefit the state's fishery resource by promoting catch-and-release fishing. In a sense, tournament participants view themselves as ambassadors of the fishing public.

The catch-and-release program started with the Bass Federation years ago and we got more bass now than we've ever had because of catch-and-release.

Bass anglers for the last 30 years practiced catch-and-release. Now it's really catching on. So for the last 30 years it grew as practicing catch and release and now we're all reaping the benefits.

The future is for the kids and if we can put these fish back for the kids, for their future and enjoyment, well, that's what catch and release is all about. To sustain the resource and make it stronger and better for the next generation... Catch-and-release fishing, for sure. It's getting pounded into people's heads.

The bass fishing is fantastic because of the attitudes that are promoted by tournament anglers.

We as tournament anglers want the resource taken care of more than anybody. We want to catch them again.

As tournament fisherman we care more about the bass than the DNR does.

I think first and foremost the public needs to understand that we are more concerned about the fishery resource than the general public, than a lot of people who are making the big fuss about this. This is what we do, this is how we decide to spend our time and our lives. So we're concerned about the future of the fishery as much as anybody is and we want to continue to see it grow so we can continue to go out and have a good time.

We want to put back into the resource, too... We're 100 percent catch-and-release. How is that bad for the resource?

Public Impressions of Tournament Anglers

Tournament participants believe they have a public image problem. They view themselves as true stewards of the resource and they want the public to have a similar understanding. They lay most of the blame for their poor image on the media coverage of DNR "mismanagement."

Tournament participants want the public to know they care for the resource.

You look at the equipment we got, almost all of the tournaments you got today are no dead fish at the weigh-ins. These guys are handling them with kit gloves, they put ice in the live-wells, they got research, they got catch-and-release... They handle them as little as possible not to stress them because they want that for their bag at the end of the day.

We don't go out there with a malicious intent to hurt the fishery. We put them back so we can come back again.

I think the impression other people have is that we do hurt the resource, that we do have a bad intent. But we invite the public to the weigh-ins to see how we handle the fish, see what's going on.

Bad news sells and tournament participants believe the Department is (unintentionally) contributing to the bad news.

Nobody hears about Sturgeon Bay where only two fish total died out of 1,500. That's not in the paper.

They use every opportunity to crucify us for every bad result but they aren't looking at the positive results either.

The media the last two years, every view of us was ridiculous... What happened in La Crosse wasn't from us it was how the fish were kept in poor pens and where they were released. They were sentenced to death is what happened. It wasn't us. But that's not how the public saw it. DNR took fish out of water that was ten degrees cooler and moving eight times as fast and basically tossed them into a pond. It was disgusting. It wasn't management it was mismanagement.

DNR set it up as part of the pilot program. The pens were in a poor location. They should have been in the main river channel. There would have been some mortality just because of the low water level but nothing like the slaughter everyone saw, everyone around the country saw it. It was on Google news.

Participants also believe that their costly equipment is providing the public with a false image – that tournament participants are wealthy individuals who can afford additional fees to cover tournament management and research expenses.

And don't think I have the money to pay these extra fees just because I have a \$35,000 boat. I live in a modest home – I don't have a million dollar cabin on a lake. It's what I do. But they think we can all afford it because they see the boats and trucks we have.

We're being blamed, being targeted for stuff they don't like. They say that we should pay for all this research because they see us with a \$35,000 boat and a \$35,000 truck and we

can afford it. They say it costs the DNR \$70,000 to monitor these tournaments, and I say why us?

Participation in Fishing and the 2005 Season

This section addresses the objective of assessing fishing participation. Specifically it reports on the various practices of anglers, who anglers choose as their fishing companions, when they go fishing, the fish they prefer to catch, any problems they encountered while fishing, where anglers obtain their information on fishing and Wisconsin's fishery resources, and overall assessments of the 2005 season as well as the job the DNR is doing managing the state's fishery resource.

Fishing Participation and Fish Pursued

To identify current anglers the questionnaire asked respondents if they did any fishing in Wisconsin in 2005. Results indicate that nearly everyone who purchased a license to fish in 2005 did so – **98 percent responded “yes,” they fished in Wisconsin.** (Results from questions which asked specifically about 2005 fishing experiences excluded the two percent that said they did not do any Wisconsin fishing in 2005.)

Respondents were asked how frequently they fished for various fish. A 4-point scale was used to measure frequency where 1 represents “never,” 2 represents “sometimes,” 3 represents “often,” and 4 represents “always.” The most sought after fish is panfish but about one-half of anglers most frequently fish for anything they can catch. Overall, the mean scores range from “never” for rough fish to “often” for panfish (Table 10).

Table 10. Frequency of fish pursued

Fish	Mean score	Percent “never”	Percent “sometimes”	Percent “often” or “always”
Panfish	2.85	5	27	68
Any fish	2.64	15	36	49
Walleye or sauger	2.35	21	34	45
Northern pike	2.10	26	46	28
Largemouth bass	2.03	31	40	29
Smallmouth bass	1.95	34	42	24
Muskellunge	1.53	63	26	11
Catfish or bullheads	1.47	66	25	9
Inland trout	1.45	67	23	10
White bass or striped bass	1.43	65	27	8
Great Lakes trout or salmon	1.37	75	17	8
Rough fish	1.24	82	14	4

Table 10 highlights anglers' varied interests in numerous fish. With two-thirds (68%) of the anglers reporting they “often” or “always” pursue panfish, it is the most frequently sought after fish. One-half of all anglers are truly generalists, as 49 percent “often” or “always” pursued no particular fish type. Not quite one-half (45%) of all anglers reported that they most frequently pursued walleye (or sauger).

One-fourth to nearly three in ten anglers “often” or “always” deliberately pursued northern pike (28%), largemouth bass (29%), and smallmouth bass (24%). Musky and inland trout, both which receive a great deal of attention within the angling public and the media, were most frequently pursued by approximately one angler in ten (10%). Catfish or bullheads, white bass or striped bass, Great Lakes trout or salmon, and rough fish were all frequently pursued by less than one angler in ten; rough fish was the least pursued type of fish with the vast majority of anglers (82%) saying they “never” pursue it.

NOTE: Statistical differences in pursued fish between general anglers and tournament anglers were found for three fish. Tournament anglers were significantly more likely than general anglers to frequently fish for walleye (or sauger), northern pike, and Great Lakes trout or salmon (all significance levels at $p < .002$ or smaller).

The type of fish pursued was followed by two questions, the first being the anglers’ favorite fish to catch (the fish they feel is their specialty) and the second being the fish they most frequently catch. Panfish and walleye are about equally popular and panfish, the fish that many anglers are first introduced and is one of the most dispersed in Wisconsin, was the fish caught most often in Wisconsin waters.

Table 11. Anglers’ favorite fish to catch and the fish they catch most often

Fish	Favorite fish to catch	Fish caught most often
Panfish	34%	58%
Walleye or sauger	32	12
Largemouth bass	9	8
Northern pike	6	5
Smallmouth bass	5	4
Muskellunge	4	1
Inland trout	3	3
Great Lakes trout or salmon	3	4
Catfish or bullheads	2	2
White bass or striped bass	1	1
Any fish	1	1
Rough fish	0	3

Without question, anglers prefer to catch panfish and walleye more than any other fish. Approximately one-third of all anglers said their favorite fish to catch is panfish (34%) or walleye (32%) (Table 11). Largemouth bass was the preferred fish for about one angler in ten (9%). All other fish, including popular gamefish such as northern pike, smallmouth bass, musky, and Great lakes trout and salmon were most preferred by not more than about one angler in 20 (5%).

As for which fish is caught most often from Wisconsin waters, panfish is king. Nearly three anglers in five (58%) reported that they catch panfish more than any other fish (Table 11). As one might expect, given the fish’s popularity and deliberate pursuit by anglers, walleye, are the next most commonly caught fish, with 12 percent of anglers reporting. All other fish were most frequently caught by less than one angler in ten (less than 10%). Note that although rough fish are the preferred fish for less than one percent of the anglers, they are most frequently caught by three percent of anglers, probably indicative of the fish’s wide dispersal and high populations.

NOTE 1: Surprisingly, statistical differences were not found between general anglers and tournament anglers for their favorite fish to catch. Tournament anglers, however, were more likely than general anglers to have a preference for smallmouth bass (8% compared to 4%, respectively) and Great Lakes trout and salmon (8% compared to 1%, respectively).

NOTE 2: Likewise, statistical differences were not found between general anglers and tournament anglers for the fish they most often catch. Tournament anglers, however, were more likely than general anglers to catch Great Lakes trout and salmon (9% compared to 1%, respectively) and general anglers were more likely than tournament anglers to catch panfish (56% compared to 50%, respectively).

Fishing Practices

Fishing is a social activity. The questionnaire asked who the respondents most often fished with in 2005. The large majority of all anglers (85%) went fishing with family and/or friends.

Table 12: Most frequent fishing companions

Fishing companions	General angler	Tournament angler	Total
Family	37%	14%	33%
Family and friends	30	37	32
Friends	19	27	20
Self	13	19	14
Business partners/clients	0	1	1
Fishing club members	0	2	1

Table 12 shows that general anglers and tournament anglers differed in their choice of fishing companions (chi square=28.54, 5 df, $p<0.000$). General anglers were significantly more likely than tournament anglers to fish exclusively with family members (37% compared to 14%, respectively). On the other hand, tournament anglers were more likely than general anglers to fish alone (19% compared to 13%, respectively), to fish with friends (27% compared to 19%, respectively), and to fish with friends and family combined (37% compared to 30%, respectively). Regardless of these differences, the vast majority of general anglers (86%) and of tournament anglers (81%) fish with a companion.

Respondents were asked how frequently in 2005 they fished using various bait types, including live bait, artificial lures, or fly fishing. Responses were on a scale of 1 to 4 where 1 represents "never," 2 represents "sometimes," 3 represents "often," and 4 represents "always." Live bait is used most often and flies are used least. Mean scores ranged from "often" for live bait to slightly more than "never" for flies.

Table 13. Frequency of use of various bait types

Bait type	Mean score	Percent "never"	Percent "sometimes"	Percent "often" or "always"
Live bait	3.03	3	20	77
Artificial lures / spinner baits	2.57	8	39	53
Fly fishing	1.25	81	14	5

Table 13 supports the prevalence of fishing with live bait. More than three-fourths of all anglers (77%) reported they most frequently fished in 2005 using live bait. In fact, very few anglers (3%) "never" fished with live bait.

Artificial lures and spinner baits were also commonly used by anglers. A majority of 53 percent of the anglers said they "often" or "always" used artificial lures or spinner baits. Less than one angler in ten (8%) said he or she "never" used such baits in 2005. Fly fishing was not widely practiced – eight anglers in ten (81%) reported they "never" used flies in 2005.

NOTE: A statistical difference between general anglers and tournament anglers was found for the use of artificial lures. Two-thirds (65%) of the tournament anglers, compared to one-half (50%) of the general anglers reported they "often" or "always" used artificial lures in 2005. No differences were found for the use of live bait or for fly fishing.

Respondents were asked from a list of five fishing platforms (or methods) which one they most frequently used. Platforms included fishing from a boat with a motor, fishing from a boat without a motor, wading, fishing on ice, and fishing from the shore (including dock or pier). Among all anglers, fishing from a boat with a motor was most common (60%) while wading was the least common (4%).

Figure 3. Frequency of use of various fishing platforms

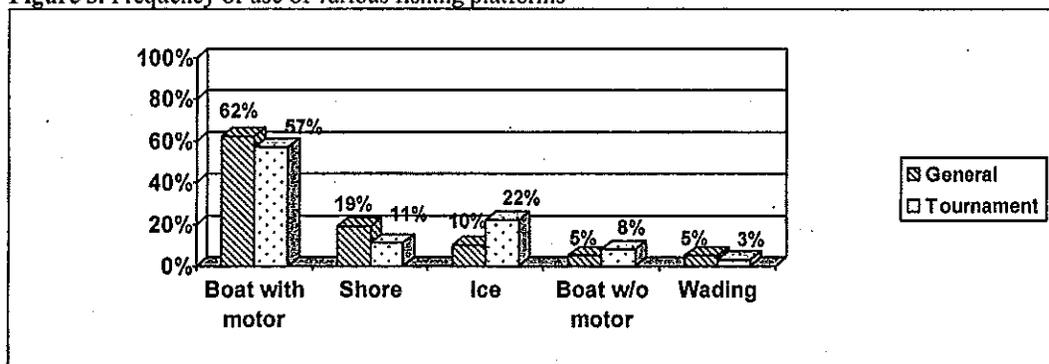
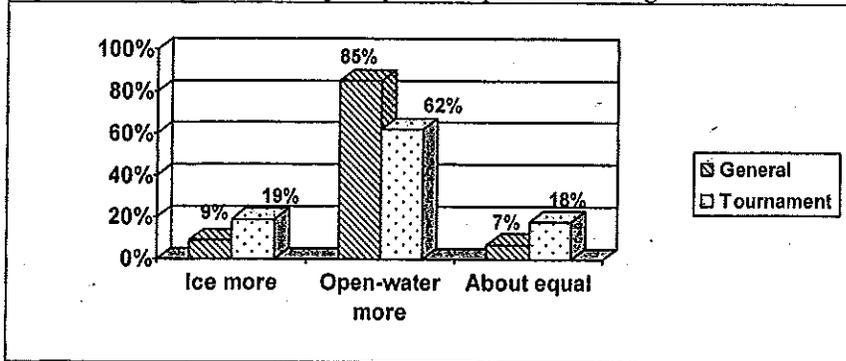


Figure 3 illustrates that both general anglers (62%) and tournament anglers (57%) were most likely to fish from a boat with a motor. The angler types differ on two of the fishing platforms (chi square=14.10, 4 df, $p < 0.007$). Fishing from the shore (or a pier or dock) was significantly more likely for general anglers (19%) than for tournament anglers (11%). Ice fishing, however, was significantly more common for tournament anglers (22%) than for general anglers (10%). Relatively small proportions of anglers (3% to 8%) most frequently fished from a boat without a motor or by wading. Both angler types were equally likely to use either of these methods.

Looking more specifically at ice fishing, respondents were asked if they spent more time ice fishing or open-water fishing. Results show that open water fishing is much more popular than ice fishing but ice fishing is significantly more popular with the tournament anglers than with the general anglers. Nearly three-fifths (59%) of the general anglers, compared to 23 percent of the tournament anglers reported that they did not do any ice fishing in 2005.

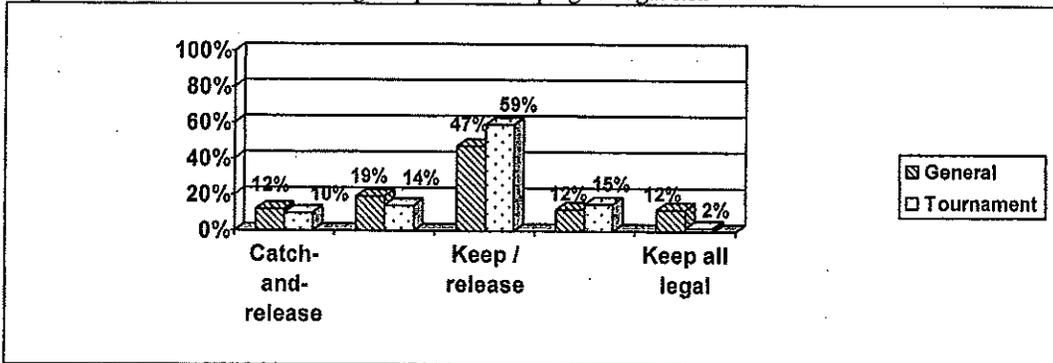
Figure 4. Time spent ice fishing compared to open-water fishing



Accounting for those who did not ice fish in 2005, Figure 4 illustrates the greater preference for ice fishing by tournament anglers than by general anglers (chi square=24.71, 2 df, $p < 0.000$). About one-fifth (19%) of the tournament anglers compared to one-tenth (9%) of the general anglers reported that they spent more time ice fishing than open-water fishing. In contrast, more than eight in ten general anglers (85%) compared to three-fifths of the tournament anglers (62%) said they spent more time open-water fishing than ice fishing.

Respondents were also asked to what extent they practiced catch-and-release fishing. This was measured using a 5-point scale where 1 represents catching-and-releasing all fish, 3 represents keeping some fish and releasing others, and 5 represents keeping all legal fish. Overall, the mean score was 2.92, indicating that anglers typically keep some fish and release others.

Figure 5. Catch-and-release fishing compared to keeping all legal fish



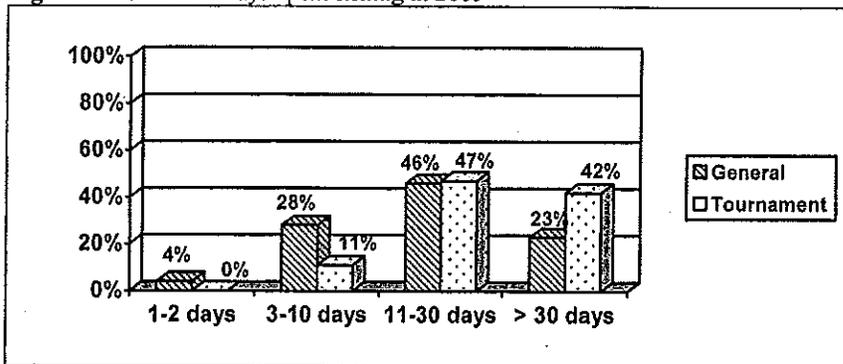
Although general anglers and tournament anglers differ statistically in their practices of catch-and-release fishing (chi square=11.22, 4 df, $p < 0.024$), the statistics do not obviously differentiate the anglers. Slightly more general anglers (31%) than tournament anglers (24%) primarily or entirely practice catch-and-release fishing (Figure 5). General anglers were also found to be more

likely than tournament anglers to keep all of the legal fish they catch – all or almost all legal fish were kept by 24 percent of the general anglers compared to 17 percent for the tournament anglers. The largest proportion of both angler types practice some combination of releasing some fish and keeping others. Forty seven percent of the general anglers compared to a significantly higher 59 percent of the tournament anglers reported that they typically keep some fish and release others.

Fishing Frequency and Out-state Fishing

Respondents were asked how many days they spent part of the day fishing in Wisconsin during 2005. Responses ranged from one day to 300 days, with a mean of 34 days.

Figure 6. Number of days spent fishing in 2005

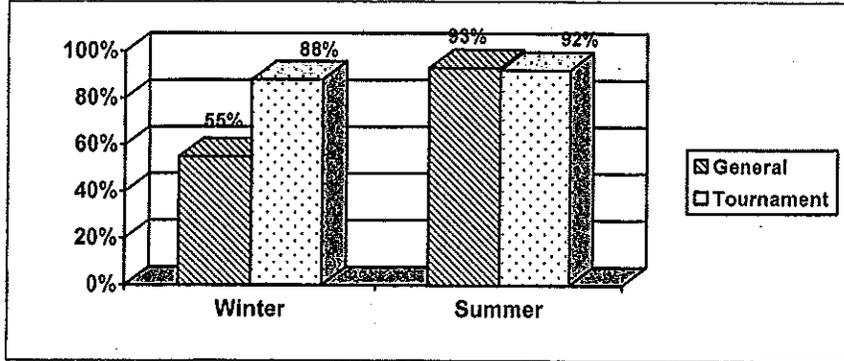


Looking at angler type, results in Figure 6 clearly show that tournament anglers fished more days during 2005 than did general anglers. One-third (32%) of the general anglers fished not more than ten days; 11 percent of the tournament anglers fished three to 11 days and no tournament angler fished fewer than three days. The upper end of days fished is as one might expect; more than 30 days were spent fishing by 23 percent of the general anglers and 42 percent of the tournament anglers. Overall, tournament anglers fished nearly twice as many days as did general anglers. The mean number of days spent fishing was 29 for general anglers and 55 for tournament anglers (chi square=22.75, 3 df, $p < 0.000$).

Given that tournament anglers spend more days fishing than do general anglers, it is not surprising that the data also show tournament anglers fishing more months of the year than do general anglers. Tournament anglers fished an average of seven months during 2005 while general anglers fished an average of five months.

Earlier findings noted that ice fishing was proportionally more popular with tournament anglers than with general anglers. This is further corroborated in Figure 7. Fishing from January through April and October through December was significantly more popular with tournament anglers (88%) than with general anglers (55%) (chi square=35.20, 1 df, $p < 0.000$). No significant difference was found between angler types for fishing the summer months of May through September – more than 90 percent of each angler type fished during the summer.

Figure 7. Winter and summer months fished



Research also shows that Wisconsin anglers tend to do their fishing in Wisconsin. Overall, about one angler in five (22%) reported that he or she did some fishing during 2005 outside of Wisconsin. Hence, more than three-fourths of all anglers (78%) did all of their fishing in Wisconsin (Table 14).

Table 14: Fishing outside of Wisconsin in 2005

Location	General angler	Tournament angler	Total
Fished outside of Wisconsin	20%	30%	22%
Canada	10	10	9
Another state	11	22	13

Table 14 also tells us that about one angler in ten (9%) fished in Canada. Fishing trips to Canada were proportionally equal for general and tournament anglers. Fishing in another state, however, was more popular with tournament anglers than with general anglers. Approximately one-fifth (22%) of the tournament anglers, compared to one-tenth (11%) of the general anglers, reported that they did some fishing in 2005 in another state (chi square=8.06, 1 df, p<0.006). Minnesota and Michigan were the most frequent outstate destinations for both general and tournament anglers.

Sources of Information

Respondents were presented a list of information sources about fishing and Wisconsin's fish resources and asked how often in 2005 they obtained information from each source. Responses were on a scale of 1 to 4 where 1 represents "never," 2 represents "sometimes," 3 represents "often," and 4 represents "always." The most frequently relied on sources for information were friends or family followed by sporting goods, hardware or bait stores.

Table 15 highlights that anglers obtain information from a variety of sources. It's worth noting that a majority of anglers did not "often" or "always" frequent a single information source. This likely underscores the availability of information from a wide variety of sources. It's also worth noting that anglers rarely turn to the DNR for information, preferring perhaps more accessible

sources (friends or family or local stores) or other similar sources (magazines and books over DNR publications).

Table 15. Frequency of obtaining information from following sources

Information source	Mean score	Percent "often" or "always"
Friends or family	2.34	46%
Sporting goods/hardware/bait stores	2.10	29
Local newspapers	1.73	16
Magazines/books	1.70	16
TV or radio reports	1.51	9
DNR website	1.37	6
DNR publications	1.36	12
Other Internet websites	1.36	9
DNR conservation warden	1.23	3
Fishing club members	1.22	4
Fishing club publications	1.19	4
DNR service center front desk	1.14	1
DNR fish biologist	1.09	1

Almost one-half of the anglers (46%) say they "often" or "always" obtain fishing-related information from their friends or family (Table 15). Just over one-fourth (29%) frequently obtain their information from sporting goods, hardware or bait stores. About one angler in six (16%) frequently obtain his or her information from local newspapers or books and magazines while a smaller proportion obtain their information from DNR publications (12%).

About one angler in ten (9%) frequently obtains his or her information from television or radio reports or from Internet websites other than the DNR. Interestingly, anglers are more likely to obtain fishing-related information from other websites than from the DNR website (6%). All other information sources were "often" or "always" relied on by less than one angler in 20 (or less than 5 percent).

NOTE: Tournament anglers were statistically more likely than general anglers to obtain information from all sources listed in Table 15 (all significance levels at $p < .05$ or smaller). The two exceptions were local newspapers and television or radio reports where no statistical differences were found.

Problems Encountered While Fishing

A list of 11 potential problems anglers might encounter while fishing in Wisconsin was included in the questionnaire. Respondents were asked to indicate the frequency with which they encountered each problem. Frequency was measured by a 4-point scale where 1 represents "never," 2 represents "sometimes," 3 represents "often," and 4 represents "always." The problems most frequently encountered were not catching many fish and catching too many small fish. Overall, the mean scores indicate that anglers "sometime" encounter at least one of the problems, but rarely is a problem frequently encountered (Table 16).

Table 16. Frequency of problems encountered while fishing

Problem	Mean score	Percent "often" or "always"
Not catching many fish	2.25	30%
Catching too many small fish	2.20	35
Poor behavior by other water users	1.90	20
Crowding – too many users on water	1.86	19
Water quality	1.77	13
Others keeping too many fish	1.72	18
Public access to water	1.71	15
Poor/inadequate fish habitat	1.71	12
Worry about toxins in fish	1.67	16
Complicated regulations	1.65	14
Daily bag limit is too small	1.54	12

Table 16 indicates that no problem was "often" or "always" encountered by a majority of anglers. Approximately one-third of the anglers frequently encountered problems of catching too many small fish (35%) and not catching many fish (30%). One angler in five frequently encountered poor behavior by water recreationists (20%), crowding on the water (19%), and other anglers keeping too many fish (18%). No other problem was reported by more than one angler in five. The problem least encountered was the daily bag limit – just over one angler in ten (12%) thought the daily bag limit for whatever he or she was fishing for was too small.

When asked which of the 11 problems anglers believed to be most serious, the two problems most frequently cited were, as expected, not catching many fish (17%) and catching too many small fish (16%). Note that these top two problems were cited by fewer than one angler in five, indicating that no single problem overwhelms those who enjoy fishing.

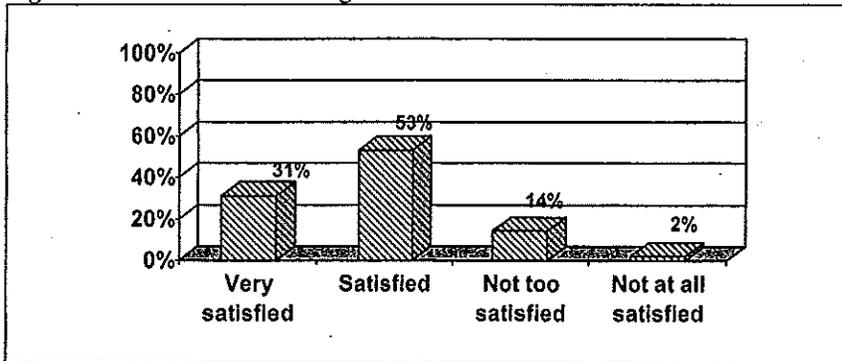
NOTE: Statistical differences between general anglers and tournament anglers were not found for any of the potential problems listed in Table 16. In other words, any of the problems were likely to be encountered or not encountered regardless of angler type.

Satisfaction with the 2005 Season and Overall Assessment of the DNR's Fish Management Program

The questionnaire included a standardized question to assess anglers' overall satisfaction with the 2005 season. Figure 8 illustrates that the vast majority of anglers were satisfied with their Wisconsin fishing experiences in 2005.

Approximately three anglers in ten (31%) reported they were very satisfied with their 2005 fishing experiences in Wisconsin; more than eight anglers in ten (84%) reported they were either satisfied or very satisfied (Figure 8). Fishing in Wisconsin in 2005 was disappointing for 16 percent of the anglers. Based on a 4-point scale where 1 equals "not at all satisfied" and 4 equals "very satisfied," the mean score was 3.1, equivalent to being satisfied.

Figure 8. Satisfaction with fishing in 2005



NOTE: A statistical difference between general anglers and tournament anglers for their satisfaction ratings was not found. In other words, tournament anglers were just as satisfied or dissatisfied with their fishing experiences as were general anglers.

Respondents were also given the opportunity to grade the DNR for the job it's doing managing Wisconsin's fishery resource. A traditional 4-point grading scale was provided where 0 represents a failing grade of an "F," 2 represents a passing grade of "C" and a 4 represents an "A." The overall mean score was 2.7, equivalent to a B-.

Figure 9. Anglers' grade the fish management program

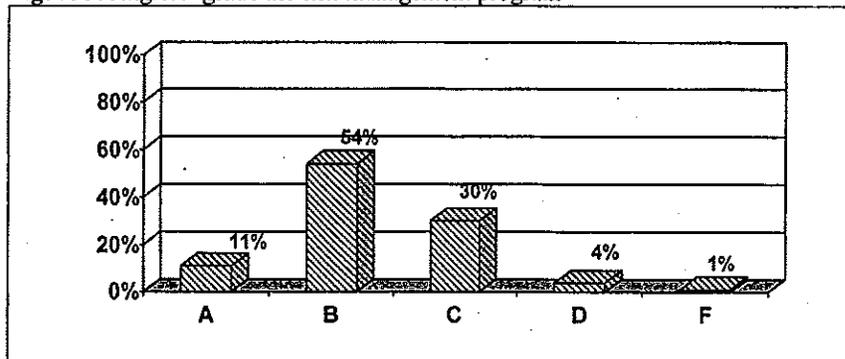


Figure 9 is evidence that more anglers are satisfied than dissatisfied with the job the DNR is doing managing the state's fishery resource. Two-thirds (65%) of the anglers give the DNR a grade of an A or a B. Three anglers in ten (30%) gave the DNR a grade of a C, indicating they thought the DNR was doing an acceptable job. Only one angler in 20 (5%) thought the DNR was doing a poor (4%) or failing job (1%).

NOTE: Grades for how well the DNR is doing managing the state's fishery resources did not differ by angler type. In other words, tournament anglers were just as likely as general anglers to offer high or low grades.

During the focus groups tournament participants were asked to offer an overall assessment of Wisconsin's fishery resource. Put another way, if they were describing fishing in Wisconsin to a new visitor to the state, what would they say? Without exception, they praised the state's fishery resource as "awesome" and "fantastic."

The fishery is fantastic. It really is great and it keeps getting better. What do you want to fish for? You can probably do it in Wisconsin and it will be good.

The walleye fishing is flourishing. The perch are coming back. The muskie are flourishing. The northern are flourishing. The salmon are doing quite well. It's all unreal.

It's awesome. The bass fishing is just phenomenal. If you can go out in a day... on the Wisconsin River the other day I caught 15 pounds worth of smallmouth in just a couple hours. To have that much fun, catch that many fish, it was such a great day and that wasn't unusual.

Asked specifically about bass fishing in Wisconsin and the participants had nothing but high praise for the "unreal" opportunities in their own "backyard."

I'm a fishing tackle rep. I cover the state selling fishing tackle so I'm in a lot of big tackle shops. I see what's going on. We have a world class fishery right in our backyard. Not just this, but Chequamegon Bay, a lot of inland lakes in north central Wisconsin. It's phenomenal. And the word is just getting out now because even when I started in this 20 years ago in north central Wisconsin, it was all walleyes, muskie. Smallmouth bass was just, nobody cared about or they didn't whatever, but they're actually fishing for them now and they're finding some really big fish...As an example, that's world class fishery, this whole state.

I think bass fishing in Wisconsin generally has really picked up, it's unreal. I mean this body of water here is just phenomenal. If you went here 20 years ago you'd catch smallmouth bass but you wouldn't catch bass like you're catching now. I mean, there's people and all these guys are fishing next to each other, and they're cranking these fish in, and they keep coming in and there's lots of fish out here.

The weights in the tournaments have gone up and that's a sign that the fishery has improved.

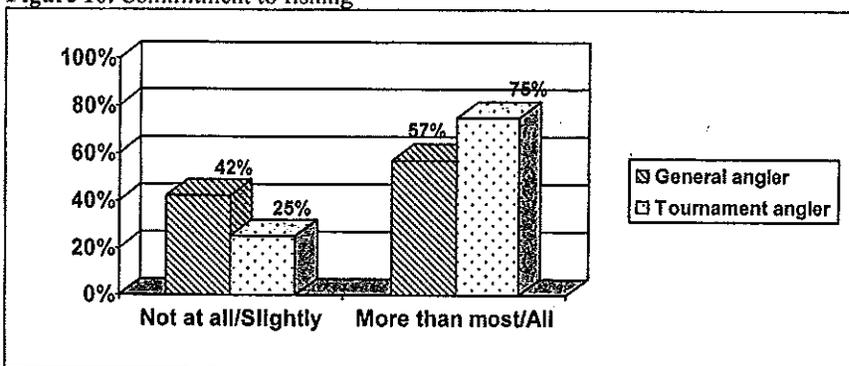
Commitment to Fishing

This section looks at anglers' commitment to fishing. Commitment was measured via a direct question asking how important fishing is to their lives as well as through questions of fishing frequency over time.

Importance of Fishing to Their Lives

The questionnaire asked respondents how much they would miss fishing if they could no longer participate. Response options included "not miss it at all," "miss it slightly," "miss it more than most of your other activities," and "miss it more than all of your other activities." Results show that anglers are committed to fishing. Overall, 61 percent said if they could no longer go fishing, they would miss it more than most or all of their other activities. Results also indicate that, as one might expect, anglers who participate in tournament fishing show a statistically higher degree of commitment than do general anglers. Three-fourths (75%) of the tournament anglers, compared to 57 percent of the general anglers, said they would miss fishing more than most or all of their other activities if they could no longer participate (chi square=10.28, 1 df, $p < 0.001$) (Figure 10).

Figure 10. Commitment to fishing



Just how committed to bass tournaments are the participants? When asked, "What, if anything, would prevent you from participating in bass tournaments?" the response theme was nothing, other than death, would prevent them from competing.

Nothing. Well, I suppose I'd have to pass away.

I'd have to be dead to stop.

Nothing. As far as I'm concerned we're going to have tournaments whether you like it or not. We're going to have them anyways. We're just not gonna let you know we're having them. We may have a group of 20 guys that get together and go to a lake and decide that we're gonna have a big fish fry afterwards just to spite you.

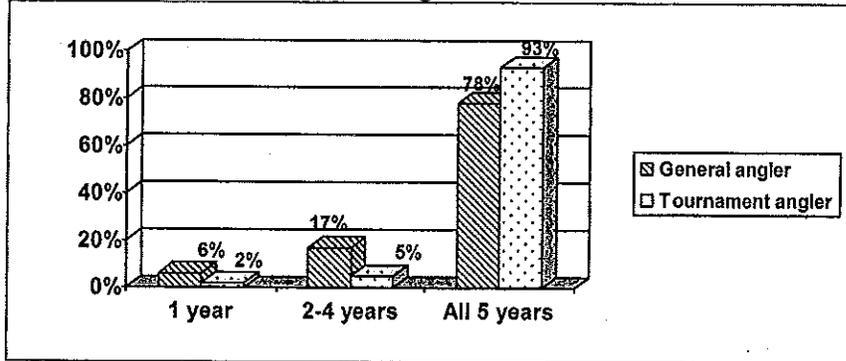
We're pretty damn committed to our tournaments. We'll get a group together, throw some money in the pot, or not, and have our own.

Participation Over the Last Five Years

A second measure of commitment to fishing is an angler's consistency in fishing from year to year. The questionnaire asked in which years, from 2001 to 2005, did the respondent do any fishing in Wisconsin. Results show that overall, more than three-fourths of anglers (79%) did

some fishing in Wisconsin in each of the preceding five years. And as seen in the previous finding, tournament anglers show a higher degree of commitment to fishing by fishing all five years than do general anglers. Figure 11 illustrates that more than nine in ten (93%) tournament anglers, compared to just over three-fourths (78%) of general anglers, fished in Wisconsin each year from 2001 through 2005 (chi square=12.37, 4 df, $p < 0.01$).

Figure 11. Years fished from 2001 through 2005

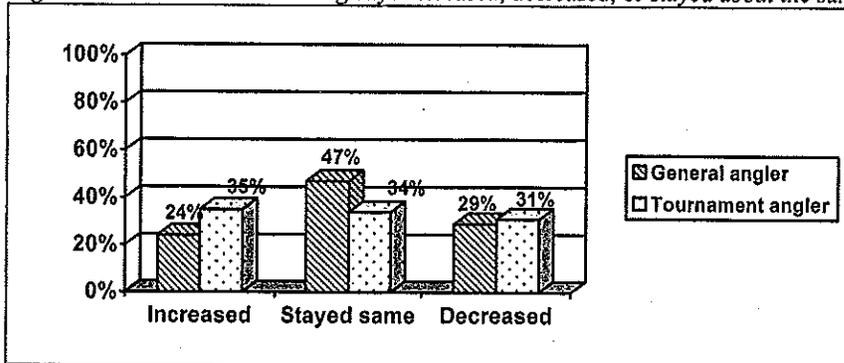


Change in Fishing Frequency Over Time

Another question asked if the number of days fished in a year has been increasing, decreasing, or staying about the same. Overall, the largest proportion of anglers, 45 percent, felt the number of days they fish in a year has been staying about the same. Nearly equal proportions of anglers reported that the number of days fished per year has been increasing (26%) and decreasing (29%).

Consistent with the previous findings, tournament anglers are more likely than general anglers to report an increase in the number of days fished in a year (Figure 12). Just over one-third (35%) of tournament anglers, compared to one-fourth (24%) of general anglers reported that the number of days they fish in a year has been increasing (chi square=6.79, 2 df, $p < 0.03$). Nearly equal proportions of tournament and general anglers said their fishing frequency has been declining.

Figure 12. Has number of fishing days increased, decreased, or stayed about the same?



Primary Reason for Declining Fishing Days

Respondents who reported they were spending less days fishing were asked to select from a list of nine possible reasons the one primary reason for the decline. Table 17 indicates that nearly one-half (47%) of all anglers said they did not have enough time. A relatively small proportion reported that their decline in fishing was because fishing was not as good (14%) or because they had other interests they enjoyed more (11%). Very few anglers attributed their decline in fishing to the regulations being too restrictive (2%), inability to obtain access to water (2%), poor water quality (2%), crowded water conditions (2%), or having no one to go fishing with (1%). Approximately one angler in five (19%) had another reason for his or her decline in fishing, including moving to a new location, not having a boat, costs, poor weather, and poor ice conditions to name a few.

Table 17. Primary reasons for declining days spent fishing

Primary reason	Percent reporting
Not enough time	47%
Fishing is not as good	14
Other more enjoyable interests	11
Regulations too restrictive	2
Access to water has declined	2
Water quality has declined	2
Water is too crowded	2
No one to go with	1
Another reason?	19

NOTE: A statistical difference was not found between tournament and general anglers for a decline in fishing frequency.

Affiliation with Fishing Clubs

Although tournament anglers are statistically more likely than general anglers to belong to a fishing club (chi square=9.6, 4 df, $p < 0.05$), overall, nine out of ten anglers (91%) do not belong to any club. Specifically, 95 percent of the general anglers and 89 percent of the tournament anglers said they are not affiliated with a fishing club. Five percent of the general anglers and 11 percent of the tournament anglers belong to one or more fishing club. A statistical difference in membership of the various club types was not found.

Respondent Background

This section is intended to help understand who responded to the survey. It summarizes eight socio-demographic characteristics of the respondents.

Wisconsin anglers are primarily married men near 50 years old, they live in rural areas, have household incomes under \$75,000, and have less than a 2-year college or trade school degree (Table 18).

Table 18 shows that the vast majority of anglers are male (81%) and are married (77%). The average age of the angler is 48 and about three in ten (29%) are at least 60 years old. The majority has some college experience (69%) but a minority has completed a bachelor's degree or higher (25%). Income is well distributed with 36 percent residing in households with annual incomes of at least \$75,000 and 40 percent residing in households with annual incomes of less than \$50,000. Approximately one-half (49%) reside in a self-described rural area of Wisconsin. A minority of 30 percent have children aged five to 17 residing in their home. Of those with children, three-fourths (76%) say that all of their children have gone fishing in the 12 months prior to the survey.

Table 18. Socio-demographic characteristics of responding anglers

Attribute	Total
Gender (see NOTE 1)	
Male	81%
Female	19
Age (see NOTE 1)	
Under 30	11%
30 - 39	14
40 - 49	22
50 - 59	24
60 +	29
Mean age	48 yrs
Education (highest level)	
Less than h.s. diploma	6%
High school diploma or GED	26
Some college/trade school	30
2-yr assoc. or trade degree	14
4-yr college degree	16
Post-graduate studies/degree	9
Income (see NOTE 2)	
Less than \$25,000	13%
\$25,000 - \$49,999	27
\$50,000 - \$74,999	24
\$75,000 - \$99,999	20
\$100,000 +	16
Residency	
Urban	21%
Suburban	29
Rural	49
Marital status	
Married/living with partner	77%
Single/divorced/widowed	23
Children aged 5 - 17	
0	70%
1	14
2 +	16
Children that fish	
None	13%
Some	11
All	76

NOTE 1: Two statistically significant characteristics distinguish tournament anglers from general anglers – gender and age. Males comprise a higher percentage of tournament anglers (92%) than general anglers (78%). Tournament anglers are slightly younger than general anglers. The mean age of the tournament angler is 43 and 30 percent are at least 50 years old. The mean age of the general angler is 48 and 50 percent are at least 50 years old. Statistical differences between tournament and general anglers were not found for any other socio-demographic characteristics.

NOTE 2: Tournament fishing can be a costly endeavor. A boat and vehicle to pull the boat can easily exceed \$60,000. In addition, the tournament angler must cover equipment, travel and often lodging expenses as well as tournament entrance fees. Despite the high costs often associated with tournament fishing, tournament anglers are not wealthy individuals. Only 20 percent of tournament anglers live in households with annual incomes of \$100,000 or more and this includes the 19 respondents that fish open water bass tournaments.

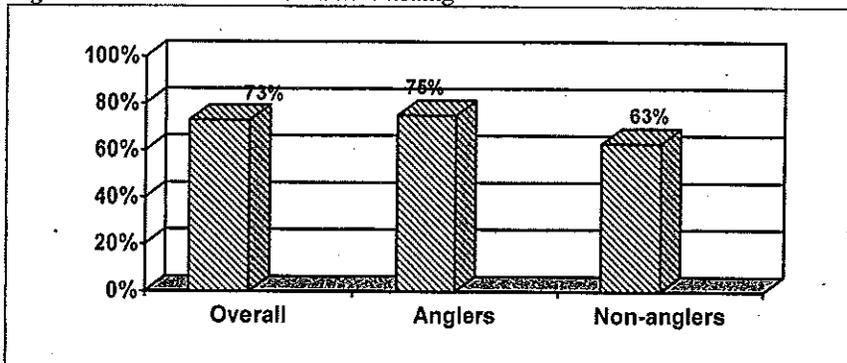
Statewide Boater Survey

Awareness of and Participation in Tournament Fishing

This section addresses the objective of assessing awareness by water users of tournament fishing as well as their participation in tournament fishing.

As in the statewide angler survey, respondents were asked if prior to receiving the questionnaire they were aware that permitted fishing tournaments occur in Wisconsin. Results found in Figure 13 show that a majority of 73 percent of all water recreation users were aware of permitted fishing tournaments in Wisconsin. Angler awareness of permitted tournaments was significantly greater (75%) than non-angler awareness (63%) (chi square=6.77, 1 df, $p < 0.008$).

Figure 13. Awareness of tournament fishing



The two questionnaires asked for the respondents' awareness of "permitted" tournaments. Riparians, however, addressed their tournament awareness in general terms – they were aware of tournaments on their water but did not speak to permitted or non-permitted tournaments.

I don't think there's public notice. But if you go to the Amoco you'll see a posting that they're looking for participants or you can keep track when you drive by Babcock Park. You can always tell if a tournament is going on by the people who are camping in the park and the vehicles and boats that are there. The campground fills up with tournament fishermen.

...I can hear those guys take off because they all go at once. My wife says, 'What in the world was that?' and I tell her, 'It must be a fishing tournament.'

During the summer months we see a tournament probably every week, mostly from the local clubs...maybe 15 to 20 boats. They got the big engines and everything else, and they'll launch from over here and buzz all the way across the lake to where the springs are and the weed beds and then they'll start working back as it gets closer to the end they'll start working the shoreline and the piers so they're in and out.

When you see the big boats take off at two or three at a time then you know a tournament is going.

It's really easy to tell because the parking lot is full by 6 a.m. and filled with pick-up trucks and trailers with glitter and stickers... You see a whole bunch of them, maybe 15 really nice looking boats, like no other boats on the water...

Riparians suggested that advance notice of a tournament would be appreciated. Contacting the lake association was suggested as a preferable method.

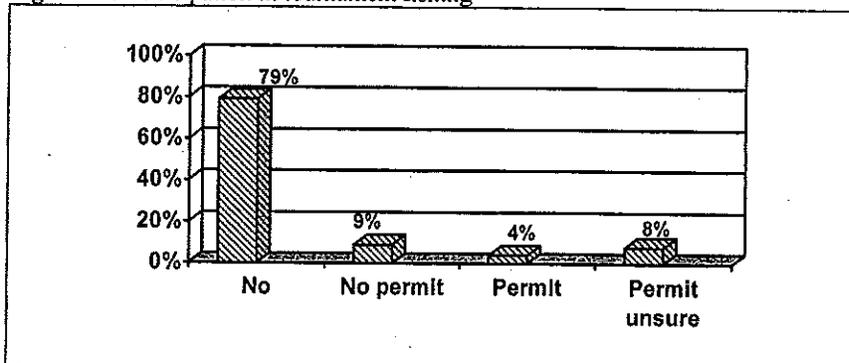
Being outside of the tournament loop we don't know when the tournaments are going to happen. We do have a web page with a calendar, and I think it would be beneficial if the permitted tournaments that were scheduled, we got notification so we could put it on the calendar. So everyone will know what's going on, when the tournaments are scheduled. So they are pre-warned and understand what's going on. And if there are problems with the tournament, they see unsafe practices or they're discourteous, they'll be more likely to report it because they'll know who it is.

A little heads up would be good because if you were planning on going fishing the day of the tournament you might decide to go to another lake where it might be quieter.

If you contact us, like maybe an e-mail or letter to our association, telling us that you were holding a tournament and include the days and times and maybe what the tournament was for, like for walleye or musky, then we would know in advance. We could plan for it.

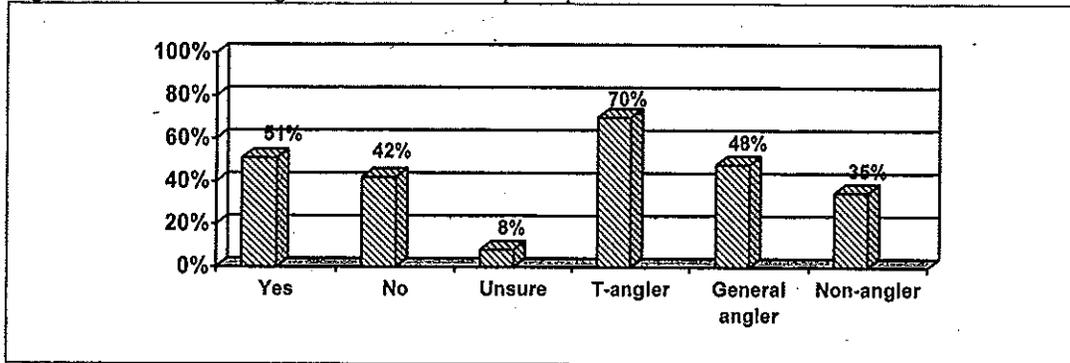
Respondents were subsequently asked if they ever participated in any kind of a fishing tournament. Figure 14 illustrates that about one user in five (21%) has participated in a permitted and/or non-permitted fishing tournament. Among anglers, approximately one-fourth (24%) have participated in some kind of fishing tournament. This participation rate is slightly higher than that reported from the angler survey (17%) probably due to differences in question wording; the angler survey asked specifically about permitted tournaments while the water recreation survey asked about any tournament.

Figure 14. Participation in tournament fishing



Although about one-fourth of all users reported that they've participated in a fishing tournament, a slight majority of 51 percent said they have been on the water while a permitted tournament was in progress as a non-participant (Figure 15). Similar to results from the angler survey, results show that being on the water during a permitted tournament as a non-participant was significantly more common for tournament anglers (70%) than for general anglers (48%) and non-anglers (35%) (chi square=26.17, 4 df, $p < 0.000$).

Figure 15. On water during tournament as a non-participant



Respondents who said they had been on the water as a non-participant during a permitted fishing tournament were asked how they knew the tournament required a permit. Table 19 reports that the greatest proportion of respondents learned the tournament was permitted because they heard about it through the media.

Table 19. How respondents were informed of a permitted tournament

Information source	Percent reporting
Heard through the media	47%
A lot more boats on the water	40
Non-participant told me	27
A participant told me	20
Went to the weigh-in	8
Found out another way	9

Almost one-half of respondents (47%) who said they had been on the water as a non-participant during a permitted fishing tournament knew the tournament was permitted by hearing about it through the media. Two respondents in five (40%) knew (or more appropriately, assumed) the tournament was permitted based on the increased number of boats on the water. A little more than one-fourth of the respondents (27%) reported that someone other than a participant told them while one-fifth of the respondents (20%) were informed by a tournament participant. A small percentage (8%) of on-water non-participants were informed by going to the weigh-in and a nearly equal proportion (9%) were informed some other way. (Responses included sponsorship signage, size and style of boats, and early morning preparations followed by noise.)

NOTE: No differences in information sources were found between anglers and non-anglers. A statistical difference between angler type was found for two items. Learning of a permitted tournament by going to the weigh-in was of greater significance for tournament

anglers (18%) than for general anglers (4%) (chi square=10.82, 1 df, $p<0.001$). More general anglers (44%) than tournament anglers reported learning of a permitted tournament by observing an increase in the number of boats on the water (chi square=3.91, 1 df, $p<0.05$).

The on-water non-participants were additionally asked if they thought the tournament affected their time on the water in any way. Responses were measured on a 4-point scale where 1 represented a "negative affect," 2 represented "no affect," 3 represented a "positive affect," and 4 represented "unsure." The seven "unsure" responses were omitted allowing for "cleaner" analyses. The overall mean score was 1.80, closest to "no affect" but indicating a leaning toward a negative rather than a positive affect.

Figure 16. Impact of tournament on time on the water

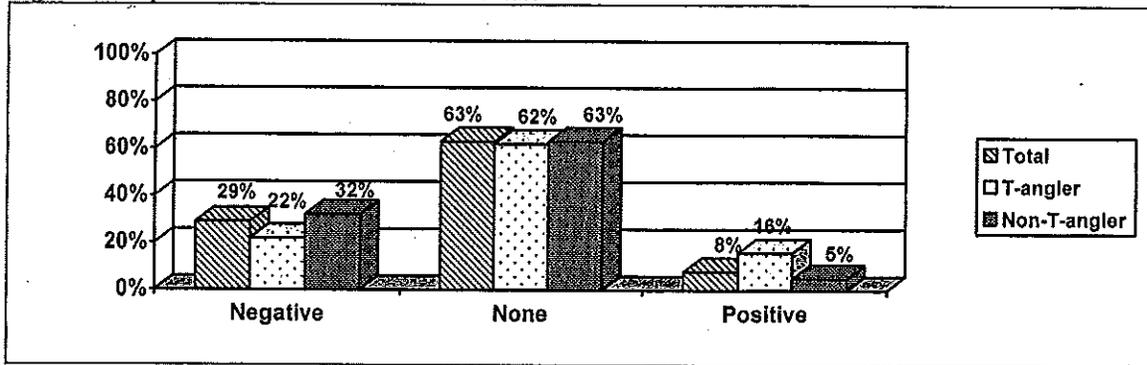


Figure 16 above illustrates that for a majority of all water users (63%), being on the water during a tournament did not interfere with their recreational pursuits. However, a greater proportion of water users said the tournament had a negative affect (29%) rather than a positive affect (8%) during their time on the water.

Significant differences were found between anglers who have participated in fishing tournaments and anglers that have not. More tournament anglers (16%) than general anglers (5%) reported that the tournament had a positive affect on their time on the water. Conversely, more general anglers (32%) than tournament anglers (22%) reported that the tournament had a detrimental affect on their time on the water.

NOTE 1: Statistical differences were not found between anglers and non-anglers.

NOTE 2: Response cells were too small to allow analyses by recreation type.

Observations of Tournament Fishing

The questionnaire included 13 statements about permitted fishing tournaments. Respondents that indicated they had been on the water during a permitted fishing tournament as a non-participant were asked to indicate whether they thought each statement was true or false. Responses were measured using a 5-point scale where 1 represents "definitely false," 3 represents "neutral," and 5 represents "definitely true." Overall, means were near the "neutral" response, but ranged from

2.08 indicating disagreement with the statement to 3.67, indicating neutrality but leaning towards agreement.

Table 20. Observations of numerous aspects of fishing tournaments

Experience	Percent true	Percent neutral	Percent false	Mean
Tournament conduct				
Tournament boat trailers and vehicles overcrowded the parking lots	56%	27%	17%	3.67
Tournament boats congested the boat ramps	54	26	21	3.57
Tournament boats kept a safe distance from my boat	45	25	30	3.23
Tournament boats created large wakes	41	30	28	3.17
Tournament boats overcrowded the water	34	36	30	3.07
Tournament boats operated at safe speeds	36	24	40	2.88
Tournament boats are ruder than other user groups on the water	26	36	38	2.76
The tournament caused me to leave the water	20	25	55	2.34
Tournament goodwill				
Because of the tournament I knew the water must have some large fish	23	54	23	2.98
I saw large fish caught by participants	27	34	39	2.79
Watching tournament boats on the water helped tell me where to fish	24	43	33	2.76
I saw techniques being used by tournament participants to catch fish	22	31	47	2.52
I received advice from a tournament participant on how to better fish the water	13	26	61	2.08

Looking at tournament conduct, a majority of respondents identified three statements as being either true or false (Table 20). Slightly more than one-half reported that tournament boats and trailers caused overcrowding in the parking lots (56%) and that tournament boats congested the boat ramps (54%). (Interestingly, although a majority felt crowded in the parking lots and at the boat ramps, about one-third of the respondents (34%) said they felt crowded on the water because of the tournament.) Also, just over one-half (55%) reported that the tournament did not cause them to leave the water. One respondent in five (20%), however, was displaced from the water because of the tournament, that is, the tournament caused them to leave the water.

A relatively high proportion of respondents agreed (45%) that tournament boats kept a safe distance from their boat but a significant minority disagreed (30%) – they thought tournament boats operated too close to their boat. Creating large wakes and operating at safe speeds were also somewhat problematic. More respondents agreed that tournament boats created large wakes (41%) than disagreed (28%) and slightly more respondents disagreed that tournament boats operated at safe speeds (40%) than agreed with the statement (36%). Lastly, although one-fourth (26%) of the respondents agreed that tournament boats are more rude than other users of the

water a modal response of 38 percent disagreed. A comprehensive view of the results indicates that tournaments are not without their problems. Although many of the statements were non-issues for a majority of the respondents, the minority that did report a problem is not negligible.

Looking at tournament goodwill indicates that tournaments did little for drawing attention to the waterbody or for educating other anglers. Only 13 percent reported that they received advice from a tournament participant on how to better fish the water. Further, about one-fourth of the respondents reported they: saw large fish caught by tournament participants (27%); watched tournament boats to identify where on the water they should fish (24%); presumed the water must hold large fish because of the tournament (23%); and observed techniques being used to catch fish by participants (22%).

Not surprisingly, of all water users, tournament anglers probably benefited the most and were most positive about being on the water as a non-participant during a permitted tournament. Specifically, results show that tournament anglers and general anglers differ on several of their observations. Tournament anglers were more likely than general anglers to report that by being on the water during a tournament as a non-participant they:

identified where on the water they should fish (30% compared to 21%, respectively, chi square=11.11, 4 df, $p<0.025$);

received advice from participants on how to better fish the water (25% compared to 8%, respectively, chi square=16.86, 4 df, $p<0.002$);

observed techniques being used by participants to catch fish (41% compared to 14%, respectively, chi square=26.39, 4 df, $p<0.000$);

saw large fish being caught by participants (43% compared to 21%, respectively, chi square=15.32, 4 df, $p<0.004$);

observed participants keeping a safe distance from their own boats (52% compared to 40%, respectively, chi square=9.85 4 df, $p<0.043$);

and they observed participants operating at safe speeds (48% compared to 31%, respectively, chi square=10.08 4 df, $p<0.039$).

NOTE 1: A statistical difference was found between anglers and non-anglers for one of the 13 statements. Anglers (29%) were more likely than non-anglers (9%) to observe large fish being caught by tournament participants.

NOTE 2: Response cells were too small to allow analyses by recreation type.

The interviews with riparians asked about any problems they may have experienced from fishing tournaments. Responses were mixed. For some riparians, even after many years of living on a lake, tournaments have never been a problem. Other riparians, however, have found tournaments

to be problematic because of engine noise and inconsiderate behavior toward other water users at the tournament's start.

Tournaments are not a problem for some riparians.

Living on the lake, my husband and I have not noticed any real problems from tournaments now. No, absolutely none.

No, these guys that fish here are pretty good. They go in and out with their electric motors and they're pretty good.

If you pay attention you know they're out there and other than when they start it's no big deal. Up here, we got some big fish and so we get some big fishing and they have a right to the lake just like anyone else.

I retired here 16 years ago and I like to fish – one of the reasons why I bought here. So I ought to know if they're causing problems and I can't say that they are. I'd like to know where they're finding all those fish!

Loud engine noise at the start of the tournament bothers other waterfront property owners.

There have been shotgun starts at six in the morning that I can hear from my house nowhere near the starting point and I can hear those guys take off because they all go at once.

The start of the tournament is probably their most offensive aspect because they start revving their engines at 5:15. There are other aspects but you have to understand and accept that there are going to be anglers and other people doing things and you can't totally close the lake down for lakefront owners only.

As someone who used to live five houses up from Babcock Park if you had your window open on Saturday morning you hear them putting in or you have someone out at the buoy signaling when it's time to start, well, when they go, they go.

And the other thing that would come out of it, to have the big power boats getting ready at 5:30 in the morning, rather than one ski boat, that could be a bit much.

The tournaments that we have now, you can hear them with their engines and you can see them zipping across the water.

Riparians also cited inconsiderate behavior by tournament participants toward other water users, particularly at the tournament's start.

During the tournament when we were skiers you could guarantee that you'd lose you're skiing lane because they had to get from the start at point A to point B so just a little more courtesy towards others that are early morning users would be nice.

There's no consideration of who's where on the water and what other water users are doing.

Plus, if you're sitting out on your pier, there were times when they were rude when they were fishing because they're in and out and around your piers. As a group they were not as courteous as you'd think they would be. I never felt these small tournaments were very well run.

One riparian who launches his boat from a location other than his home has found parking lots congested with tournament boats and trailers.

An off the water issue for me is parking and launching my boat. To go to Babcock Park on a Saturday and find every stall filled is really annoying and then I have to go around the lake to find another cite where I can launch and park.

To place potential problems from tournament boats in perspective with other water recreations respondents were asked how much of a problem, if at all, 11 different watercrafts have been for them on Wisconsin waters in 2006. Responses were measured using a 4-point scale where 1 represents "no problem," 2 represents "slight," 3 represents "moderate," and 4 represents a "serious" problem. Mean scores ranged from 1.0 to 2.1, indicating that no water recreation was considered by the respondents to be a "serious" or even a "moderate" problem.

Table 21 indicates that overall, tournament fishing boats were no more of a problem for water users than were other fishing boats. Just under one respondent in ten (8%) reported that tournament boats as well as other fishing boats were a "moderate" or "serious" problem. Less than 10 percent (9%) said these boats were the biggest problem on Wisconsin waters. It's important to note that tournament boats were not at all a problem for about eight respondents in ten (79%), results nearly equal to those for pontoons and houseboats (83% no problem, mean score 1.2).

Table 21. Problems encountered with watercrafts

Potential problem	Percent no problem	Percent slight problem	Percent moderate or serious problem	Percent biggest problem	Mean score
Personal watercrafts	41%	20%	40%	45%	2.1
Waterskiers or ski boats	51	28	21	20	1.8
Motor/Speed boats	52	27	21	11	1.7
Tournament fishing boats	79	13	8	9	1.3
Other fishing boats	70	22	8	9	1.4
Cabin cruisers	90	5	5	3	1.2
Pontoons or houseboats	83	14	3	2	1.2
Sailboats	93	5	2	1	1.1
Rowboats, canoes, kayaks	96	3	1	1	1.1
Windsurfers	96	3	1	1	1.1
Inflatable boats or rafts	98	2	0	0	1.0

Respondents identified three watercrafts as being significantly more problematic than tournament fishing boats. Personal watercrafts were reported as a problem by 60 percent of the respondents; 40 percent reported them as being “moderate” to “serious” problems and 45 percent said they were the biggest problem. Waterskiers and ski boats were reported as being a “slight” to “serious” problem for about one-half (49%) of the respondents; they were most problematic for one-fifth (20%) of the respondents. Speedboats were also reported as being a “slight” to “serious” problem for about one-half (48%) of the respondents (Table 21).

NOTE 1: Statistical differences were not found between anglers and non-anglers nor tournament anglers and general anglers.

NOTE 2: Response cells were too small to allow analyses by recreation type.

Tournament participants from the focus groups support survey results – jet skis can be problematic for other water users. Conflicts with riparians, however, were most troubling to the tournament participants.

The only water user that we've had a conflict with is the jet skis. We fish the shoreline a lot and they will try to go between us and the shore sometimes.

The people who don't like you will run their boats between you and the shore...more often than not jet skis. Some do it on purpose.

They [personal watercrafts] are the worst, really the only ones I've had a problem with. I don't know if they think because they're small they can go wherever they want but they really create a wake and they just don't seem to care.

Tournament participants were most vocal about their interactions with waterfront property owners.

Property owners think they own the lake. You'll be fishing a lake, near one of their docks and they'll come right out and say, 'What the hell are you doing near my dock? Don't fish here.' And that's real nice.

I had a property owner come out with a shotgun on Shawano Lake. He just threatened to shoot if I didn't move.

I've gone to lakes where boat trailers have been chained to guard railings and landings to keep people from going there, which is all property owners. I've run into that at least a half dozen times.

I think all we're doing at this point is fighting landowners who don't like what we're doing. There's some rich landowners on the lakes that don't like us on their lakes. Well, it's not their lake alone. It's everybody's, belongs to all of us. Don't tell me you own the lake just because you had enough money to purchase a beautiful piece of land on the lake...But there are guys that will scream at you, 'This is my territory!' Most times I wouldn't go near if he was fishing. I go right around him. But some come running from their house ready to throw a fit.

There's a big difference between lakes with landowners and lakes with fisherman that are landowners. The guy that buys his vacation home and thinks that's all his water, he's definitely going to come out and raise a fit. But you go out on other waters and they come out and talk to you, some cheer when they see you catch a fish near their dock or in front of their house.

How many of the property owners that scream about us catching their bass go out themselves and catch 25 bluegills, go home, throw them in their freezer and then go back out to get 25 more, all while they're spawning? There needs to be some equality with the rules we all are supposed to follow.

These participants, as well as their group as a whole, have the impression that a riparian's pier is public property because it extends over a public resource.

I think we as fishermen understand what our rights are, what our limits are, a lot better than what a landowner understands what his rights are. Apparently they don't understand the limitations of their property and what is actually public use land. And I think they need a better grasp of their rights before they start taking shots at us, saying

that we're the ones in the wrong...If they knew what the laws were they'd see that they don't have any beef with us. They may have complaints but not legal ones.

If a landowner is out there and says, 'Don't go on my dock,' well, it's not his dock. He may have put it in but it's in public water. I mean if you wanted to you could go up and fish off it. But it's just common courtesy to take it easy and just stay away.

If it's on public water it's a public right. So if that's where I need to go, to get onto, I have the right to do that.

These participants noted that interference from other water users or from riparians is probably not motivated by a dislike of tournaments.

They don't do it because I'm in a tournament. That don't matter. It's just some jerk, but not because I'm in a tournament.

To be honest I've probably had more conflicts when I've fished not in a tournament than when I was tournament fishing, so I don't think it matters.

Other participants made it clear that they've never had problems with other water users or with riparians.

Most fishermen are talkers. It's common courtesy when you're coming in or going out to ask about how you did and stuff. So no, I never really ran into any bad problems.

No, never. To be completely honest, everybody who fishes a tournament is in and out like that [finger snap]. If anybody takes time it's their loss.

I've had people come down their dock and ask how I'm doing. I like that. Some people, they like to see what you're catching because they had no idea what was in the lake.

Another participant made it clear that his group considers other user needs when scheduling tournaments.

We [Bass Federation] try not to have two or three clubs at the same boat launch at the same time so we don't tie it up for the public. And if we do have two or three clubs scheduled for that water, then we try to switch them.

Riparians that were interviewed were provided a list of water recreations, including tournament fishing, and asked which, if any, they've had problems with and which one is most problematic. Their experiences confirm what the survey results and tournament participant interviews disclosed – the primary problem is from personal watercrafts and speed boats. It's worth noting, however, that while tournament participants cited confrontations with waterfront property

owners, the reverse was not found – riparians that were interviewed did not speak of any personal confrontations with tournament anglers.

Jet skis – going back and forth and back and forth. Not paying any attention to the no-wake zones. They're the biggest problem for me.

And jet skis can be a problem with harassing wildlife. There's wildlife on the water and not all jet skiers but some find the water birds to be a wonderful target to go after.

The big speed boats, like the cigarette boats, they don't even belong on lakes of this size.

There's been a battle between fishermen and other users, skiers and jet skis. There seems to be an increase of fishermen calling the sheriff using a cell phone because other users getting too close to where they're fishing.

Speaking from an angler's perspective because that's mostly what I do on the water, when you see a speed boat going across the water, they want to go from point A to point B, and they don't care if there are two or three anchored boats in a certain area. They're not going to make a big swing around to avoid the anchored boats and so they go right through or just too close and create a big wake. I often wonder if the operators of these big boats do not fish. It doesn't even enter their minds.

The biggest problem that we have is the visitors. They're coming down to see somebody on the lake, they're bringing their water toys, and launching them. When a visitor comes in they will not go further than line of sight from their home base – the people they're visiting – so the jet skiers go bzzzz back and forth for a couple of hours. They never venture out further in to the lake. So they go back and forth and do all their little tricks and to a degree it can get a little annoying. But that's not every weekend, not every day, so we have this infrequent kind of annoyance coming in.

Etiquette is pretty good among the people that live on the lake. It's more if you have visitors and all of a sudden they're hot-rodding around the lake in ski boats and personal watercrafts.

Participation in Water Recreations

This section reports on the participation in numerous water recreations on Wisconsin waters. Specifically, it reports on the participation in fishing, occurrences of interferences while on the water, and time and location restrictions for various water recreations.

Participation in Water Recreations

The questionnaire included a list of 16 recreations occurring on Wisconsin waters. Respondents were asked to indicate which, if any, they participated in during 2006. The mean number of

activities participated in by respondents was 3.0; more than one-half (55%) participated in three or more activities.

Table 22. Participation in various water activities

Recreation	Percent participated	Percent most often
Fishing from boat	80%	60%
Fishing from shore/pier	53	4
Pleasure cruising	52	19
Canoeing	25	3
Towing or riding behind boat on towed toys	23	3
Waterskiing or towing water skiers	20	3
Swimming or scuba diving from boat	20	1
Riding personal watercraft	11	2
Kayaking	10	1
Hunting/trapping on water	10	1
Sailing	6	1
On-board overnight mooring	3	<1
Racing	2	<1
Rafting	1	<1
Windsurfing	<1	<1
Something else?	2	<1
Did not participate in any water activities in 2006	5	

Fishing was clearly the preferred water recreation both in terms of overall participation and frequency (Table 22). Four out of five respondents (80%) said they fished from a boat in 2006; more than one-half (53%) said they fished from the shore or a pier. (When the two are combined, 83% participated in fishing, indicating that respondents are more likely to have done both types of fishing rather than only one type.) As one might expect, of all the listed water recreations respondents said they most frequently participated in fishing (64% total; 60% from a boat and 4% from shore or pier).

Pleasure cruising was the next most common water recreation. Just over one-half (52%) of the respondents said they went pleasure cruising on Wisconsin waters in 2006 and for one-fifth of the respondents (19%), they did this more than any other water recreation. One-fifth to one-fourth of the respondents reported that in 2006 they went canoeing (25%), towed or rode on a towed toy behind a boat (23%), waterskied or towed water skiers (20%), and went swimming or scuba diving from a boat (20%). All other water recreations were participated in by not more than approximately one respondent in ten (not more than 11%), including riding personal watercrafts such as Jet Skis (11%).

NOTE: The five percent responding that they did not participate in any water recreation during 2006 were omitted from inappropriate questions in this section.

Restricting Water Recreations by Time and/or Location

The questionnaire included definitions of restricted use by time and by location. Respondents were then asked to indicate which, if any, of six water recreations should be restricted. Given that nearly one-half or more of the respondents reported problems with water skiers, speed boats and personal watercrafts, it's not surprising to find that a majority of all respondents believe these three water recreations should be considered for restricted use (Table 23).

Table 23. Water recreations restricted by time and/or location

Water activity	Percent no restriction	Percent restrict by time	Percent restrict by location	Percent restrict by time and location
Other fishing	95%	2%	2%	1%
Motor boating or pleasure cruising	79	7	9	5
Tournament fishing	52	12	20	16
Water skiing	28	27	15	30
Speed boating	28	22	20	30
Personal watercraft	24	25	16	35

Approximately three-fourths (76%) of the respondents said the use of personal watercrafts should be restricted by time of day and/or location on the water. A nearly equal proportion of respondents (72%) felt that speed boating and water skiing should also be restricted.

Of particular importance is that a minority of respondents reported that tournament fishing should be restricted by time and/or location (although 48% is a significant minority). A greater proportion of respondents suggested fishing tournaments be restricted by location (36%) than by time (28%).

A relatively small proportion of respondents said that motorboating or pleasure cruising should be restricted (21%) and the smallest proportion of respondents (5%) thought fishing (non-tournament) should be restricted.

NOTE 1: Statistical differences were not found between anglers and non-anglers, or between recreation types, or between riparian ownership (respondents who own waterfront property and those who do not).

NOTE 2: More tournament anglers (82%) than general anglers (70%) supported restricted use for waterskiing (chi square=8.48 3 df, $p < 0.037$).

Respondent Background

This section is intended to help understand who responded to the survey. It summarizes respondent gender, age and watercraft ownership.

Table 24. Respondent gender and age

Attribute	Percent of total
Gender	
Male	89%
Female	11
Age	
Under 30	5%
30 - 39	12
40 - 49	23
50 - 59	29
60 +	31
Mean age	52 years

Table 24 above shows that the vast majority of the respondents are male (89%). The average age of the respondent is 52 and about three in ten (31%) are at least 60 years old. Non-tournament fishing boats were owned by more respondents (45%) than any other type of watercraft (Table 25 below). Further, more respondents (32%) selected non-tournament fishing boats as their primary boat, that is, the boat they most often used. Bass boats or other boats used specifically for tournament fishing were owned by approximately one respondent in seven (14%) and ten percent of the respondents said their tournament boat was the boat they most often used. It's worth noting that personal watercrafts were owned by only seven percent of the respondents and only one percent listed it as their primary watercraft. Yet, in the opinion of the respondents, personal watercrafts were the leading source of user problems on Wisconsin waters (see Table 21).

Table 25. Watercraft owned

Watercraft	Percent of total	Percent primary boat
Other fishing boat	45%	32%
Canoe	28	3
Open motor boat 16' and over not specific for fishing	25	17
Pontoon	22	17
Rowboat	20	3
Open motor boat under 16' not specific for fishing	17	9
Bass boat / tournament boat	14	10
Kayak	9	1
Personal watercraft	7	1
Inflatable boat / raft	7	1
Sailboat	6	1
Sailboard	3	< 1
Cabin cruiser	2	2
Houseboat	0	0

NOTE: As found in the statewide angler survey, males comprise a higher percentage of tournament anglers (98%) than general anglers (87%) and tournament anglers are slightly younger than general anglers. The mean age of the tournament angler is 47 and 44 percent are at least 50 years old. The mean age of the general angler is 54 and 63 percent are at least 50 years old. (Differences for gender and age are statistically significant at $p < 0.000$.)
