MICHIGAN DEPARTMENT OF NATURAL RESOURCES
Fisheries Division

Response to:

"Public Comment on MDNR Fish Division's proposal
to modify Trout Stream Regulations"

June 30, 2009

On June 12, 2009 the Michigan Department of Natural Resources (DNR) received a letter co-signed by six members of Fisheries Division's Coldwater Regulations Committee with comments on the Division's proposed changes for regulations governing trout and salmon fishing in inland streams of the State. Staff in Fisheries Division has prepared this response for each specific comment in the letter received to provide additional information for all Committee members in anticipation of further discussion and clarification at an upcoming meeting of the Committee.

As a general comment, the authors seem to imply that we are either not interested in, or possibly don't understand, the economic benefit of tourism and fishing to the State of Michigan. In fact, we are acutely aware of the economic hardship facing the State and the need to promote tourism. We are especially cognizant of the economic benefits and the quality of life derived from the State's fabulous natural resources in general, and from our aquatic resources specifically.

The authors suggest "*According to the Pure Michigan campaign, supported by public funds, for every dollar we spend promoting Michigan recreation the State receives three dollars back in tax revenue*". Although this may be true and is a positive for the State in general, we wish to point out that those tax dollars do not come to Fisheries Division to help with managing the State's vast aquatic resources. In fact, those who own gas stations, restaurants, hotels, etc., and thus benefit directly from tourism, do not pay anything in return to help with future management of the State's aquatic resources. This has always been the case in Michigan, even though some portion of the benefits these owners receive are generated explicitly because of the management of the State's aquatic resources by personnel in Fisheries Division. Given these realities and the tenuous nature of the budget for Fisheries Division over the past 10 years, we find it difficult to understand why the authors would suggest our conclusions are "*…unsupported speculation…*" simply because we based our conclusions on a sample of representative trout streams rather than a survey of every trout stream under the Type 2 category (or any category for that matter). Although the samples were chosen for good reason, if the latter methodology is the standard to which management will be held in the future, then gridlock will always be the eventual outcome. The paradox is immutable!

Response: *Several different comments are being taken out of context here.*

The letter from June 12th does not imply that the Fisheries Division does not appreciate the economic hardship of MI. It states that we feel that more can be done with the management of our fisheries resources to aid the problem than is currently being done. The argument presented was that it might be possible to expand the recreation and tourism economy of MI by having a larger percentage of our trout streams under "quality or trophy" management – which we believe would be more likely to attract tourism.

The fisheries of MI are state resources managed under the Public Trust Doctrine, where they are managed for the greatest good of citizens present and in the future. As such, their management should be funded by all citizens of the state. However, despite this not being the case, they are still resources of the state, and could be used optimally to help benefit all citizens of the state (through nurturing their ability to support tourism and recreation).

The statement that conclusions are "unsupported speculation" refers specifically to the comment that the increase in larger trout and catch rates of larger trout on the Manistee River were PRIMARILY due to habitat improvements. No information or data was presented that shows the relative contribution of trout regulations or habitat improvements to the measured increase in larger trout. Without information or data that speaks to the relative weight of each of these factors – it is speculating to attribute it.

The June 12th letter was not suggesting that a census (a survey of all) of all Type 2 streams needed to be conducted to draw conclusions on the regulation's effectiveness. The comment was that information was not provided to address the representativeness of the sample of 7 streams that was chosen. Were they purely randomly chosen? Were the sizes of the streams selected in the sample representative of all the Type 2 streams (if randomly chosen, was a sample of 7 more or less than needed to assure representativeness)? What were the angler dynamics for each stream (few anglers, lots of anglers, predominant gear types used, harvest preferences, etc)? The sample of 7 streams might have been representative of all type 2 streams – we were just stating that insufficient information was provided for readers to conclude this and determine whether the results from the evaluation were applicable in other type 2 streams.

Comment I: **Inadequate evaluation of existing trout stream regulation framework provided**

When the trout stream category system was implemented in 2000, the least restrictive regulation was applied to streams classified under the Type 1 category. This single category comprised 84% of all waters designated as trout streams in the State. Regulations under the Types 2, 5, 6, and 7 categories were new, and were most often applied to reaches of inland trout streams isolated from the Great Lakes by barriers that blocked migration of fish upstream. The streams classified under the Type 2 category had higher minimum size limits on all species of trout than found in the Type 1 category, but no new gear restrictions. Presently about 600 miles of streams in Michigan are classified under the Type 2 category, which represents 88% of the total miles of trout streams currently classified under Types 2, 5, 6, and 7 combined. Most streams

designated as Types 5 or 7 were already managed under flies-only or no-kill regulations prior to 2000. With the exception of Johnson Creek, streams designated as Type 6 included only the Escanaba River and Duck Creek where artificial lures or flies and higher minimum size limits than found in the Type 1 category were already in effect prior to 2000.

Thus, the DNR focused most evaluation efforts on streams classified under the Type 2 category because this was clearly the most important regulation change that occurred in 2000. In our opinion there was little point in directing additional evaluation effort toward streams classified under the Types 5, 6, or 7 categories because no significant change in regulations occurred on these streams. In addition, no pre-regulation-change data were available for comparison to post-regulation-change data on many of the new streams that were added to the Types 5, 6, or 7 categories in 2000 (e.g., the Manistee River downstream of M-72).

Type 2 regulations were often applied on streams where habitat improvement work had been conducted in hopes that better protection of trout at improved sites would generate even more angling opportunity than stream improvement alone. Trout population data collected prior to 2000 to evaluate effects of stream improvement provided pre-regulation-change data useful for comparison to data collected after the Type 2 regulations went into effect. In the case of the Manistee River, the possible effects of the regulation change were confounded with possible effects of stream improvement and higher levels of natural reproduction. On some other streams both improved and unimproved sites were surveyed on the same streams and on others only unimproved sites were evaluated.

Response: *"Type 2 regulations were often applied on streams where habitat improvement work had been conducted in hopes that better protection of trout at improved sites would generate even more angling opportunity than stream improvement alone." This is a great justification for why the Manistee River might have been an informative site to include in the evaluation. The results from this evaluation seem to indicate though, that the prior hypothesis was correct – greater harvest regulation, in conjunction with stream improvement might have yielded greater results than achievable with either alone? But instead, the conclusion was drawn that the increased abundance of larger trout was primarily due to stream improvements – and there is no need for Type 2 on this section of river.*

Response: *We support and understand the need to prioritize the activities of the division with limited resources. We appreciate the explanation as to why Type 2 regulations were prioritized for evaluation. We also appreciate the additional information provided now on other regulations types. Our comments on the lack of evaluation on all types of regulations is tied to the larger needed to ensure that we use each type of different regulation effectively – since each unique type also contributes to the complexity of the regulation framework. Before and after evaluations are preferable. However, other questions arise. Type 1 regulations are the most widely used, and have been in place for a long time – what information is available to ensure they are the best for the*

majority of our streams? Are they best on small, rarely fished streams? Best for all types of streams? Is Type 4 regulation effective anywhere it is in place? Is Type 3 effective enough on the important tailwater fisheries that is worth the complexity to maintain it? The groups that wrote the June 12th letter are sincerely dedicated to helping ensure that our fisheries be optimally managed, and that the regulations are not overly complex. In our serious efforts to provide thoughtful and useful input to this end, we felt information on all of the regulation types was useful.

Although effects of the regulations implemented in 2000 on trout in streams classified in categories other than Type 2 were not discussed in DNR's recent proposal to modify Michigan's trout stream regulations, some information on evaluations can be provided for these other stream Types.

For example, streams classified in the Type 1 category were not specifically evaluated for two primary reasons. First, the regulations applied to streams classified under the Type 1 category were virtually identical to the statewide regulations in effect prior to 2000. The only substantive difference was a lower creel limit. Fisheries researchers and managers have known for over a half century that creel limits have no significant effect on angling mortality, except in cases where a majority of anglers catch their limit. In spite of the rhetoric to the contrary, these conditions do not exist in Michigan's inland trout streams that are subject to a 5-fish creel limit. Second, Fisheries Division's Streams Status and Trends Program was not implemented until 2002, so there was little pre-regulation-change population data available for assessing trends in Type 1 streams. Most survey activities prior to 2002 did not include population estimates.

Response: *Does the MDNR Fish Division possess data to illustrate the extent to which anglers achieve a creel limit, both of the 5 fish, and the 3 fish over 15"? What is the percentage of angler trips where a creel is achieved? What is the nature of harvest success? From creel survey data, can we tell the difference between someone who caught their limit and kept less voluntarily, and someone who just didn't catch (and keep) their limit? Is there a special report or some other resource for those considering these regulations to see the actual creel survey data for inland streams summarized?*

The best data set we have available for evaluating a trend in abundance of brown trout in a Type 1 stream is a 14-year series of annual population estimates conducted in a 1.4 mile reach of Gilchrist Creek. In this stretch of Gilchrist Creek, there was an upward trend in abundance of age-2-and older brown trout from 1995 to 2008. The increase in abundance of older and larger brown trout in Gilchrist Creek over time parallels a steady increase in reproduction of brown trout between 1998 and 2008. In other words, we observed that greater numbers of young-of-year trout subsequently produced greater numbers of large brown trout over the following years in Gilchrist Creek. This same phenomenon was also observed in the Manistee River at Cameron Bridge after this stretch was classified under the Type 2 category, yet in the case of Gilchrist Creek no regulation change had occurred.

Effects of regulations on streams classified under the Type 3 and Type 4 categories have been evaluated only for the Muskegon River using both electrofishing data and angler census. Although omitting this information from the proposal may have been an oversight, it had been extensively discussed in previous regional public meetings held specifically for reviewing and proposing changes to regulations on the Muskegon River. We do, however, include the major findings below:

- angler use, catch, and catch rates all declined under the more restrictive regulations for the Type 3 category;
- numbers of trout larger than 15 inches did not increase in the population or in the creel under more restrictive regulations for the Type 3 category; and
- high summer water temperatures limited survival of stocked trout such that more restrictive regulations did not result in the production of more large individuals.

Response: This is useful, but also highlights the need for more information on our regulations' effectiveness. For one of the Type 3 rivers, the regulation has appeared ineffective since warmer summer water temperatures seem to be the limiting factor. In the future, it would be important to know if this applies just for the Muskegon, or for other tailwaters listed under Type 3 regulations. In striving to keep regulations easy to understand, but flexible enough to allow optimal management of fisheries – this type of information may be critical. Additionally, no information appears to exist for type 4 regulation waters.

In the case of streams newly classified under the Type 5 category in 2000, only a stretch of the Manistee River was changed from statewide regulations to the Type 5 category. In this sole instance, the effect was not evaluated because pre-regulation change data suitable for before-and-after comparisons were not available for this stretch of the Manistee River.

The majority of stream miles (30 of 51 miles) classified under the Type 5 category in 2000 were located on the North and South branches of the Au Sable River. These reaches were previously regulated under flies-only rules with a 10-inch minimum size limit for brown trout and an 8-inch minimum size limit for brook trout. In addition, angler census data indicate that a majority of contemporary anglers fishing these waters voluntarily release trout that could be legally kept. We believe that any evaluation of populations in these streams after 2000 would not be reflective of what might happen if a stream where more liberal statewide regulations were in effect before 2000 was classified under the Type 5 category. However, long-term data collected on the Au Sable River system can be used to demonstrate the relative importance of regulations and habitat conditions in shaping the size structure of trout populations.

Response: Why would these streams not be reflective of other places? Does the Division believe that the rate of voluntary catch and release that occurs on these streams is not found elsewhere? Does creel survey data, or angler survey data exist, to characterize the harvest preferences of anglers across different regions of the state? This type of information would be fundamentally important to these discussions. A

recent Masters Degree research presentation at MSU, on the 2008 MI Angler Survey, incidcated that most people river fishing in MI identified themselves as primarily catch & Release practioners. 42% of all non-resident fishermen identified themselves as primarily catch & release; as did 32% of resident MI anglers (the two other categories were "primarily catch & Keep", and "keep some and release some").

The DNR has made large investments in habitat improvement work on the Au Sable River beginning about 75 years ago. Some of the first artificial cover structures constructed in Michigan were placed into the North Branch of the Au Sable River in the 1930s. A large amount of habitat work was also done on multiple branches of the Au Sable River in past decades, particularly in the 1950s, 1970s, and 1990s. More recently Fisheries Division has invested most of a $2,000,000 commitment to fund $200,000 of habitat rehabilitation work per year for 10 years on the upper Au Sable River watershed. This recent work was undertaken in large part because trout population levels in the upper watershed had declined steadily from the peak levels observed in the 1960s and 1970s, reaching a deep trough in the 1990s. In the North and South branches these declines occurred during a time when angling regulations did not change. On the mainstream of the Au Sable River a variety of regulations were tested, but none of them halted the downward trend.

Fall population estimates for the North Branch of the Au Sable have been made during many years from 1957 to the present time. The section of river containing the DNR's present day population index station at Dam 4 has been subject to flies-only regulations for the entire period for which population data are available. Minimum size limits for both brown trout and brook trout were 9 inches from 1957 through 1967, 10 inches for brown trout and 8 inches for brook trout from 1968 through 1999, and 15 inches for brown trout and 10 inches for brook trout since 2000. Creel limits were 5 or fewer fish throughout the entire period. Fifty years ago, large numbers of trout were harvested from this stretch of the North Branch of the Au Sable compared to more recent times.

Between 1961 and 1967 anglers harvested an average of 8,767 trout per year between the Sheep Ranch and Kellogg Bridge, and in 1976 they harvested 3,030 trout in the same reach (Alexander et al. 1979). Angler harvest was much lower from 1985-90 when total numbers of trout harvested between the Ranch and Kellogg Bridge fell to an average of 1,354 per year (Clark and Alexander 1992). Voluntary release rates of legal-sized fish caught from the North Branch increased steadily from 40% in 1976 to nearly 80% in 1990 (Clark and Alexander 1992). It is certain that this trend toward higher levels of voluntary release continued beyond 1990. Declining levels of angler harvest did not stem the decline in abundance of larger brown trout as is shown in Figure 1.

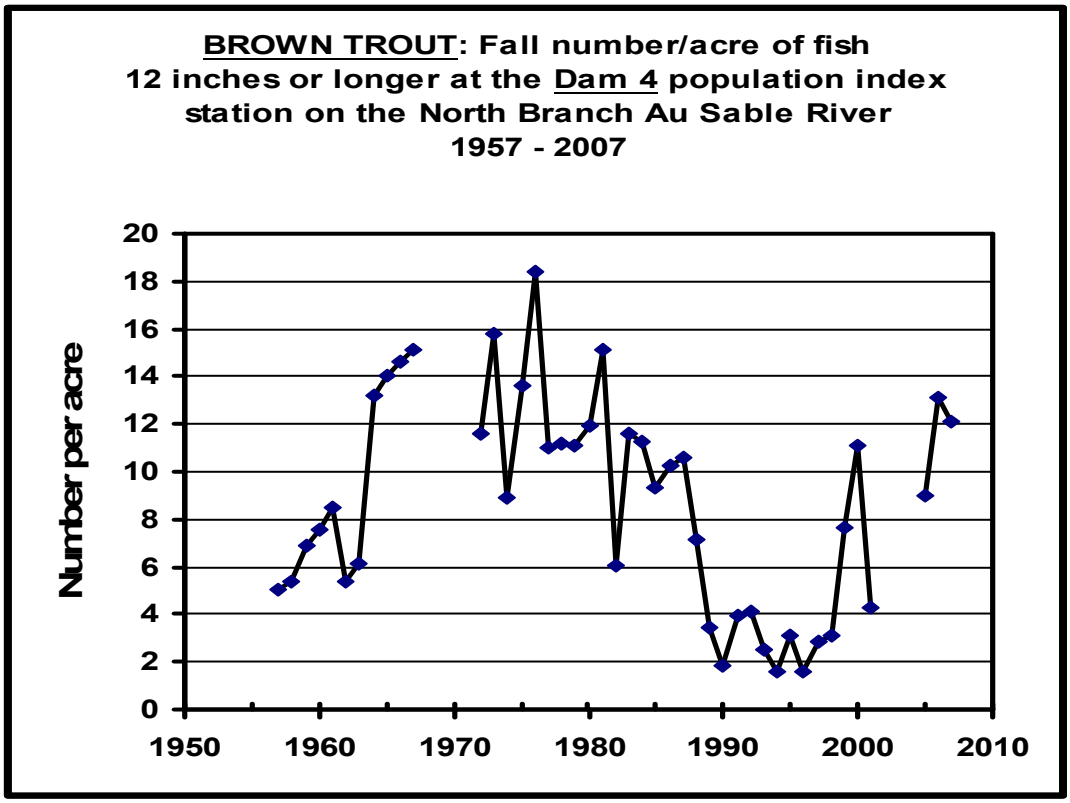

Figure 1 – Abundance of brown trout at the North Branch Au Sable River population index station at Dam 4.

In recent years vast quantities of large woody debris (LWD) in the form of whole trees, as well as constructed cover, have been added to the North Branch. Reproduction levels for brown trout were also higher in the late 1990s and early 2000s. These stronger year classes carried forward to produce more large brown trout, which also presumably took advantage of the better fish cover that was available. These two reasons are the best explanations for recent increases in abundance of larger trout. During 1961-67 when many trout were harvested, anglers cropped only 4% of the annual production of brook trout and 15% of the annual production of brown trout in the waters governed by special regulations (Alexander and Ryckman 1976). Angler harvest had only minor effects on the population in the past and has negligible effect on the population today.

Figure 1 clearly illustrates that highest abundance levels occurred when harvest was most intense and regulations were more liberal. The point to take home here is that natural mortality rates are high in the North Branch and fishing mortality is negligible.

Response: *This is very informative and appreciated. One additional point for consideration however, is the ability of the population to respond positively and rebound from low densities. While the lowered harvest of mature trout was not strong enough of an influence to stave off a decline, the high rates of voluntary catch & release and*

lowered harvest of mature fish, might have allowed the population to respond to habitat improvements and beneficial environmental fluctuations more rapidly. If harvest rates were still elevated and legal – would the population be able to recover from unavoidable downturns as quickly? The speed at which the population of existing mature fish can reproduce and recover from low numbers is significant to anglers experiencing the downturns, and to local communities that might experience lower contributions from tourism due to the lower populations of stream trout. Regulations for harvest are likely not the most influential factor controlling our stream trout fisheries, but it may still play important biological roles in some instances.

Regulations on streams classified under the Type 6 category were not evaluated due to a lack of data before and after the regulation change was implemented in 2000. Only three streams are presently in this category. Almost no trout stocked into Johnson Creek in Wayne County survive beyond the summer of the year they are stocked, so there was no point in evaluating regulations for the Type 6 category on this creek since the trout die before growing to 12 inches. In the cases of Duck Creek and the Escanaba River, pre-regulation-change data were not adequate for evaluating the effects of Type 6 regulations.

Response: *The information for why these streams were not suitable for evaluation is good. However, in striving to reduce regulation types that are not worth the complexity, it might have been possible for the state to place one or more other stream reaches into this category specifically to evaluate the regulation's ability to effect change on some streams (aka – on an experimental basis). Regardless, the division's proposal for eliminating types 5,6, and 7 in lieu for a Gear-Restricted category should prevent the need for this. In the future though, we may need to evaluate whether streams like Johnson's Creek or Duck Creek should be listed under Type 6 or any other gear-restricted category. Good information will be needed to defend a change in classification (perhaps particularly so for Johnson's Creek). So, even if good "before-after" data is not possible, good data on the nature of those fisheries, and the angler dynamics surrounding their use, will be needed to understand the effectiveness of the regulation use.*

Regulations for streams classified under the Type 7 category were not evaluated because no streams that had more liberal regulations prior to 2000 were placed into this category after the new regulations were implemented[1]. However, a long-term data set at Stephan Bridge on the mainstream of the Au Sable River can be used to illustrate how a variety of regulations failed to stem declines in populations of brown trout in the face of changing habitat (Figure 2). The mainstream of the Au Sable River has been fished under a flies-only regulation since 1955. From 1955-72 the minimum size limit for brown trout was 10 inches. The minimum size limit was 12 inches from 1973-78. A harvest slot limit was in effect from 1979-88. Slot regulations allowed the harvest of

[1]The only new stream added to the Type 7 category after 2000 was a section of the Pere Marquette River from M-37 to Gleason's Landing. The regulations on this stretch prior to its classification under the Type 7 category were: open all year; artificial flies only; minimum size limit of 16 inches for trout and salmon; possession limit was 1 trout or salmon per day; and catch-and-release of brown trout from October 1 to the last Friday in April.

trout 8.0 to 11.9 inches, no kill of trout 12.0 to 15.9 inches, and the harvest of one individual 16.0 inches or longer.

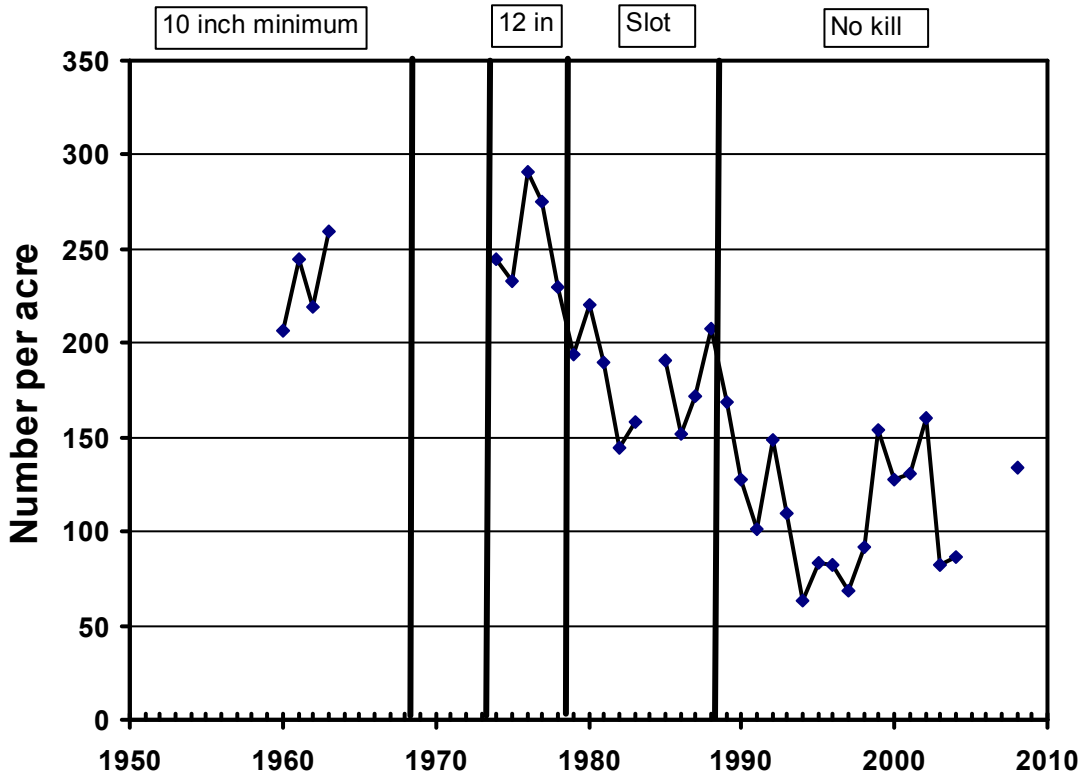

Figure 2 – Number of 8.0- to 11.9-inch brown trout per acre in the mainstream of the Au Sable River at the Stephan Bridge population index station from 1960-2008.

Managers and researchers at the time wanted to test the hypothesis that thinning the population of intermediate-sized trout might improve growth rates so that trout would grow more rapidly beyond 12 inches. During the days of sewage enrichment, trout grew very rapidly in the mainstream of the Au Sable River, but after discharges ceased growth declined such that 3-year-old brown trout that used to average nearly 14 inches in length by fall now fell short of 12 inches in length. Growth rates in the North and South branches were now faster than in the mainstream, instead of slower as in the past. However, the slot limit was ineffective at increasing growth rates, and was in fact less effective than the 12-inch minimum size limit (Clark and Alexander 1985).

Response: Since the Pere Marquette offered the only Type 7 stream that was under a different regulation prior to 2000, it seems like it would have been highly informative to prioritize evaluating it. If sufficient data did not exist, perhaps again, it might have been a worthwhile project for the Fisheries Research unit to prioritize the evaluation of an "experimental regulation" where a new Type 1 water could be managed under Type 7 regulations (or type 6 or 5, or others) specifically to learn about the effectiveness and appropriateness of the regulations classes.

Response: *The study conducted on the effectiveness of harvest slot limits was conducted during a period of rapid decline in trout on the river. As mentioned previously, the lack of nutrient enrichment, and other environmental variables are often over-powering of harvest regulations. It seems like the harvest slot limits, or any other regulation of harvest would have likely been unsuccessful at staving off the strong trend during that time period. If a more stable fishery were assessed, or perhaps more accentuated bounds for a slot limit– slot limits may be found effective.*

The lowest abundance of intermediate-sized brown trout in nearly 50 years was observed during the middle 1990s when the mainstream of the Au Sable River was managed under no-kill regulations. This extensive data set from the mainstream of the Au Sable River clearly illustrates that changes in habitat features, such as nutrient levels, quantity of large woody debris, weather, flow regime, etc., are far more powerful than fishing regulations in shaping the size structure of trout populations. Indeed, data collected for trout populations from around the state have revealed that temporal rises and declines in abundance of trout were synchronous across many streams in Michigan. One such example is the high level of synchrony in abundance of age-2 brown trout in the Pere Marquette River at Zimmy's and the mainstream of the Au Sable River at Thendara Road, as shown in Figure 3 from Zorn and Nuhfer (2007). Influences of spring stream-discharge patterns on reproductive levels of trout appeared to be the primary cause.

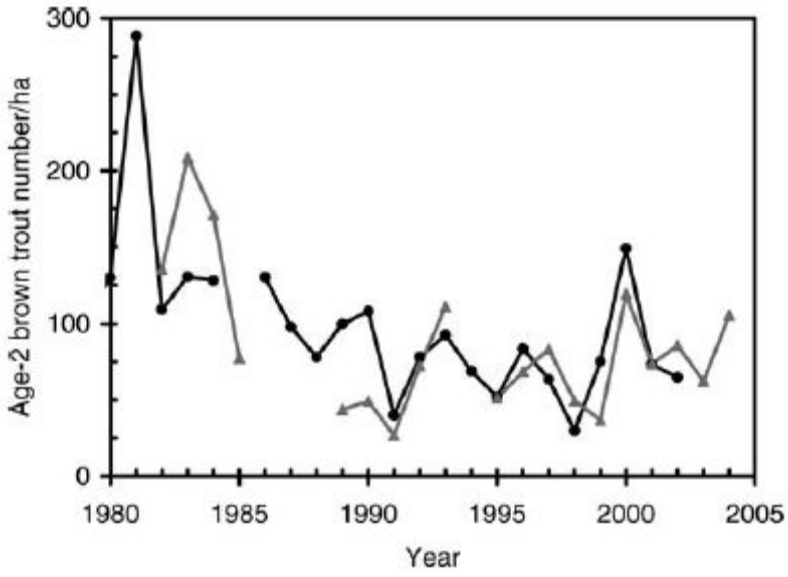

FIGURE 3.—Age-2 brown trout density over time at sites 140 km apart on two Michigan rivers, the main-stem Au Sable (black circles) and Pere Marquette (gray triangles).

Habitat improvement work and probably some help from the weather do appear to have improved contemporary populations of brown trout over 12 inches in the mainstream of

the Au Sable River. For example, at Stephan Bridge where no-kill regulations have been in effect since 1989, abundance of trout larger than 12 inches was significantly higher after 2000 than from 1989-1999 as shown in Figure 4. Virtually all of the trout over 12 inches depicted in Figure 4 are brown trout.

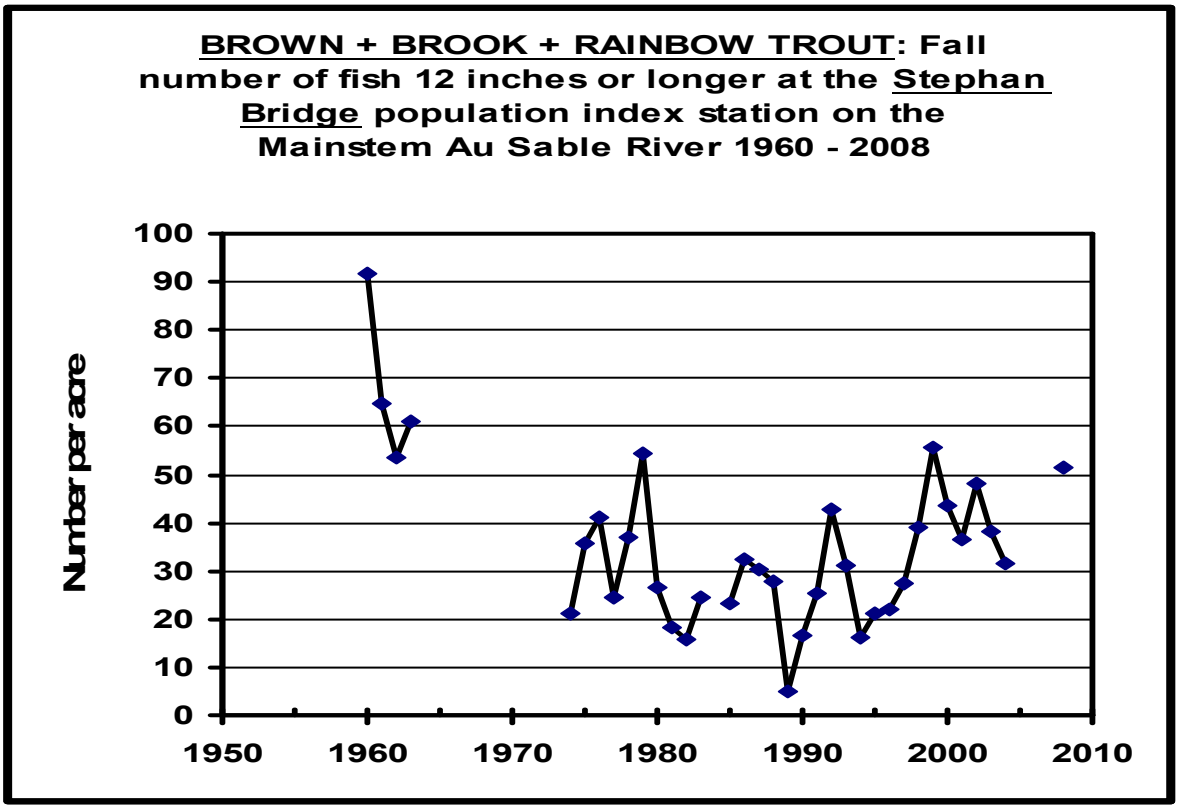

Figure 4 – Abundance of brown, brook, and rainbow trout in the mainstream of the Au Sable River at the Stephan Bridge population index station.

Comment II: **All types of size restrictions considered**

DNR did consider more than just minimum size limits. The proposal, however, did not include maximum size limits or slot size limits because our experience and knowledge indicate that they are less effective than minimum size limits for producing large trout. For example, the harvest slot limit applied to the Holy Waters of the mainstream of the Au Sable River from 1979-1988 yielded fewer brown trout over 12 inches in the population than the minimum size limit of 12 inches that was in effect during 1973-1978 (Clark and Alexander 1985, 1992). Maximum size limits do not protect fish unless they survive long enough to grow to the size limit. Few brown trout in Michigan streams live beyond age 4, yet most do not grow to be 18 inches until they reach 5 years of age. Thus, these regulations would protect from harvest only that small percentage of individuals that grow to a large size, whereas minimum size limits protect most of the trout smaller than the minimum size for harvest.

Response: *The study conducted on the effectiveness of harvest slot limits was conducted during a period of rapid decline in trout on the river. As mentioned previously, the lack of nutrient enrichment, and other environmental variables are often over-powering of harvest regulations. The harvest slot limits, or any other regulation of harvest would have likely been unsuccessful at staving off the strong trend during that time period. If a more stable fishery were assessed, or perhaps more accentuated bounds for a slot limit this tool might be found effective.*

In the data period for the mainstream Au Sable, from the cited study, the minimum size length restriction of 12" in effect in 1973-1978 was likely to have "yielded" more trout than the slot limit from 1979-1988, simply because there were many more trout present during that time period. The time period in which this study was conducted (and the unknown cause for the drastic declines in fish density during the study) just doesn't allow for a closed discussion of slot limits.

Maximum lengths indeed only work where trout grow larger enough, fast enough, and live long enough. But this situation does occur in Michigan. While the number of large brown trout (15" and up) are relatively small compared to the number of trout less than 15", it does not mean that this number is insignificant biologically or to anglers. Similar to white-tailed deer, few bucks live to 2.5 years of age or older. However, the presence and abundance of this small set of deer is profoundly important to the people experiencing it, that desire a trophy experience, or desire to attract the type of tourism to MI that Iowa or Kansas receives. Similar to that, there are streams in MI that can grow big trout, and whether they are at 1 fish per acre or 10 fish per acre is significant (even if this is still just 5% of the trout in the stream). We do not possess the data to specifically propose or defend slot limits or maximum lengths for any particular rivers. We trust our fish division biologists to do this for us. Our comments were meant to solicit the justification for why they were not being considered. It still seems like it should be an open topic for consideration.

Comment III: **Size limits for brook and brown trout in Type 1 streams**

It is true that brown trout mature at older ages and larger sizes than brook trout. Brown trout are much harder to catch than brook trout, however, and hence even if it is permissible to harvest them at 8 inches before they mature, the fact is that plenty of them escape angling mortality at small sizes and grow to maturity.

Response: *We understand this to be anectodotally true. However, our fisheries are managed with sound science, and we were not provided with any real data to support the statements that lower catch rates of browns will offset the lower length to harvest – prior to maturity. Our own groups can provide rhetoric about the catchability of browns versus brook trout. However, we did not want to formulate management recommendations based on causal observations. The logic presented for minimum length of brook trout appeared reasonable. We proposed that it be applied to brown trout as well. If that same logic means that brown trout minimum lengths should be*

12.9", exactly how much should this be lowered to adjust for the "lower catchability of brown trout"? We suggested a 12" minimum. If the division proposes 8" as adequate, we want to have this informed by quantitative data. This minimum is set to ensure we reach our primary objective of having sustainable populations of trout. To develop confidence in a minimum length that deviates from the 12.9" as start point, more information would need to be provided (to meet the benchmark of sound science).

Figures 5 and 6 show that some of the highest stocks of brown trout in Michigan are currently found in streams managed under an 8-inch minimum size limit, as has been proposed statewide for the Type 1 category. These data were collected under the Division's Stream Status and Trends Program from sites throughout Michigan that were surveyed during late summer after the majority of angling had occurred. In most cases, the abundance levels for trout shown in the graphs are the average of 3 or more population estimates made since 2002. Note that some streams with a very low abundance of brown trout are occupied primarily by brook trout, including Bear Creek, the North Branch of the Manistee River, the Black River, and the West Branch of the Maple River.

These figures also show that some rivers managed under restrictive regulations, including the North and South branches of the Au Sable River have middle-of-the-road standing stocks of brown trout. In the case of the shallow North Branch of the Au Sable River, high rates of natural mortality are the primary hurdle that limits production of more big brown trout. In the South Branch, reproduction levels are a primary factor limiting production of more big browns. If you view the graphics of trends for the Au Sable River on the Hunt Creek Research Station Web Page (http://www.michigan.gov/dnr/0,1607,7-153-10364_52259_10951_11302-114740--,00.html) depicting abundance of brown trout 12 inches and longer, note that the highest abundance levels for all 3 branches occurred during times when minimum size limits were generally 10 inches on the North and South branches and during a period when voluntary release of legal-sized fish was much lower than it is today.

Response: *refer to previous data and statements that mentioned that abundance was higher and that no regulations had an effect in staving off the decline. Therefore it is concluded that the regulations before and after the decline had nothing to do with the decline itself, which goes against the arguments presented above.*

Large investments in habitat work by the DNR and a multitude of private groups appear to have fostered better survival and retention of large brown trout in the upper Au Sable River. Recently, abundance of 12-inch and larger brown trout has been high in all three branches of the Au Sable River. In our opinion this is most likely a result of a combination of habitat improvement work and, in some cases, increases in reproduction. Angling mortality on these branches has been low for many years. While regulations are important and generate much discussion and excitement, keep in mind that habitat conditions are a very critical factor. If this was not true, we would not have so many contemporary brown trout streams managed under an 8-inch minimum size

limit with outstanding stocks of brown trout. Harvest of immature brown trout by anglers did not prevent this achievement.

Perhaps the proposed 8-inch minimum size limit is not the "best" for streams classified under the Type 1 category. Other minimum size limits were discussed internally and could certainly be considered for non-biological reasons. Recognize, however, that a 12-inch minimum size limit would severely limit the numbers of harvestable-sized brown trout in small, cold streams classified under the Type 1 category. For example, in Gilchrist Creek the average length of a 3-year old brown trout around the end of August is 10.5 inches. There were an average of 44 brown trout over 12 inches in a 1.4 mile reach of Gilchrist Creek where DNR estimated populations annually from 1995-2008. By contrast, there was an average of 432 brown trout over 8 inches in the same stream section. This is a 10-fold difference in the number of harvestable-sized brown trout.

Response: *In the published document entitled 'Field Performance of One Wild and Two Domestic Brown Trout Strains in Seven Michigan Rivers' (2005), Todd C. Wills states "GC (Gilchrist Creek) brown trout appear better suited to stocking into streams with minimum size limits >10 inches because they survive better to old ages, grow faster, and consequently are more likely to reproduce, whereas WR (Wild Rose) fish may better suited to streams with 8-inch minimum size limits where most of the angler harvest occurs during the year they are stocked." This seems to indicate that while the Gilchrist Creek brown trout are "okay" with 8" in their natal creek, where they are stocked elsewhere, our studies show they will do best with a 10" minimum.*

Even though Gilchrist Creek has been classified under the Type 1 category since 2000 with a minimum size limit of 8 inches for harvest of brown trout, the creek has continued to maintain a standing stock of brown trout second only to the Au Sable River at Stephan Bridge among streams sampled for the Status and Trends Program in the Northern Lake Huron Management Unit (Figure 5). In addition, the average fall density of young-of-year brown trout in a 1.4 mile reach of Gilchrist Creek has averaged over 1,000 per acre since 2000, as compared to 700 per acre at Stephan Bridge on the mainstream of the Au Sable River, and 390 per acre at Dam 4 on the North Branch of the Au Sable River. It is apparent from these data that harvest by anglers under the existing 8-inch minimum size limit has not impaired natural reproduction by brown trout in Gilchrist Creek.

Response: *We were not proposing that brown trout would universally become unsustainable with an 8" minimum length. Rather, this lower limit does not ensure sustainability. It makes a population become determined by localized angler dynamics (number of anglers, pressure, gear and hooking mortality, harvest preferences, rates of voluntary catch and release, etc.). For most of the smaller streams listed under Type 1 regulations, most could likely not receive intensive harvest pressure or hooking mortality – due to a lack of fishing on them. Because of this, 8" minimum will still allow most of the trout to go from 8" to 12.9" and reproduce once (averages used for illustration),*

resulting in good densities and sustainability. However, if a stream under Type 1 regulations does receive localized pressure and hooking mortality and harvest pressure is significant enough, the 8" legal minimum would not be protective enough of spawning stock. Whether 8", 10", or 12" is sufficient to ensure sustainable stocks comes down to local angler dynamics. Without an ability to canvas the state with creel surveys, we do not know with certainty which streams or regions might need more or less protection from harvest. We do not expect the division to have the ample resources to necessarily achieve this level of understanding of angler dynamics. This is however the variable that determines whether a harvest regulation is biologically effective, improves or protects fisheries effectively. In the absence of this information, we proposed that brown trout be allowed to spawn once to ensure sustainable stocks (listed as the primary objective of regulations in the original proposal). This was derived simply by applying the same logic presented for brook trout. Given additional data, our confidence in certain regulations would likely change.

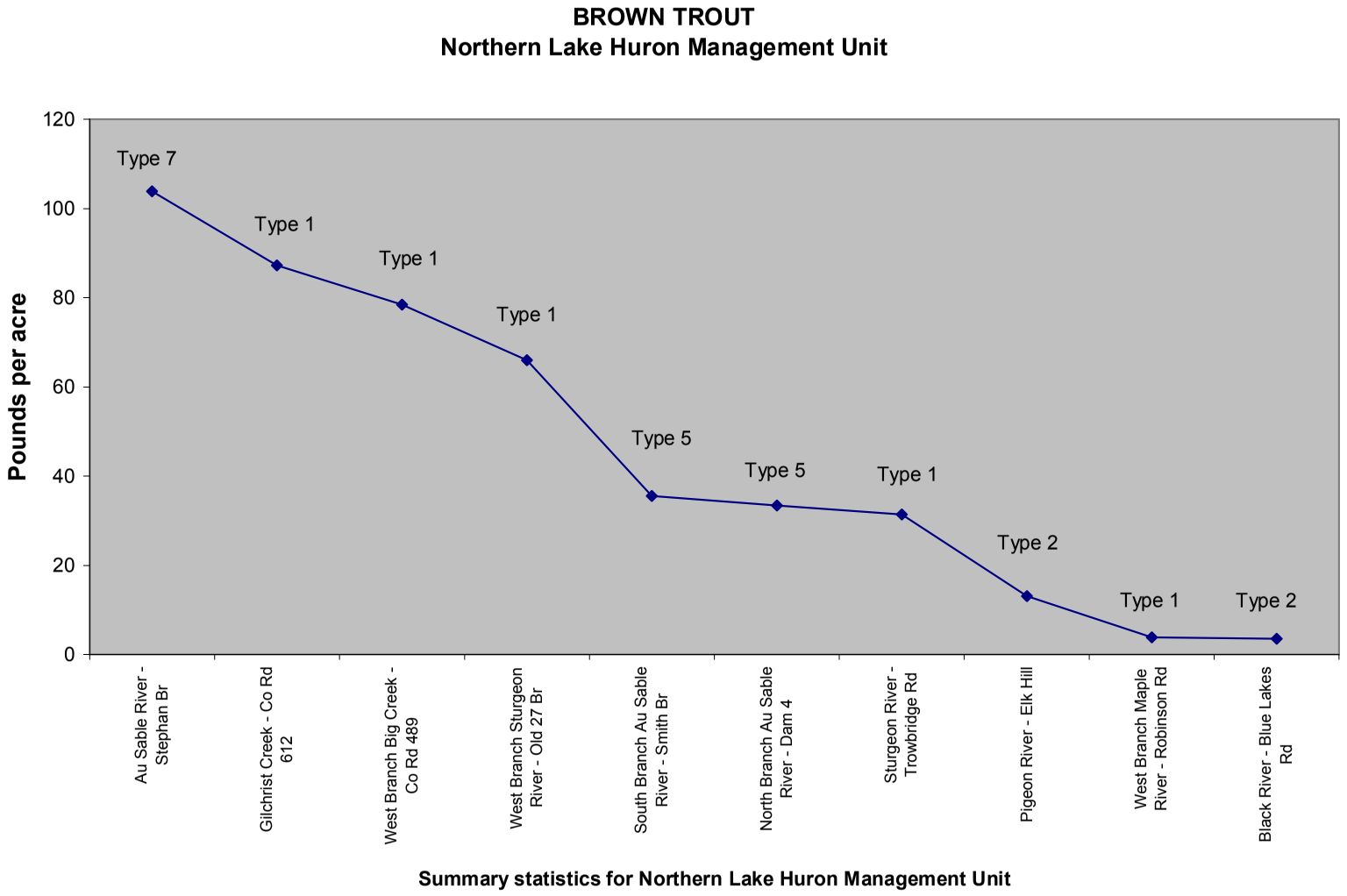

Figure 5 – Pounds per acre of brown trout at population index stations in the Northern Lake Huron Management Unit surveyed under the Division's Streams Status and Trends Program.

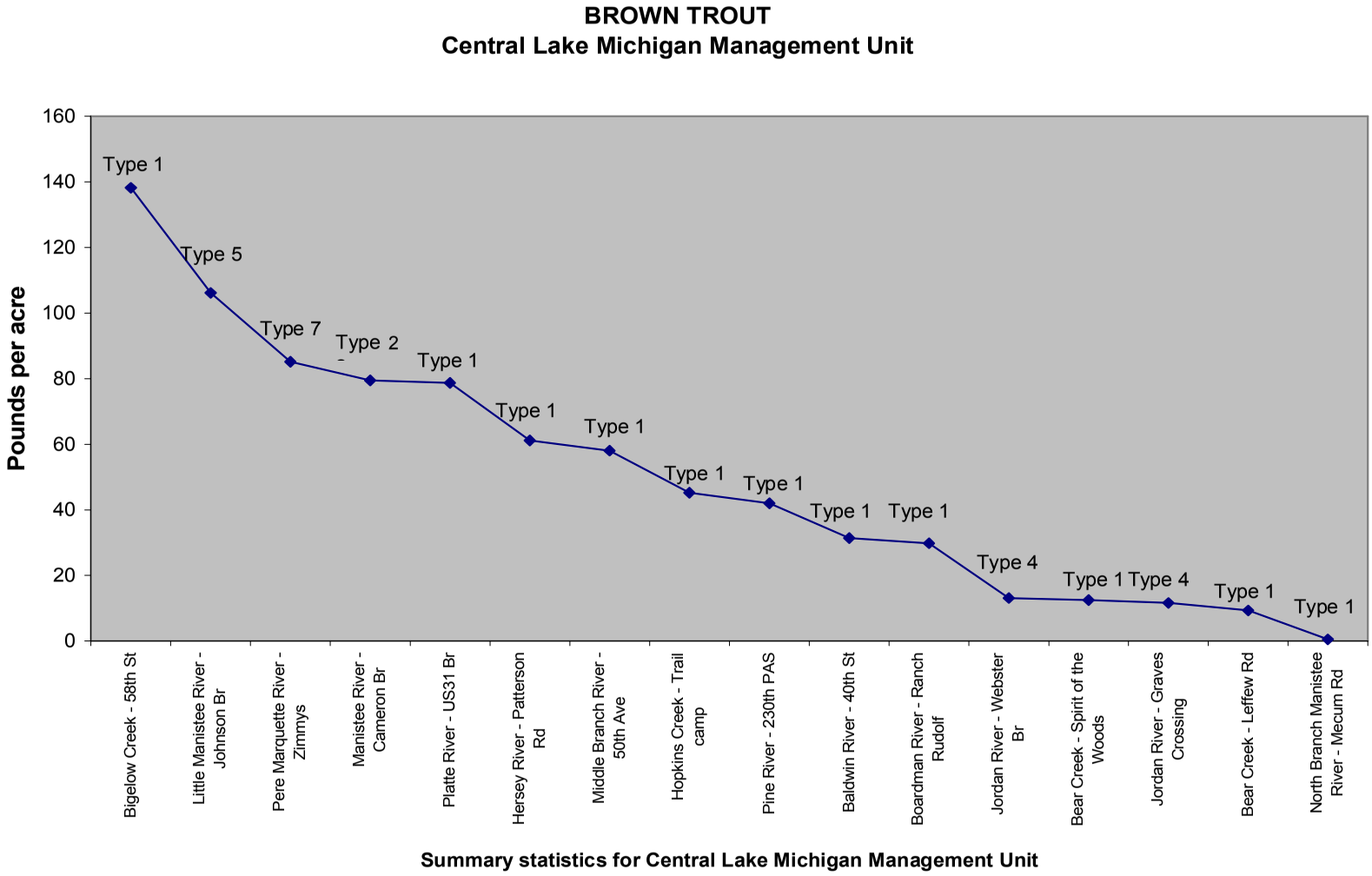

Figure 6 – Pounds per acre of brown trout at population index stations in the Central Lake Michigan Management Unit surveyed under the Division's Streams Status and Trends Program.

Comment IV: **Elimination of Existing Type 2 Regulations**

Ideally, a long-term study spanning a period of about 10 years would have been designed to evaluate the effects of imposing regulations for the Type 2 category on trout streams. Study stream segments would have included sites with and without stream improvement. Data would have been collected for 5 years before and 5 years after the change. Reference streams where regulations were not changed would have been surveyed for 10 years in a row, and angler surveys would have been conducted so that natural and angling mortality rates could be partitioned. This was the research approach the DNR was able to use in the past to evaluate experimental regulations for trout on rivers such as the Au Sable and Pigeon. We must also point out that at those times, however, more resources were available and allocated to evaluate the health of trout populations in inland lakes and streams.

The reality today is that such a long-term study would have cost well over one million dollars and was simply not feasible with the dollars and manpower available to Fisheries Division to manage all of the State's aquatic resources. The only affordable option was to use pre-existing data sets, which were almost all population abundance data collected late in the summer. In most cases, the population data were collected to help evaluate the effectiveness of habitat improvement work. The only angler census data available were from a volunteer angler survey on the Manistee River. These data did show that catch rates for the volunteers were higher in the reach of river classified under a Type 2 category. Yet, because total angling effort was not measured, it is not possible to determine whether more or fewer anglers used the river section after regulations became more restrictive in 2000.

Response: *In times of decreased financial resources, one can continue to do the same quantity of items with less quality, or it can prioritize items based on importance, and do less quantity while maintaining high quality. These are decisions for leadership to consider.*

A million dollar survey conducted over the 10 years or so since regulations were changed, would amount to about $100,000 per year. The annual budget for assessment and monitoring in the Fish Division is roughly $8 million per year. The budgets for Hunt Creek, IFR, and the statewide creel survey program combined are in the neighborhood of $3 million per year. Allocation of $100,000 annually for the sake of understanding statewide inland stream regulations could have been feasible if it met prioritization levels exceeding other activities. If budgets annually do go towards several research facilities and staff, and creel survey programs – where does inland trout and salmon producing streams fit in priority amongst other resources and research endeavors?

We understand the diminishing resources available to the division. We have supported efforts to expand this, and will do so again in the future. For now however, prioritization of the available resources is needed. Inland trout and salmon streams, and the fisheries they support (including the wild fisheries in the Great Lakes) are certainly important to the division. Is understanding the effectiveness of regulations a first level

budget cut that was already made (during the last 10 years when this evaluation did not occur)?

No angler census was conducted on the Iron River where populations of 7.0- to 9.9-inch brook trout doubled under Type 2 regulations. Many anglers complained, however, that they could not catch many legal-sized fish and few expressed satisfaction with the new regulation. As a result of angler dissatisfaction on the Iron River and on other streams, fisheries managers in the Upper Peninsula had already reclassified the Iron River, the Fence River, and the East Branch of the Fox River from the Type 2 category to the Type 1 category before the current proposal was even developed.

Response*: In the absence of an angler survey, this seems justifiable. However: 1) the regulation appeared to be effective, so in essence the decision to transfer them to Type 1 was made based on informal social input. Stakeholders communicated that they had different objectives for the fishery than more big fish. So the decision was made, despite the biological effectiveness of the regulation. This highlights the need for a consistent and transparent standard for making regulation decisions based on social input. Many feel that when the division is asked to alter a fishery based on social desire for larger fish – that the input is not given ample consideration. Here in the case of the Iron River – informal social input advocating for more harvest opportunity was all that was needed, despite biological data.*
2) In the absence of formal angler survey techniques, taking social input is prone to bias. We lack the ability to confidently know whether a small but vocal group of anglers, in this case on the Iron River, were the only ones that wanted the fishery back to high harvest opportunities. They may not have represented the full population of anglers on that stream. Just a caution for how we need more consistent standards for handling social input.

The assertion by the authors that DNR is engaging in unwarranted speculation by stating that habitat improvements contributed, at least in part, to increases in the abundance of larger brown trout in Silver Creek and the Manistee River, both of which have stretches that are currently classified under the Type 2 category, is itself unwarranted. The authors have either ignored or discounted data that do not support the notion that more restrictive regulations will result in more large trout. For example, Spring Brook and Brandywine Creek are two creeks in southwest Michigan that are currently classified under the Type 2 category and both are on par with Silver Creek. Yet both Spring Brook (statistical significance of 95%) and Brandywine Creek (statistical significance of 94%),had abundances of trout that were higher when these streams were previously classified under the Type 1 category. That being true, what logic leads one to a conclusion that regulations were responsible for an increase in abundance of intermediate-sized brown trout in Silver Creek? There is none because no such change occurred in abundance of brown trout at the unimproved site in Silver Creek, while the population of brown trout increased at the improved site. This was observed even though the same regulation governed fishing for brown trout at both sites.

A more careful reading of the analysis for the Manistee River clearly shows that the DNR did not state that regulations had no effect, and did in fact point out that factors well known to influence subsequent abundance of larger trout were involved such as increased levels of natural reproduction.

> *"… the increase in abundance of larger brown trout cannot be fully attributed to the regulation change. Extensive habitat improvement work has been conducted on the Manistee River over the past 3 decades. The naturally reproduced brown trout juveniles that produced more big brown trout after the regulations change in 2000 were nearly twice as abundant as they were during the late 1980s and early to middle 1990s. In other words, higher levels of natural reproduction produced greater numbers of large brown trout over the following years. We believe that improved reproduction achieved by controlling excess sediment and additions of LWD were primarily responsible for increased abundance of large brown trout in the Manistee River, although the more restrictive regulations may have contributed to the increase."*

Response: "We believe that improved reproduction achieved by controlling excess sediment and additions of LWD were primarily responsible for increased abundance of large brown trout in the Manistee River, although the more restrictive regulations may have contributed to the increase." The part of this statement that is speculation is where the DNR states that habitat improvements were primarily responsible. As mentioned earlier, no information or data was provided to indicate the relative weight of contributions from regulations versus habitat improvements. Increased natural reproduction could have been equally from habitat improvements and greater protection of fish (to make more spawners). The point is, while these statements could be true, the evaluation was not designed to be able to make the statement that habitat improvements were primarily responsible (no information was even given on the nature of habitat improvements that did occur there and when they occurred).

Finally, control of excess sediment has been shown to improve habitat for reproduction and, therefore, the success of reproduction. We leave this discussion with a single, rhetorical question: if the authors believe that habitat protection or enhancement efforts are not important for improving trout populations, why then has so much time and money been spent on such efforts?

Response: *Fish Division seems to be relying on causal generalizations to make "black or white" statements. We understand that both habitat improvements and harvest regulations play a role in managing fisheries. We are also learning, through the work of many researchers, including many in the DNR, that habitat and more so, stochastic environmental factors largely determine the density of fish in our streams. However, we use regulations for biological and social reasons, because we do believe they also can influence the fisheries. This is not all or one, its about trying to fine tune our use of harvest regulations to benefit our fisheries, even if they are not as powerful as some uncontrollable weather patterns. The division has stated this question incorrectly "*if the authors believe that habitat protection or enhancement efforts are not important for improving trout populations*"... again we did not say they were unimportant. We stated*

that adequate data was not provided in the proposal to conclude that the habitat improvements, in the case of the Manistee River, were primarily responsible for larger trout.

Comment V: **The newly proposed Type 2 and 3 regulations (existing types 3 & 4)**

Some elements of this comment have already been addressed above. A short description of the evaluation of regulations for the Muskegon River when classified under the existing Types 3 and 4 categories is given in the response to Comment I. Minimum size limits have also been discussed relative to regulations for streams classified under the Type 1 category. The proposed regulations for streams classified under the new Type 3 category are popular and work well for certain tailwater fisheries on rivers that are stocked with trout. Examples include the Muskegon and Manistee rivers where stocked trout grow to exceed the minimum size limit during the year in which they are stocked, but few survive to grow to the larger size limits as suggested by the authors.

Response: *Fish division has not provided any data to allow readers to evaluate these causal statements. Example:* "they are popular and work well", *earlier tn this rebuttal, the division mentioned they were unpopular and did not work for the Muskegon, the only water for which an evaluation was presented.*

"Examples include the Muskegon and Manistee rivers where stocked trout grow to exceed the minimum size limit during the year in which they are stocked, but few survive to grow to the larger size limits as suggested by the authors." *Does this statement indicate that these regulations are only good on "put & take fisheries"? Need to qualify the statement "but few survive to grow to larger size limits". What is "few" what is larger? Are these amounts insignificant to sport fisheries?*

Comment VI: **New proposed gear restricted category**

We support moving forward with a review of both the streams that currently exist in the proposed Gear Restricted category, as well as those proposed for future inclusion in this category. At the same time, we disagree with the assertion that the criteria in Fisheries Order 213 (FO-213) are neither objective nor quantifiable. These statements not only ignore the biological and social parameters and benchmarks contained in the criteria, but also show a lack of historical perspective on the development of the criteria. The criteria established in FO-213 are the result of a collective effort between Fisheries Division and the Coldwater Regulations Committee over the course of several years. While the most recent effort to develop criteria began in earnest in the summer of 2002, the process to establish criteria for "Quality Trout Streams" actually started many years ago. Ideas generated by Committee members during those earlier meetings, and even prior to that during the development of the "Blue Ribbon Trout Streams" list, helped shape the existing Order. The Division accepted these comments and spent

considerable time discussing drafts of FO-213 at our October 2002 biologist meeting, during a subcommittee work group meeting in December 2002, and at our March 2003 biologist meeting. The Division then convened the Committee in the summer of 2003 for a final review, discussion, and agreement. The Coldwater Regulations Committee was not only instrumental in the development of the criteria; they also were in support of the final product. Furthermore, Trout Unlimited testified in strong support of FO-213 at the October 2003 NRC meeting.

The criteria contained in FO-213 clearly recognize, first and foremost, the importance of biological factors when considering streams for inclusion in the gear restricted category. Yet, the criteria are also structured to acknowledge the geographical, social, and political factors that can be important considerations before selecting or rejecting a given stream or reach. Overall the criteria provide us with a sound and defensible framework to use when making such decisions, and they offer excellent guidance in how to approach the selection process.

Response: *The authors mentioned the lack of objectivity in fisheries Order 213, to help prevent conflicts with different interpretations of it in the future. It was a suggestion meant to proactively prevent non-productive discussions. The Order does have many elements that are subjective. For example, are stocked fisheries pre-empted from gear –restricted status? Our repeated review does not identify this anywhere, but we have heard other interpretations that it does. Other examples include "Is natural mortality rate High" and "Is angling mortality low"? What is considered High? What is considered Low?*

Response: *The aforementioned stakeholders appreciate the additional information provided, and look forward to the opportunity to discuss these regulations further in our upcoming meeting. Thank you for consideration of our comments.*

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